

BOREHOLE CONSTRUCTION	SAMPLE		SOIL VAPOUR (ppm)	GROUNDWATER	DEPTH (m)	GEOLOGY	BOREHOLE NUMBER: MSMW79s&d		PAGE 1 of 1		
	NUMBER	TYPE					START DATE: 12/06/98	DRILLING METHOD: Cable Percussion/Rotary			
							FINISH DATE: 12/06/98	BOREHOLE DIAMETER: 200/115mm			
							DRILLER: CP3/R1	SCREEN TYPE & DIAMETER: UPVC 50mm			
							LOGGED BY: ED	APPR'D BY:	SCREEN SLOT SIZE: 0.5mm		
							DESCRIPTION		COMMENTS		
						0		Soft sandy brown CLAY with rootlets and occasional gravel (MADE GROUND)		Black staining and mild hydrocarbon odour	
						1.0		Soft dark grey CLAY with gravel and sand (MADE GROUND)		Black staining - moderate hydrocarbon odour	
						2.0		Stiff grey CLAY with rubble (MADE GROUND)		Black staining - Moderate hydrocarbon odour	
						3.0		Rotary drilling from 3.1 mbgl			
						4.0		ROCKHEAD: Hard blue-grey fine to medium grained SANDSTONE (BEDROCK)			
						5.0					
						6.0					
						7.0					
						8.0					
						9.0					
						10		Borehole terminated at 10 mbgl			

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 SOIL & GROUNDWATER INVESTIGATION Location LLANDARCY REFINERY Client BP LLANDARCY App'd DRAFT Ref. MC/CR/BRS Date JUL 98 Job No. 39991-001-401	
2. Cable Percussion to 3.1 mbgl, Rotary to 10 mbgl				DAMES & MOORE	

BOREHOLE CONSTRUCTION	SAMPLE		SOIL VAPOUR (ppm)	GROUNDWATER	DEPTH (m)	GEOLOGY	BOREHOLE NUMBER: MSMW81		PAGE 1 of 2		
	NUMBER	TYPE					START DATE: 26/06/98		DRILLING METHOD: Cable Percussion/Rotary		
							FINISH DATE: 29/06/98		BOREHOLE DIAMETER: 200/165/115mm		
						DRILLER: CP3/R2		SCREEN TYPE & DIAMETER: UPVC 50mm			
						LOGGED BY: ED		APPR'D BY:		SCREEN SLOT SIZE: 0.5mm	
						DESCRIPTION		COMMENTS			
						0	Loose brown sandy silty CLAY with rootlets (TOPSOIL)	No odour or staining	0		
						0.5	Firm silty brown CLAY with medium angular sandstone GRAVEL		0.5		
						1.0	Stiff silty brown CLAY with angular sandstone COBBLES with boulders		1.0		
						2.0	Rotary drilling from 2.1 mbgl		2.0		
						3.0	Firm to stiff light brown very gravelly CLAY with cobbles (BOULDER CLAY)		3.0		
						4.0	ROCKHEAD: Hard blue-grey medium grained SANDSTONE (BEDROCK)	No water encountered above bedrock	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. Cable Percussion to 2.1 mbgl, Rotary to 15.5 mbgl with odex to 4 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 App'd DRAFT Ref. MC/CR/BR5 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: MSMW81		PAGE 2 of 2		
	NUMBER	TYPE					START DATE: 26/06/98	DRILLING METHOD: Cable Percussion/Rotary	FINISH DATE: 29/06/98	BOREHOLE DIAMETER: 200/165/115mm	DRILLER: CP3/R2
							DESCRIPTION	COMMENTS			
						10	Hard blue-grey medium grained SANDSTONE		10		
						11			11		
						12			12		
						13			13		
						14			14		
						15	Borehole terminated at 15.5 mbgl		15		
						16			16		
						17			17		
						18			18		
						19			19		
						20			20		

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 SOIL & GROUNDWATER INVESTIGATION Location LLANDARCY REFINERY Client BP LLANDARCY App'd DRAFT Ref. MC/CR/BRS Date JUL 98 Job No. 39991-001-401	
2. Cable Percussion to 2.1 mbgl, Rotary to 15.5 mbgl with odex to 4 mbgl				 DAMES & MOORE	

