Tarbert Generating Station

IPPC Licence Reg. No. PO607-02

Annual Environmental Report

For the period of 1st January to 31st December 2008

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1 Introduction

1.1 IPPC Licence Number: PO607-02

1.2 Name and Location

Electricity Supply Board
Tarbert Generating Station
Tarbert
Co. Kerry

This licence underwent a transfer of ownership on the 8th of January 2009. The License was transferred to Endesa Ireland Limited. However during 2008 ESB were the owners of this licensed facility.

1.3 Description of Activities

"The production of energy in combustion plant, rated thermal input of which is greater than 50 MW".

Tarbert Station has four generating units, giving a total electricity generating capacity of 626 MWe. All of these units are conventional steam generating units.

Generating units 3 and 4 have capacities of 256 MWe, while units 1 and 2 both have capacities of 57 MWe. Each unit is independent and consists of a boiler, steam turbine and auxiliary plant.

The station is fired on Heavy Fuel Oil (HFO) which is shipped directly to site and stored in the station's own oil farm areas. Gas Oil is used as a start-up fuel.

1.3.1 Running Regime in 2008

This report covers Environmental activities for the period of January to December 2008. During this time a number of generating units had maintenance outages where the units were not running.

Unit 1: This generating unit which is rated at 57MW ran for a total of 1110 run hours during 2008 which is not a significantly different load factor compared to the previous year. This equates to a total of 6.6 weeks on load out of a possible 52. This unit generated a total of 28763 MW during 2008. These 57MW units tend to have a low load factor and only run when the system requires. This unit was on annual overhaul from the 10th to the 17th of May 2008.

Unit 2: This generating unit which is rated for 57MW ran for a total of 454 hours during 2008. This relates to 2.7 weeks on load operation and a total of 12450MW's generated. This unit had a significantly reduced load factor during 2008 which translated to limited running in response to system demand. This unit was also on annual overhaul from the 10th to the 17th of May 2008.

Unit 3: This 256MW rated unit ran for a total of 5180 run hours in 2008 and generated a total of, 527510 MW hrs. Unit 3 operated for a total of 31 weeks out of a possible for 52. Unit 3 was on Annual Over-Haul between the 17th of July to the 31st of July. Due to the way the electricity system is operated this unit is called on as required to meet system demands and tends to have a very low load factor at night time.

Unit 4: This unit which is also rated at 256MW ran for a total of 6286run hours and generated a total of 653615 MW hrs during 2008. This unit ran for a total of 37 weeks out of 52. Unit 4 was on Annual Over-Haul from 9th of August to the 23rd of August. This unit is also run based on system demands and has a very low load factor at night.

1.3.2 EPA Audits 2008

During 2008 there were no audits conducted on site. The Agency did visit the site on a number of occasions in relation to the Divestment issues and the requested Technical amendments to the licence.
No non-conformances were raised during 2008

1.4 Environmental Policy 2008

Tarbert Generating Station is part of ESB Power Generation. It produces a maximum of 626 MW of Electricity from steam generation plant utilising residual oil as fuel. The plant is situated on the Shannon Estuary in an area encompassing designated Natural Heritage Areas (NHA) which are of environmental importance.

We the management and staff at Tarbert, believe that:

- the protection of the environment is an integral part of good business practice.
- we must produce electricity with the minimum impact on our neighbours and be responsive to the public in relation to our operations.
- we must be committed to the minimisation of waste production and to the safe and efficient disposal of that which is produced.
- we must produce electricity from our plant as efficiently as possible, by optimising the plant operation and minimising losses.

To this end we will:

- establish and regularly review environmental performance standards for our business to ensure full compliance with ESB Standards and E.U., National and Local Legislation on the Environment.
- develop and regularly review management processes, operational procedures and audit capabilities to ensure that the systems put in place to prevent environmental damage function effectively.
- put in place systems to reduce the production of waste and to monitor and ensure the safe disposal of that waste which is produced.
- put in place systems and equipment which minimise the risk of environmental accidents.
- draw up emergency response plans and in conjunction with local and national authorities, ensure an emergency response capability to deal with accidental pollution.
- ensure that our suppliers of goods and services are considerate of the environmental impacts of their dealings with Tarbert by advising them of ESB's environmental policy and our expectation that they conform with all relevant environmental legislation.
- seek to actively promote environmental awareness amongst staff and to foster among all employees at all levels an individual sense of responsibility for the environment and the need to be alert to potential sources of pollution in our operations.
- regard the achievement of Tarbert's annual environmental targets and objectives as a line management responsibility requiring personal commitment from all staff.
- provide the necessary training and support for staff to carry out their environmental role.
- review our environmental objectives and targets at regular intervals in order to ensure continued

improvement in environmental performance.
- consider environmental concerns at an early stage in project planning.
- report on our performance in environmental matters to staff, the authorities and other interested parties.
- respond swiftly to all complaints on environmental matters.

Compliance Issues
Ensure compliance with the terms and conditions of our IPPCL, all other relevant legal requirements and conformance with all relevant in-house standards and procedures relating to environmental protection with proper monitoring and control systems in place.

Environmental Awareness
Actively promote environmental awareness among staff through communication and training programmes and takes into account the impacts on and concerns of the local community.

Auditing and Reporting
Conduct regular internal and external audits to assess the level of performance and compliance with the environmental requirements of the company and regulatory bodies. Report, as appropriate, to staff, regulatory bodies and other interested parties.

Review
Carry out regular reviews of environmental policies and practices and keep abreast of any changing legislation or technology.

This policy has Corporate Body endorsement.

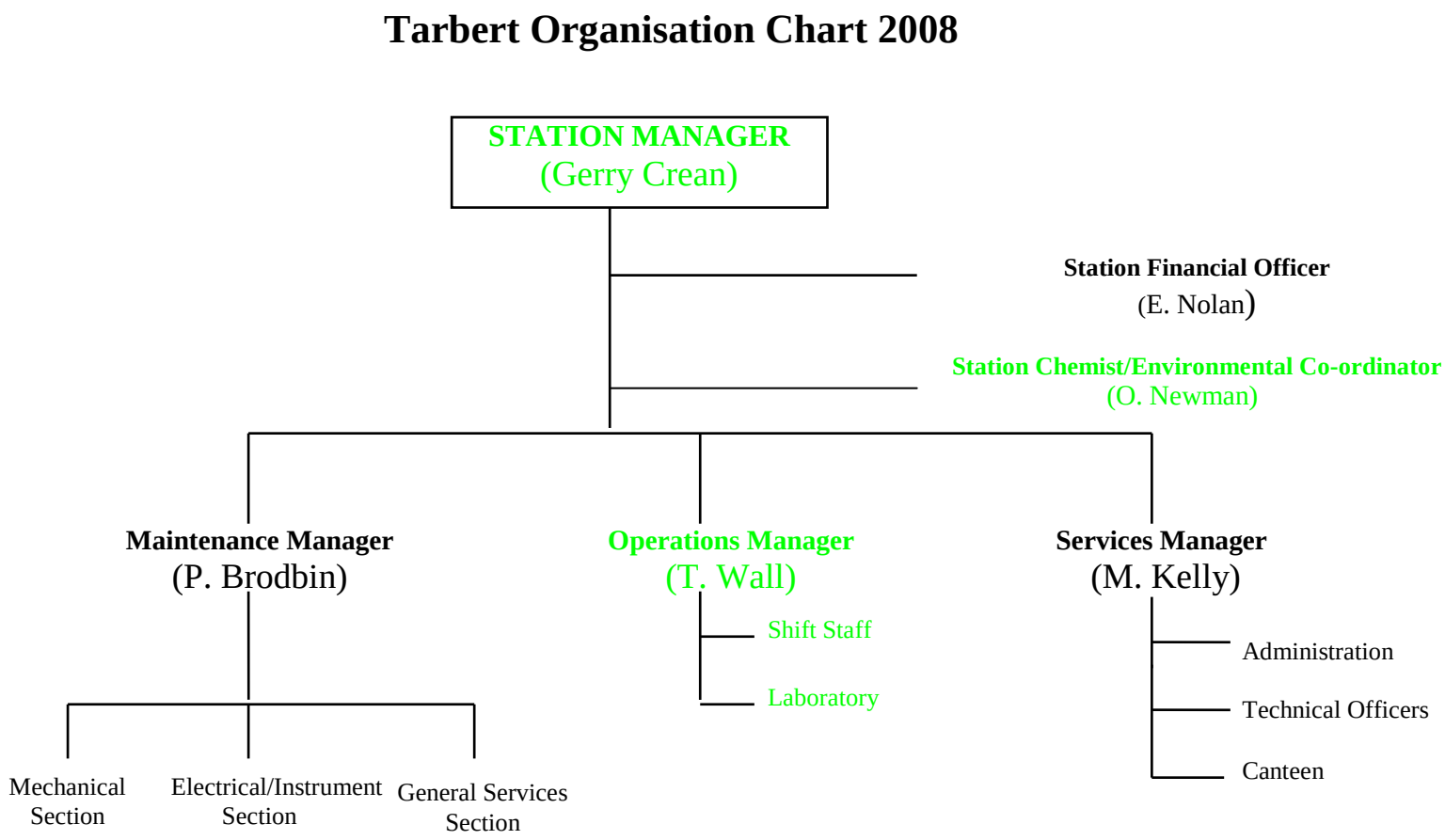
Signed:_____
Gerry Crean, Station Manager

1.5 Environmental Management Structure and Responsibility

Environmental Management is fully integrated into all aspects of management on site. The management structure is shown in figure 1. Those marked in green have a significant environmental role within the station. The Environmental Co-ordinator is responsible for the co-ordination of all environmental activity at the station. The Environmental Co-ordinator works with the management team and environmental management group to ensure that;

- The station complies with or betters the requirements of any environmental provisions specified under its IPPC licence, other licences, planning permission and environmental legislation.
- The Station's EMS is operated and maintained to the required ISO14001 standard.
- By way of audit and review cycle, the EMS is effective, is adaptive to changing circumstances and is delivering continuous improvement.

Fig 1: Company Organisation Chart for Environmental Management



2.0 Emissions - Summary Information

2.1 Emissions to Water

Emissions to water;

Schedule 2 (i) of Tarbert's IPPC Licence sets out the requirement to monitor Emissions to Water having regard to Licence Conditions 3 and 6. In Tarbert there are eight licensed process water emission points which are currently labelled as:

- SW5 Boiler Blowdown Units 1 and 2 – quarterly monitoring
- SW6 Boiler Blowdown Units 3 and 4 – quarterly monitoring
- SW7 Boiler House drains Units 3 and 4 – quarterly monitoring
- SW8 Neutralised water treatment effluent- continuous monitoring pH and flow
- SW26 Engine room drains – quarterly monitoring
- SW29 Condenser cooling water- continuous monitoring ΔT
- SW33 Cooling water screen wash water – quarterly monitoring
- SW34 Cooling water screen wash water – quarterly monitoring

Schedule 2 (iii) Also requires monitoring of foul drain emission points SW10 and SW24 on a quarterly basis.
Schedule 4(i) Requires quarterly monitoring of surface water discharge points SW3, SW9, SW12, SW15, SW16, SW17, SW19, SW20, SW22, SW23, SW25, SW30, SW31 and SW32.

Note: SW 6 and SW 7 descriptions are reversed as outlined in the 2005 AER. As part of the drains rationalisation programme which was carried out during 2006 all of the above discharge points and all of the non process drains have been re-labelled during 2008. The re-labelled discharge points are named as follows:

Location Reference	Formerly	Location Description
SE 1 & Int 1	SW 2	Reservoir & Canteen
SE 2 & Int 2	SW 3 & Int 2	Diesel Bund
PE 1 & Int 4	SW 5 & Int 4	Blowdown Unit 1 & 2
PE 2 & Int 6	SW 6 & Int 6	Unit 3 & 4
PE 3	SW 7	Blowdown Unit 3 & 4
PE 4	SW 8	W.T.P.
SE 3 & Int 7	SW 9 & Int 7	WTP & Boiler Building
FE 1	SW 10	Effluent Plant No. 1
PE 5 & Int 8	SW12 & Int 8	Chemical Storage Bund
SE 4 & Int 11	SW 15 &Int 11	Island Tank Farm
SE 5	SW 16	Open Area
SE 6 & Int 19, 12, 13, 14	New SW 17/18 & Int 12, SW 19 & Int 13 SW 20 & Int 14	Mainland Tank Farm

FE 2	SW 21	Septic Tank Private Dwelling
SE 7 & Int 15, 18	SW 22 & Int 15	No 1 220KV Compound
SE 8 & Int 16	SW 23 & Int 16	No 2 220KV Compound
FE 3	SW 24	Effluent Plant No. 2
SE 9 & Int 17	SW 25 & Int 17	Island Pumphouse
PE 6 & Int 9	SW 26 & Int 9	Engine Room
FE 4	SW 28	Septic Tank Mech
PE 7	SW 29	Condenser Cooling Water
SE 10	SW 31	110 KV Compound
SE 11	SW 32	Hydrant Pumphouse
PE 8	SW 33	Screen Wash No 1
PE 9	SW 34	Screen Wash No 2
FE 5	SW 35	Sewage Gate
FE 6	SW 36	Sewage Jetty
FE 7	New	Irish Lights Site - Foul
SE 12	SW27	Mechanical Car Park

FE = Foul Effluent
PE = Process Effluent
SE = Surface Effluent

Tarbert Generating station has carried out the re-labelling of these discharge points, as outlined above, during 2008. Attachment 1 shows an updated site discharge map showing the above listed points.

Tarbert Generating Station request that the current IPPCL be amended to update the discharge point references as proposed above. A communication is also being sent to the Agency to formally request this Technical Amendment.

2.1.1 Continuous Monitoring- Process Drains

Emission Point Reference No. SW8 – Water Treatment Neutralisation Tank – Units 1,2, 3 and 4

pH (limit 6 -9.5)and volume (200m^{3}per hour) of discharge

2007	Monthly Avg. pH	Monthly Avg. Flow (m3/hr)
Jan		
Feb		
Mar		
Apr		
May		
Jun		
Jul		
Aug		
Sept		
Oct		
Nov		
Dec		

Fig 2: Monthly Average pH

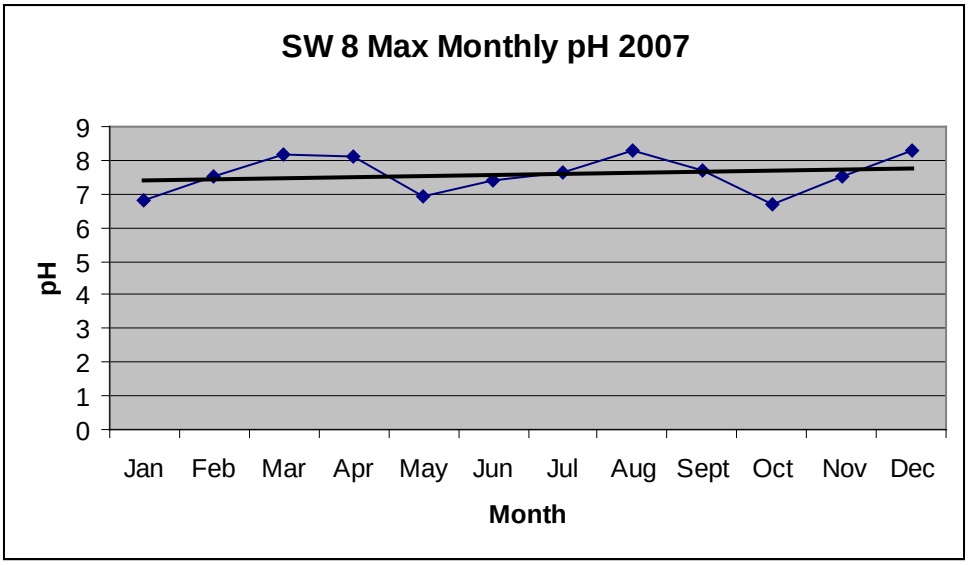
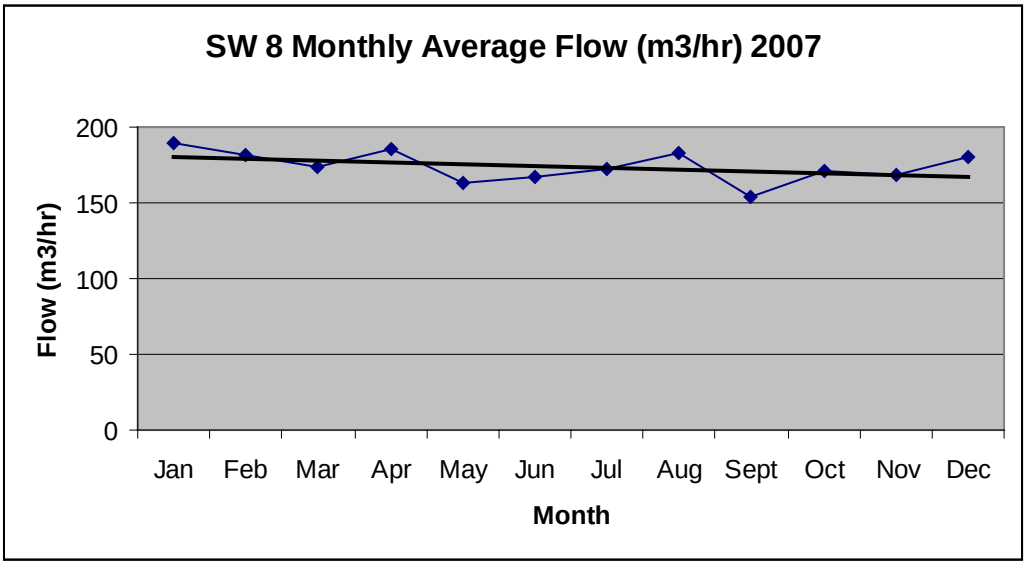


Fig 3: Monthly Average Flow



pH and Flow:

The emission limit value for flow of 200m^3/hr was not exceeded during the reporting period (2008). Due to the fact that the maximum flow rate per hour was not exceeded, the maximum volume to be emitted per day of 2000m^3 was adhered to. The total mass emission for flow form this licensed discharge during 2008 was calculated to be **99280 m^3** which is within the permitted mass emission of 730,000 m^3 (based on a daily figure of 2000m3 as per Schedule 2(i)).

The pH of the discharge from SW8 did not exceed the ELV range of between, 6 - 9.5. Both pH and flow are measured on a continuous basis as per IPPC licence No. PO 607-02 and are alarmed locally to prevent any discharge outside the permitted limits. The monthly average figures graphed above show little variation from the 2006 or 2007 continuous monitoring results. The trend line on both graphs indicates the consistent results throughout the monitoring period, which is as expected for this discharge point.

Quarterly Monitoring Results of SW8

Parameter	Emission Limit	Quarter 1 2008	Quarter 2 2008	Quarter 3 2008	Quarter 4 2008
Ammonia (as N) (mg/l)	100Kg/day	0.5 mg/l	0.22 mg/l	0.18 mg/l	0.24 mg/l
Suspended Solids (mg/l)	100 mg/l	<2.0	<2	<2	25
Iron (Boiler Wash) (mg/l)	5 mg/l	0.29	0.4	<0.1	0.265
Vanadium (Boiler Wash) (mg/l)	5 mg/l	0.008	0.025	0.003	0.02

The effluent is analysed for Iron and Vanadium in conjunction with the analysis of the WTP sump discharge results. These parameters were well within the ELV's outlined in the licence.

The emission limits for SW8 were not exceeded during this reporting period January to December 2008. The mass emission for Ammonia was calculated to be **113.18 Kg for 2008**. This calculation is based on the average ammonia discharge by the annual flow. The permitted mass emission is 100kg/day or 36500kg per annum.
The mass emission of suspended solids was calculated to be **3077.7 Kg for 2008 (equates to 8 kg/day)**. This is within the permitted mass emission of 18kg/day or 6570Kg per annum.

Emission Point Reference Number: SW29 Condenser Cooling Water

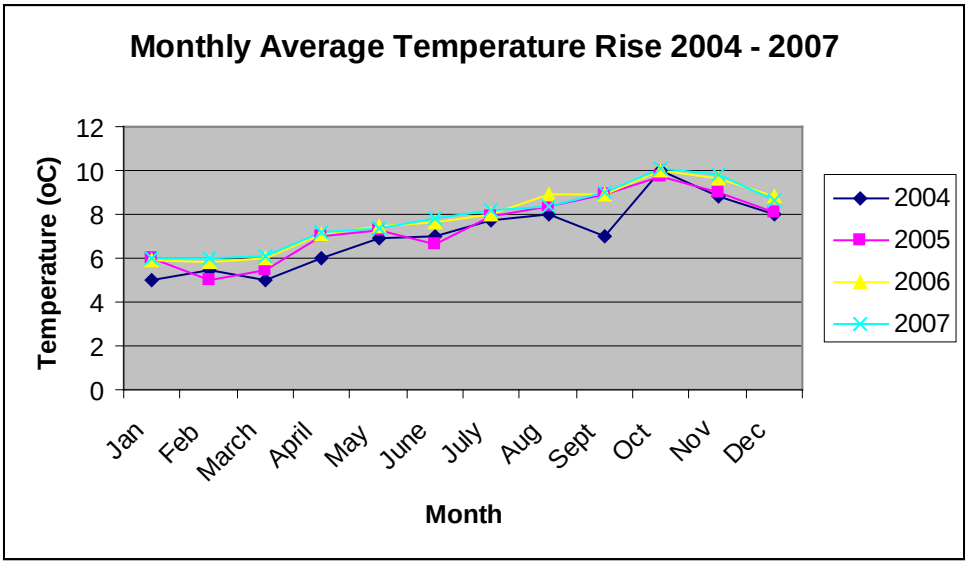
Temperature

Continuous monitoring of the temperature rise between the condenser cooling water intake and common outfall has been in place since the March 2003. The continuous monitor for this parameter is located in the control room at Tarbert and is alarmed at the ELV limit of 12.5 ºC.

The maximum monthly temperature differentials for 2008 are tabulated below. The ELV for delta T is 12.5ºC (98% ile of hourly values over a year) with a maximum of 15 ºC. **Fig 4** Shows a graph of the Monthly average CW temperature rise for 2008:

Month	2004	2005	2006	2007	Station Average ΔT 2008
Jan	5	6	5.9	6	
Feb	5.5	5	5.8	6	
March	5	5.5	6	6.1	
April	6	7	7.1	7.15	
May	6.87	7.24	7.5	7.4	
June	7	6.68	7.6	7.8	
July	7.7	7.9	8	8.2	
Aug	8	8.32	8.89	8.4	
Sept	7	8.89	8.9	8.99	
Oct	10	9.70	10	10.01	
Nov	8.8	9	9.6	9.8	
Dec	8	8.11	8.8	8.6	

Fig 4: Monthly Average Temperature Rise



Comment

The monitoring of the condenser cooling water temperature differential for the period January 2007 to December 2008 indicates no excursions above the IPPC Licence limit of 12.5ºC (98%ile of hourly values over a year - 15ºC max), for this monitoring period. Temperature differential figures for this reporting period are fairly typical and do not indicate any significant changes from expected trends. When compared to 2005, 2006 and 2007 figures it is clear to see the strong correlation between the monitored results. This indicates that there is very little variation in temperature rise across the station.

Flow:

The maximum permissible volume to be emitted in any one day of 2,491,200 m^3 and the maximum rate per hour of 103,800 m^3 have not been exceeded in this reporting period.

The capacity of the six CW pumps at Tarbert is such that the maximum flow possible **91,000 m^3/hour** so therefore it is not expected that the limit of 103,800 m^3 per hour will be breached.

Although flow is not measured on a continuous basis operations staff are aware of the maximum rating of the CW pumps and are also aware of the number of pumps that are running at any given time. Based on this information it is always possible to calculate the maximum flow rate in m^3/hour.

Chlorine (Weekly monitoring required):

Weekly grab samples are taken for chlorine analysis of the condenser cooling water (SW29). The results are tabulated below. The emission limit value of 0.5mg/l has not been exceeded in this reporting period.

Week no.	Total Chlorine (mg/l)	Week no.	Total Chlorine (mg/l)	Week no.	Total Chlorine (mg/l)	Week no.	Total Chlorine (mg/l)	Week no.	Total Chlorine (mg/l)
1	nil	13	nil	25	nil	37	nil	49	nil
2	nil	14	nil	26	nil	38	nil	50	nil
3	nil	15	nil	27	nil	39	nil	51	nil
4	nil	16	nil	28	nil	40	nil	52	nil
5	nil	17	nil	29	nil	41	nil		
6	nil	18	nil	30	nil	42	nil		
7	nil	19	nil	31	nil	43	nil		
8	nil	20	nil	32	nil	44	nil		
9	nil	21	nil	33	nil	45	nil		
10	nil	22	nil	34	nil	46	nil		
11	nil	23	nil	35	nil	47	nil		
12	nil	24	nil	36	nil	48	nil		

The limit for Chlorine at SW 29 is 0.5mg/l

2.1.2 Quarterly Monitoring SW5, 6, 7, 26, 33, 34 (Process Drains)

The tables below show quarterly monitoring results for the process drains listed above. None of the quarterly monitoring results exceed the stated Emission Limit Values. Where NS has been entered in the tables this means that No Sample was available on the day that monitoring was conducted. Some discharge points will have no flow when the plant is not running (process drains) or in dry conditions (surface water drains).

SW5 Boiler Blowdown U1 and U2

Date	Oils	Orhto-phosphate (P)	pH	Ammonia (As N) (mg/l)
Emission Limit Value	20 mg/l	4 mg/l	6-10	1
Quarter 1 2008	NS	NS	NS	NS
Quarter 2 2008	NS	NS	NS	NS
Quarter 3 2008	NS	NS	NS	NS
Quarter 4 2008	NS	NS	NS	NS

Emission limits were not breached during the reporting period. The fact that NS was recorder for each quarter of 2008 has highlighted a problem with the sample point. The end point of this discharge is affected by tides and it's actual point of discharge is difficult to locate due to rock armouring along the shore. **ESB Tarbert proposes to sample from the outlet of the interceptor associated with this discharge point during 2009 rather than at the end point of the discharge pipe.**

SW 6 Boiler House Drains

Date	Oils
Emission Limit Value	20 mg/l
Quarter 1 2008	Clear
Quarter 2 2008	Clear
Quarter 3 2008	Clear
Quarter 4 2008	Clear

Emission limits were not breached during the reporting period. During the weekly visual inspections of this discharge point no oil was seen to be present.

SW6 Boiler Blowdown U3 and U4: Quarterly Monitoring

Date	pH	Ammonia (As N) (mg/l)
Emission Limit Value	6.0-9.0	1.0 mg/l
Quarter 1 2008	6.7	NIL
Quarter 2 2008	6.3	NIL
Quarter 3 2008	6.3	NIL
Quarter 4 2008	7.4	0.15mg/l

Emission limits were not breached during the reporting period.

SW 26 Engine room drains

Date	Oils	pH	Ammonia (As N) (mg/l)
Emission Limit Value	20 mg/l	6-10	1
Quarter 1 2008	NS	NS	NS
Quarter 2 2008	NS	NS	NS
Quarter 3 2008	NS	NS	NS
Quarter 4 2008	NS	NS	NS

Emission limits were not breached during 2008. No sample was obtained from the discharge pipe due to mixing with sea water at this point. **ESB Tarbert proposes to take a sample from the third chamber of the interceptor associated with this discharge point. A mixed sample at the outlet will also be taken for comparative purposes. This will be reflected in the monitoring results for 2009.**

SW 33 and SW34 Cooling water screen wash.

Emission limits were not breached for SW33 and 34 during 2008. The Sodium Hypochlorite dosing system was commissioned in May 2007 and ran intermittently during the summer months. However technical difficulties with this injection system meant that the dosing level was minimal when it was in service and also that the system was out of service for a large portion 2007. The system also failed to run successfully during 2008 and this is reflected in the monitoring results for 2008.

Date	Chlorine (mg/l)
Emission Limit Value	1.0 mg/l
Quarter 1 2008	Nil
Quarter 2 2008	Nil
Quarter 3 2008	Nil
Quarter 4 2008	Nil

In conjunction with monitoring carried out by ESB Tarbert the EPA visited the site, for the purpose of water discharge monitoring, a total of seven times during the reporting

period. On each of these occasions samples were obtained and the analysis results were found to be in compliance with the licence discharge limits.

The results obtained by EPA monitoring showed a strong correlation with the results obtained by ESB Tarbert. Parameters such as pH, mineral oils, ammonia, TOC and suspended solids as determined by the EPA, were in most cases identical to the stations quarterly results as recorded above and indicated full compliance with licence discharge limits. **Appendix 1** contains copies of all EPA monitoring results for water discharges from Tarbert during 2008.

2.1.3 Quarterly Monitoring Surface Water Discharge (Schedule 4 (i))

Schedule 4 (i) requires Surface Water discharge monitoring points to be monitored on a quarterly basis for pH and COD. A weekly visual inspection for oil is also required. **Appendix 2** contains tables showing all monitoring results for SW3, 9, 12, 15, 16, 17, 19, 20, 22, 23, 25, 30, 31 and 32 recorded in 2008.

No exceedences occurred at any of these licensed discharge points in 2008.
There are elevated temperature values at SW6. Although no temperature ELV applies at this discharge point it is clear that this temperature is due to plant blowdown. This is an unavoidable temperature rise at this process drain which is directly related to the running of Units 3 and 4.

2.2 Ambient Surface Water Monitoring

Ambient surface water monitoring points ASW1 and ASW2 are monitored on a quarterly basis as per Schedule 4 (iii) of IPPC licence no. P0607-02. Below are the results that were obtained for 2008:

Quarter 1

Stream Analysis	Quarter 1 2008
	ASW1
BOD (mg/l)	4
Ammonia (as N) (mg N/l	<0.1
Nickel (ug/l)	<5
Iron (ug/l)	317
Zinc (ug/l)	8
Vanadium (ug/l)	<5
Lead (ug/l)	<5
Cadmium (ug/l)	<0.5
Conductivity (uS/cm)	375
pH	6.8

Stream Analysis	Quarter 1 2008
	ASW2
BOD (mg/l)	<4
Ammonia (as N) (mg N/l	<0.1
Nickel (ug/l)	<5
Iron (ug/l)	176
Zinc (ug/l)	15
Vanadium (ug/l)	150
Lead (ug/l)	<5
Cadmium (ug/l)	<0.5
Conductivity (uS/cm)	1021
pH	6.9

Comments:

The Iron figures recorded at ASW1 and 2 during quarter1 2008, although elevated, are expressed in ppb. These figures are well below the EPA interim guideline value for

Surface water (EQS's) of 1.0 mg/l so therefore are not a cause for concern ("Towards Setting Guideline Values for the Protection of Groundwater in Ireland")

Conductivity figures are associated with mixing at this monitoring location with sea water.

All of the other reported parameters are well within the interim guideline values as outlined by the Agency. Although a limit for vanadium has not been outlined in the interim guidelines set by the EPA, the recorded figure at both ASW1 and ASW2 is insignificant.

Quarter 2

Stream Analysis	**Quarter 2 2008**
	ASW1
BOD (mg/l)	No sample
Ammonia (as N) (mg N/l	
Nickel (ug/l)	
Iron (ug/l)	
Zinc (ug/l)	
Vanadium (ug/l)	
Lead (ug/l)	
Cadmium (ug/l)	
Conductivity (uS/cm)	
pH	

Stream Analysis	**Quarter 2 2008**
	ASW2
BOD (mg/l)	4
Ammonia (as N) (mg N/l	1.9
Nickel (ug/l)	<50
Iron (ug/l)	3700
Zinc (ug/l)	129
Vanadium (ug/l)	511
Lead (ug/l)	3700
Cadmium (ug/l)	<1
Conductivity (uS/cm)	7335
pH	8.4

Comments:
There was no sample available at ASW1 when the Quarter 2 samples were being taken. This can occur due to weather conditions. The sample that was taken at ASW2 would therefore have been stagnant and this may have influenced the monitoring results.

Both Lead and Iron figures recorded at ASW2 are elevated. Vanadium and conductivity figures are also higher than during Q1. The elevated values may be due to sampling conditions.

Recorded values, although elevated in some cases, are expressed in ppb. The Fe figure relates to 3.7 ppm, which is above the interim guideline value of 1 mg/l ("Towards Setting Guideline Values for the Protection of Groundwater in Ireland"). The interim guideline value for lead is 0.01 mg/l. The recorded value at ASW 2 is above this guideline value. However lead values recorded during Q1 and Q3 monitoring indicate that the recorded values are well below the guideline value. The figure recorded during Q2 may be spurious or due to monitoring condition. Again conductivity figures are associated with mixing at this monitoring location with sea water.

All other recorded values are typical results for this monitoring point and are within guideline values as outlined in the EPA guidance document.

Quarter 3

Stream Analysis	Quarter 3 2008
	ASW1
BOD (mg/l)	No sample
Ammonia (as N) (mg N/l	
Nickel (ug/l)	
Iron (ug/l)	
Zinc (ug/l)	
Vanadium (ug/l)	
Lead (ug/l)	
Cadmium (ug/l)	
Conductivity (uS/cm)	
pH	

Stream Analysis	Quarter 3 2008
	ASW2
BOD (mg/l)	<4
Ammonia (as N) (mg N/l	0.06
Nickel (ug/l)	3
Iron (ug/l)	0.3
Zinc (ug/l)	<1
Vanadium (ug/l)	37
Lead (ug/l)	<1
Cadmium (ug/l)	<0.5
Conductivity (uS/cm)	378
pH	7.4

Comments:

There was no sample available at ASW1 when the Quarter 2 samples were being taken. This can occur due to weather conditions. The sample that was taken at ASW2 would therefore have been stagnant and this may have influenced the monitoring results.

All values recorded are within the guideline values outlined in the document "Towards Setting Guideline Values for the Protection of Groundwater in Ireland". The Vanadium values recorded here does appear to be lower that previous monitoring periods.

Quarter 4

Stream Analysis	Quarter 4 2008
	ASW1
BOD (mg/l)	<4
Ammonia (as N) (mg N/I)	0.22
Nickel (ug/l)	<5
Iron (mg/l)	79
Zinc (ug/l)	16
Vanadium (ug/l)	<5
Lead (ug/l)	<5
Cadmium (ug/l)	<0.5
Conductivity (uS/cm)	361
pH	7.2

Stream Analysis	Quarter 4 2008
	ASW2
BOD (mg/l)	< 2.0
Ammonia (as N) (mg N/I)	0.16
Nickel (ug/l)	26.9
Iron (mg/l)	297
Zinc (ug/l)	19
Vanadium (ug/l)	240
Lead (ug/l)	8
Cadmium (ug/l)	0.4
Conductivity (uS/cm)	341
pH	6.9

Comments:
The values recorded at ASW1 and ASW2 are within the limits as outlined in the interim guidance document issued by the EPA.

The figures recorded appear to be typical for these monitoring locations. The results obtained during Q4 2007 are very similar to those obtained for the same period in 2007.

General Comments:

The ambient water which is referred to in this section is a stream which flows through the licensee's land. Once it leaves the site the stream enters the Shannon estuary. ASW1 is the point at which this ambient water source enters Tarbert's site. ASW2 is the point at which the stream leaves the site and enters the estuary.

At certain times of the year there is no flow in this stream so the sample may be taken from a stagnant water source. Monitoring point ASW2 is also susceptible to tidal influence. This fact is represented in the conductivity figures expressed in the above Tables. In general there is no significant change in the monitoring results between ASW1 and ASW2.

In general the figures which have been recorded at these monitoring points during 2004, 2005, 2006, 2007 and have showed little variations from year to year and tend to indicate no significant changes in the last number of years.

Interim Guideline Values: "Towards Setting Guideline Values for the Protection of Groundwater in Ireland".

pH	6.5 – 9.5
Ammonia	0.15 mg/l
Iron	0.2 mg/l
Cadmium	0.005 mg/l
Nickel	0.02 mg/l
Zinc	0.1 mg/l
Lead	0.01 mg/l

No guideline values are outlined for BOD, Conductivity or Vanadium

Section 2.3 Bi-annual Groundwater Monitoring

Bi-annual groundwater monitoring was carried out as per IPPCL No PO607-02. The results are tabulated below. No ELV's have been set for groundwater conditions in the licence, however the results below have been compared to the Interim Guideline Values as presented by the EPA in the document, "Towards setting Guideline values for the Protection of Groundwater in Ireland".

Phase 1 Bi-annual groundwater monitoring 2008

Borehole Name	**BH 9**	**BH 10**	**BH 11**	**BH 12**	**RC1**	**Interim Guideline**
Ammonia **ug/l**	4.8	4.4	0.3	0.12	<0.1	0.15 mg/l
Arsenic **ug/l**	8.8	0.6	<0.2	<0.2	0.6	0.01 mg/l
Cadmium **ug/l**	1	1.4	0.7	1.3	1.9	0.05 mg/l
Conductivity	4400	5500	428	888	2080	1000
DRO **mg/l**	<0.4	<0.4	<0.4	<0.4	<0.4	Total hydro 0.01 mg/l
Iron **ug/l**	17.8	7320	587	<8	<8	0.2 mg/l
Lead **ug/l**	8	10	<2	<10	<10	NO value
Mineral Oil **mg/l**	<0.4	<0.4	<0.4	<0.4	<0.4	Total hydro 0.01 mg/l
Nickel **ug/l**	2	9.3	13.4	6.5	<0.5	0.02 mg/l
Nitrate **mg/l**	4	<0.5	0.8	0.6	1	25 mg/l
Nitrite **mg/l**	8	<1	<0.2	<0.2	<0.2	0.1 mg/l
PAH	<0.01	<0.01	<0.01	<0.01	<0.01	0.1
pH	6.9	6.2	5.9	5.9	7.2	6.5-9.5
Selenium **ug/l**	<0.5	1.1	<0.5	0.9	<0.5	No Value
Vanadium **ug/l**	2.16	3.8	2.38	1.34	1.93	No value
VOC **ug/l**	<1	<1	<1	<1	<1	
Zinc **ug/l**	<0.01	<0.01	<0.01	<0.01	<0.01	0.1 mg/l

Phase 2 Bi-annual groundwater monitoring 2008

As part of the divestment process all groundwater on site was tested by URS. The extensive investigation included normal groundwater monitoring wells, groundwater in the area of the capped landfills and new monitoring wells. The extensive monitoring carried out by URS covered soil and sediment sampling and water analysis also. All of these monitoring results can be viewed in Attachment 3. The Q2 groundwater monitoring results are tabulated below.

Client: ESB
Project: Phase 2 Environmental Investigation
Location: ESB Tarbert, Co. Kerry
Job No: 49341640
Table 15: Groundwater Analytical Results: Hydrocarbons

				Island Area							
Sample Type				Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Sample ID				BH 309A	BH 319	BH 311	BH 306	RC 1	MW 101	MW 102B	MW 103
Date				28-Oct-08	28-Oct-08	28-Oct-08	28-Oct-08	28-Oct-08	28-Oct-08	28-Oct-08	28-Oct-08
Parameters	**UNITS**	**MDL**	**IGV**								
Hydrocarbons											
Aromatics											
C6-C7	ug/L	10	nv	-	-	-	-	-	-	-	-
C7-C8	ug/L	10	nv	-	-	-	-	-	-	-	-
C8-C10	ug/L	10	nv	-	-	-	-	-	-	-	-
C10-C12	ug/L	10	nv	-	-	-	-	-	-	-	-
C12-C16	ug/L	10	nv	-	-	-	-	-	-	-	-
C16-C21	ug/L	10	nv	-	-	-	-	-	-	-	-
C21-C35	ug/L	10	nv	-	-	-	-	-	-	-	-
Total Aromatics	ug/L	10	nv	-	-	-	-	-	-	-	-
Aliphatics											
C5-C6	ug/L	10	nv	-	-	-	-	-	-	-	-
C6-C8	ug/L	10	nv	-	-	-	-	-	-	-	-
C8-C10	ug/L	10	nv	-	-	-	-	-	-	-	-
C10-C12	ug/L	10	nv	-	-	-	-	-	-	-	-
C12-C16	ug/L	10	nv	-	-	-	-	-	-	-	-
C16-C21	ug/L	10	nv	-	-	-	-	-	-	-	-
C21-C35	ug/L	10	nv	-	-	-	-	-	-	-	-
Total Aliphatics (MO)	ug/L	10	nv	-	-	-	-	-	-	-	-
Total TPH	ug/L	10	10	-	-	-	-	-	-	-	-
BTEX											
Benzene	ug/L	10	1	-	-	-	-	-	-	-	-
Toluene	ug/L	10	10	-	-	-	-	-	-	-	-
Ethylbenzene	ug/L	10	10	-	-	-	-	-	-	-	-
Total Xylene	ug/L	10	10	-	-	-	-	-	-	-	-
MTBE	ug/L	10	30	-	-	-	-	-	-	-	-
BTEX	ug/L	10	nv	-	-	-	-	-	-	-	-

IGV	Interim Guideline Value for Groundwater
xx	Exceeds IGV for Groundwater
MDL	Method Detection Limit
-	Less than the MDL
na	Not Analysed
nv	No Value
MO	Mineral Oil
NDP	No Determination Possible

Client: ESB
Project: Phase 2 Environmental Investigation
Location: ESB Tarbert, Co. Kerry
Job No: 49341640
Table 15: Groundwater Analytical Results: Hydrocarbons

				Island Area								
Sample Type				Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Sample ID				RC2	BH317	BH11	BH12	MW301	BH318	BH9	BH314	BH301
Date				24-Oct-08	24-Oct-08	24-Oct-08	24-Oct-08	24-Oct-08	24-Oct-08	24-Oct-08	29-Oct-08	29-Oct-08
Parameters	**UNITS**	**MDL**	**IGV**									
Hydrocarbons												
Aromatics												
C6-C7	ug/L	10	nv	-	-	-	-	-	-	-	-	-
C7-C8	ug/L	10	nv	-	-	-	-	-	-	-	-	-
C8-C10	ug/L	10	nv	-	-	-	-	-	-	-	-	-
C10-C12	ug/L	10	nv	-	-	-	-	-	-	-	-	-
C12-C16	ug/L	10	nv	-	-	-	-	-	563	-	-	-
C16-C21	ug/L	10	nv	-	-	-	-	-	-	-	-	-
C21-C35	ug/L	10	nv	-	-	-	-	-	-	-	-	-
Total Aromatics	ug/L	10	nv	-	-	-	-	-	563	-	-	-
Aliphatics												
C5-C6	ug/L	10	nv	-	-	-	-	-	-	-	-	-
C6-C8	ug/L	10	nv	-	-	-	-	-	-	-	-	-
C8-C10	ug/L	10	nv	-	-	-	-	-	-	-	-	-
C10-C12	ug/L	10	nv	-	-	-	-	-	-	-	-	-
C12-C16	ug/L	10	nv	-	-	-	-	-	-	-	-	-
C16-C21	ug/L	10	nv	-	-	-	-	-	-	-	-	-
C21-C35	ug/L	10	nv	-	-	-	-	-	-	-	-	-
Total Aliphatics (MO)	ug/L	10	nv	-	-	-	-	-	-	-	-	-
Total TPH	ug/L	10	10	-	-	-	-	-	563	-	-	-
BTEX												
Benzene	ug/L	10	1	-	-	-	-	-	-	-	-	-
Toluene	ug/L	10	10	-	-	-	-	-	-	-	-	-
Ethylbenzene	ug/L	10	10	-	-	-	-	-	-	-	-	-
Total Xylene	ug/L	10	10	-	-	-	-	-	-	-	-	-
MTBE	ug/L	10	30	-	-	-	-	-	-	-	-	-
BTEX	ug/L	10	nv	-	-	-	-	-	-	-	-	-

IGV	Interim Guideline Value for Groundwater
xx	Exceeds IGV for Groundwater
MDL	Method Detection Limit
-	Less than the MDL
na	Not Analysed
nv	No Value
MO	Mineral Oil
NDP	No Determination Possible

Client: ESB
Project: Phase 2 Environmental Investigation
Location: ESB Tarbert, Co. Kerry
Job No: 49341640
Table 15: Groundwater Analytical Results: Hydrocarbons

Mainland Area

Sample Type				Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Sample ID				BH 321	BH 24	BH 25	BH1	BH5	MW202
Date				29-Oct-08	29-Oct-08	29-Oct-08	24-Oct-08	24-Oct-08	24-Oct-08
Parameters	**UNITS**	**MDL**	**IGV**						
Hydrocarbons									
Aromatics									
C6-C7	ug/L	10	nv	-	-	-	-	NDP	-
C7-C8	ug/L	10	nv	-	-	-	-	NDP	-
C8-C10	ug/L	10	nv	-	-	-	-	NDP	-
C10-C12	ug/L	10	nv	-	-	-	-	NDP	-
C12-C16	ug/L	10	nv	-	0.689	-	-	NDP	-
C16-C21	ug/L	10	nv	-	0.024	-	-	NDP	-
C21-C35	ug/L	10	nv	-	-	-	-	NDP	-
Total Aromatics	ug/L	10	nv	-	0.713	-	-	NDP	-
Aliphatics									
C5-C6	ug/L	10	nv	-	-	-	-	NDP	-
C6-C8	ug/L	10	nv	-	-	-	-	NDP	-
C8-C10	ug/L	10	nv	-	-	-	-	NDP	-
C10-C12	ug/L	10	nv	-	-	-	-	NDP	-
C12-C16	ug/L	10	nv	-	-	-	-	NDP	-
C16-C21	ug/L	10	nv	-	-	-	-	NDP	-
C21-C35	ug/L	10	nv	-	-	-	-	NDP	-
Total Aliphatics (MO)	ug/L	10	nv	-	-	-	-	NDP	-
Total TPH	ug/L	10	10	-	0.713	-	-	NDP	-
BTEX									
Benzene	ug/L	10	1	-	-	-	-	NDP	-
Toluene	ug/L	10	10	-	-	-	-	NDP	-
Ethylbenzene	ug/L	10	10	-	-	-	-	NDP	-
Total Xylene	ug/L	10	10	-	-	-	-	NDP	-
MTBE	ug/L	10	30	-	-	-	-	NDP	-
BTEX	ug/L	10	nv	-	-	-	-	NDP	-

Client: ESB
Project: Phase 2 Environmental Investigation
Location: ESB Tarbert, Co. Kerry
Job No: 49341640
Table 16: Groundwater Analytical Results: PAHs

Island Area

Sample Type				Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Sample ID				BH 309A	BH 319	BH 311	BH 306	RC 1	MW 101	MW 102	MW 103
Date				29-Oct-08	29-Oct-08	29-Oct-08	29-Oct-08	29-Oct-08	29-Oct-08	29-Oct-08	29-Oct-08
Parameter	**Units**	**MDL**	**IGV**								
PAHs											
Naphthalene	ug/L	0.01	1	-	-	-	-	-	-	-	-
Acenaphthylene	ug/L	0.01	nv	-	-	-	-	-	-	-	-
Acenaphthene	ug/L	0.01	nv	-	-	-	-	-	-	-	-
Fluorene	ug/L	0.01	nv	-	-	-	-	-	-	-	-
Phenanthrene	ug/L	0.01	nv	-	-	-	-	-	-	-	-
Anthracene	ug/L	0.01	10000	-	-	-	-	-	-	-	-
Fluoranthene**	ug/L	0.01	1	-	-	-	-	-	-	-	-
Pyrene	ug/L	0.01	nv	-	-	-	-	-	-	-	-
Benzo(a)anthracene	ug/L	0.01	nv	-	-	-	-	-	-	-	-
Chrysene	ug/L	0.01	nv	-	-	-	-	-	-	-	-
Benzo(b)+Benzo(k) fluoranthene**	ug/L	0.01	0.05*	-	-	-	-	-	-	-	-
Benzo(a)pyrene**	ug/L	0.01	0.01	-	-	-	-	-	-	-	-
Indeno(123cd)pyrene**	ug/L	0.01	0.05	-	-	-	-	-	-	-	-
Dibenzo(ah)anthracene	ug/L	0.01	nv	-	-	-	-	-	-	-	-
Benzo(ghi)perylene**	ug/L	0.01	0.05	-	-	-	-	-	-	-	-
Sum 6 PAHs	ug/L	-	0.1	-	-	-	-	-	-	-	-
Total 16 EPA PAHs	ug/L	0.01	nv	-	-	-	-	-	-	-	-