BOREHOLE CONSTRUCTION	SAMPLE		SOIL VAPOUR (ppm)	GROUNDWATER	DEPTH (m)	GEOLOGY	BOREHOLE NUMBER: MSMW092		PAGE 1 of 1		
	NUMBER	TYPE					START DATE: 3/03/99		DRILLING METHOD: Window Sampling		
							FINISH DATE: 3/03/99		BOREHOLE DIAMETER: 100 mm		
						DRILLER: GEOTECHNICAL		SCREEN TYPE & DIAMETER: UPVC 50 mm			
						LOGGED BY: JC/SG		APPR'D BY:		SCREEN SLOT SIZE: 1 mm	
						DESCRIPTION		COMMENTS			
						0		Loose to medium dense orange-brown gravelly CLAY with predominantly sandstone cobbles at 0.75m and 1.4m		Damp from ponded water. No odour.	
						0.5					
						1.0					
						1.5		Soft to firm brown silty CLAY		Wet at 1.6m	
						2.0		Soft orange/brown slightly gravelly sandy SILT			
						2.5					
						3.0		Medium dense grey coarse GRAVEL and sandstone cobbles			
						3.5					
						4.0					
						4.5					
						5.0					
						5.5					
						6.0					
						6.5					
						7.0					
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BOREHOLE CONSTRUCTION	SAMPLE		SOIL VAPOUR (ppm)	GROUNDWATER	DEPTH (m)	GEOLOGY	BOREHOLE NUMBER: MSTP243		PAGE 1 of 1	
	NUMBER	TYPE					START DATE: 22/2/99		DRILLING METHOD: Window Sampling	
							FINISH DATE: 22/2/99		BOREHOLE DIAMETER: 100 mm	
							DRILLER: GEOTECHNICAL		SCREEN TYPE & DIAMETER: UPVC 50 mm	
				LOGGED BY: SG		APPR'D BY:		SCREEN SLOT SIZE: 1 mm		
						DESCRIPTION	COMMENTS			
						Soft, orangey brown slightly sandy SILT with occasional sub-angular medium gravel and sand sized ash and brick fragments (MADE GROUND)	Damp	0		
						Soft, orangey brown, very clayey, slightly sandy SILT with occasional gravel		0.5		
						Soft grey/blue, slightly clayey sandy SILT with some gravel.	Slight hydrocarbon odour.	1.0		
						Soft, grey, clayey SILT occasional sub-angular medium gravel.	Damp	1.5		
						Soft grey/brown very sandy SILT with large gravel.	Intermittent visible hydrocarbon from 1.5m - 3m. Distinct layers at 2.5m, 2.9m	2.0		
						Borehole terminated 3.3m 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)

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/DS/BIR/LON**

Date **APRIL 99**

Job No. **39991-004-401**

DAMES & MOORE

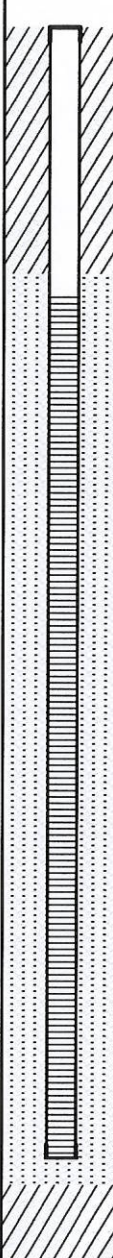
BOREHOLE CONSTRUCTION	SAMPLE		SOIL VAPOUR (ppm)	GROUNDWATER	DEPTH (m)	GEOLOGY	BOREHOLE NUMBER: NSMW001		PAGE 1 of 2	
	NUMBER	TYPE					DRILLING DATES: 21/11/2003-25/11/2003		DRILLING METHODS: Various	
							DRILLER: Soil Mechanics & Apex		BOREHOLE DIAMETER: 100-115mm	
							LOGGED BY: SS		SCREEN TYPE & DIAM: 50mm HDPE	
							CHECKED BY: SG		SCREEN SLOT SIZE: 1mm	
							DESCRIPTION	COMMENTS	S,V	
					0.0		Medium dense, dark brown, very sandy SILT with fractured cobbles and abundant rootlets in top 0.3m.	Damp. NVO		
					0.5		Becoming, medium dense, light brown, very silty SAND with frequent fractured cobbles and gravel.	Slight, patchy grey staining. No odour. Dry		
					1.0		Becoming yellow-brown from 1.0m.	Patchy grey staining, slight hydrocarbon odour. Dry		
					1.5		Poor recovery (condensed) due to SPT.	Thorough grey staining, moderate, light hydrocarbon odour		
					2.0		Dense, brown-grey (stained), slightly sandy SILT with gravel and cobbles.	Dry. Moderate, light hydrocarbon odour and grey staining		
					2.5			Moderate, light hydrocarbon odour, patchy black staining. Dry		
					3.0		Strong to very strong, very close-closely fractured, grey, fine to medium grained SANDSTONE with sub-horizontal, rough planar fractures with some orange staining, and rare sub-vertical, slightly stepped, rough fractures.	Rock coring used from 3.0m		
					3.5					
					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 Headspace Analysis Down Borehole Analysis Groundwater Table Perched Water Table	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: NSMW001		PAGE 2 of 2		
	NUMBER	TYPE					DRILLING DATES: 21/11/2003-25/11/2003		DRILLING METHODS : Various		
							DRILLER : Soil Mechanics & Apex		BOREHOLE DIAMETER : 100-115mm		
							LOGGED BY : SS		SCREEN TYPE & DIAM: 50mm HDPE		
							CHECKED BY : SG		SCREEN SLOT SIZE: 1mm		
								COMMENTS	S,V		
						5.5					
						6.0					
						6.5		Borehole terminated at 6.5m.			
						7.0					
						7.5					
						8.0					
						8.5					
						9.0					
						9.5					
						10.0					
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 Headspace Analysis Down Borehole Analysis Groundwater Table Perched Water Table		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: NSMW002		PAGE 1 of 1	
	NUMBER	TYPE					DRILLING DATES: 17/11/2003		DRILLING METHODS : Percussive	
							DRILLER : Soil Mechanics		BOREHOLE DIAMETER : 100-115mm	
							LOGGED BY : SS/JG		SCREEN TYPE & DIAM: 50mm HDPE	
							CHECKED BY : SG		SCREEN SLOT SIZE: 1mm	
					0.0		DESCRIPTION		COMMENTS	S,V
			*88				Surface gravel of brick and clinker (MADE GROUND)		Slight hydrocarbon odour, No staining	1,0
							Loose, grey-brown, sandy gravel of brick and sandstone. (MADE GROUND)		Strong hydrocarbon odour, black ash	3,3
					0.5		Loose, black, fine sand (ash) (MADE GROUND)		Slight hydrocarbon odour, no staining	
							Soft to firm, brown, slightly sandy clayey silt with occasional subrounded to subangular gravel.			
			*11.5		1.0		Loose, black medium sand (ash). (MADE GROUND)		Strong hydrocarbon odour.	1,0
			*50				Firm, brown, fine sandy clayey SILT with occasional cobbles.			3,3
					1.5					
			*9.4		2.0		With frequent subangular to subrounded cobbles from 2.0m		Strong hydrocarbon odour with grey staining	1,1
			*61		2.5					
				3.0		With abundant cobbles.		Black staining, strong hydrocarbon odour. Damp-wet with sheen on water	2,4	
		*239		3.5						
		*300								
		*204				Borehole terminated at 3.7m				
					4.0					
					4.5					
					5.0					