Client: ESB
Project: Phase 2 Environmental Investigation
Location: ESB Tarbert, Co. Kerry
Job No: 49341640
Table 16: Groundwater Analytical Results: PAHs

Island Area

Sample Type				Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Sample ID				RC2	BH317	BH11	BH12	MW301	BH318	BH9	BH314	BH301
Date				24-Oct-08	24-Oct-08	24-Oct-08	24-Oct-08	24-Oct-08	24-Oct-08	24-Oct-08	29-Oct-08	29-Oct-08
Parameter	Units	MDL	IGV									
PAHs												
Naphthalene	ug/L	0.01	1	-	-	-	-	-	0.104	-	-	-
Acenaphthylene	ug/L	0.01	nv	-	-	-	-	-	0.033	-	-	-
Acenaphthene	ug/L	0.01	nv	-	-	-	-	-	0.143	-	-	-
Fluorene	ug/L	0.01	nv	-	-	-	-	-	0.153	-	-	-
Phenanthrene	ug/L	0.01	nv	-	-	-	-	-	0.207	-	-	-
Anthracene	ug/L	0.01	10000	-	-	-	-	-	0.028	-	-	-
Fluoranthene**	ug/L	0.01	1	-	-	-	-	-	-	-	-	-
Pyrene	ug/L	0.01	nv	-	-	-	-	-	-	-	-	-
Benzo(a)anthracene	ug/L	0.01	nv	-	-	-	-	-	-	-	-	-
Chrysene	ug/L	0.01	nv	-	-	-	-	-	-	-	-	-
Benzo(b)+Benzo(k) fluoranthene**	ug/L	0.01	0.05*	-	-	-	-	-	-	-	-	-
Benzo(a)pyrene**	ug/L	0.01	0.01	-	-	-	-	-	-	-	-	-
Indeno(123cd)pyrene**	ug/L	0.01	0.05	-	-	-	-	-	-	-	-	-
Dibenzo(ah)anthracene	ug/L	0.01	nv	-	-	-	-	-	-	-	-	-
Benzo(ghi)perylene**	ug/L	0.01	0.05	-	-	-	-	-	-	-	-	-
Sum 6 PAHs	ug/L	-	0.1	-	-	-	-	-	-	-	-	-
Total 16 EPA PAHs	ug/L	0.01	nv	-	-	-	-	-	0.668	-	-	-

Client: ESB
Project: Phase 2 Environmental Investigation
Location: ESB Tarbert, Co. Kerry
Job No: 49341640
Table 16: Groundwater Analytical Results: PAHs

Mainland Area

Sample Type				Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Sample ID				BH 321	BH 24	BH 25	BH1	BH5	MW 202
Date				29-Oct-08	29-Oct-08	29-Oct-08	24-Oct-08	24-Oct-08	24-Oct-08
Parameter	Units	MDL	IGV						
PAHs									
Naphthalene	ug/L	0.01	1	-	0.122	-	-	NDP	-
Acenaphthylene	ug/L	0.01	nv	-	0.053	-	-	NDP	-
Acenaphthene	ug/L	0.01	nv	-	0.295	-	-	NDP	-
Fluorene	ug/L	0.01	nv	-	0.106	-	-	NDP	-
Phenanthrene	ug/L	0.01	nv	-	0.148	-	-	NDP	-
Anthracene	ug/L	0.01	10000	-	0.38	-	-	NDP	-
Fluoranthene**	ug/L	0.01	1	-	0.015	-	-	NDP	-
Pyrene	ug/L	0.01	nv	-	0.034	-	-	NDP	-
Benzo(a)anthracene	ug/L	0.01	nv	-	0.013	-	-	NDP	-
Chrysene	ug/L	0.01	nv	-	0.011	-	-	NDP	-
Benzo(b)+Benzo(k) fluoranthene**	ug/L	0.01	0.05*	-	-	-	-	NDP	-
Benzo(a)pyrene**	ug/L	0.01	0.01	-	-	-	-	NDP	-
Indeno(123cd)pyrene**	ug/L	0.01	0.05	-	-	-	-	NDP	-
Dibenzo(ah)anthracene	ug/L	0.01	nv	-	-	-	-	NDP	-
Benzo(ghi)perylene**	ug/L	0.01	0.05	-	-	-	-	NDP	-
Sum 6 PAHs	ug/L	-	0.1	-	0.015	-	-	NDP	-
Total 16 EPA PAHs	ug/L	0.01	nv	-	0.835	-	-	NDP	-

Client: ESB
Project: Phase 2 Environmental Investigation
Location: ESB Tarbert, Co. Kerry
Job No: 49341640
Table 17: Groundwater Analytical Results: Heavy Metals

Island Area

Sample Type				Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Sample ID				BH 309A	BH 319	BH 311	BH 306	RC 1	MW 101	MW 102	MW 103
Date				29-Oct-08	29-Oct-08	29-Oct-08	29-Oct-08	29-Oct-08	29-Oct-08	29-Oct-08	29-Oct-08
Parameters	**UNITS**	**MDL**	**IGV**								
Metals											
Antimony	mg/L	0.001	nv	-	0.002	-	-	-	-	0.002	-
Arsenic	mg/L	0.001	0.01	-	0.010	0.003	-	-	0.008	0.021	-
Barium	mg/L	0.001	0.1	0.003	0.029	0.068	0.008	0.008	0.020	0.094	0.024
Cadmium	mg/L	0.0004	0.005	-	-	-	-	-	-	-	-
Chromium	mg/L	0.001	0.03	0.007	0.003	0.008	0.003	0.005	0.007	0.026	0.007
Cobalt	mg/L	0.001	nv	0.004	-	-	-	-	-	0.006	0.003
Copper	mg/L	0.001	0.03	0.004	0.004	0.002	0.005	0.004	0.004	0.006	0.004
Lead	mg/L	0.001	0.01	-	-	-	-	-	-	-	-
Mercury	mg/L	0.00005	0.001	-	-	-	-	-	-	-	-
Molybdenum	mg/L	0.001	nv	-	0.036	0.011	-	0.002	0.01	0.002	0.002
Nickel	mg/L	0.001	0.02	0.002	0.002	0.003	0.002	0.002	0.004	0.005	0.004
Selenium	mg/L	0.001	nv	-	0.006	0.023	-	-	0.039	0.101	-
Vanadium	mg/L	0.001	nv	-	0.058	-	0.003	-	0.003	-	-
Zinc	mg/L	0.001	0.1	0.020	0.016	0.014	0.018	0.018	0.022	0.023	0.021

Client: ESB
Project: Phase 2 Environmental Investigation
Location: ESB Tarbert, Co. Kerry
Job No: 49341640
Table 17: Groundwater Analytical Results: Heavy Metals

Island Area

Sample Type				Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Sample ID				RC2	BH317	BH11	BH12	MW301	BH318	BH9	BH314	BH301
Date				24-Oct-08	24-Oct-08	24-Oct-08	24-Oct-08	24-Oct-08	24-Oct-08	24-Oct-08	29-Oct-08	29-Oct-08
Parameters	**UNITS**	**MDL**	**IGV**									
Metals												
Antimony	mg/L	0.001	nv	-	0.003	-	-	-	-	-	-	-
Arsenic	mg/L	0.001	0.01	-	-	-	-	-	-	-	-	-
Barium	mg/L	0.001	0.1	0.037	0.012	0.01	0.005	0.028	0.318	0.542	0.013	0.099
Cadmium	mg/L	0.0004	0.005	-	0.0019	-	-	0.0035	-	-	-	-
Chromium	mg/L	0.001	0.03	0.003	-	-	-	-	0.004	0.003	0.009	0.007
Cobalt	mg/L	0.001	nv	0.078	0.026	0.011	0.002	0.012	-	0.002	0.002	-
Copper	mg/L	0.001	0.03	0.001	0.009	0.004	-	0.001	-	0.001	-	-
Lead	mg/L	0.001	0.01	-	0.001	-	-	-	-	-	-	-
Mercury	mg/L	0.00005	0.001	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	0.001	nv	-	-	-	-	-	0.002	0.001	0.014	0.01
Nickel	mg/L	0.001	0.02	0.065	0.012	0.006	0.007	0.012	0.003	0.003	-	-
Selenium	mg/L	0.001	nv	-	0.002	-	-	-	0.019	0.004	-	-
Vanadium	mg/L	0.001	nv	0.006	0.004	0.001	0.003	0.007	0.012	0.009	0.544	-
Zinc	mg/L	0.001	0.1	0.013	0.002	0.011	0.019	0.011	0.017	0.004	0.014	0.016

Client: ESB
Project: Phase 2 Environmental Investigation
Location: ESB Tarbert, Co. Kerry
Job No: 49341640
Table 17: Groundwater Analytical Results: Heavy Metals

Mainland Area

Sample Type				Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Sample ID				BH 321	BH 24	BH 25	BH1	BH5	MW 202
Date				29-Oct-08	29-Oct-08	29-Oct-08	24-Oct-08	24-Oct-08	24-Oct-08
Parameters	**UNITS**	**MDL**	**IGV**						
Metals									
Antimony	mg/L	0.001	nv	-	0.001	0.001	0.001	0.003	0.001
Arsenic	mg/L	0.001	0.01	0.01	0.002	-	-	-	0.001
Barium	mg/L	0.001	0.1	0.147	0.003	-	0.047	0.32	0.019
Cadmium	mg/L	0.0004	0.005	-	-	-	-	-	-
Chromium	mg/L	0.001	0.03	0.006	0.003	0.003	-	0.01	0.001
Cobalt	mg/L	0.001	nv	0.004	0.005	-	-	-	0.015
Copper	mg/L	0.001	0.03	0.002	0.002	0.001	0.003	0.021	0.004
Lead	mg/L	0.001	0.01	-	-	-	0.001	0.017	0.002
Mercury	mg/L	0.00005	0.001	-	-	-	-	-	-
Molybdenum	mg/L	0.001	nv	0.002	-	-	0.009	0.013	0.003
Nickel	mg/L	0.001	0.02	0.004	0.002	-	0.013	0.025	0.059
Selenium	mg/L	0.001	nv	0.046	0.004	0.002	-	-	-
Vanadium	mg/L	0.001	nv	-	-	-	0.981	1.411	0.006
Zinc	mg/L	0.001	0.1	0.019	0.013	0.015	-	0.1	0.063

Client: ESB
Project: Phase 2 Environmental Investigation
Location: ESB Tarbert, Co. Kerry
Job No: 49341640
Table 18: Groundwater Analytical Results: Various

Island Area

Sample Type				Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Sample ID				BH 309A	BH 319	BH 311	BH 306	RC 1	MW 101	MW 102	MW 103
Date				28-Oct-08	28-Oct-08	28-Oct-08	28-Oct-08	28-Oct-08	28-Oct-08	28-Oct-08	28-Oct-08
Parameter	**Units**	**MDL**	**IGV**								
Anions and Cations											
Aluminium	mg/L	0.002	0.2	0.002	-	-	0.124	-	-	-	-
Boron	mg/L	0.003	1	0.057	0.542	1.045	0.031	0.082	1.928	3.298	0.234
Calcium	mg/L	0.12	200	26.68	82.320	104.500	39.760	75.920	129.500	226.400	72.99
Chloride	mg/L	1	30	43	1736	4636	56	467	6961	16956	292
Fluoride	mg/L	0.1	1	0.4	1	0.7	0.3	0.3	0.8	1.8	0.4
Iron	mg/L	0.002	0.2	3.197	0.038	0.008	0.273	-	-	0.062	-
Potassium (Total as K)	mg/L	0.2	5	7.5	49.9	93.8	6.8	7.8	154.2	248.8	9.6
Managanese	mg/L	0.001	0.05	12.38	1.270	0.611	0.672	1.273	0.623	8.416	17.52
Sodium (Total as Na)	mg/L	0.2	150	53.2	980.6	2692	49.6	205.2	4062	7161	230.7
Sulphate	mg/L	3	200	-	179	637	29	43	748	-	-
Alkalinity as $CaCO_3$	mg/L	1	nv	220	383	380	160	180	560	2260	500
Total Hardness as $CaCO_3$	mg/L	1	200	125	577	1159	143	323	1609	3528	326
Total Dissolved Solids (TDS)	mg/L	5	1000	240	2980	8970	601	910	11800	22700	797
Nutrients											
Ammonia*	mg/L	0.257	0.15	-	3.472	8.745	0.257	0.386	3.472	100.308	5.401
Nitrate (as NO_3)	mg/L	0.3	25	-	-	-	1.2	0.4	-	-	1.1
Nitrite (as NO_2)	mg/L	0.05	0.1	-	0.27	0.06	0.09	0.15	0.24	-	2.15
Phosphate	mg/L	0.03	0.03	0.12	-	-	-	-	0.52	3.27	-
Miscellaneous											
Electrical Conductivity	mS/cm	0.014	1	0.505	2.576	14	0.513	1.575	20	36	1.668
pH	pH Units	na	>6.5 - <9.5	6.68	7.86	7.54	7.12	7.5	7.68	7.58	7.16
Redox Potential	mV	na	nv	150	18	180	200	160	170	170	170
Total Phenols	mg/L	0.01	0.0005	0.08	0.08	0.08	0.08	0.08	0.08	0.05	0.08
Total Cyanide	mg/L	0.05	0.01	-	-	-	-	-	-	-	-

Client: ESB
Project: Phase 2 Environmental Investigation
Location: ESB Tarbert, Co. Kerry
Job No: 49341640
Table 18: Groundwater Analytical Results: Various

Island Area

Sample Type				Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Sample ID				RC2	BH317	BH11	BH12	MW301	BH318	BH9	BH314	BH301
Date				24-Oct-08	24-Oct-08	24-Oct-08	24-Oct-08	24-Oct-08	24-Oct-08	24-Oct-08	29-Oct-08	29-Oct-08
Parameter	**Units**	**MDL**	**IGV**									
Anions and Cations												
Aluminium	mg/L	0.002	0.2	0.003	0.144	-	0.025	-	-	-	-	0.048
Boron	mg/L	0.003	1	0.087	0.028	0.019	0.049	0.031	0.318	0.072	0.022	0.006
Calcium	mg/L	0.12	200	99.01	16.33	8.463	18.2	151.4	186.1	76.43	34.41	8.889
Chloride	mg/L	1	30	565	137	74	179	103	4,975	1,643	14	57
Fluoride	mg/L	0.1	1	0.5	0.4	0.3	0.2	-	0.4	0.6	0.3	4.7
Iron	mg/L	0.002	0.2	-	0.017	-	-	-	0.328	-	0.023	0.104
Potassium (Total as K)	mg/L	0.2	5	10.1	4	2.4	1	5.3	106.5	52.1	3.2	3.2
Managanese	mg/L	0.001	0.05	2.507	2.39	1.523	3.939	3.921	1.874	3.602	0.098	0.347
Sodium (Total as Na)	mg/L	0.2	150	261.9	105.5	68.3	147.8	234.8	2112	934.9	31.3	105.1
Sulphate	mg/L	3	200	13	26	42	55	963	460	24	47	28
Alkalinity as $CaCO_3$	mg/L	1	nv	340	190	89	150	150	230	510	150	130
Total Hardness as $CaCO_3$	mg/L	1	200	411	119	53	100	699	602	453	138	33
Total Dissolved Solids (TDS)	mg/L	5	1000	6980	2780	1100	382	128	303	408	185	255
Nutrients												
Ammonia*	mg/L	0.257	0.15	2.186	4.372	6.301	12.474	98.379	23.277	8.102	-	1.929
Nitrate (as NO_3)	mg/L	0.3	25	-	-	0.9	-	-	-	-	1	0.3
Nitrite (as NO_2)	mg/L	0.05	0.1	-	-	-	-	-	-	0.19	-	-
Phosphate	mg/L	0.03	0.03	-	-	0.03	0.07	-	0.03	-	0.08	0.09
Miscellaneous												
Electrical Conductivity	mS/cm	0.014	1	2.092	0.771	0.464	0.9	2.111	13	5	0.39	0.514
pH	pH Units	na	>6.5 - <9.5	6.53	6.13	6.5	6.18	6.48	6.82	7.03	7.7	7.97
Redox Potential	mV	na	nv	150	150	140	140	140	0	160	120	130
Total Phenols	mg/L	0.01	0.0005	-	0.02	0.04	0.02	0.01	0.01	0.02	0.07	0.09
Total Cyanide	mg/L	0.05	0.01	-	-	-	-	-	-	-	-	-

Client: ESB
Project: Phase 2 Environmental Investigation
Location: ESB Tarbert, Co. Kerry
Job No: 49341640
Table 18: Groundwater Analytical Results: Various

Mainland Area

Sample Type				Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Sample ID				BH 321	BH 24	BH 25	BH1	BH5	MW202
Date				29-Oct-08	29-Oct-08	29-Oct-08	24-Oct-08	24-Oct-08	24-Oct-08
Parameter	**Units**	**MDL**	**IGV**						
Anions and Cations									
Aluminium	mg/L	0.002	0.2	-	0.033	0.003	0.019	2.75	0.05
Boron	mg/L	0.003	1	1.242	0.044	0.037	0.076	0.048	0.039
Calcium	mg/L	0.12	200	153.8	35.47	24.02	29.18	74.22	27.66
Chloride	mg/L	1	30	5475	82	-	45	36	155
Fluoride	mg/L	0.1	1	0.9	-	-	0.3	0.4	0.3
Iron	mg/L	0.002	0.2	-	0.984	-	0.038	1.324	-
Potassium (Total as K)	mg/L	0.2	5	120	3.7	3.6	2.8	5.2	4
Managanese	mg/L	0.001	0.05	11.92	8.314	0.003	1.084	0.15	2.023
Sodium (Total as Na)	mg/L	0.2	150	3254	47.2	52.4	39.8	42	88.6
Sulphate	mg/L	3	200	665	7	20	10	17	92
Alkalinity as $CaCO_3$	mg/L	1	nv	150	150	100	140	310	130
Total Hardness as $CaCO_3$	mg/L	1	200	1655	136	108	114	282	182
Total Dissolved Solids (TDS)	mg/L	5	1000	9980	254	229	216	23300	205
Nutrients									
Ammonia*	mg/L	0.257	0.15	1.800	1.415	-	5.530	na	1.029
Nitrate (as NO_3)	mg/L	0.3	25	-	-	4.8	2.8	na	-
Nitrite (as NO_2)	mg/L	0.05	0.1	-	0.07	0.06	1.01	na	-
Phosphate	mg/L	0.03	0.03	0.03	-	-	0.06	na	0.04
Miscellaneous									
Electrical Conductivity	mS/cm	0.014	1	15.5	0.529	0.479	0.402	0.68	0.805
pH	pH Units	na	>6.5 - <9.5	6.74	6.77	7.01	7.25	7.82	6.37
Redox Potential	mV	na	nv	170	150	140	140	130	150
Total Phenols	mg/L	0.01	0.0005	0.08	0.07	0.07	-	0.02	0.01
Total Cyanide	mg/L	0.05	0.01	-	-	-	-	-	-

IGV Interim Guideline Value for Groundwater

Sample Type				Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Sample ID				BH 309A	BH 319	BH 311	BH 306	RC 1	MW 101
Date				28-Oct-08	28-Oct-08	28-Oct-08	28-Oct-08	28-Oct-08	28-Oct-08
Parameters	**Units**	**MDL**	**IGV**						
Dichlorodifluoromethane	ug/l	3.0	nv	-	-	-	-	-	-
Chloromethane	ug/l	1.0	nv	-	-	-	-	-	-
Vinyl Chloride	ug/l	3.0	nv	-	-	-	-	-	-
Bromomethane	ug/l	3.0	nv	-	-	-	-	-	-
Chloroethane	ug/l	2.0	nv	-	-	-	-	-	-
Trichlorofluoromethane	ug/l	1.0	nv	-	-	-	-	-	-
1,1-Dichloroethene	ug/l	2.0	nv	-	-	-	-	-	-
Carbon Disulphide	ug/l	1.0	nv	-	-	-	-	-	-
Dichloromethane	ug/l	2.0	10	-	-	-	-	-	-
Tert-butyl methyl ether	ug/l	1.0	30	-	-	-	-	-	-
Trans-1,2-Dichloroethene	ug/l	2.0	nv	-	-	-	-	-	-
1,1-Dichloroethane	ug/l	1.0	nv	-	-	-	-	-	-
Cis-1,2-Dichloroethene	ug/l	2.0	nv	-	-	-	-	-	-
2,2-Dichloropropane	ug/l	2.0	nv	-	-	-	-	-	-
Bromochloromethane	ug/l	2.0	nv	-	-	-	-	-	-
Chloroform	ug/l	1.0	12	-	-	-	-	-	-
1,1,1-Trichloroethane	ug/l	2.0	500	-	-	-	-	-	-
1,1-Dichloropropene	ug/l	2.0	nv	-	-	-	-	-	-
Carbontetrachloride	ug/l	1.0	nv	-	-	-	-	-	-
1,2-Dichloroethane	ug/l	2.0	3	-	-	-	-	-	-
Benzene	ug/l	1.0	1	-	-	-	-	-	-
Trichloroethene	ug/l	1.5	70	-	-	-	-	-	-
1,2-Dichloropropane	ug/l	2.0	nv	-	-	-	-	-	-
Dibromomethane	ug/l	3.0	nv	-	-	-	-	-	-
Bromodichloromethane	ug/l	3.0	nv	-	-	-	-	-	-
Cis-1,3-Dichloropropene	ug/l	1.0	nv	-	-	-	-	-	-
Toluene	ug/l	1.0	10	-	-	-	-	-	-
Trans-1,3-Dichloropropene	ug/l	2.0	nv	-	-	-	-	-	-
1,1,2-Trichloroethane	ug/l	3.0	nv	-	-	-	-	-	-
1,3-Dichloropropane	ug/l	2.0	nv	-	-	-	-	-	-
Tetrachloroethene	ug/l	0.4	40	-	-	-	-	-	-
Dibromochloromethane	ug/l	3.0	nv	-	-	-	-	-	-
1,2-Dibromoethane	ug/l	2.5	nv	-	-	-	-	-	-
Chlorobenzene	ug/l	1.0	1	-	-	-	-	-	-
1,1,1,2-tetrachloroethane	ug/l	1.0	nv	-	-	-	-	-	-
Ethylbenzene	ug/l	1.0	10	-	-	-	-	-	-
p/m-Xylene	ug/l	1.0	10	-	-	-	-	-	-
o-Xylene	ug/l	1.5	10	-	-	-	-	-	-
Styrene	ug/l	1.0	nv	-	-	-	-	-	-
Bromoform	ug/l	3.0	nv	-	-	-	-	-	-
Isopropylbenzene	ug/l	1.0	nv	-	-	-	-	-	-
1,1,2,2-Tetrachloroethane	ug/l	3.0	nv	-	-	-	-	-	-
1,2,3-Trichloropropane	ug/l	2.0	nv	-	-	-	-	-	-
Bromobenzene	ug/l	1.0	nv	-	-	-	-	-	-
Propylbenzene	ug/l	1.0	nv	-	-	-	-	-	-
2-Chlorotoluene	ug/l	2.0	nv	-	-	-	-	-	-
1,3,5-Trimethylbenzene	ug/l	1.0	nv	-	-	-	-	-	-
4-Chlorotoluene	ug/l	1.0	nv	-	-	-	-	-	-
Tert-Butylbenzene	ug/l	1.0	nv	-	-	-	-	-	-
1,2,4-Trimethylbenzene	ug/l	1.5	nv	-	-	-	-	-	-
Sec-Butylbenzene	ug/l	1.0	nv	-	-	-	-	-	-
4-Isopropyltoluene	ug/l	1.0	nv	-	-	-	-	-	-
1,3-Dichlorobenzene	ug/l	2.0	nv	-	-	-	-	-	-
1,4-Dichlorobenzene	ug/l	3.0	nv	-	-	-	-	-	-
n-Butylbenzene	ug/l	1.0	nv	-	-	-	-	-	-
1,2-Dichlorobenzene	ug/l	2.0	10	-	-	-	-	-	-
1,2-Dibromo-3-Chloropropan	ug/l	5.0	nv	-	-	-	-	-	-
1,2,4-Trichlorobenzene	ug/l	4.0	0.4	-	-	-	-	-	-
Hexachlorobutadiene	ug/l	1.0	0.1	-	-	-	-	-	-
Naphthalene	ug/l	2.0	1	-	-	-	-	-	-
1,2,3-Trichlorobenzene	ug/l	2.0	nv	-	-	-	-	-	-
VOC TICs	ug/l	nv	nv	nd	nd	nd	nd	nd	nd