LOCATION / NOTES:		LEGEND		BOREHOLE LOG	
NVO = No visual or olfactory evidence of contamination		 Disturbed Sample		Job Title: BP Llandarcy Whole Site Investigation	
S,V = Contamination Observations		 Undisturbed Sample		Location: BP Llandarcy Refinery	
S - Odour score (0-5)		 Headspace Analysis		Client: BP/WDA	
V - Visual score (0-5)		 Down Borehole Analysis			
		 Groundwater Table		App'd: _____ Date: December 2003	
		 Perched Water Table		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: NSMW003		PAGE 1 of 1	
	NUMBER	TYPE					DRILLING DATES: 10/12/2003		DRILLING METHODS : Beretta - Various	
							DRILLER : APEX - Richard		BOREHOLE DIAMETER : 100-115mm	
							LOGGED BY : OG		SCREEN TYPE & DIAM: 50mm HDPE	
							CHECKED BY : SG		SCREEN SLOT SIZE: 1mm	
						DESCRIPTION		COMMENTS	S,V	
						0.0 Light brown fine to medium SAND with frequent angular gravel.		Air hammer case dry.		
						0.5 1.0 Becoming grey at 0.8m. With grey sandstone chippings from 1.0m.		Slight hydrocarbon odour.		
						1.5 2.0 Grey fine to medium sandy SILT Percussive drilling obstructed by boulders and cobbles from 2.0m.		Dry - damp.	3,4	
						2.5 3.0 3.5 4.0 4.5 5.0 Probable weathered SANDSTONE Borehole terminated at 5.0m.		Damp to wet.	4,4	
								Saturated	4,4	
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: HM Ref: _____ Scale: As scale Job No: 39991-044-785 Drg. Size: A4 BOREHOLE LOG				

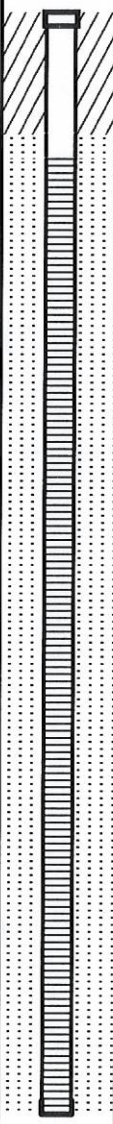
BOREHOLE CONSTRUCTION	SAMPLE		SOIL VAPOUR (ppm)	GROUNDWATER	DEPTH (m)	GEOLOGY	BOREHOLE NUMBER: NSMW013		PAGE 1 of 3	
	NUMBER	TYPE					DRILLING DATES: 10/12/2003		DRILLING METHODS: Beretta - Various	
							DRILLER: APEX - Richard		BOREHOLE DIAMETER: 100-115mm	
							LOGGED BY: OG		SCREEN TYPE & DIAM: 50mm HDPE	
				CHECKED BY: SG		SCREEN SLOT SIZE: 1mm				
						DESCRIPTION		COMMENTS	S,V	
						0.0		Grey SILT with fine to medium sand and occasional sandstone clasts.	Air hammer and casing	
						0.5				
						1.0		Grey fine to medium SANDSTONE chippings, probable bedrock.	Dry	
						1.5				
						2.0		Slightly damp		
						2.5				
						3.0				
						3.5				
						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 Headspace Analysis Down Borehole Analysis Groundwater Table Perched Water Table	Job Title: BP Llandarcy Whole Site Investigation Location: BP Llandarcy Refinery Client: BP/WDA	
		App'd:	Date: December 2003
		Drawn: HM	Ref:
		Scale: As scale	Job No: 39991-044-785
Drg. Size: A4	BOREHOLE LOG		

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BOREHOLE CONSTRUCTION	SAMPLE		SOIL VAPOUR (ppm)	GROUNDWATER	DEPTH (m)	GEOLOGY	BOREHOLE NUMBER: NSMW013		PAGE 3 of 3	
	NUMBER	TYPE					DRILLING DATES: 10/12/2003		DRILLING METHODS: Beretta - Various	
							DRILLER: APEX - Richard		BOREHOLE DIAMETER: 100-115mm	
							LOGGED BY: OG		SCREEN TYPE & DIAM: 50mm HDPE	
							CHECKED BY: SG		SCREEN SLOT SIZE: 1mm	
								COMMENTS	S,V	
				10.5						
				11.0						
				11.5		Borehole terminated at 11.5m		Dry		
				12.0						
				12.5						
				13.0						
				13.5						
				14.0						
				14.5						
				15.0						