Client: ESB
Project: Phase 2 Environmental Investigation
Location: ESB Tarbert, Co. Kerry
Job No: 49341640
Table 19: Groundwater Analytical Results: VOCs

Island Area

Sample Type				Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Sample ID				MW 102	MW 103	RC2	BH317	BH11	BH12
Date				29-Oct-08	28-Oct-09	24-Oct-08	24-Oct-08	24-Oct-08	24-Oct-08
Parameters	Units	MDL	IGV						
Dichlorodifluoromethane	ug/l	3.0	nv	-	-	-*	-*	-*	-*
Chloromethane	ug/l	1.0	nv	-	-	-*	-*	-*	-*
Vinyl Chloride	ug/l	3.0	nv	-	-	-*	-*	-*	-*
Bromomethane	ug/l	3.0	nv	-	-	-*	-*	-*	-*
Chloroethane	ug/l	2.0	nv	-	-	-*	-*	-*	-*
Trichlorofluoromethane	ug/l	1.0	nv	-	-	-*	-*	-*	-*
1,1-Dichloroethene	ug/l	2.0	nv	-	-	-*	-*	-*	-*
Carbon Disulphide	ug/l	1.0	nv	-	-	-*	-*	-*	-*
Dichloromethane	ug/l	2.0	10	-	-	-*	-*	-*	-*
Tert-butyl methyl ether	ug/l	1.0	30	-	-	-*	-*	-*	-*
Trans-1,2-Dichloroethene	ug/l	2.0	nv	-	-	-*	-*	-*	-*
1,1-Dichloroethane	ug/l	1.0	nv	-	-	-*	-*	-*	-*
Cis-1,2-Dichloroethene	ug/l	2.0	nv	-	-	-*	-*	-*	-*
2,2-Dichloropropane	ug/l	2.0	nv	-	-	-*	-*	-*	-*
Bromochloromethane	ug/l	2.0	nv	-	-	-*	-*	-*	-*
Chloroform	ug/l	1.0	12	-	-	-*	-*	-*	-*
1,1,1-Trichloroethane	ug/l	2.0	500	-	-	-*	-*	-*	-*
1,1-Dichloropropene	ug/l	2.0	nv	-	-	-*	-*	-*	-*
Carbontetrachloride	ug/l	1.0	nv	-	-	-*	-*	-*	-*
1,2-Dichloroethane	ug/l	2.0	3	-	-	-*	-*	-*	-*
Benzene	ug/l	1.0	1	-	-	-*	-*	-*	-*
Trichloroethene	ug/l	1.5	70	-	-	-*	-*	-*	-*
1,2-Dichloropropane	ug/l	2.0	nv	-	-	-*	-*	-*	-*
Dibromomethane	ug/l	3.0	nv	-	-	-*	-*	-*	-*
Bromodichloromethane	ug/l	3.0	nv	-	-	-*	-*	-*	-*
Cis-1,3-Dichloropropene	ug/l	1.0	nv	-	-	-*	-*	-*	-*
Toluene	ug/l	1.0	10	-	-	-*	-*	-*	-*
Trans-1,3-Dichloropropene	ug/l	2.0	nv	-	-	-*	-*	-*	-*
1,1,2-Trichloroethane	ug/l	3.0	nv	-	-	-*	-*	-*	-*
1,3-Dichloropropane	ug/l	2.0	nv	-	-	-*	-*	-*	-*
Tetrachloroethene	ug/l	0.4	40	-	-	-*	-*	-*	-*
Dibromochloromethane	ug/l	3.0	nv	-	-	-*	-*	-*	-*
1,2-Dibromoethane	ug/l	2.5	nv	-	-	-*	-*	-*	-*
Chlorobenzene	ug/l	1.0	1	-	-	-*	-*	-*	-*
1,1,1,2-tetrachloroethane	ug/l	1.0	nv	-	-	-*	-*	-*	-*
Ethylbenzene	ug/l	1.0	10	-	-	-*	-*	-*	-*
p/m-Xylene	ug/l	1.0	10	-	-	-*	-*	-*	-*
o-Xylene	ug/l	1.5	10	-	-	-*	-*	-*	-*
Styrene	ug/l	1.0	nv	-	-	-*	-*	-*	-*
Bromoform	ug/l	3.0	nv	-	-	-*	-*	-*	-*
Isopropylbenzene	ug/l	1.0	nv	-	-	-*	-*	-*	-*
1,1,2,2-Tetrachloroethane	ug/l	3.0	nv	-	-	-*	-*	-*	-*
1,2,3-Trichloropropane	ug/l	2.0	nv	-	-	-*	-*	-*	-*
Bromobenzene	ug/l	1.0	nv	-	-	-*	-*	-*	-*
Propylbenzene	ug/l	1.0	nv	-	-	-*	-*	-*	-*
2-Chlorotoluene	ug/l	2.0	nv	-	-	-*	-*	-*	-*
1,3,5-Trimethylbenzene	ug/l	1.0	nv	-	-	-*	-*	-*	-*
4-Chlorotoluene	ug/l	1.0	nv	-	-	-*	-*	-*	-*
Tert-Butylbenzene	ug/l	1.0	nv	-	-	-*	-*	-*	-*
1,2,4-Trimethylbenzene	ug/l	1.5	nv	-	-	-*	-*	-*	-*
Sec-Butylbenzene	ug/l	1.0	nv	-	-	-*	-*	-*	-*
4-Isopropyltoluene	ug/l	1.0	nv	-	-	-*	-*	-*	-*
1,3-Dichlorobenzene	ug/l	2.0	nv	-	-	-*	-*	-*	-*
1,4-Dichlorobenzene	ug/l	3.0	nv	-	-	-*	-*	-*	-*
n-Butylbenzene	ug/l	1.0	nv	-	-	-*	-*	-*	-*
1,2-Dichlorobenzene	ug/l	2.0	10	-	-	-*	-*	-*	-*
1,2-Dibromo-3-Chloropropan	ug/l	5.0	nv	-	-	-*	-*	-*	-*
1,2,4-Trichlorobenzene	ug/l	4.0	0.4	-	-	-*	-*	-*	-*
Hexachlorobutadiene	ug/l	1.0	0.1	-	-	-*	-*	-*	-*
Naphthalene	ug/l	2.0	1	-	-	-*	-*	-*	-*
1,2,3-Trichlorobenzene	ug/l	2.0	nv	-	-	-*	-*	-*	-*
VOC TICs	ug/l	nv	nv	nd	nd	nd	nd	nd	nd

Client: ESB
Project: Phase 2 Environmental Investigation
Location: ESB Tarbert, Co. Kerry
Job No: 49341640
Table 19: Groundwater Analytical Results: VOCs

Island Area

Sample Type				Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Sample ID				MW301	BH318	BH9	BH314	BH301
Date				24-Oct-08	24-Oct-08	24-Oct-08	29-Oct-08	29-Oct-08
Parameters	**Units**	**MDL**	**IGV**					
Dichlorodifluoromethane	ug/l	3.0	nv	-*	-*	-*	-*	-*
Chloromethane	ug/l	1.0	nv	-*	-*	-*	-*	-*
Vinyl Chloride	ug/l	3.0	nv	-*	-*	-*	-*	-*
Bromomethane	ug/l	3.0	nv	-*	-*	-*	-*	-*
Chloroethane	ug/l	2.0	nv	-*	-*	-*	-*	-*
Trichlorofluoromethane	ug/l	1.0	nv	-*	-*	-*	-*	-*
1,1-Dichloroethene	ug/l	2.0	nv	-*	-*	-*	-*	-*
Carbon Disulphide	ug/l	1.0	nv	-*	-*	-*	-*	-*
Dichloromethane	ug/l	2.0	10	-*	-*	-*	-*	-*
Tert-butyl methyl ether	ug/l	1.0	30	-*	-*	-*	-*	-*
Trans-1,2-Dichloroethene	ug/l	2.0	nv	-*	-*	-*	-*	-*
1,1-Dichloroethane	ug/l	1.0	nv	-*	-*	-*	-*	-*
Cis-1,2-Dichloroethene	ug/l	2.0	nv	-*	-*	-*	-*	-*
2,2-Dichloropropane	ug/l	2.0	nv	-*	-*	-*	-*	-*
Bromochloromethane	ug/l	2.0	nv	-*	-*	-*	-*	-*
Chloroform	ug/l	1.0	12	-*	-*	-*	-*	-*
1,1,1-Trichloroethane	ug/l	2.0	500	-*	-*	-*	-*	-*
1,1-Dichloropropene	ug/l	2.0	nv	-*	-*	-*	-*	-*
Carbontetrachloride	ug/l	1.0	nv	-*	-*	-*	-*	-*
1,2-Dichloroethane	ug/l	2.0	3	-*	-*	-*	-*	-*
Benzene	ug/l	1.0	1	-*	-*	-*	-*	-*
Trichloroethene	ug/l	1.5	70	-*	-*	-*	-*	-*
1,2-Dichloropropane	ug/l	2.0	nv	-*	-*	-*	-*	-*
Dibromomethane	ug/l	3.0	nv	-*	-*	-*	-*	-*
Bromodichloromethane	ug/l	3.0	nv	-*	-*	-*	-*	-*
Cis-1,3-Dichloropropene	ug/l	1.0	nv	-*	-*	-*	-*	-*
Toluene	ug/l	1.0	10	-*	-*	-*	-*	-*
Trans-1,3-Dichloropropene	ug/l	2.0	nv	-*	-*	-*	-*	-*
1,1,2-Trichloroethane	ug/l	3.0	nv	-*	-*	-*	-*	-*
1,3-Dichloropropane	ug/l	2.0	nv	-*	-*	-*	-*	-*
Tetrachloroethene	ug/l	0.4	40	-*	-*	-*	-*	-*
Dibromochloromethane	ug/l	3.0	nv	-*	-*	-*	-*	-*
1,2-Dibromoethane	ug/l	2.5	nv	-*	-*	-*	-*	-*
Chlorobenzene	ug/l	1.0	1	-*	-*	-*	-*	-*
1,1,1,2-tetrachloroethane	ug/l	1.0	nv	-*	-*	-*	-*	-*
Ethylbenzene	ug/l	1.0	10	-*	-*	-*	-*	-*
p/m-Xylene	ug/l	1.0	10	-*	-*	-*	-*	-*
o-Xylene	ug/l	1.5	10	-*	-*	-*	-*	-*
Styrene	ug/l	1.0	nv	-*	-*	-*	-*	-*
Bromoform	ug/l	3.0	nv	-*	-*	-*	-*	-*
Isopropylbenzene	ug/l	1.0	nv	-*	-*	-*	-*	-*
1,1,2,2-Tetrachloroethane	ug/l	3.0	nv	-*	-*	-*	-*	-*
1,2,3-Trichloropropane	ug/l	2.0	nv	-*	-*	-*	-*	-*
Bromobenzene	ug/l	1.0	nv	-*	-*	-*	-*	-*
Propylbenzene	ug/l	1.0	nv	-*	-*	-*	-*	-*
2-Chlorotoluene	ug/l	2.0	nv	-*	-*	-*	-*	-*
1,3,5-Trimethylbenzene	ug/l	1.0	nv	-*	-*	-*	-*	-*
4-Chlorotoluene	ug/l	1.0	nv	-*	-*	-*	-*	-*
Tert-Butylbenzene	ug/l	1.0	nv	-*	-*	-*	-*	-*
1,2,4-Trimethylbenzene	ug/l	1.5	nv	-*	-*	-*	-*	-*
Sec-Butylbenzene	ug/l	1.0	nv	-*	-*	-*	-*	-*
4-Isopropyltoluene	ug/l	1.0	nv	-*	-*	-*	-*	-*
1,3-Dichlorobenzene	ug/l	2.0	nv	-*	-*	-*	-*	-*
1,4-Dichlorobenzene	ug/l	3.0	nv	-*	-*	-*	-*	-*
n-Butylbenzene	ug/l	1.0	nv	-*	-*	-*	-*	-*
1,2-Dichlorobenzene	ug/l	2.0	10	-*	-*	-*	-*	-*
1,2-Dibromo-3-Chloropropan	ug/l	5.0	nv	-*	-*	-*	-*	-*
1,2,4-Trichlorobenzene	ug/l	4.0	0.4	-*	-*	-*	-*	-*
Hexachlorobutadiene	ug/l	1.0	0.1	-*	-*	-*	-*	-*
Naphthalene	ug/l	2.0	1	-*	-*	-*	-*	-*
1,2,3-Trichlorobenzene	ug/l	2.0	nv	-*	-*	-*	-*	-*
VOC TICs	ug/l	nv	nv	nd	nd	nd	nd	nd

Client: ESB
Project: Phase 2 Environmental Investigation
Location: ESB Tarbert, Co. Kerry
Job No: 49341640
Table 19: Groundwater Analytical Results: VOCs

Mainland Area

Sample Type				Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Sample ID				BH 321	BH 24	BH 25	BH1	BH5	MW202
Date				29-Oct-08	29-Oct-08	29-Oct-08	24-Oct-08	24-Oct-08	24-Oct-08
Parameters	**Units**	**MDL**	**IGV**						
Dichlorodifluoromethane	ug/l	3.0	nv	-	-	-	-*	-*	-*
Chloromethane	ug/l	1.0	nv	-	-	-	-*	-*	-*
Vinyl Chloride	ug/l	3.0	nv	-	-	-	-*	-*	-*
Bromomethane	ug/l	3.0	nv	-	-	-	-*	-*	-*
Chloroethane	ug/l	2.0	nv	-	-	-	-*	-*	-*
Trichlorofluoromethane	ug/l	1.0	nv	-	-	-	-*	-*	-*
1,1-Dichloroethene	ug/l	2.0	nv	-	-	-	-*	-*	-*
Carbon Disulphide	ug/l	1.0	nv	-	-	-	-*	-*	-*
Dichloromethane	ug/l	2.0	10	-	-	-	-*	-*	-*
Tert-butyl methyl ether	ug/l	1.0	30	-	-	-	-*	-*	-*
Trans-1,2-Dichloroethene	ug/l	2.0	nv	-	-	-	-*	-*	-*
1,1-Dichloroethane	ug/l	1.0	nv	-	-	-	-*	-*	-*
Cis-1,2-Dichloroethene	ug/l	2.0	nv	-	-	-	-*	-*	-*
2,2-Dichloropropane	ug/l	2.0	nv	-	-	-	-*	-*	-*
Bromochloromethane	ug/l	2.0	nv	-	-	-	-*	-*	-*
Chloroform	ug/l	1.0	12	-	-	-	-*	-*	-*
1,1,1-Trichloroethane	ug/l	2.0	500	-	-	-	-*	-*	-*
1,1-Dichloropropene	ug/l	2.0	nv	-	-	-	-*	-*	-*
Carbontetrachloride	ug/l	1.0	nv	-	-	-	-*	-*	-*
1,2-Dichloroethane	ug/l	2.0	3	-	-	-	-*	-*	-*
Benzene	ug/l	1.0	1	-	-	-	-*	-*	-*
Trichloroethene	ug/l	1.5	70	-	-	-	-*	-*	-*
1,2-Dichloropropane	ug/l	2.0	nv	-	-	-	-*	-*	-*
Dibromomethane	ug/l	3.0	nv	-	-	-	-*	-*	-*
Bromodichloromethane	ug/l	3.0	nv	-	-	-	-*	-*	-*
Cis-1,3-Dichloropropene	ug/l	1.0	nv	-	-	-	-*	-*	-*
Toluene	ug/l	1.0	10	-	-	-	-*	-*	-*
Trans-1,3-Dichloropropene	ug/l	2.0	nv	-	-	-	-*	-*	-*
1,1,2-Trichloroethane	ug/l	3.0	nv	-	-	-	-*	-*	-*
1,3-Dichloropropane	ug/l	2.0	nv	-	-	-	-*	-*	-*
Tetrachloroethene	ug/l	0.4	40	-	-	-	-*	-*	-*
Dibromochloromethane	ug/l	3.0	nv	-	-	-	-*	-*	-*
1,2-Dibromoethane	ug/l	2.5	nv	-	-	-	-*	-*	-*
Chlorobenzene	ug/l	1.0	1	-	-	-	-*	-*	-*
1,1,1,2-tetrachloroethane	ug/l	1.0	nv	-	-	-	-*	-*	-*
Ethylbenzene	ug/l	1.0	10	-	-	-	-*	-*	-*
p/m-Xylene	ug/l	1.0	10	-	-	-	-*	-*	-*
o-Xylene	ug/l	1.5	10	-	-	-	-*	-*	-*
Styrene	ug/l	1.0	nv	-	-	-	-*	-*	-*
Bromoform	ug/l	3.0	nv	-	-	-	-*	-*	-*
Isopropylbenzene	ug/l	1.0	nv	-	-	-	-*	-*	-*
1,1,2,2-Tetrachloroethane	ug/l	3.0	nv	-	-	-	-*	-*	-*
1,2,3-Trichloropropane	ug/l	2.0	nv	-	-	-	-*	-*	-*
Bromobenzene	ug/l	1.0	nv	-	-	-	-*	-*	-*
Propylbenzene	ug/l	1.0	nv	-	-	-	-*	-*	-*
2-Chlorotoluene	ug/l	2.0	nv	-	-	-	-*	-*	-*
1,3,5-Trimethylbenzene	ug/l	1.0	nv	-	-	-	-*	-*	-*
4-Chlorotoluene	ug/l	1.0	nv	-	-	-	-*	-*	-*
Tert-Butylbenzene	ug/l	1.0	nv	-	-	-	-*	-*	-*
1,2,4-Trimethylbenzene	ug/l	1.5	nv	-	-	-	-*	-*	-*
Sec-Butylbenzene	ug/l	1.0	nv	-	-	-	-*	-*	-*
4-Isopropyltoluene	ug/l	1.0	nv	-	-	-	-*	-*	-*
1,3-Dichlorobenzene	ug/l	2.0	nv	-	-	-	-*	-*	-*
1,4-Dichlorobenzene	ug/l	3.0	nv	-	-	-	-*	-*	-*
n-Butylbenzene	ug/l	1.0	nv	-	-	-	-*	-*	-*
1,2-Dichlorobenzene	ug/l	2.0	10	-	-	-	-*	-*	-*
1,2-Dibromo-3-Chloropropan	ug/l	5.0	nv	-	-	-	-*	-*	-*
1,2,4-Trichlorobenzene	ug/l	4.0	0.4	-	-	-	-*	-*	-*
Hexachlorobutadiene	ug/l	1.0	0.1	-	-	-	-*	-*	-*
Naphthalene	ug/l	2.0	1	-	-	-	-*	-*	-*
1,2,3-Trichlorobenzene	ug/l	2.0	nv	-	-	-	-*	-*	-*
VOC TICs	ug/l	nv	nv	nd	nd	nd	nd	nd	nd

Client: ESB
Project: Phase 2 Environmental Investigation
Location: ESB Tarbert, Co. Kerry
Job No: 49341640
Table 20: Groundwater Analytical Results: SVOCs

				Island Area				
Sample Type				Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Sample ID				BH 309A	BH 319	BH 311	BH 306	RC 1
Date				28-Oct-08	28-Oct-08	28-Oct-08	28-Oct-08	28-Oct-08
Parameters	**Units**	**MDL**	**IGV**					
Phenol	ug/l	1	0.5	-	-	-	-	-
2-Chlorophenol	ug/l	1	200	-	-	-	-	-
2-Methylphenol	ug/l	1	nv	-	-	-	-	-
4-Methylphenol	ug/l	1	nv	-	-	-	-	-
2-Nitrophenol	ug/l	1	nv	-	-	-	-	-
4-Nitrophenol	ug/l	1	nv	-	-	-	-	-
2,4-Dichlorophenol	ug/l	1	nv	-	-	-	-	-
2,4-Dimethylphenol	ug/l	1	nv	-	-	-	-	-
4-Chloro-3-methylphenol	ug/l	1	nv	-	-	-	-	-
2,4,6-Trichlorophenol	ug/l	1	200	-	-	-	-	-
2,4,5-Trichlorophenol	ug/l	1	nv	-	-	-	-	-
Pentachlorophenol	ug/l	1	2	-	-	-	-	-
1,3-Dichlorobenzene	ug/l	1	nv	-	-	-	-	-
1,4-Dichlorobenzene	ug/l	1	10	-	-	-	-	-
1,2-Dichlorobenzene	ug/l	1	10	-	-	-	-	-
1,2,4-Trichlorobenzene	ug/l	1	0.4	-	-	-	-	-
Nitrobenzene	ug/l	1	10	-	-	-	-	-
Azobenzene	ug/l	1	nv	-	-	-	-	-
Hexachlorobenzene	ug/l	1	0.03	-	-	-	-	-
Naphthalene	ug/l	1	1	-	-	-	-	-
Acenaphthylene	ug/l	1	nv	-	-	-	-	-
Acenaphthene	ug/l	1	nv	-	-	-	-	-
Fluorene	ug/l	1	nv	-	-	-	-	-
Phenanthrene	ug/l	1	nv	-	-	-	-	-
Anthracene	ug/l	1	10000	-	-	-	-	-
Fluoranthrene	ug/l	1	1	-	-	-	-	-
Pyrene	ug/l	1	nv	-	-	-	-	-
Benzo(a)anthracene	ug/l	1	nv	-	-	-	-	-
Chrysene	ug/l	1	nv	-	-	-	-	-
Benzo(b)fluoranthrene	ug/l	1	0.5	-	-	-	-	-
Benzo(k)fluoranthrene	ug/l	1	0.05	-	-	-	-	-
Benzo(a)pyrene	ug/l	1	0.01	-	-	-	-	-
Indeno(1,2,3-cd)pyrene	ug/l	1	0.05	-	-	-	-	-
Dibenzo(a,h)anthracene	ug/l	1	nv	-	-	-	-	-
Benzo(ghi)perylene	ug/l	1	0.05	-	-	-	-	-
2-Chloronaphthalene	ug/l	1	nv	-	-	-	-	-
2-Methylnaphthalene	ug/l	1	nv	-	-	-	-	-
Carbazole	ug/l	1	nv	-	-	-	-	-
Isophorone	ug/l	1	nv	-	-	-	-	-
Dibenzofuran	ug/l	1	nv	-	-	-	-	-
Dimethyl phthalate	ug/l	1	nv	-	-	-	-	-
Diethyl phthalate	ug/l	1	10	-	-	-	-	-
Di-n-butylphthalate	ug/l	1	2	-	-	-	-	-
Di-n-octylphthalate	ug/l	1	0.1	-	-	-	-	-
Bis(2-ethylhexyl)phthalate	ug/l	1	8	-	-	-	-	-
Butylbenzylphthalate	ug/l	1	1	-	-	-	-	-
4-Chloroaniline	ug/l	1	nv	-	-	-	-	-
2-Nitroaniline	ug/l	1	10	-	-	-	-	-
3-Nitroaniline	ug/l	1	10	-	-	-	-	-
4-Nitroaniline	ug/l	1	nv	-	-	-	-	-
2,4-Dinitrotoluene	ug/l	1	nv	-	-	-	-	-
2,6-Dinitrotoluene	ug/l	1	nv	-	-	-	-	-
Bis(2-chloroethyl)ether	ug/l	1	30	-	-	-	-	-
4-Bromophenylphenylether	ug/l	1	nv	-	-	-	-	-
4-Chlorophenylphenylether	ug/l	1	40	-	-	-	-	-
Hexachloroethane	ug/l	1	10	-	-	-	-	-
Hexachlorobutadiene	ug/l	1	0.1	-	-	-	-	-
Hexchlorocyclopentadiene	ug/l	1	nv	-	-	-	-	-
Bis(2-chloroethoxy)methane	ug/l	1	10	-	-	-	-	-
N-nitrosodi-n-propylamine	ug/l	1	nv	-	-	-	-	-
SVOC-TIC								
1H-Indene, 2,3-dihydro-4-methyl- (CAS)	ug/l	nv	nv	1.05	nd	nd	nd	nd
1,2,4 Methenoazulene, decahydro-1,5,5,8a-tetramethyl-, [1S-(1.alpha.,2.alpha.,3a.beta.,4.alpha.,8a.beta.,9R*)]- (CAS)	ug/l	nv	nv					
Isolongifolene	ug/l	nv	nv	1.37	nd	nd	nd	nd
Eicosane	ug/l	nv	nv	1.94	nd	nd	nd	nd
Heneicosane	ug/l	nv	nv	nd	nd	nd	nd	nd
Docosane	ug/l	nv	nv	nd	nd	nd	nd	nd
14.,BETA.-H PREGNA	ug/l	nv	nv	nd	nd	nd	nd	nd
Hexacosane	ug/l	nv	nv	nd	nd	nd	nd	nd
9-Hexacosene	ug/l	nv	nv	nd	nd	nd	nd	nd
Nonadecane	ug/l	nv	nv	nd	nd	nd	nd	nd
1-(4-phenylcyclohexyl)-1-hexanone	ug/l	nv	nv	nd	nd	nd	nd	nd
Octadecanoic acid, butyl ester	ug/l	nv	nv	nd	nd	nd	nd	nd
Ethanol	ug/l	nv	nv	nd	nd	nd	nd	nd
1,6-Dimethylnaphthalene	ug/l	nv	nv	nd	nd	nd	nd	nd
Butyl Octadecanoate	ug/l	nv	nv	nd	nd	nd	nd	nd
Tetracosane	ug/l	nv	nv	nd	nd	nd	nd	nd