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 Headspace Analysis Down Borehole Analysis Groundwater Table Perched Water Table	Job Title: BP Llandarcy Whole Site Investigation Location: BP Llandarcy Refinery Client: BP/WDA	
			App'd: _____ Date: December 2003 Drawn: HM 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: RFSW001		PAGE 1 of 1	
	NUMBER	TYPE					DRILLING DATES: 10/10/2000		DRILLING METHODS: Percussive	
							DRILLER: Geotechnical		BOREHOLE DIAMETER: 128mm	
							LOGGED BY: JG		SCREEN TYPE & DIAM: 50mm HDPE	
							CHECKED BY:		SCREEN SLOT SIZE: 1mm	
					0.0	MADE GROUND Loose, dark grey, silty gravel	Dry	0.0		
					0.5	MADE GROUND Soft, dark redsilt	Dry	0.5		
					1.0	CLAY Firm, brown clay with fine to coarse sand and gravel	Moist	1.0		
					1.5	No returns from 1.25 - 1.5m		1.5		
					2.0	CLAY Soft clay with gravel		2.0		
					2.5	GRAVEL Poorly graded fine to coarse gravel with medium plastic clay	Moist	2.5		
					3.0	CLAY Grey, medium plastic clay with some fine sand	Wet	3.0		
					3.5		Product staining	3.5		
					4.0		Hydrocarbon odour	4.0		
					4.5	GRAVEL Poorly graded fine to coarse gravel with fine to coarse sand and some medium plastic clay	Moist to wet	4.5		
				5.0	End of Borehole		5.0			

LOCATION / NOTES:	LEGEND	BOREHOLE LOG	
NVO = No visual or field activity evidence	 Disturbed Sample  Undisturbed Sample  Headspace Analysis  Down Borehole Analysis  Groundwater Table  Perched Water Table	Job Title: Sentinel Wells Location: BP Llandarcy Refinery Client: BP Oil UK	
			App'd: _____
			Date: August 2002
			Drawn: NML
			Ref: _____
		Scale: _____	Job No: 39991-016
		Dwg. Size: _____	BOREHOLE LOG

BOREHOLE CONSTRUCTION	SAMPLE		SOIL VAPOUR (ppm)	GROUNDWATER	DEPTH (m)	GEOLOGY	BOREHOLE NUMBER: RFSW002		PAGE 1 of 1	
	NUMBER	TYPE					DRILLING DATES: 10/10/2000		DRILLING METHODS: Percussive	
							DRILLER: Geotechnical		BOREHOLE DIAMETER: 128mm	
							LOGGED BY: JG		SCREEN TYPE & DIAM: 50mm HDPE	
							CHECKED BY:		SCREEN SLOT SIZE: 1mm	
					0.0	MADE GROUND Loose, black, poorly graded, silty fine to coarse sand	Moist, no odour	0.0		
					0.5	MADE GROUND Firm, red-brown, medium plastic, gravelly clay with iron staining	Wet, no odour	0.5		
					1.0	MADE GROUND Concrete rubble with asphalt, ash and clinker	No odour	1.0		
					1.5	CLAY Soft, brown, medium plastic clay, with some fine sand	Moist to wet	1.5		
					2.0	Goes to dark grey - brown from 1.9m	Hydrocarbon odour. Wet	2.0		
					2.5	Coarse gravel lens	Hydrocarbon odour. Wet	2.5		
					2.5	No returns from 2.3 - 3.0m				
					3.0	CLAY Layer of soft brown clay		3.0		
					3.5	CLAY Firm, dark grey - brown, gravelly clay, with fine to coarse gravels	Hydrocarbon odour. Wet	3.5		
					3.5	Coarse gravel lens	Hydrocarbon odour. Wet			
					4.0	SAND Brown silty sand	Hydrocarbon odour. Wet	4.0		
					4.0	SAND Firm, brown, poorly graded, fine sand with silt and some fine gravel and coarse sand	Hydrocarbon odour. Wet			
					4.5			4.5		
					5.0	End of Borehole		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: Sentinel Wells Location: BP Llandarcy Refinery Client: BP Oil UK <table border="1"> <tr> <td>App'd:</td> <td>Date: August 2002</td> </tr> <tr> <td>Drawn: NML</td> <td>Ref:</td> </tr> <tr> <td>Scale:</td> <td>Job No: 39991-016</td> </tr> <tr> <td>Dwg. Size:</td> <td>BOREHOLE LOG</td> </tr> </table>		App'd:	Date: August 2002	Drawn: NML	Ref:	Scale:	Job No: 39991-016	Dwg. Size:	BOREHOLE LOG
App'd:	Date: August 2002												
Drawn: NML	Ref:												
Scale:	Job No: 39991-016												
Dwg. Size:	BOREHOLE LOG												