Client: ESB
Project: Phase 2 Environmental Investigation
Location: ESB Tarbert, Co. Kerry
Job No: 49341640
Table 20: Groundwater Analytical Results: SVOCs

					Island Area			
Sample Type				Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Sample ID				MW 101	MW 102	MW 103	RC2	BH317
Date				28-Oct-08	28-Oct-08	28-Oct-08	24-Oct-08	24-Oct-08
Parameters	**Units**	**MDL**	**IGV**					
Phenol	ug/l	1	0.5	-	-	-	-	-
2-Chlorophenol	ug/l	1	200	-	-	-	-	-
2-Methylphenol	ug/l	1	nv	-	-	-	-	-
4-Methylphenol	ug/l	1	nv	-	-	-	-	-
2-Nitrophenol	ug/l	1	nv	-	-	-	-	-
4-Nitrophenol	ug/l	1	nv	-	-	-	-	-
2,4-Dichlorophenol	ug/l	1	nv	-	-	-	-	-
2,4-Dimethylphenol	ug/l	1	nv	-	-	-	-	-
4-Chloro-3-methylphenol	ug/l	1	nv	-	-	-	-	-
2,4,6-Trichlorophenol	ug/l	1	200	-	-	-	-	-
2,4,5-Trichlorophenol	ug/l	1	nv	-	-	-	-	-
Pentachlorophenol	ug/l	1	2	-	-	-	-	-
1,3-Dichlorobenzene	ug/l	1	nv	-	-	-	-	-
1,4-Dichlorobenzene	ug/l	1	10	-	-	-	-	-
1,2-Dichlorobenzene	ug/l	1	10	-	-	-	-	-
1,2,4-Trichlorobenzene	ug/l	1	0.4	-	-	-	-	-
Nitrobenzene	ug/l	1	10	-	-	-	-	-
Azobenzene	ug/l	1	nv	-	-	-	-	-
Hexachlorobenzene	ug/l	1	0.03	-	-	-	-	-
Naphthalene	ug/l	1	1	-	-	-	-	-
Acenaphthylene	ug/l	1	nv	-	-	-	-	-
Acenaphthene	ug/l	1	nv	-	-	-	-	-
Fluorene	ug/l	1	nv	-	-	-	-	-
Phenanthrene	ug/l	1	nv	-	-	-	-	-
Anthracene	ug/l	1	10000	-	-	-	-	-
Fluoranthrene	ug/l	1	1	-	-	-	-	-
Pyrene	ug/l	1	nv	-	-	-	-	-
Benzo(a)anthracene	ug/l	1	nv	-	-	-	-	-
Chrysene	ug/l	1	nv	-	-	-	-	-
Benzo(b)fluoranthrene	ug/l	1	0.5	-	-	-	-	-
Benzo(k)fluoranthrene	ug/l	1	0.05	-	-	-	-	-
Benzo(a)pyrene	ug/l	1	0.01	-	-	-	-	-
Indeno(1,2,3-cd)pyrene	ug/l	1	0.05	-	-	-	-	-
Dibenzo(a,h)anthracene	ug/l	1	nv	-	-	-	-	-
Benzo(ghi)perylene	ug/l	1	0.05	-	-	-	-	-
2-Chloronaphthalene	ug/l	1	nv	-	-	-	-	-
2-Methylnaphthalene	ug/l	1	nv	-	-	-	-	-
Carbazole	ug/l	1	nv	-	-	-	-	-
Isophorone	ug/l	1	nv	-	-	-	-	-
Dibenzofuran	ug/l	1	nv	-	-	-	-	-
Dimethyl phthalate	ug/l	1	nv	-	-	-	-	-
Diethyl phthalate	ug/l	1	10	-	-	-	-	-
Di-n-butylphthalate	ug/l	1	2	-	-	-	-	-
Di-n-octylphthalate	ug/l	1	0.1	-	-	-	-	-
Bis(2-ethylhexyl)phthalate	ug/l	1	8	-	-	-	-	-
Butylbenzylphthalate	ug/l	1	1	-	-	-	-	-
4-Chloroaniline	ug/l	1	nv	-	-	-	-	-
2-Nitroaniline	ug/l	1	10	-	-	-	-	-
3-Nitroaniline	ug/l	1	10	-	-	-	-	-
4-Nitroaniline	ug/l	1	nv	-	-	-	-	-
2,4-Dinitrotoluene	ug/l	1	nv	-	-	-	-	-
2,6-Dinitrotoluene	ug/l	1	nv	-	-	-	-	-
Bis(2-chloroethyl)ether	ug/l	1	30	-	-	-	-	-
4-Bromophenylphenylether	ug/l	1	nv	-	-	-	-	-
4-Chlorophenylphenylether	ug/l	1	40	-	-	-	-	-
Hexachloroethane	ug/l	1	10	-	-	-	-	-
Hexachlorobutadiene	ug/l	1	0.1	-	-	-	-	-
Hexchlorocyclopentadiene	ug/l	1	nv	-	-	-	-	-
Bis(2-chloroethoxy)methane	ug/l	1	10	-	-	-	-	-
N-nitrosodi-n-propylamine	ug/l	1	nv	-	-	-	-	-
SVOC-TIC								
1H-Indene, 2,3-dihydro-4-methyl- (CAS)	ug/l	nv	nv	nd	nd	nd	nd	nd
1,2,4-Methanoazulene, decahydro-1,5,5,8a-tetramethyl-, [1S-(1.alpha.,2.alpha.,3a.beta.,4.alpha.,8a.beta.,9H*)]- (CAS)	ug/l	nv	nv	nd	nd	nd	nd	nd
Isolongifolene	ug/l	nv	nv	nd	nd	nd	nd	nd
Eicosane	ug/l	nv	nv	nd	nd	nd	nd	nd
Heneicosane	ug/l	nv	nv	nd	nd	nd	nd	nd
Docosane	ug/l	nv	nv	nd	nd	nd	nd	nd
14.BETA.-H PREGNA	ug/l	nv	nv	nd	nd	nd	nd	nd
Hexacosane	ug/l	nv	nv	nd	nd	nd	nd	nd
9-Hexacosene	ug/l	nv	nv	nd	nd	nd	nd	nd
Nonadecane	ug/l	nv	nv	nd	nd	nd	nd	nd
1-(4-phenylcyclohexyl)-1-hexanone	ug/l	nv	nv	nd	nd	nd	nd	nd
Octadecanoic acid, butyl ester	ug/l	nv	nv	nd	nd	nd	nd	nd
Ethanol	ug/l	nv	nv	nd	nd	nd	nd	nd
1,6-Dimethylnaphthalene	ug/l	nv	nv	nd	nd	nd	nd	nd
Butyl Octadecanoate	ug/l	nv	nv	nd	nd	nd	nd	nd
Tetracosane	ug/l	nv	nv	nd	nd	nd	nd	nd

Client: ESB
Project: Phase 2 Environmental Investigation
Location: ESB Tarbert, Co. Kerry
Job No: 49341640
Table 20: Groundwater Analytical Results: SVOCs

							Island Area	
Sample Type				Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Sample ID				BH11	BH12	MW301	BH318	BH9
Date				24-Oct-08	24-Oct-08	24-Oct-08	24-Oct-08	24-Oct-08
Parameters	**Units**	**MDL**	**IGV**					
Phenol	ug/l	1	0.5	-	-	-	-	-
2-Chlorophenol	ug/l	1	200	-	-	-	-	-
2-Methylphenol	ug/l	1	nv	-	-	-	-	-
4-Methylphenol	ug/l	1	nv	-	-	-	-	-
2-Nitrophenol	ug/l	1	nv	-	-	-	-	-
4-Nitrophenol	ug/l	1	nv	-	-	-	-	-
2,4-Dichlorophenol	ug/l	1	nv	-	-	-	-	-
2,4-Dimethylphenol	ug/l	1	nv	-	-	-	-	-
4-Chloro-3-methylphenol	ug/l	1	nv	-	-	-	-	-
2,4,6-Trichlorophenol	ug/l	1	200	-	-	-	-	-
2,4,5-Trichlorophenol	ug/l	1	nv	-	-	-	-	-
Pentachlorophenol	ug/l	1	2	-	-	-	-	-
1,3-Dichlorobenzene	ug/l	1	nv	-	-	-	-	-
1,4-Dichlorobenzene	ug/l	1	10	-	-	-	-	-
1,2-Dichlorobenzene	ug/l	1	10	-	-	-	-	-
1,2,4-Trichlorobenzene	ug/l	1	0.4	-	-	-	-	-
Nitrobenzene	ug/l	1	10	-	-	-	-	-
Azobenzene	ug/l	1	nv	-	-	-	-	-
Hexachlorobenzene	ug/l	1	0.03	-	-	-	-	-
Naphthalene	ug/l	1	1	-	-	-	-	-
Acenaphthylene	ug/l	1	nv	-	-	-	-	-
Acenaphthene	ug/l	1	nv	-	-	-	-	-
Fluorene	ug/l	1	nv	-	-	-	-	-
Phenanthrene	ug/l	1	nv	-	-	-	-	-
Anthracene	ug/l	1	10000	-	-	-	-	-
Fluoranthrene	ug/l	1	1	-	-	-	-	-
Pyrene	ug/l	1	nv	-	-	-	-	-
Benzo(a)anthracene	ug/l	1	nv	-	-	-	-	-
Chrysene	ug/l	1	nv	-	-	-	-	-
Benzo(b)fluoranthrene	ug/l	1	0.5	-	-	-	-	-
Benzo(k)fluoranthrene	ug/l	1	0.05	-	-	-	-	-
Benzo(a)pyrene	ug/l	1	0.01	-	-	-	-	-
Indeno(1,2,3-cd)pyrene	ug/l	1	0.05	-	-	-	-	-
Dibenzo(a,h)anthracene	ug/l	1	nv	-	-	-	-	-
Benzo(ghi)perylene	ug/l	1	0.05	-	-	-	-	-
2-Chloronaphthalene	ug/l	1	nv	-	-	-	-	-
2-Methylnaphthalene	ug/l	1	nv	-	-	-	-	-
Carbazole	ug/l	1	nv	-	-	-	-	-
Isophorone	ug/l	1	nv	-	-	-	-	-
Dibenzofuran	ug/l	1	nv	-	-	-	-	-
Dimethyl phthalate	ug/l	1	nv	-	-	-	-	-
Diethyl phthalate	ug/l	1	10	-	-	-	-	-
Di-n-butylphthalate	ug/l	1	2	-	-	-	-	-
Di-n-octylphthalate	ug/l	1	0.1	-	-	-	-	-
Bis(2-ethylhexyl)phthalate	ug/l	1	8	-	-	-	1	-
Butylbenzylphthalate	ug/l	1	1	-	-	-	-	-
4-Chloroaniline	ug/l	1	nv	-	-	-	-	-
2-Nitroaniline	ug/l	1	10	-	-	-	-	-
3-Nitroaniline	ug/l	1	10	-	-	-	-	-
4-Nitroaniline	ug/l	1	nv	-	-	-	-	-
2,4-Dinitrotoluene	ug/l	1	nv	-	-	-	-	-
2,6-Dinitrotoluene	ug/l	1	nv	-	-	-	-	-
Bis(2-chloroethyl)ether	ug/l	1	30	-	-	-	-	-
4-Bromophenylphenylether	ug/l	1	nv	-	-	-	-	-
4-Chlorophenylphenylether	ug/l	1	40	-	-	-	-	-
Hexachloroethane	ug/l	1	10	-	-	-	-	-
Hexachlorobutadiene	ug/l	1	0.1	-	-	-	-	-
Hexchlorocyclopentadiene	ug/l	1	nv	-	-	-	-	-
Bis(2-chloroethoxy)methane	ug/l	1	10	-	-	-	-	-
N-nitrosodi-n-propylamine	ug/l	1	nv	-	-	-	-	-
SVOC-TIC								
1H-Indene, 2,3-dihydro-4-methyl- (CAS)	ug/l	nv	nv	nd	nd	nd	nd	nd
1,2,4-Methanoazulene, decahydro-1,5,5,8a-tetramethyl-, [1S-(1.alpha.,2.alpha.,3a.beta.,4.alpha.,8a.beta.,9R*)]- (CAS)	ug/l	nv	nv	nd	nd	nd	nd	nd
Isolongifolene	ug/l	nv	nv	nd	nd	nd	nd	nd
Eicosane	ug/l	nv	nv	nd	nd	nd	nd	1.27
Heneicosane	ug/l	nv	nv	nd	nd	nd	nd	1.11
Docosane	ug/l	nv	nv	nd	nd	nd	nd	1.99
14.BETA.-H PREGNA	ug/l	nv	nv	nd	nd	nd	nd	1.07
Hexacosane	ug/l	nv	nv	nd	nd	nd	nd	nd
9-Hexacosene	ug/l	nv	nv	nd	nd	nd	nd	nd
Nonadecane	ug/l	nv	nv	nd	nd	nd	nd	nd
1-(4-phenylcyclohexyl)-1-hexanone	ug/l	nv	nv	nd	nd	nd	9.8	nd
Octadecanoic acid, butyl ester	ug/l	nv	nv	nd	nd	nd	nd	nd
Ethanol	ug/l	nv	nv	nd	nd	nd	1.66	nd
1,6-Dimethylnaphthalene	ug/l	nv	nv	nd	nd	nd	2.14	nd
Butyl Octadecanoate	ug/l	nv	nv	nd	nd	nd	6.9	nd
Tetracosane	ug/l	nv	nv	nd	nd	nd	1.1	nd

Client: ESB
Project: Phase 2 Environmental Investigation
Location: ESB Tarbert, Co. Kerry
Job No: 49341640
Table 20: Groundwater Analytical Results: SVOCs

				Mainland Area				
Sample Type				Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Sample ID				BH 321	BH 24	BH 25	BH1	BH5
Date				29-Oct-08	29-Oct-08	29-Oct-08	24-Oct-08	24-Oct-08
Parameters	**Units**	**MDL**	**IGV**					
Phenol	ug/l	1	0.5	-	-	-	-	NDP
2-Chlorophenol	ug/l	1	200	-	-	-	-	NDP
2-Methylphenol	ug/l	1	nv	-	-	-	-	NDP
4-Methylphenol	ug/l	1	nv	-	-	-	-	NDP
2-Nitrophenol	ug/l	1	nv	-	-	-	-	NDP
4-Nitrophenol	ug/l	1	nv	-	-	-	-	NDP
2,4-Dichlorophenol	ug/l	1	nv	-	-	-	-	NDP
2,4-Dimethylphenol	ug/l	1	nv	-	-	-	-	NDP
4-Chloro-3-methylphenol	ug/l	1	nv	-	-	-	-	NDP
2,4,6-Trichlorophenol	ug/l	1	200	-	-	-	-	NDP
2,4,5-Trichlorophenol	ug/l	1	nv	-	-	-	-	NDP
Pentachlorophenol	ug/l	1	2	-	-	-	-	NDP
1,3-Dichlorobenzene	ug/l	1	nv	-	-	-	-	NDP
1,4-Dichlorobenzene	ug/l	1	10	-	-	-	-	NDP
1,2-Dichlorobenzene	ug/l	1	10	-	-	-	-	NDP
1,2,4-Trichlorobenzene	ug/l	1	0.4	-	-	-	-	NDP
Nitrobenzene	ug/l	1	10	-	-	-	-	NDP
Azobenzene	ug/l	1	nv	-	-	-	-	NDP
Hexachlorobenzene	ug/l	1	0.03	-	-	-	-	NDP
Naphthalene	ug/l	1	1	-	-	-	-	NDP
Acenaphthylene	ug/l	1	nv	-	-	-	-	NDP
Acenaphthene	ug/l	1	nv	-	-	-	-	NDP
Fluorene	ug/l	1	nv	-	-	-	-	NDP
Phenanthrene	ug/l	1	nv	-	-	-	-	NDP
Anthracene	ug/l	1	10000	-	-	-	-	NDP
Fluoranthrene	ug/l	1	1	-	-	-	-	NDP
Pyrene	ug/l	1	nv	-	-	-	-	NDP
Benzo(a)anthracene	ug/l	1	nv	-	-	-	-	NDP
Chrysene	ug/l	1	nv	-	-	-	-	NDP
Benzo(b)fluoranthrene	ug/l	1	0.5	-	-	-	-	NDP
Benzo(k)fluoranthrene	ug/l	1	0.05	-	-	-	-	NDP
Benzo(a)pyrene	ug/l	1	0.01	-	-	-	-	NDP
Indeno(1,2,3-cd)pyrene	ug/l	1	0.05	-	-	-	-	NDP
Dibenzo(a,h)anthracene	ug/l	1	nv	-	-	-	-	NDP
Benzo(ghi)perylene	ug/l	1	0.05	-	-	-	-	NDP
2-Chloronaphthalene	ug/l	1	nv	-	-	-	-	NDP
2-Methylnaphthalene	ug/l	1	nv	-	-	-	-	NDP
Carbazole	ug/l	1	nv	-	-	-	-	NDP
Isophorone	ug/l	1	nv	-	-	-	-	NDP
Dibenzofuran	ug/l	1	nv	-	-	-	-	NDP
Dimethyl phthalate	ug/l	1	nv	-	-	-	-	NDP
Diethyl phthalate	ug/l	1	10	-	-	-	-	NDP
Di-n-butylphthalate	ug/l	1	2	-	-	-	-	NDP
Di-n-octylphthalate	ug/l	1	0.1	-	-	-	-	NDP
Bis(2-ethylhexyl)phthalate	ug/l	1	8	-	-	-	-	NDP
Butylbenzylphthalate	ug/l	1	1	-	-	-	-	NDP
4-Chloroaniline	ug/l	1	nv	-	-	-	-	NDP
2-Nitroaniline	ug/l	1	10	-	-	-	-	NDP
3-Nitroaniline	ug/l	1	10	-	-	-	-	NDP
4-Nitroaniline	ug/l	1	nv	-	-	-	-	NDP
2,4-Dinitrotoluene	ug/l	1	nv	-	-	-	-	NDP
2,6-Dinitrotoluene	ug/l	1	nv	-	-	-	-	NDP
Bis(2-chloroethyl)ether	ug/l	1	30	-	-	-	-	NDP
4-Bromophenylphenylether	ug/l	1	nv	-	-	-	-	NDP
4-Chlorophenylphenylether	ug/l	1	40	-	-	-	-	NDP
Hexachloroethane	ug/l	1	10	-	-	-	-	NDP
Hexachlorobutadiene	ug/l	1	0.1	-	-	-	-	NDP
Hexchlorocyclopentadiene	ug/l	1	nv	-	-	-	-	NDP
Bis(2-chloroethoxy)methane	ug/l	1	10	-	-	-	-	NDP
N-nitrosodi-n-propylamine	ug/l	1	nv	-	-	-	-	NDP
SVOC-TIC								
1H-Indene, 2,3-dihydro-4-methyl- (CAS)	ug/l	nv	nv	nd	nd	nd	nd	nd
1,2,4-Methanoazulene, decahydro-1,5,5,8a-tetramethyl-, [1S-(1.alpha.,2.alpha.,3a.beta.,4.alpha.,8a.beta.,9R*)]- (CAS)	ug/l	nv	nv	nd	nd	nd	nd	nd
Isolongifolene	ug/l	nv	nv	nd	nd	nd	nd	nd
Eicosane	ug/l	nv	nv	nd	nd	nd	nd	nd
Heneicosane	ug/l	nv	nv	nd	nd	nd	nd	nd
Docosane	ug/l	nv	nv	nd	nd	nd	nd	nd
14.,BETA.-H PREGNA	ug/l	nv	nv	nd	nd	nd	nd	nd
Hexacosane	ug/l	nv	nv	nd	nd	nd	nd	nd
9-Hexacosene	ug/l	nv	nv	nd	nd	nd	nd	nd
Nonadecane	ug/l	nv	nv	nd	nd	nd	nd	nd
1-(4-phenylcyclohexyl)-1-hexanone	ug/l	nv	nv	nd	nd	nd	nd	nd
Octadecanoic acid, butyl ester	ug/l	nv	nv	nd	nd	nd	nd	nd
Ethanol	ug/l	nv	nv	nd	nd	nd	nd	nd
1,6-Dimethylnaphthalene	ug/l	nv	nv	nd	nd	nd	nd	nd
Butyl Octadecanoate	ug/l	nv	nv	nd	nd	nd	nd	nd
Tetracosane	ug/l	nv	nv	nd	nd	nd	nd	nd

Client: ESB
Project: Phase 2 Environmental Investigation
Location: ESB Tarbert, Co. Kerry
Job No: 49341640
Table 20: Groundwater Analytical Results: SVOCs

Sample Type				Groundwater
Sample ID				MW202
Date				24-Oct-08
Parameters	Units	MDL	IGV	
Phenol	ug/l	1	0.5	-
2-Chlorophenol	ug/l	1	200	-
2-Methylphenol	ug/l	1	nv	-
4-Methylphenol	ug/l	1	nv	-
2-Nitrophenol	ug/l	1	nv	-
4-Nitrophenol	ug/l	1	nv	-
2,4-Dichlorophenol	ug/l	1	nv	-
2,4-Dimethylphenol	ug/l	1	nv	-
4-Chloro-3-methylphenol	ug/l	1	nv	-
2,4,6-Trichlorophenol	ug/l	1	200	-
2,4,5-Trichlorophenol	ug/l	1	nv	-
Pentachlorophenol	ug/l	1	2	-
1,3-Dichlorobenzene	ug/l	1	nv	-
1,4-Dichlorobenzene	ug/l	1	10	-
1,2-Dichlorobenzene	ug/l	1	10	-
1,2,4-Trichlorobenzene	ug/l	1	0.4	-
Nitrobenzene	ug/l	1	10	-
Azobenzene	ug/l	1	nv	-
Hexachlorobenzene	ug/l	1	0.03	-
Naphthalene	ug/l	1	1	-
Acenaphthylene	ug/l	1	nv	-
Acenaphthene	ug/l	1	nv	-
Fluorene	ug/l	1	nv	-
Phenanthrene	ug/l	1	nv	-
Anthracene	ug/l	1	10000	-
Fluoranthrene	ug/l	1	1	-
Pyrene	ug/l	1	nv	-
Benzo(a)anthracene	ug/l	1	nv	-
Chrysene	ug/l	1	nv	-
Benzo(b)fluoranthrene	ug/l	1	0.5	-
Benzo(k)fluoranthrene	ug/l	1	0.05	-
Benzo(a)pyrene	ug/l	1	0.01	-
Indeno(1,2,3-cd)pyrene	ug/l	1	0.05	-
Dibenzo(a,h)anthracene	ug/l	1	nv	-
Benzo(ghi)perylene	ug/l	1	0.05	-
2-Chloronaphthalene	ug/l	1	nv	-
2-Methylnaphthalene	ug/l	1	nv	-
Carbazole	ug/l	1	nv	-
Isophorone	ug/l	1	nv	-
Dibenzofuran	ug/l	1	nv	-
Dimethyl phthalate	ug/l	1	nv	-
Diethyl phthalate	ug/l	1	10	-
Di-n-butylphthalate	ug/l	1	2	-
Di-n-octylphthalate	ug/l	1	0.1	-
Bis(2-ethylhexyl)phthalate	ug/l	1	8	-
Butylbenzylphthalate	ug/l	1	1	-
4-Chloroaniline	ug/l	1	nv	-
2-Nitroaniline	ug/l	1	10	-
3-Nitroaniline	ug/l	1	10	-
4-Nitroaniline	ug/l	1	nv	-
2,4-Dinitrotoluene	ug/l	1	nv	-
2,6-Dinitrotoluene	ug/l	1	nv	-
Bis(2-chloroethyl)ether	ug/l	1	30	-
4-Bromophenylphenylether	ug/l	1	nv	-
4-Chlorophenylphenylether	ug/l	1	40	-
Hexachloroethane	ug/l	1	10	-
Hexachlorobutadiene	ug/l	1	0.1	-
Hexchlorocyclopentadiene	ug/l	1	nv	-
Bis(2-chloroethoxy)methane	ug/l	1	10	-
N-nitrosodi-n-propylamine	ug/l	1	nv	-
SVOC-TIC				
1H-Indene, 2,3-dihydro-4-methyl- (CAS)	ug/l	nv	nv	nd
1,2,4-Methenoazulene, decahydro-1,5,5,8a-tetramethyl-, [1S-(1.alpha.,2.alpha.,3a.beta.,4.alpha.,8a.beta.,9R*)]- (CAS)	ug/l	nv	nv	nd
Isolongifolene	ug/l	nv	nv	nd
Eicosane	ug/l	nv	nv	1.27
Heneicosane	ug/l	nv	nv	1.11
Docosane	ug/l	nv	nv	1.99
14.BETA.-H PREGNA	ug/l	nv	nv	1.07
Hexacosane	ug/l	nv	nv	1.04
9-Hexacosene	ug/l	nv	nv	1.54
Nonadecane	ug/l	nv	nv	nd
1-(4-phenylcyclohexyl)-1-hexanone	ug/l	nv	nv	nd
Octadecanoic acid, butyl ester	ug/l	nv	nv	nd
Ethanol	ug/l	nv	nv	nd
1,6-Dimethylnaphthalene	ug/l	nv	nv	nd
Butyl Octadecanoate	ug/l	nv	nv	nd
Tetracosane	ug/l	nv	nv	nd

Client: ESB
Project: Phase 2 Environmental Investigation
Location: ESB Tarbert, Co. Kerry
Job No: 49341640
Table 21: Groundwater Analytical Results: PCBs

Island Area

Sample Type				Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Sample ID				BH 309A	BH 319	BH 311	BH 306	RC 1	MW 102	MW 103	MW 101	BH318
Date				29-Oct-08	29-Oct-08	29-Oct-08	29-Oct-08	29-Oct-08	29-Oct-08	29-Oct-08	24-Oct-08	24-Oct-08
Parameter	**Units**	**MDL**	**IGV**									
PCBs												
PCB Congener 28	ug/L	0.01	nv	-	-	-	-	-	-	-	-	-
PCB Congener 52	ug/L	0.01	nv	-	-	-	-	-	-	-	-	-
PCB Congener 101	ug/L	0.01	nv	-	-	-	-	-	-	-	-	-
PCB Congener 118	ug/L	0.01	nv	-	-	-	-	-	-	-	-	-
PCB Congener 153	ug/L	0.01	nv	-	-	-	-	-	-	-	-	-
PCB Congener 138	ug/L	0.01	nv	-	-	-	-	-	-	-	-	-
PCB Congener 180	ug/L	0.01	nv	-	-	-	-	-	-	-	-	-
PCB Total of 7 Congeners	ug/L	0.01	0.01	-	-	-	-	-	-	-	-	-

Client: ESB
Project: Phase 2 Environmental Investigation
Location: ESB Tarbert, Co. Kerry
Job No: 49341640
Table 21: Groundwater Analytical Results: PCBs

Island Area

Sample Type				Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Ground Water
Sample ID				BH9	RC2	BH317	BH11	BH12	MW301	BH319	BH9	BH314	BH301
Date				24-Oct-08	24-Oct-08	24-Oct-08	24-Oct-08	24-Oct-08	24-Oct-08	24-Oct-08	24-Oct-08	29-Oct-08	29-Oct-08
Parameter	**Units**	**MDL**	**IGV**										
PCBs													
PCB Congener 28	ug/L	0.01	nv	-	-	-	-	-	-	0.037	-	-	-
PCB Congener 52	ug/L	0.01	nv	-	-	-	-	-	-	0.049	-	-	-
PCB Congener 101	ug/L	0.01	nv	-	-	-	-	-	-	0.083	-	-	-
PCB Congener 118	ug/L	0.01	nv	-	-	-	-	-	-	0.061	-	-	-
PCB Congener 153	ug/L	0.01	nv	-	-	-	-	-	-	0.036	-	-	-
PCB Congener 138	ug/L	0.01	nv	-	-	-	-	-	-	0.068	-	-	-
PCB Congener 180	ug/L	0.01	nv	-	-	-	-	-	-	-	-	-	-
PCB Total of 7 Congeners	ug/L	0.01	0.01	-	-	-	-	-	-	0.333	-	-	-

Client: ESB
Project: Phase 2 Environmental Investigation
Location: ESB Tarbert, Co. Kerry
Job No: 49341640
Table 21: Groundwater Analytical Results: PCBs

Mainland Area

Sample Type				Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Sample ID				BH 321	BH 24	BH 25	BH1	BH5	MW202
Date				29-Oct-08	29-Oct-08	29-Oct-08	24-Oct-08	24-Oct-08	24-Oct-08
Parameter	**Units**	**MDL**	**IGV**						
PCBs									
PCB Congener 28	ug/L	0.01	nv	-	-	-	-	NDP	-
PCB Congener 52	ug/L	0.01	nv	-	-	-	-	NDP	-
PCB Congener 101	ug/L	0.01	nv	-	-	-	-	NDP	-
PCB Congener 118	ug/L	0.01	nv	-	-	-	-	NDP	-
PCB Congener 153	ug/L	0.01	nv	-	-	-	-	NDP	-
PCB Congener 138	ug/L	0.01	nv	-	-	-	-	NDP	-
PCB Congener 180	ug/L	0.01	nv	-	-	-	-	NDP	-
PCB Total of 7 Congeners	ug/L	0.01	0.01	-	-	-	-	NDP	-

Client:	ESB
Project:	Phase 2 Environmental Investigation
Location:	ESB Tarbert, Co. Kerry
Job No:	49341640
Table 22:	Groundwater Analytical Results: Biological

				Island Area					
Sample Type				Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
Sample ID				BH 309A	RC 1	MW 101	MW 102	MW 103	RC2
Date				28-Oct-08	28-Oct-08	28-Oct-08	28-Oct-08	28-Oct-08	28-Oct-08
Parameter	**Units**	**MDL**	**IGV**						
Biological									
Biological Oxygen Demand (BOD)	mg/L	2	nv	2	-	17	11	7	3
Chemical Oxygen Demand (COD)	mg/L	15	nv	36	-	613	203	51	59
Faecal coliforms	cfu/100ml	1	0	-	-	900	-	124	19
Total coliforms	cfu/100ml	nv	0	44	-	130000	56	20000	700

Client:	ESB
Project:	Phase 2 Environmental Investigation
Location:	ESB Tarbert, Co. Kerry
Job No:	49341640
Table 22:	Groundwater Analytical Results: Biological

				Island Area						
Sample Type				Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Ground Water
Sample ID				BH317	BH11	BH12	MW301	MW318	BH314	BH301
Date				28-Oct-08	28-Oct-08	28-Oct-08	28-Oct-08	28-Oct-08	29-Oct-08	29-Oct-08
Parameter	**Units**	**MDL**	**IGV**							
Biological										
Biological Oxygen Demand (BOD)	mg/L	2	nv	-	-	3	-	4	-	15
Chemical Oxygen Demand (COD)	mg/L	15	nv	239	18	-	16	318	-	206
Faecal coliforms	cfu/100ml	1	0	1	37	200	10	-	8	2,190,000
Total coliforms	cfu/100ml	nv	0	7	400	400	100	31	-	350,000

Client:	ESB
Project:	Phase 2 Environmental Investigation
Location:	ESB Tarbert, Co. Kerry
Job No:	49341640
Table 22:	Groundwater Analytical Results: Biological

				Mainland Area	
Sample Type				Groundwater	Groundwater
Sample ID				BH1	MW 202
Date				28-Oct-08	28-Oct-08
Parameter	**Units**	**MDL**	**IGV**		
Biological					
Biological Oxygen Demand (BOD)	mg/L	2	nv	-	4
Chemical Oxygen Demand (COD)	mg/L	15	nv	185	3908
Faecal coliforms	cfu/100ml	1	0	9	19
Total coliforms	cfu/100ml	nv	0	600	700

IGV	Interim Guideline Value for Groundwater
xx	Exceeds IGV for Groundwater
MDL	Method Detection Limit
-	Less than the MDL
na	Not Analysed
nv	No Value

Comments:

In general, the analytical results for most analytes were comparable to Dutch screening values. There were exceedances of the Dutch intervention values for hydrocarbons (mineral oil), vanadium, nickel and zinc at four locations across the site.

Elevated hydrocarbon and polychlorinated biphenyl (PCB) concentrations were detected in a groundwater sample collected from monitoring well BH318 located immediately south of the 220kV switching yard. PCBs were not detected in any of the other soil, sediment, groundwater or surface water samples analysed. A further groundwater sample should be collected from this well to confirm whether these elevated concentrations are indicative of impact on this part of the site.

A detailed summary of all findings and comments from URS is attached in **Appendix 3**.

Section 2. 4 ESB Tarbert Emissions to Atmosphere Annual Report 2008

Emissions to Atmosphere

Schedules 1(i) and 1(ii) of Tarbert's IPPC licence requires the monitoring of emissions to atmosphere at Emission Point Reference Nos. A1-1, A1-2, A1-3 and A1-4, having regard to Licence Conditions 3 and 5.

A summary of the monitoring of atmospheric emissions for Units 3 and 4 for the calendar months in the reporting period January – December 2008 is given below. The figures have been extracted from the CEMS (Continuous Emissions Monitoring System).

Unit 3: Air Emission Data:
Emission Point A1-3: Monthly Average Emissions Data (CEMS)

Date	Monthly Avg. NO_2 (mg/m^3)	Monthly Avg. SO_2 (mg/m^3)	Dust (mg/m^3)
Limits	**1100**	**1700**	**200/300(sootblow)**
Jan 08	386.89	1132.11	79
Feb 08	498.302	1428.21	73.67
Mar 08	503.42	1422.85	85
April 08	488.44	1464.52	77
May 08	490.44	1432.5	97
June 08	542.5	1527	134.8
July 08	634	1357	133.2
Aug 08	576.46	1248.3	95.6
Sept 08	619.54	1233	96.7
Oct 08	572.68	1462	83.3
Nov 08	531.34	1438.8	90
Dec 08	512.61	1380	199

Comment:

The monthly average values reported above for NO_2, SO_2 and dust did not exceed the ELV as outlined in the licence. Monthly averages are calculated based on the hours of operation and the daily emission values for each of the parameters in a calendar month.

There were 128, 48hour monitoring periods recorded on Unit 3 CEMS system during 2008. For SO_2, 100 % of all the 48 hourly average figures were within the ELV of 1700 mg/Nm^3. This means that the 97%ile was achieved and indeed surpassed for this monitoring parameter.

The NO_2 limit was not breached during 2008 as 100% of all NO_2 readings were within the ELV of 1100 mg/Nm^3.

With regard to particulates, 97% of all 48 hourly average means were within the ELV (200/300 mg/Nm^3 sootblowing), the ELV for dust was not breached during 2008 and all the recorded values indicate full compliance with the conditions of the licence for this parameter.
(See **Appendix 3** for CEMS cross checks and calibration reports for the instrumentation)

Unit 4: Air Emission Data:

Emission Point A1-4: Monthly Average Emissions Data (CEMS)

Date	Monthly Avg. NO_2 (mg/m^3)	Monthly Avg. SO_2 (mg/m^3)	Dust (mg/m^3)
Limits	1100	1700	200/300(sootblow)
Jan 07	667.88	1372.6	128.7
Feb 07	665.9	1453.3	305.1
Mar 07	615.8	1552.87	76.3
Apr 07	562	1409.5	71
May 07	545	1341	57.5
Jun 07	560	1385.5	53.73
July 07	611.8	1142	50
Aug 07	659.7	1134	71.5
Sept 07	678	1071.6	74.6
Oct 07	654	1231.7	72.8
Nov 07	716	1442	78
Dec 07	719	1350.5	119

Comments:
The monthly average values reported above for NO_2, SO_2 and dust did not exceed the ELV as outlined in the licence. Monthly averages are calculated based on the hours of operation and the daily emission values for each of the parameters in a calendar month.

There were 139, 48 hourly periods of continuous data recorded on the unit 4 CEMS system during 2008. For NO_2 , 100% of all the 48 hr average readings were within the ELV indicating full compliance with the licence conditions for NOx.

With regard to SO_2 , 100% of all 48 hr average readings were within the ELV of 1700 mg/m^3 . No exceedences were recorded indicating full compliance.

The ELV for dust was breached during 2008. 97% of all 48 hourly averages were not within the ELV. There were problems with the particulates analyser on U4 during the early part of 2008. This lead to some high particulate readings and also some negative values being recorded. The particulates monitors were replaced on U4 and this rectified the problems.

Annual cross check and calibration reports for Units 3 and 4 CEMS are attached ***(Appendix 3)***

Unit 1: Emission Point A1-1 2007

Date	Dust (mg/m^3)	Monthly Avg. NO_2 (mg/m^3)	Monthly Avg. SO_2 (mg/m^3)
Limits	**150/690**	**850**	**1700**
Feb 07	137	393	718.8
Mar 07	159	785	1404
Apr 07	107	107	1344
May 07	97	790	1250
July 07	141	704	1443
Aug 07	205	737	1396
Sept 07	280	630	1300
Oct 07	213	600	939
Nov 07	158	754.8	1010

Comments:
The monthly averages reported above for Unit 1 are in compliance with the ELV's as per the IPPCL. Where the ELV for dust is above 150 mg the limit of 690mg (sootblowing) has not been exceeded. Due to the way this unit is run it tends to come on for a few hours to meet system demands. This means that the portion of time that sootblowing is taking place is quite high relative to the time the unit is on load.

For Unit1 NOx 100% of all 48 hourly average readings were within the ELV during 2007.

With regards to SO_2, 100% of all 48 hourly averages were within the ELV. No values were above the limit of 1700mg.

97% of all 48 hourly averages were not within the ELV of 150 mg for dust. However all of the reported values were within the sootblowing ELV of 690 mg. The running regime for this units means that it has a very limited time on load over the course of a year. The operational requirement for sootblowing means that approximately one third of the time that the unit is on load sootblowing is in progress. This tends to distort the emission figures for particulates as sootblowing dominates on load periods.

Due to the requirement for sootblowing and the continued low load factor of this unit we anticipate that the particulate values recorded will be typical for this unit. Therefore as long as this operating regime continues we feel that the operational ELV for particulates should be expected to lie between the current normal ELV of 150mg and the sootblowing limit of 690 mg.

Unit 2: Emission Point A1-2 2007

Date	Monthly Avg. NO_2 (mg/m^3)	Monthly Avg. SO_2 (mg/m^3)	Dust (mg/m^3)
Limits	**850**	**1700**	**150/690(sootblow)**
Jan 07	683	1548	105
Feb 07	554	1296	119
Mar 07	405	1025	109
April 07	500	884	120
May 07	535	1188	113
July 07	857	1429	189
Aug 07	827	1409	90
Sept 07	809	1399	129
Oct 07	767	1449	141

Comments:

The monthly averages reported above for Unit 2 are in compliance with the ELV's as per the IPPCL. Where the ELV for dust is above 150 mg (November) the limit of 690mg (sootblowing) has not been exceeded.

For Unit2 NOx 95% of all 48 hourly average readings were within the ELV during 2007. One 48 hourly average was recorded that were above 850mg. These value recorded was 880 mg.
With regards to SO_2, 97% of all 48 hourly averages were within the ELV. No values were above the limit of 1700mg.

97% of all 48 hourly averages were not within the ELV for dust. However all of the reported values were within the sootblowing ELV of 690 mg.

The running regime for this units means that it has a very limited time on load over the course of a year. The operational requirement for sootblowing means that approximately one third of the time that the unit is on load sootblowing is in progress. This tends to distort the emission figures for particulates as sootblowing dominates on load periods.

Due to the requirement for sootblowing and the continued low load factor of this unit we anticipate that the particulate values recorded will be typical for this unit. Therefore as long as this operating regime continues we feel that the operational ELV for particulates should be expected to lie between the current normal ELV of 150mg and the sootblowing limit of 690 mg.

CEMS for U1 and 2 was not operational during June and July 2007 (reference communication of 05/07/07). This situation was rectified in July.

Independent Emissions Monitoring:

Air emissions testing was also carried out by EES on behalf of the EPA (U4). A report received by ESB on the 7th of November 2007, showed ESB Tarbert to be compliant with the air emissions limits as outlined in IPPCL No. 607-02. This report also showed a strong correlation between the air emissions recorded by EES on the day of testing and the stations CEMS data for the same period. **Appendix 4**

2.5 Diesel Pump Logs 2007

These logs show the duration of running of all diesel pumps within the station. All diesel pumps are tested on a regular basis for a set time period as shown above.

1. Diesel Generator

Date	Duration
	30 mins
	30 mins
	30 mins
	30 mins
	30 mins

2. Hydrant Diesel

Date	Duration
	20 min
	20 min
	20 min
	20 min
	20 min
	20 min
	20 min
	20 min
	20 min
	20 min

3. M&P Diesel No.1

Date	Duration
	20 min
	20 min
	20 min
	20 min
	20 min
	20 min
	20 min
	20 min
	20 min

4. M&P Diesel No.2

Date	Duration
	20 min
	20 min
	20 min
	20 min
	20 min
	20 min
	20 min
	20 min
	20 min

2.6 Waste Management

ESB Tarbert operates a certified EMS which was accredited to ISO14001 in 1998 and was re-certified in 2005 to ISO14001 (2004). As part of this system proper segregated waste management streams are in operation on the site. The table below outlines the type, quantity and final destination of waste which was disposed from Tarbert Generating Station during 2008.

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Waste Management Report 2008

European Waste Catalogue Code	Description of Waste	Hazardous (Yes/No)	Quantity (t/year)	Name of Waste Disposal Recovery Contractor	Waste Permit Details and Issuing authority.	Ultimate Destination of Waste
20 03 01 20 01 08	General Waste Canteen Waste	No		Veolia Ireland Ltd, Dock Road, Limerick	EPA Waste Licence No. W0177-03. WCP/LK/051/02b-Limerick County Council	Limerick county council landfill site
16 06 01 16 06 04	Lead acid batteries Dry cell batteries	Yes No	0 0.07	Returnbatt, Kildare Enterprise Centre, Melitta Rd., Kildare	Waste collection permit, WCP/LK/060/02b EPA waste Licence no. 105-1	Processed by RETURNBATT in Co. Kildare
17 04 05/ 17 04 11	Mixed Metals	No	185	Cork Metals, Dublin Hill, Cork.	Waste collection permit no. WCP/LK/024/02b Waste Management permit 08/01	Dublin Hill Cork
15 01 01	Paper /Cardboard	No	7.66	Veolia Ireland Ltd, Dock Road, Limerick	EPA Waste Licence No. W0177-03 WCP/LK/051/02b-Limerick County Council	Sent for recycling
10 01 22	Boiler filter cake	Yes	11	ENVA Ireland, Clonminam Ind. Estate, Portlaoise, Co. Laois.	1.EPA IPC License No. W0184-01 Waste Collection Permit No.WCP/LK/052/02b	Lindenschmidt, Germany
17 02 01	Timber	No	12.79	Veolia Ireland Ltd, Dock Road, Limerick	EPA Waste Licence No. W0177-03 WCP/LK/051/02b-Limerick County Council	Sent for recycling

European Waste Catalogue Code	Description of Waste	Hazardous (Yes/No)	Quantity (t/year)	Name of Waste Disposal Recovery Contractor	Waste Permit Details and Issuing authority.	Ultimate Destination of Waste
19 09 05	Spent Ion Exchange Resins	No	14	Veolia Ireland Ltd, Dock Road, Limerick	Veolia Ireland Ltd. EPA Waste Licence No. W0177-03. WCP/LK/051/02b-Limerick County Council	North Kerry Landfill or Limerick county council landfill site.
10 01 04	Boiler Ash/Slag	Yes	87	RILTA, Ballyogan Business Park, Ballyogan Road, Sandyford, Dublin 18.	1. EPA waste licence no. W0192-01	Germany
15 01 10	Boiler additive contaminated drums	Yes	22.5	ENVA Ireland, Clonminam Ind. Estate, Portlaoise, Co. Laois.	1.EPA IPC License No. W0184-01 Waste Collection Permit No.WCP/LK/052/02b	Lindenschmidt, Germany
13 08 99 13 08 99	Waste Oils, Oil contaminated material Oil contaminated materials	Yes Yes	79 18.22	ENVA Ireland, Clonminam Ind. Estate, Portlaoise, Co. Laois. .	1.EPA IPC License No. W0184-01 Waste Collection Permit No.WCP/LK/052/02b	Recovery of the oil takes place at ENVA and is subsequently re-processed on-site for use as a fuel.
17 06 01	Asbestos	Yes	0	RILTA Environmental, Ballyogan Business Park, Ballyogan Road, Sandyford, Dublin 18.	EPA waste Licence No. W0192-01.	Disposed by RILTA at licensed landfill in Rotterdam.
10 01 04	Oil fly ash	Yes	12	RILTA Environmental, Ballyogan Business Park, Ballyogan Road, Sandyford, Dublin 18.	EPA waste Licence No. W0192-01.	Germany
16 07 08	Tank cleaning waste	Yes	3	RILTA Environmental, Ballyogan Business Park, Ballyogan Road,Sandyford, Dublin 18.	EPA waste Licence No. W0192-01.	Germany.