BOREHOLE CONSTRUCTION	SAMPLE		SOIL VAPOUR (ppm)	GROUNDWATER	DEPTH (m)	GEOLOGY	BOREHOLE NUMBER: RFSW003		PAGE 1 of 1	
	NUMBER	TYPE					DRILLING DATES: 10/10/2000		DRILLING METHODS : Percussive	
							DRILLER : Geotechnical		BOREHOLE DIAMETER : 128mm	
							LOGGED BY : JG		SCREEN TYPE & DIAM: 50mm HDPE	
							CHECKED BY :		SCREEN SLOT SIZE: 1mm	
							DESCRIPTION	COMMENTS		
	0.0						MADE GROUND	Dry	0.0	
	Grey, poorly graded, fine to coarse gravel						Moist			
	Loose, dark brown, fine to coarse sand with some fine gravel and silt							0.5		
	0.5						Loose poorly graded sand with some clay	Moist		
	Dark brown, medium plastic sandy clay									
	1.0						Dark brown, poorly graded fine gravel with some clay	Hydrocarbon odour. Wet	1.0	
	CLAY									
	Soft to firm, dark brown slightly sandy clay						Hydrocarbon odour. Wet			
	1.5						no returns 1.4 - 1.5m		1.5	
2.0						SAND				
Firm, dark grey-brown, silty fine to medium sand with occasional fine gravel						Hydrocarbon odour. Wet	2.0			
2.5						CLAY				
Firm to stiff, dark brown fine to coarse gravelly clay						Hydrocarbon odour. Wet	2.5			
3.0								3.0		
3.5						SAND				
Firm, dark brown, silty fine to medium slightly gravelly sand						Hydrocarbon odour. Wet	3.5			
4.0						Clay lense 3.8 - 3.9m		4.0		
4.5						CLAY				
Stiff, grey-brown, fine to coarse, gravelly, clay with slight sand fraction						No odour. Moist	4.5			
5.0						End of Borehole		5.0		

LOCATION / NOTES:	LEGEND	BOREHOLE LOG	
NVO = No visual or laboratory evidence	Disturbed Sample Undisturbed Sample Headspace Analysis Down Borehole Analysis Groundwater Table Perched Water Table	Job Title: Sentinel Wells Location: BP Llandarcy Refinery Client: BP Oil UK	
			App'd: _____
			Date: August 2002
			Drawn: NML
			Ref: _____
		Scale: _____	Job No: 39991-016
		Drg. Size: _____	BOREHOLE LOG

BOREHOLE CONSTRUCTION	SAMPLE		SOIL VAPOUR (ppm)	GROUNDWATER	DEPTH (m)	GEOLOGY	BOREHOLE NUMBER: RSFW004		PAGE 1 of 1	
	NUMBER	TYPE					DRILLING DATES: 10/10/2000		DRILLING METHODS : Percussive	
							DRILLER : Geotechnical		BOREHOLE DIAMETER : 128mm	
							LOGGED BY : JG		SCREEN TYPE & DIAM: 50mm HDPE	
							CHECKED BY :		SCREEN SLOT SIZE: 1mm	
					0.0	MADE GROUND Grey, poorly graded gravel fill			0.0	
					0.5	MADE GROUND Black, loose, ash and clinker fill		Moist	0.5	
					1.0	SAND Medium dense, brown-tan, clayey sand with occasional gravels			1.0	
					1.5	CLAY Goes to dark brown, fine sandy firm clay with occasional gravel		Moist	1.5	
					2.0	SAND Goest o grey, silty fine sand with occasional gravel			2.0	
					2.5	CLAY Firm, grey, sandy clay with gravels		Wet	2.5	
					3.0	SAND Poorly graded, brown, slightly silty medium sand			3.0	
					3.5	SAND Brown, silty fine to medium sand with occasional gravel		Wet	3.5	
					4.0	SAND Brown, poorly graded, slightly silty, medium sand		Wet	4.0	
					5.0	End of Borehole		Wet	5.0	

LOCATION / NOTES:	LEGEND	BOREHOLELOG	
NVO = No visual or field activity evidence	Disturbed Sample Undisturbed Sample Headspace Analysis Down Borehole Analysis Groundwater Table Perched Water Table	Job Title: Sentinel Wells Location: BP Llandarcy Refinery Client: BP Oil UK 	
		App'd:	Date: August 2002
		Drawn: NML	Ref:
		Scale:	Job No: 39991-016
		Drg. Size:	BOREHOLELOG

BOREHOLE CONSTRUCTION	SAMPLE		SOIL VAPOUR (ppm)	GROUNDWATER	DEPTH (m)	GEOLOGY	BOREHOLE NUMBER: RFSW005		PAGE 1 of 1	
	NUMBER	TYPE					DRILLING DATES: 10/10/2000		DRILLING METHODS : Percussive	
							DRILLER : Geotechnical		BOREHOLE DIAMETER : 128mm	
							LOGGED BY : JG		SCREEN TYPE & DIAM: 50mm HDPE	
							CHECKED BY :		SCREEN SLOT SIZE: 1mm	
					0.0	SAND Dark brown, slightly clayey fine sand with occasional gravel	Moist	0.0		
					0.5	CLAY Brown, medium dense, sandy clay with gravels Goes to brown-yellow, slightly sandy clay	Moist	0.5		
					1.0	Grades to medium dense, brown, clayey, fine sand		1.0		
					1.5	Goes to brown-grey, firm to stiff sand clay with occasional gravel clast	Moist to wet	1.5		
					2.5	SAND AND GRAVEL Grades to brown, sandy fine gravel with some silt	Wet	2.5		
				3.0			3.0			
				3.5			3.5			
				4.0			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: Sentinel Wells Location: BP Llandarcy Refinery Client: BP Oil UK App'd: _____ Date: August 2002 Drawn: NML Ref: _____ Scale: _____ Job No: 39991-016 Drg. Size: _____ BOREHOLE LOG		