2.7 Energy and Water Consumption

Energy Consumption

Energy usage at Tarbert Generating Station includes distillate oil and heavy fuel oil.

The total amount of distillate oil consumed in 2008 was **1,192** Tonnes.

The total amount of Heavy Fuel Oil consumption during 2008 was **294,373** Tonnes.

Water Consumption

Kerry County Council provides the mains water supply. Water consumption for the reporting period was **486,983** Tonnes.

2.8 Environmental Incidents and Complaints

2.8.1 Complaints

One black smoke complaint was received during 2008. Reference communication sent to the Agency on the 1st of July 2008. This issue was addressed at the time of the complaint.

2.8.1 Incidents

One reportable environmental incident occurred during 2008. This related to a minor release from the boiler wash effluent treatment tank on the 12th of August 2008.
A number of problems with the CEMS systems were communicated to the EPA during 2008. All the issued that were raised were rectified during the reporting period.

3.0 Management of the Activity

3.1 Environmental Management Programme Report 2008

Of the 14 projects that were included on Tarbert's EMP for 2008, 12 of these are currently complete. The remaining two projects are to be carried forward to the 2008 EMP.

The following is a report on progress in relation to the 2007 Objectives and Targets. Items are referenced with the environmental programme task where appropriate.

Tarbert Generating Station 2007 AER Status Report for 2007 Environmental Programme						
Objective No.	**Project Description**	**Objectives**	**Status**	**Person Responsible**	**Update Comment**	**Completion Date**
P1/2007	**Bunding Programme 2007:** M&P Trafo, UT4, HOT4, HOT3, T2101, T2102, T210X, HOT12,	Test bunds and certify them as holding. Carry out repairs as required	Complete	Services Manager Mr. B. Griffin	All certs obtained. See Programme 2008 for follow up	Dec-07
P2/2007	Tank 1 Island oil farm in service inspection	Inspection of tank without cleaning out product. Assess condition and implement any repairs necessary	Complete	B. Griffin (Services Manager)	Work on Tank 3 has been successfully completed	Oct-07
P3/2007	Construct new concrete waste plinth	Construct new concrete was storage area for hazardous waste	Complete	O. Newman (Station Chemist /Env.Co-ordinator)	Construction complete. Water tightness test also complete	May-07
P4/2007	URS Retired dump survey	Label all capped areas on site	Complete	Services Manager Mr. B. Griffin	All capped areas are now clearly labelled	Oct-07
P5/2007	Oil farm bunds	A report was commissioned to evaluate the suitability of these earthen bunds for the storage of HFO	Complete	O. Newman (Station Chemist/ Env.Co-ordinator))	A detailed survey has been completed on these earthen bunds. This report will be submitted to the Agency as part of the AER 2007	Dec-07
P6/2007	Pipeline inspection programme	Carry out inspection of specific sections of pipeline in Block 1, 3 and 4. See summary tank and pipeline inspection report.	Complete	P.Brodbin (Maintenance Manager)	All planned work was completed during 2007 – see summary report	Dec-07
P7/2007	Sulphuric acid bund drainage line repairs	Repair damages concrete at acid bund and associated line	Complete	B.Griffin (Services Manager)	Appropriate repairs have been completed	Nov-07
P8/2007	Ammonia Tank	Clean out and test the integrity of Ammonia tank.	Complete	O. Newman (Station Chemist/ Env.Co-ordinator)	The ammonia tank was emptied and cleaned. The tank was inspected and no problems were encountered. Tank back in service.	Oct-07
P9/2007	Energy Efficiency	Target was to improve energy efficiency by 0.5% on the year end figure for 2006	Incomplete	T.Wall (Operations Manager)	Due to a number of plant issues and an un-avoidably extended outage on U3 no major improvements in station energy efficiency were achieved.	Dec 07
P10/2007	Rationalisation of surface water discharge points	All surface water discharge points are to be re-labelled following rationalisation as per proposal outlined in section 2.1 of the AER.	Incomplete	O. Newman (Station Chemist/ Env.Co-ordinator)	Following a survey that was carried out as per IPCL 607, ESB has completed the rationalisations of discharge points on site the labelling process has yet to be completed.	Dec-07
P11/2007	Oil detection :oil farms	Source, purchase and commission an oil detection system for the oil farm discharges	Complete	P.Brodbin (Maintenance Manager)	An appropriate instrument was sourced and purchased by ESB Tarbert. This instrument was installed and commissioned on the discharge from the island oil farm. Working well.	Dec-07
P12/2007	Reduction of waste to landfill	Target was set to reduce the amount of waste to landfill by 5%	Complete	O. Newman (Station Chemist/ Env.Co-ordinator	Due to the type and quantity of waste generated on site during 2007 this target was achieved.	Dec-07

Objective No.	Project Description	Objectives	Status	Person Responsible	Update Comment	Completion Date
P13/2007	Chemical tank upgrade WTP (phase 2)	Install and commission new chemical dosing tanks for streams A and B in the WTP	Complete	M. Kelly (Engineer)	This tank upgrade was successfully completed	May-07
P14/2007	Inspection of ammonia line from WTP to station	Take the ammonia delivery line out of service and pressure test it to ensure integrity	Complete	P.Brodbin (Maintenance Manager)	Testing completed successfully. No repairs required.	Nov-07

3.2 Environmental Management Programme 2008

Below is Tarbert's proposed EMP for 2008. This proposal is a guideline and while it is expected that all projects listed in this programme will be complete by December 2008 other items may be added to this programme during the year. A progress report on this programme will be submitted with the station's AER in 2008.

2008 AER Environmental Management Programme Proposal 2008				
EMP Task	**Description**	**Person Responsible**	**Update Comment**	**Completion Date**
P1/2008	**Bunding Testing Programme 2008:** Water tightness tests required on bunds; UT3, UT4, T2003, T102, UT2, UT1, T101, M&P, T2004, HOT 1, 2, 6, 7, 8, 11, ST11, Diesel, Waste oil tank, Chemical bunds.	O. Newman Env. Co-ordinator		Dec-08
P2/2008	**Tank 4:** In service inspection	M. Kelly Services Manager		Oct-08
P3/2008	**Island Oil Farm Bund:** Re-instate earthen embankment	M.kelly Services Manager		June-08
P4/2008	**Neutralisation sump:** Clean out and inspect floor lining	P. Brodbin Maintenance Manager		Nov-08
P5/2008	**Pipeline Inspection Programme 08:** Reference pipeline inspection plan 2008	P. Brodbin Maintenance Manager		Nov-08
P6/2008	**Waste Target:** Reduce waste to landfill. Reduction to be made on 2007 total waste figures. Increase recycling/re-use options for waste disposal.	O. Newman Env. Co-ordinator		Dec-08
P7/2008	**Energy efficiency:** Commission energy efficiency audit for the office block.	T. Wall Operations Manager		Dec-08
P8/2008	**Construct concrete plinth beside 220 compound and in area for storing barrells**	O. Newman Environmental Co-ordinator		Nov-08
P9/2008	**Boiler Wash tank:** Clean out tank, dispose of waste appropriately and inspect tank	O. Newman Environmental Co-ordinator		Dec-08
P10/2008	**Re-labelling of surface water discharge points:** All surface water discharge points are to be re-labelled following rationalisations as per proposal outlined in section 2.1 Emissions to water	O. Newman Environmental Co-ordinator		Sept-08
P11/2008	**Training:** Environmental awareness training for all staff and chemical spill training for relevant staff	O. Newman Environmental Co-ordinator		Jun-08

3.3 Pollution Emission Register

"The licensee shall, not later than six months from the date of grant of this license and thereafter as part of the AER, agree with the Agency the list of substances to be included in the PER, and the methodology to be used in their determination"

PER calculations have historically been based on the individual formula listed below. However CEMS data is now used to calculate mass emissions.

Sulphur Dioxide

Heavy Fuel Oil; gas oil (distillate oil)

SO_2 (tonnes) = Fuel consumed (tonnes), multiplied by

Fuel sulphur (S) content (fraction), multiplied by

Conversion factor S $\rightarrow$ SO_2, i.e. 1.998

Nitrogen Oxides

NO_x (tonnes) = Electricity generated (MWhours exported), multiplied by

NO_x emission factor (Kg/MWhour), divided by

1,000

Carbon Dioxide

Heavy Fuel Oil; gas oil (distillate oil)

CO_2 (tonnes) = Fuel consumed (tonnes), multiplied by

Fuel carbon (C) content (fraction), multiplied by

Conversion factor C $\rightarrow$ CO_2, i.e. 3.664

Dust

Dust (Tonnes)= (Avg. Monthly particulate figure (CEMS)) X (flue gas flow/hr) X (No. Of run hours) / 1000 X 3

Tonnes of dust can be calculated as above for an estimated annual value. However the CEMS monthly and 48 hourly average data provided are used to calculate the ELV compliance values. See section 2.4 for calculated results.

Mass emission figures in the PER summary report below for air emissions are based on CEMS data for 2007.

PER Report for 2007

Facility Identification					
Name	ESB Tarbert				
IPPC Register Number	607-02				
Reporting Period	1st January 2007 - 31st December 2007				
Pollutant Summary					
Pollutant Name	**Output to Air (tonnes)**				
	A1-1	**A1-2**	**A1-3**	**A1-4**	
Sulphur Dioxide (SO_2)	85.5	85.79	2285	3086	
Nitrogen Oxides (as NO_2) 2007	48	46.1	759	505	
Dust	13.8	8.25	118.9	163	
Carbon Dioxide - Station 2007	1006559.04 tonnes				
	Annual Usage				
Ammonia	10 tonnes				
Hydrazine	2000 litres				

3.3.1 PER 2007:

The PER emissions outlined for heavy metal below is based on the quantity of fuel consumed in KT multiplied by an emission factor. The calculations are devised as per VGB guidelines and have been agreed with the Agency. ESB proposes to report on these parameters in the PER 2008 subject to any agreement or clarification with the Agency.

Specific Flue Gas Volumes - dry gas in nm3/GJ Basis is normal conditions 0 deg c 1013 mb and Nett Calorific Value.						
Fuel	VGB/EE Recommended	ESB Calculation ESB std fuels	FG Conditions			
HFO	280		3% O2			
Diesel oil			3% O2		Boiler Plant	

Fuel consumption						
HFO	313,480.00	tons	40.59	MJ NCV	12,724,153	GJ
Diesel	1,048.00	tons	43.31	MJ NCV	45,389	GJ
Total					12,769,542	GJ

Substance	EF g/GJ	Emissions kg	Comments on Data
Methane	0.8	10,216	VGB from IPCC 2006
CO	15	191,543	VGB from IPCC 2006
N2O	0.3	3,831	VGB from IPCC 2006
NH3	0	0.00	Report as nil - no SCR
NMVOC	0.6	7,662	VGB expert group
As	0.002	25.54	VGB expert group
Cd	0.002	25.54	VGB expert group
Cr	0.008	102.2	VGB expert group
Cu	0.008	102.2	VGB expert group
Hg	0.0003	3.83	VGB expert group
Ni	0.2	2,554	VGB expert group
Pb	0.02	255.4	VGB expert group
Zn	0.04	511	VGB expert group
Benzene	0.00062	7.92	VGB from US EPA AP42
PAHs	0.00007	0.894	VGB expert group
PCDD/PCDF	6.00E-10	7.66E-06	VGB expert group 0.00766 grams ITEQ

3.4 Summary Report on Tank and Pipeline Inspections

Introduction

HFO Pipework Inspections 2007

Inspections were carried out on 16 sections of the HFO pipework in Block 4 (HFO island pupm house and pipework to rear of site canteen)

The pipework was stripped of cladding and lagging and cleaned by shot blasting. NDT inspections included visual and UT wall thickness measurement and all reports were received by the stations maintenance team.

Once inspection phase was complete, protective paint coatings were applied and the pipework was re-insulated with new insulation and re-clad with existing or new cladding as required.

Repaire were carried out for areas <50% WT remaining and to areas previously inspected in 2006.

A number of steam lines were also inspected and various sections replaced including tracing steam lines, drain pots and steam manifolds on the 10" steam line to the mainland oil farm

Overview

To ensure that the pipelines remains fit for purpose a programme of control has been devised based on a five yearly cycle. The aim of this programme is to apply adequate examination to the system to obtain timely warning of developing problems.

Due to the extensive nature of the system, the pipeline control programme divides the network into five approximately equal blocks. Each year the entire five blocks are subject to a visual examination and one selected block, i.e. Block No1,2,3,4 or 5, receives a detailed inspection.

Description of the Blocks

The following outlines the area covered by each block.

Block No1
Jetty head marine unloading arms to shore Tee.
Shore Tee to each of Fuel Tanks 1, 2, 3 & 4.
Shore Tee towards Mainland Oil Farm, end at outfall bridge.

Block No2
Outfall bridge to Fuel Tanks 9,10,11 & 12.
Fuel Tanks 8,10,11 & 12 to Mainland Pump House

Block No3
Fuel Tanks 1,2,3 & 4 to Island farm bund wall penetration

Block No4
Island farm bund wall penetration to Island Pump House
Island Pump House to North West corner of Rings A & B rear of WTP

Block No5
North West corner of Rings A & B rear of WTP to Boilers 1,2,3 & 4

Examination Cycle

Block No1 = year 2005, No2 2006 to No5 2009, after which cycle shall repeat.

Requirements of the examination
a. General Visual of entire system

Every 12 months a general visual examination of the entire system, Blocks No1 through 5, shall be made by a competent person. The competent person shall observe the state of the pipeline cladding taking note of missing or damaged sections. Each pipeline support shall be observed for displacement or collapse or for pipeline displacement causing loss of bearing on the supports. Each anchorage point and expansion point shall be observed for signs of displacement, loss of alignment or other abnormalities. A number of features present as weaknesses in pipeline, namely vertical junctions and vent points where water may penetrate the cladding. All such points are to be examined and any defects reported.

b. Detailed Examination of the selected Block

As part of the general visual examination described in section **a** above, the competent person shall also carry out a detailed examination of selected Blocks of pipeline. This examination will involve assessment of areas of special interest such as:

-Points of pipeline anchorage.
-Pipeline expansion devices.
-Vent or other vertical fittings.
-Pipeline supports having defects from visual examination.
-Flexible section including Vitrolic couplings at tanks.
-Transfer from pipeline to valve at flanges.
-Tank draw-off heaters and associated pipeworks.

Following removal of the thermal insulation the competent person shall examination the exposed area visually. Detailed non destructive testing involving cleaning by shotblasting and the use of NDT techniques is not normally required on fuel oil pipelines.
However, should visual examination expose defects of a significant nature such techniques shall be employed.

When the examination is complete the thermal insulation and cladding shall be returned to position and all joints made good. The competent person shall confirm that insulations are returned to the prior to condition, or better, and that sealing against water ingress has been made.

Pipeline Inspection 2008

It is intended to carry out further inspections of the HFO Pipework in 2008 in Block 5. This includes the HFO pipework from the rear of the site canteen to the station.
Some repair work may also be carried out in follow up to 2007 inspections.

4 Licence Specific Reports

4.1 Noise Monitoring Reports

A noise survey was carried out for the station during 2006. See **Appendix 5** for the attached report.

4.2 Energy Efficiency Audit Report Summary

General

Tarbert station has 4 generating units, giving a total electricity generating capacity of 632 MWe. These units are conventional oil fired steam generating units.

Units 1 and 2 both have a rated generating capacity of 60MWe and Unit 3 and 4 have an output of 256MWe. Each unit is independent and consists of a boiler, steam turbine and auxiliary plant.

Operating efficiency figures are based on target heat inputs which depend on conditions such as loads, starts and ambient conditions versus actual electrical energy outputs. Ideally, these targets are set so that an operating efficiency of 100% is achievable if all plant conditions are correct. Operating efficiency figures for each unit for 2007 are presented in the attached table.

Maintenance Overhauls

Over time a Unit's performance will inevitably degrade, both in terms of output and efficiency. Some of this degradation is temporary and can be recovered. Some degradation however is not recoverable. Plant overhauls are scheduled based on run hours and starts to ensure continued reliability and to recover the temporary degradation. All of the work undertaken during overhauls improves plant efficiency, performance and availability.

Operating Efficiency 2007

Unit 1	Unit 2	Unit 3	Unit 4
88.94%	85.09%	99.04%	99.05%

4.3 Bund Test Report

Over the last number of years a significant programme has been undertaken to upgrade all of the bunds on the site. On 17 November 2004 an EPA audit was conducted on site with reference to IPC licence 607. One Non-Compliance and one Observation were raised regarding the bunds. This issued has again been raised with the station and a comprehensive bund programme was put in place (reference communication of the 21st of December 2005). A detailed risk assessment of all bunds was carried out in September 2005 (see details below) and as a result of this a comprehensive bunding plan was put in place (**Attachment 3**)

Environmental Risk Assessment on Bunds at Tarbert Generating Station

For Risk Assessment purposes, the bunds are grouped dependant on the medium being controlled. These groups are 1) Oil filled Transformer Bunds, 2) Oil Tank bunds and 3) Chemical Bunds.

1) Oil Filled Electrical Transformers Bunds

The equipment being protected is an oil containing vessel, and also a complex high voltage, high current operational piece of equipment. This presents numerous safety and environmental risks, of which the environmental risks are considered here.

Risk Factors

The condition of the bund. Is the bund of sound construction and capable of holding any oil that might leak.

The Condition of the Transformer. Stringent maintenance programs are in place to keep this equipment is safe working order. This includes management of oil quality and elimination of any leaks.

The Volume of oil in the transformer. An indication of the potential size of an oil spill.

Is the Transformer in service or not. The likelihood of an oil leak on an out of service transformer is extremely low.

Is the transformer located indoors or outdoors. Outdoor transformers are more vulnerable to deterioration from the weather and rain. Indoor bunds do not need drains.

The probability of a minor spill or a major leak

- Minor spills are mostly associated with a maintenance activity or a weeping joint. These can be tidied up immediately and do not pose an environmental risk.
- Major spills are usually associated with a transformer failure, which may cause a fire or explosion and are very rear.

The response time to a leak. Minor leaks are usually identified immediately and the area tidied up at the same time. More significant leaks are alarmed in the Control room and Operations staff will survey the area within minutes. An appropriate emergency response team will then be deployed.

Transformer design. Transformer tanks are normally at ambient pressure, and are fitted with an expansion tank and breather system to accommodate temperature variations. Transformer tanks are designed for an overpressure of 25 Bar in the event of a fire or explosion.

Bund access. All our major bunds have good road vehicle access to facilitate a response to any incident that may occur.

Transformer fire defences. There are two main systems.
Automatic deluge system. This will activate automatically on detection of a fire on the transformer, and cover the entire transformer in a fine mist, and quench the fire.
Stone layer on the floor of the bund. The stone provides a barrier between any leaked oil and the radiant heat from a fire. The oil can then be safely removed from the bund in a controlled manner.

A determination of the likelihood and severity of an incident is made for each transformer, and a risk ranking is tabulated

Bund Design and bund up-grading experience
All the bunds associated with the transformers were built in the 1960's and 1970's to the standards at that time.
Over the last 6 years a significant amount of resources and project time has been invested in upgrading all of our bunds to present day standards. This work has included

- the provision of a dedicated isolation valve for each bund,
- the provision of a down stream interceptor to process any drainage form the bund,
- the upgrading of the surface of the bund by cementatious means and/or by installing a liner.

Our experience to date with these projects has been mixed. Establishing an acceptable bund has proved to be very difficult to achieve in some cases. Re-testing the bund 12 months after its up grade has also produced varied results, with numerous contractors being requested back on to site to re-establish the bund tightness. While this work is significantly improving the ability of the bund to contain its contents, it is our experience that it is not feasible to retro fit a containment system that will provide a loss rate which is to current *new build* standards.

Testing of bunds
The testing of our bunds is carried out in accordance with our Test procedure, which has been agreed with our Civil Engineer and approved by the EPA. A stabilising period is provided and allowances are made for rainfall and evaporation. The total drop in level, taking rainfall/evaporation into account should not exceed 10mm.

Due to operational restrictions, it is not always possible to test the bund to its full height (equivalent to 110% of oil). In all cases, the test level is above the stone level. This means that all floor joints, drain lines and floor to wall joints are included in the test. The only areas not included in the test are the corner joints above the gravel, all of which are available for visual inspection. In the event of a major leak, the bund would be managed to keep the level low, so the integrity of the higher parts of the bund are not as significant as the lower areas.

2) Oil Tank Bunds

Environmental Risk Factors that are considered.

Condition of the Tanks A maintenance program and an internal inspection program is in place for all oil storage tanks.

Condition of the bunds Is the bund of sound construction and capable of holding any oil that might leak.

Bund surfaces The Heavy Fuel Oil earthen bunds pose particular problems in that they can not be water tested, and certified.

Volumes of the tanks An indication of the potential size of an oil spill.

Probability of minor or major spills HFO is difficult to handle and can result in minor spills. Systems are developed to manage this. Major spills are very rare.

Response to a spill Availability of spill control equipment and procedures to minimise and impact caused by a spill

A determination of the likelihood and severity of an oil spill incident is made, and a risk ranking is tabulated for each bund.

Bund Design and bund up-grading experience
The Diesel bund which is concrete lined has proven to be very difficult. Several different approaches have been used. A lining system is currently being installed. The HFO bunds are porous so testing is not possible. Our experience is that HFO will not travel down through compacted stone.

Testing of Oil Bunds.
The testing of our bunds is carried out in accordance with our Test procedure. There are no test height limitations due to the plant.

3) Chemical Bunds
Chemicals present safety and environmental risks which are specific to the chemical being stored. The environmental risks they pose are considered here.

Risk Factors

Condition of the Tanks A maintenance program and an internal inspection program is in place for all chemical storage tanks.

Condition of the bunds Is the bund of sound construction and capable of holding any chemical that might leak.

Bund surfaces Are the bunds capable of holding the contents for an acceptable period of time.

Volumes of the tanks An indication of the potential size of a chemical spill

Probability of minor or major spills

Response time to a spill Availability of spill control equipment and procedures to minimise and impact caused by a spill

Bund Design and bund up-grading experience
Chemical Bunds installed in the 1960's and 1970's were constructed to a much higher standard than the transformer bunds. They are a lot less complex than the transformer bunds to upgrade and repair.

Testing of Oil Bunds.
The testing of our bunds is carried out in accordance with our Test procedure. There are no test height limitations due to the plant.

Summary: Appendix 6 shows a detailed outline of all bund testing and repair that was carried out in 2007. Bunds that have passed the water test have been issued with Certificates. These are available on request. See attached update as of December 2007 for the current status of bunds on site and EMP 2008 for remainder of work to be carried out.

During 2007 a report was carried out on the earthen bunds in the Island and Mainland oil farm. The purpose of this report was to assess the suitability of these earthen bunds for their purpose. This once off report has been included in **Appendix 7**.

The main conclusion from this report is that the earthen bunds are suitable for the purpose of storing HFO. The report also recommends some work be carried out in relation to re-instating earthen embankments where over time the height has been reduced due to natural processes. This recommendation has been addressed in the EMP 2008.

Drawing 1: Site Map and Discharge Points

Appendix 1: EPA Water Monitoring Results 2007

Appendix 2: Quarterly Monitoring Results 2007

Appendix 3: CEMS Annual Cross Checks and Calibrations

Appendix 4: ESS Air Emissions Monitoring Report

Appendix 5: Noise Survey

POWER GENERATION
ASSET TECHNOLOGY

TARBERT POWER STATION

IPCL
NOISE REPORT 2007

Turbine Services **August 2007**

1. Introduction

This work was carried out to ascertain the Db sound levels at the NSL's as an annual requirement for the ESB Tarbert Station IPCL.