BOREHOLE CONSTRUCTION	SAMPLE		SOIL VAPOUR (ppm)	GROUNDWATER	DEPTH (m)	GEOLOGY	BOREHOLE NUMBER: RFSW006A		PAGE 1 of 1	
	NUMBER	TYPE					DRILLING DATES: 10/10/2000		DRILLING METHODS : Percussive	
							DRILLER : Geotechnical		BOREHOLE DIAMETER : 128mm	
							LOGGED BY : JG		SCREEN TYPE & DIAM: 50mm HDPE	
							CHECKED BY :		SCREEN SLOT SIZE: 1mm	
							DESCRIPTION	COMMENTS		
				0.0	CONCRETE		Concrete hard standing	Wet. Free product	0.0	
				0.5	MADE GROUND		Loose, grey - black, gravelly fine to medium sand		0.5	
				1.0	MADE GROUND		Black, loose ash and clinker	Moist. Free product	1.0	
				1.5	MADE GROUND		Loose, grey - black, slightly clayey, fine to medium sand with gravel	No hydrocarbon staining	1.5	
				2.0			Goes brown after 1mbgl		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	
							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: Sentinel Wells Location: BP Llandarcy Refinery Client: BP Oil UK	
			App'd: _____ Date: August 2002 Drawn: NML Ref: _____ Scale: _____ Job No: 39991-016 Drg. Size: _____ BOREHOLE LOG

BOREHOLE CONSTRUCTION	SAMPLE		SOIL VAPOUR (ppm)	GROUNDWATER	DEPTH (m)	GEOLOGY	BOREHOLE NUMBER: RFSW006B		PAGE 1 of 1	
	NUMBER	TYPE					DRILLING DATES: 10/10/2000		DRILLING METHODS : Percussive	
							DRILLER : Geotechnical		BOREHOLE DIAMETER : 128mm	
							LOGGED BY : JG		SCREEN TYPE & DIAM: 50mm HDPE	
		CHECKED BY :		SCREEN SLOT SIZE: 1mm						
			13.6		0.0		DESCRIPTION		COMMENTS	0.0
					0.5		CONCRETE Concrete hard standing	Wet		
			175		MADE GROUND Black-grey, loose, slightly silty, sand and gravel					
					0.5		Loose, black, ash and clinker fill	Moist		
			*250		CLAY Grey, firm, slightly sandy clay					
					1.0		COBBLE Large cobble of fractured sandstone			
					1.5		SAND Brown, medium dense, silty, fine sand with some fine to coarse gravels			
			*22.7		1.5		Noreturns from 1.4 - 1.8m			
			25		2.0		Grades to brown, medium dense, slightly silty fine sand	Moist		
					2.5		Noreturns from 2.25 - 3.0m			
		0		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 orolf actory evidence	Disturbed Sample Undisturbed Sample Headspace Analysis Down Borehole Analysis Groundwater Table Perched Water Table	Job Title: Sentinel Wells Location: BP Llandarcy Refinery Client: BP Oil UK	
			App'd: _____ Date: August 2002 Drawn: NML Ref: _____ Scale: _____ Job No: 39991-016 Drg. Size: _____ BOREHOLE LOG

BOREHOLE CONSTRUCTION	SAMPLE		SOIL VAPOUR (ppm)	GROUNDWATER	DEPTH (m)	GEOLOGY	BOREHOLE NUMBER: RFSW008		PAGE 1 of 1	
	NUMBER	TYPE					DRILLING DATES: 26/10/2000		DRILLING METHODS : Percussive	
							DRILLER : Geotechnical		BOREHOLE DIAMETER : 128mm	
							LOGGED BY : JG		SCREEN TYPE & DIAM: 50mm HDPE	
							CHECKED BY :		SCREEN SLOT SIZE: 1mm	
							DESCRIPTION	COMMENTS		
							CONCRETE Concretehard standing	Slight hydrocarbon odour	0.0	
							MADE GROUND Loose, grey, poorly graded gravel		0.5	
							MADE GROUND Loose, black, ash and clinker			
							CLAY Soft to firm, brown-grey, slightly sandy clay			
							No returns from 1.5 - 2m			
Lense of brown silty sand 2.65 - 2.75m								2.5		
End of Borehole								3.0		
								3.5		
								4.0		
								4.5		
								5.0		

LOCATION / NOTES: NVO = No visual orolf actory evidence		LEGEND Disturbed Sample Undisturbed Sample Headspace Analysis Down Borehole Analysis Groundwater Table Perched Water Table		BOREHOLE LOG Job Title: Sentinel Wells Location: BP Llandarcy Refinery Client: BP Oil UK	
				App'd: _____ Date: August 2002 Drawn: NML Ref: _____ Scale: _____ Job No: 39991-016 Drg. Size: _____ BOREHOLE LOG	

BOREHOLE CONSTRUCTION	SAMPLE		SOIL VAPOUR (ppm)	GROUNDWATER	DEPTH (m)	GEOLOGY	BOREHOLE NUMBER: RFSW009		PAGE 1of 1	
	NUMBER	TYPE					DRILLING DATES: 19/10/2000		DRILLING METHODS : Percussive	
							DRILLER : Geotechnical		BOREHOLE DIAMETER : 128mm	
							LOGGED BY : JG		SCREEN TYPE & DIAM: 50mm HDPE	
						CHECKED BY :		SCREEN SLOT SIZE: 1mm		
					0.0		DESCRIPTION		COMMENTS	
			0		0.0		MADE GROUND Loose, black, clayey gravel			
					0.5		Firm, brown, clayey sand			
			0		0.5		Loose, black, ashw ith clinker and some e clay			
					1.0		MADE GROUND Firm, grey, slightly sandy clay		Moist	
					1.0		MADE GROUND Loose, black, ash and clinker w ith silt		Wet	
			*137		1.5		MADE GROUND Soft, brown, sand y clay			
			*837		2.0		MADE GROUND Loose, black ash and clink er		Hydrocarbon odour	
			11.7		2.0		CLAY Soft to firm , brown-grey , sand y clay with occasional gravel clasts at depth			
			*680		2.5				Wet	
		144		3.0		SAND Soft to firm , grey , sil ty, fine to coarse sand , w ith trace fine gravel clasts		Hydrocarbon odour		
		*466		3.5		No returns from 3.2 -4.0m				
				4.0		Collapse back to 3.2m				
				4.0		End of Borehole				
					4.5					
					5.0					

LOCATION / NOTES:

NVO = No visual orolf actory evidence

LEGEND

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

BOREHOLE LOG

Job Title: Sentinel Wells

Location: BP Llandarcy Refinery

Client: BP Oil UK

App'd:	Date: August 2002
Drawn: NML	Ref:
Scale:	Job No: 39991-016
Drg. Size:	BOREHOLE LOG

BOREHOLE CONSTRUCTION	SAMPLE		SOIL VAPOUR (ppm)	GROUNDWATER	DEPTH (m)	GEOLOGY	BOREHOLE NUMBER: RFSW011		PAGE 1of 1	
	NUMBER	TYPE					DRILLING DATES: 12/10/2000		DRILLING METHODS : Percussive	
							DRILLER : Geotechnical		BOREHOLE DIAMETER : 128mm	
							LOGGED BY : JG		SCREEN TYPE & DIAM: 50mm HDPE	
							CHECKED BY :		SCREEN SLOT SIZE: 1mm	
							DESCRIPTION	COMMENTS		
				0.0	X X X X	CONCRETE			0.0	
				27	Concretehard standing			Moist Hydrocarbon odour		
				39	SAND AND GRAVEL					
				0.5	Loose,black , gravellysandw ithsom esilt				0.5	
				39	CLAY					
					Soft,dark brown, slightly sandyclay					
				39	SAND					
					Medium-dense, brown-greysil ty fine sand with occasionalgravel			Moist Hydrocarbon odour	1.0	
				41						
				*153	CLAY					
					Soft tofirm ,brown , slightl ysandy clay			Moist Hydrocarbon odour	1.5	
					GRAVEL					
					Loose,poorly graded gravel					
				101	CLAY					
					Soft,brown, sand yclay			Moist Hydrocarbon odour	2.0	
				*309	SAND					
					Firm, brown-grey,silty , fine sandw ithfinet o coarse gravels					
				99						
				2.5					2.5	
				3.0					3.0	
				3.5					3.5	
				4.0					4.0	
				4.5					4.5	
				5.0					5.0	
					Noreturnsfr om2.7 -3.67m					
					Endof Borehole					

LOCATION / NOTES:

NVO = No visual orolf actoryev idence

LEGEND

- [X] Disturbed Sample
- [■] Undisturbed Sample
- [*] Headspace Analysis
- [+]
- [⊕] Down Borehole Analysis
- [~] Groundwater Table
- [~] Perched Water Table

BOREHOLELOG

JobT itle: Sentinel Wells

Location: BP Llandarcy Refinery

Client: BP Oil UK

App'd:	Date: August 2002
Drawn: NML	Ref:
Scale:	JobN o: 39991-016
Drg. Size:	BOREHOLELOG

BOREHOLE CONSTRUCTION	SAMPLE		SOIL VAPOUR (ppm)	GROUNDWATER	DEPTH (m)	GEOLOGY	BOREHOLE NUMBER: RFSW012		PAGE 1 of 1	
	NUMBER	TYPE					DRILLING DATES: 19/10/2000		DRILLING METHODS : Percussive	
							DRILLER : Geotechnical		BOREHOLE DIAMETER : 128mm	
							LOGGED BY : JG		SCREEN TYPE & DIAM: 50mm HDPE	
				CHECKED BY :		SCREEN SLOT SIZE: 1mm				
					0.0	CONCRETE	DESCRIPTION	COMMENTS	0.0	
					0.5	MADE GROUND Loose, black, silty finesandw ith somegravel s, m ixed with layers of loose, black ash and clinker		Moist	0.5	
			11.5		1.0	CLAY Firm, brown-grey, finesandy , clay with trace gravel s		Hydrocarbon odour Moist	1.0	
			23.2		1.5				1.5	
			*81.8		2.0	GRAVEL Loose, poorly graded, sandy, fine to coarse gravel with some silt		Hydrocarbon odour	2.0	
			52		2.5	SAND Firm, brown, poorly graded, silty finesand		Wet	2.5	
			37		3.0	Sand becomes medium to coarse from 2.35m		Hydrocarbon odour	3.0	
			*885		3.5	No returns from 2.7 - 3m			3.5	
			278		4.0	Goes dark grey from 3m			4.0	
			0		4.5	SAND Firm, grey, clayey, fine sand with occasional coarse gravel clasts		Wet	4.5	
		*37.5		5.0	No returns from 4 - 4.6m			5.0		
		0			End of Borehole					

LOCATION / NOTES:

NVO = No visual orolfactory evidence

LEGEND

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

BOREHOLELOG

Job Title: Sentinel Wells

Location: BP Llandarcy Refinery

Client: BP Oil UK

App'd:

Date: August 2002

Drawn: NML

Ref:

Scale:

Job No: 39991-016

Dwg. Size:

BOREHOLELOG

BOREHOLE CONSTRUCTION	SAMPLE		SOIL VAPOUR (ppm)	GROUNDWATER	DEPTH (m)	GEOLOGY	BOREHOLE NUMBER: RFSW013		PAGE 1 of 1	
	NUMBER	TYPE					DRILLING DATES: 10/10/2000		DRILLING METHODS: Percussive	
							DRILLER: Geotechnical		BOREHOLE DIAMETER: 128mm	
							LOGGED BY: JG		SCREEN TYPE & DIAM: 50mm HDPE	
		CHECKED BY:		SCREEN SLOT SIZE: 1mm						
					0.0	MADE GROUND Concrete.	DESCRIPTION	COMMENTS	0.0	
					0.5	MADE GROUND Loose, black, poorly sorted gravel. Asphalt base		NVO		
					1.0	GRAVEL Loose, brown, moist, poorly sorted gravel with some sand		Moist, hydrocarbon odour		
					1.5	CLAY Firm, yellow-brown, moist clay with some fine sand		Moist, hydrocarbon odour Grey staining		
					2.0					
					2.5	CLAYEY SAND Loose, grey-brown, wet, fine-medium clayey sand.		Wet		
					3.0					
					3.5					
					4.0					
					4.5					
				5.0	Drilled to 5.0m, collapsed at 3.84m					
					End of Borehole					

LOCATION / NOTES:	LEGEND	BOREHOLELOG	
NVO = No visual or offactory evidence	Disturbed Sample Undisturbed Sample Headspace Analysis Down Borehole Analysis Groundwater Table Perched Water Table	Job Title: Sentinel Wells Location: BP Llandarcy Refinery Client: BP Oil UK	
			App'd: _____ Date: August 2002 Drawn: SS Ref: _____ Scale: _____ Job No: 39991-016 Drg. Size: _____ BOREHOLELOG

BOREHOLE CONSTRUCTION	SAMPLE		SOIL VAPOUR (ppm)	GROUNDWATER	DEPTH (m)	GEOLOGY	BOREHOLE NUMBER: RFSW014		PAGE 1 of 1	
	NUMBER	TYPE					DRILLING DATES: 12/10/00		DRILLING METHODS: Dynamic	
							DRILLER: Geotechnical		BOREHOLE DIAMETER: 128, 113, 98mm	
							LOGGED BY: JG		SCREEN TYPE & DIAM: 50mm HDPE	
							CHECKED BY:		SCREEN SLOT SIZE: 1mm	
					0.0		GRAVEL Loose, dark grey brown, poorly graded fine to coarse gravel with fine sand and some clay	Moist	0.0	
					0.5		CLAY Firm, black, fine sandy, medium plastic clay with fine to coarse gravel and organic material. Becomes brown from 0.9m	Moist	0.5	
					1.0			Wet	1.0	
					1.5				1.5	
					2.0		SAND Loose to firm brown silty fine sand with fine to coarse gravel. No returns from 2.25 - 3.0m	Wet	2.0	
					2.5				2.5	
					3.0		SAND Loose, brown, poorly graded fine sand with silt	Wet	3.0	
					3.5		GRAVEL Loose brown poorly graded fine gravel with occasional/some silt/clay	Wet	3.5	
					4.0		SAND Loose to firm, brown, silty fine sand with some/occasional fine gravels.		4.0	
					4.3	Drilled to 4.3m, collapsed to 4.2m				
				4.5	End of Borehole					
				5.0					5.0	

LOCATION / NOTES:	LEGEND	BOREHOLE LOG	
NVO = No visual or factory evidence	Disturbed Sample Undisturbed Sample Headspace Analysis Down Borehole Analysis Groundwater Table Perched Water Table	Job Title: Sentinel Wells Location: BP Llandarcy Refinery Client: BP Oil UK	
			App'd: _____ Date: August 2002 Drawn: AR Ref: _____ Scale: _____ Job No: 39991-016 Drg. Size: _____ BOREHOLE LOG

BOREHOLE CONSTRUCTION	SAMPLE		SOIL VAPOUR (ppm)	GROUNDWATER	DEPTH (m)	GEOLOGY	BOREHOLE NUMBER: RFSW015		PAGE 1 of 1	
	NUMBER	TYPE					DRILLING DATES: 12/10/2000		DRILLING METHODS : Dynamic System	
							DRILLER : Geotechnical		BOREHOLE DIAMETER : 128,113 , 98mm	
							LOGGED BY : JG		SCREEN TYPE & DIAM: 50mm HDPE	
				CHECKED BY :		SCREEN SLOT SIZE: 1mm				
					0.0	GRAVEL Fine black, poorly graded gravel with some fine sand and occasional clay	Wet	0.0		
			32		0.5	SILTY SAND Firm fine black Silty S and	Wet	0.5		
					1.0	CLAY Soft to firm, brown, medium plastic CLAY with fine sand	Moist	1.0		
					1.5	SAND Firm grey-green fine silty sand with occasional fine gravel.	Wet	1.5		
			50		2.0			2.0		
			*350		2.5			2.5		
					3.0			3.0		
					3.5			3.5		
					4.0	End of Borehole		4.0		
					5.0			5.0		

LOCATION / NOTES:	LEGEND	BOREHOLELOG	
NVO = No visual or off actory evidence	Disturbed Sample Undisturbed Sample Headspace Analysis Down Borehole Analysis Groundwater Table Perched Water Table	Job Title: Sentinel Wells Location: BP Llandarcy Refinery Client: BP Oil UK	
			App'd: _____ Date: August 2002 Drawn: AR Ref: _____ Scale: _____ Job No: 39991-16 Drg. Size: _____ BOREHOLELOG