2. Test Personnel

This work was carried out by Liam Broderick of ESB Asset Technology.

3. Equipment

The noise measurements were made using the following:
Bruel & Kjaer noise meter type 2260 (S N 2001649)
Microphone type 4189 (serial No. 2021133)
Calibrator type 4231 (serial No. 2084922)
Wind shield (type UA0237)
The NAMAS certificate dated 02/11/06 for the meter is included in this report in Appendix 3.
Meter set to A weighting, 1/3 octave analysis and Fast response. The microphone was positioned 1.3 m above the ground and mounted on a tripod for all samples.

4. Tests

A total of six Leq 30 measurements were made, one for Night and one for Day at NSL1, 2 and 3
All measurements were made on 20/21 st August in accordance the latest guidelines laid down in the EPA guidance document 2nd edition dated 2006. Full details of each NSL result are given in Appendix 2

5. Conditions

The weather was fair with dry conditions and medium wind speeds for the duration of all measurements.
The plant was on full load for the duration of the noise measurements during the day (Units 1, 2, 3 and 4).
Only Unit 3 and 4 were on load for the night measurements.
The station was clearly audible in all tests.
Comments regarding specific local conditions are contained in Appendix 1
Tarbert NSL Site Map is shown in Appendix 4

6. Results

Location	LeqA 30	LA 90	LA 10	LA Max	LA Min
NSL1 Day	**58.3**	55.1	60.2	74.9	51.2
NSL1 Night	**40.7**	38.9	42.1	54.3	36.6
NSL2 Day	**58.2**	56.4	59.7	66.4	53.2
NSL2 Night	**47.4**	46.4	48.5	57.6	44.8
NSL3 Day	**56.5**	53.8	58.3	72.6	51.9
NSL3 Night	**46.5**	45.2	47.6	57.6	43.5

Full Spectrum and all Percentiles are included in Appendix 2

7. Summary

The results of these tests show that the Station is compliant with the requirements of its noise IPCL set at (Leq30) 55db Day, when account is taken of the high traffic volumes to the ferry port during a busy summer's day and the (L90) supports this observation.
Similarly the night readings which are slightly raised due to the load changing and subsequent steam leakage during the test period are within the (Leq30) 45db Night when the (L90) values are assessed.
However a tonal component was observed in all the night tests and has been explained in relevant survey comments as due to steam leakage on roof at the time.

……..

Liam Broderick (ESB) 26-09-2007

Appendix 4A

Survey Comments

Location	Day Time	Night Time
NSL 1 Car Park, Near Main Entrance and in line of sight of the Station.	Average W/S 3.5 m/s. Weather dry with clear skies Station clearly audible. Occasional passing traffic (readings paused manually). Birds Chirping People walking in area. Frequent Traffic passing from busy ferry traffic. Steam sounds from station building. Shannon Ferry clearly audible for periods during the test.	Average W/S 0.5 m/s. Weather dry with clear skies. Station clearly audible. Occasional passing traffic (readings paused manually). Birds Chirping. Some overnight camper vans nearby, some activity heard from that area, Gas bottles moving etc. Due to the very low background noise level the tone of 630 Hz from ID fans on U3 and U4 can be identified but is very small and even with a tonal penalty of 5dB is below licence limits.
NSL 2 Private House beside "Shannon Bar" Approach Road to Station.	Average W/S 3.5 m/s. Weather dry with clear skies Station clearly audible. Occasional passing traffic (readings paused manually). Birds Chirping People walking in area. Frequent Traffic passing from busy ferry traffic. Steam sounds from station building. Shannon Car Ferry clearly audible for periods during the test.	Average W/S 0.5 m/s. Weather dry with clear skies. Station clearly audible with a low but continuous steam emission sound Occasional passing traffic (readings paused manually). Birds Chirping. 1 Aircraft overhead Low steam discharge may have contributed to a tone at 100Hz and appears to account for an LEQ at licence limits and further supported by similar L10 and L90 values.
NSL 3 Causeway. Private House on approach Road	Average W/S 3.5 m/s. Weather dry with clear skies Station clearly audible. Occasional passing traffic (readings paused manually). Birds Chirping Frequent Traffic passing from busy ferry traffic. Steam sounds from station building. Shannon Car Ferry clearly audible for periods during the test.	Average W/S 0.5 m/s. Weather dry with clear skies. Station clearly audible with a low but continuous steam emission sound Occasional passing traffic (readings paused manually). Birds Chirping. Low steam discharge may have contributed to a tone at 100Hz and appears to account for an LEQ at licence limits and further supported by similar L10 and L90 values.

APPENDIX 4B

Measurement data

1. Bruel & Kjaer Noise Measurement Printouts for NSL's

It should be noted that all Calibration measurements have been grouped together and spectrum data omitted for clarity.

Instrument:	2260
Application:	BZ7210 version 1.0
Start Time:	20/08/2007 14:14:42
End Time:	20/08/2007 14:14:49
Elapsed Time:	0:00:07
Bandwidth:	1/3 Octave
Peaks Over:	140.0 dB
Range:	30.9-110.9 dB

	Time	Frequency
Broad-band measurements:	S F I	A L
Broad-band statistics:	F	A

Instrument Serial Number:	2001649
Microphone Serial Number:	2021133
Input:	Microphone
Pol. Voltage:	0 V
S. I. Correction:	Frontal

Calibration Time:	28/06/2007 11:47:54
Calibration Level:	94.0 dB
Sensitivity:	-27.0 dB
ZF0023:	Not used

Pre Cal Day Test Text

Start time	Elapsed time	Overload [%]	LAeq [dB]	LAF90 [dB]	LAF10 [dB]	LAFMax [dB]	LAFMin [dB]
Value		0.0	93.7	93.6	93.8	93.8	93.5
Time 14:14:42	0:00:07						
Date 20/08/2007							

Post Cal Day Test Text

Start time	Elapsed time	Overload [%]	LAeq [dB]	LAF90 [dB]	LAF10 [dB]	LAFMax [dB]	LAFMin [dB]
Value		0.0	94.0	93.8	94.0	94.0	93.9
Time 19:27:26	0:00:10						
Date 20/08/2007							

Pre Cal Night Test Text

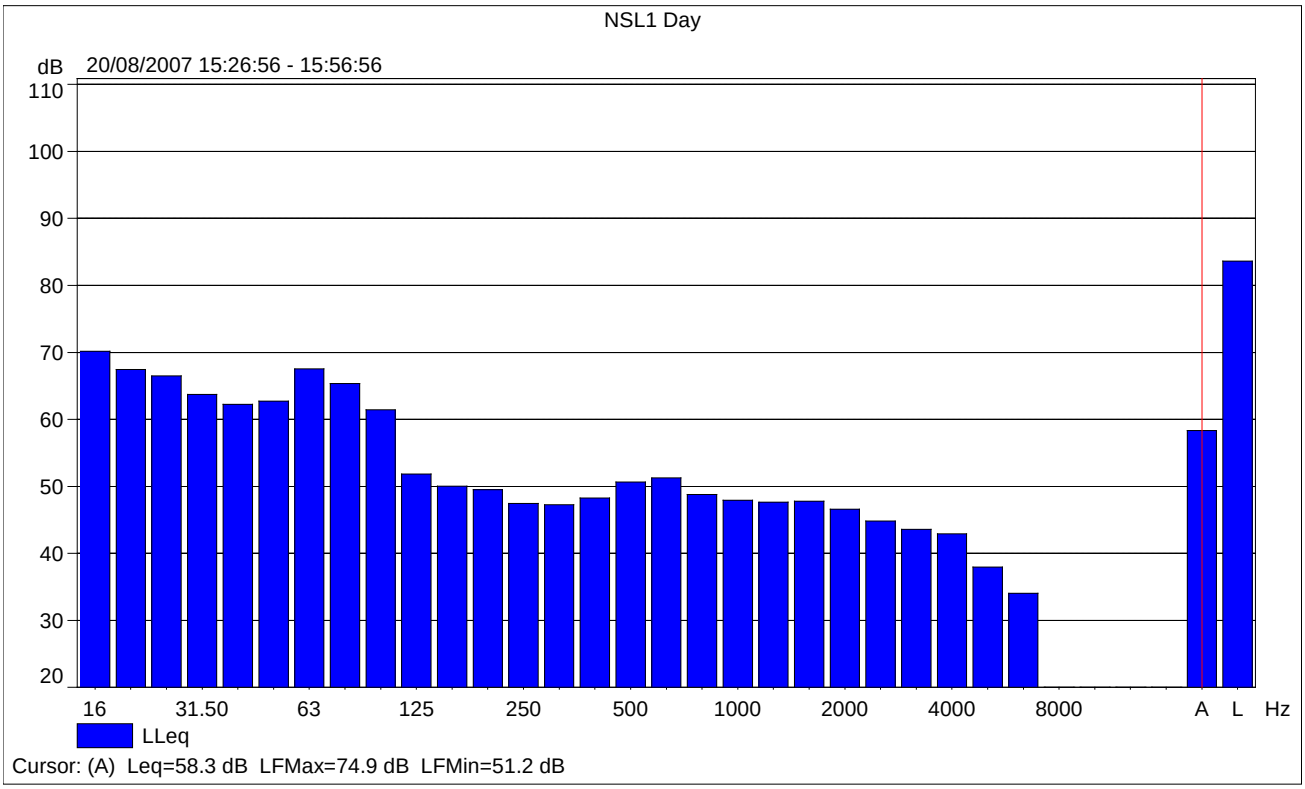
Start time	Elapsed time	Overload [%]	LAeq [dB]	LAF90 [dB]	LAF10 [dB]	LAFMax [dB]	LAFMin [dB]
Value		0.0	93.9	93.8	94.0	94.0	93.8
Time 23:30:07	0:00:09						
Date 20/08/2007							

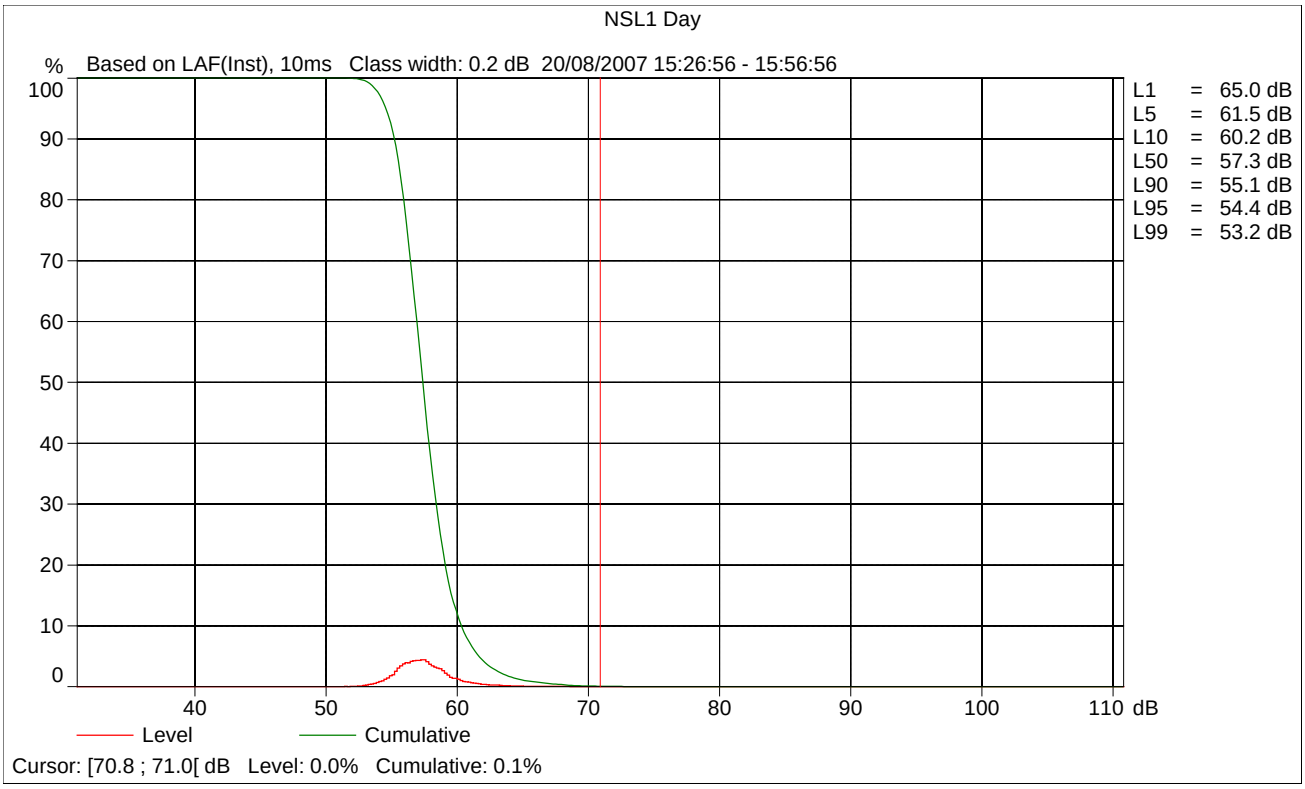
Post Cal Night Test Text

Start time	Elapsed time	Overload [%]	LAeq [dB]	LAF90 [dB]	LAF10 [dB]	LAFMax [dB]	LAFMin [dB]
Value		0.0	93.6	93.6	93.8	93.6	93.6
Time 01:16:40	0:00:05						
Date 21/08/2007							

NSL1 Day Text

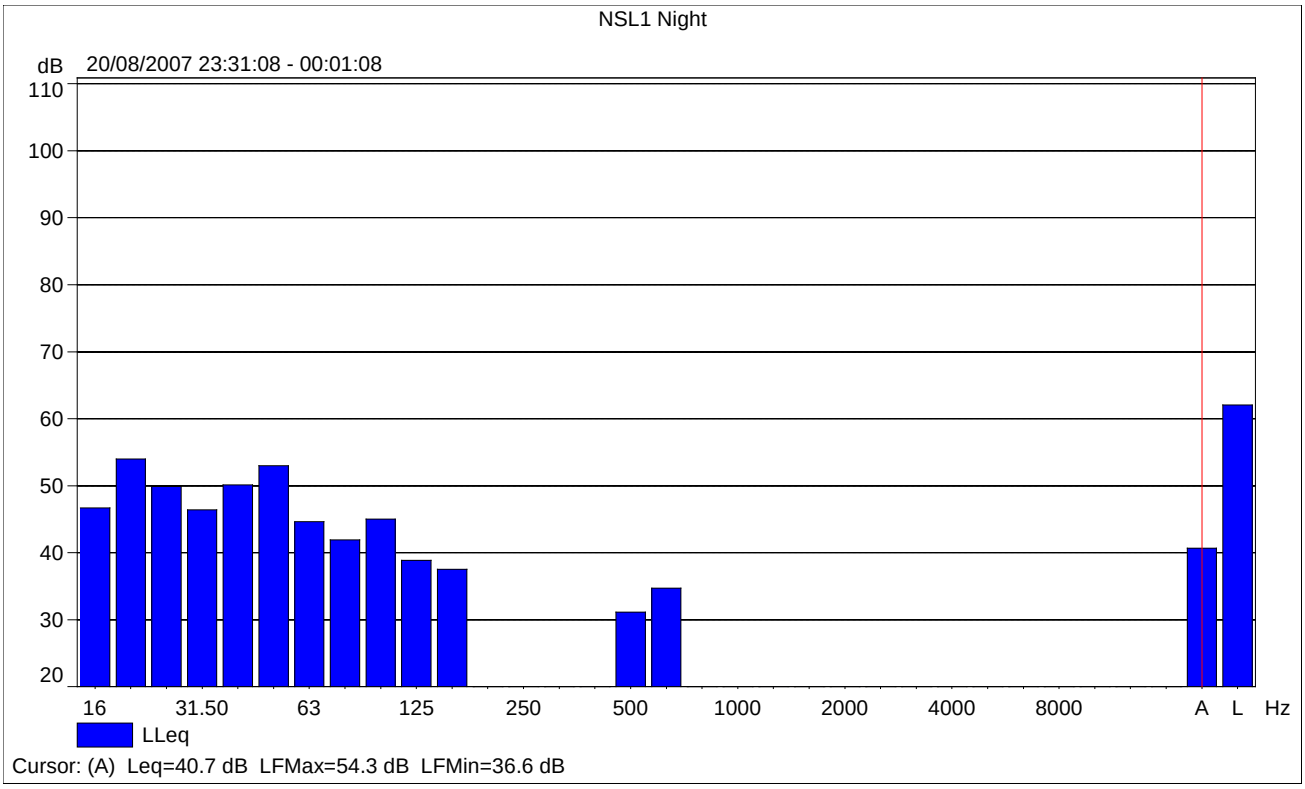
Start time	Elapsed time	Overload [%]	LAeq [dB]	LAF90 [dB]	LAF10 [dB]	LAFMax [dB]	LAFMin [dB]
Value		0.0	58.3	55.1	60.2	74.9	51.2
Time 15:26:56	0:30:00						
Date 20/08/2007							

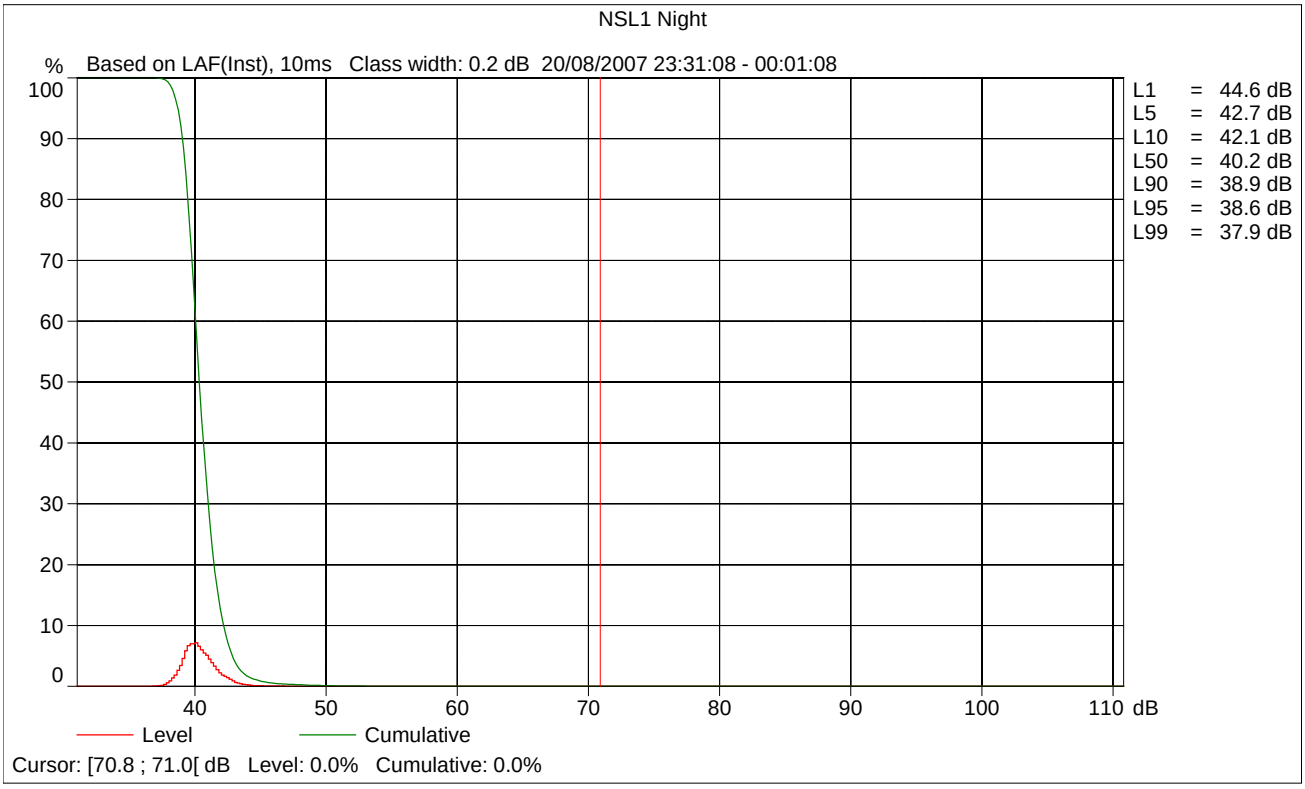




NSL1 Night Text

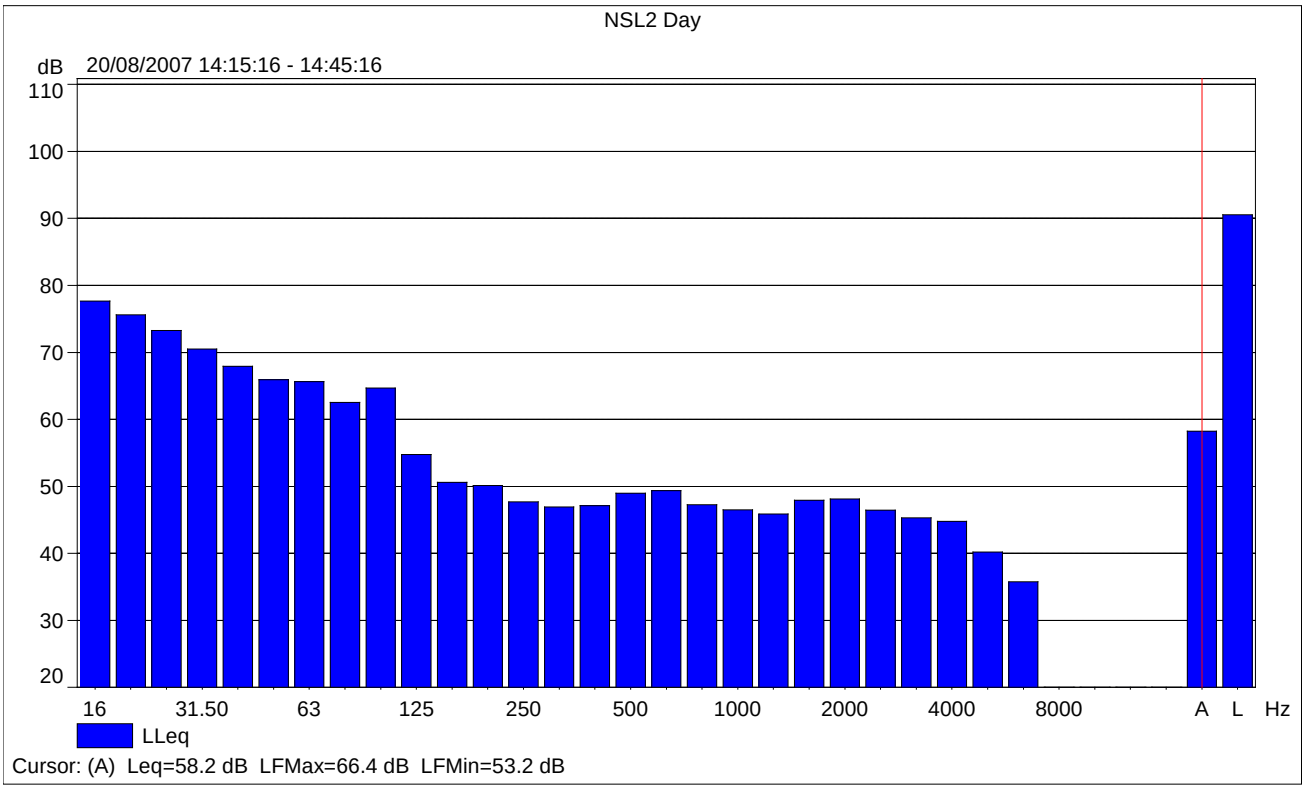
Start time	Elapsed time	Overload [%]	LAeq [dB]	LAF90 [dB]	LAF10 [dB]	LAFMax [dB]	LAFMin [dB]
Value		0.0	40.7	38.9	42.1	54.3	36.6
Time 23:31:08	0:30:00						
Date 20/08/2007							

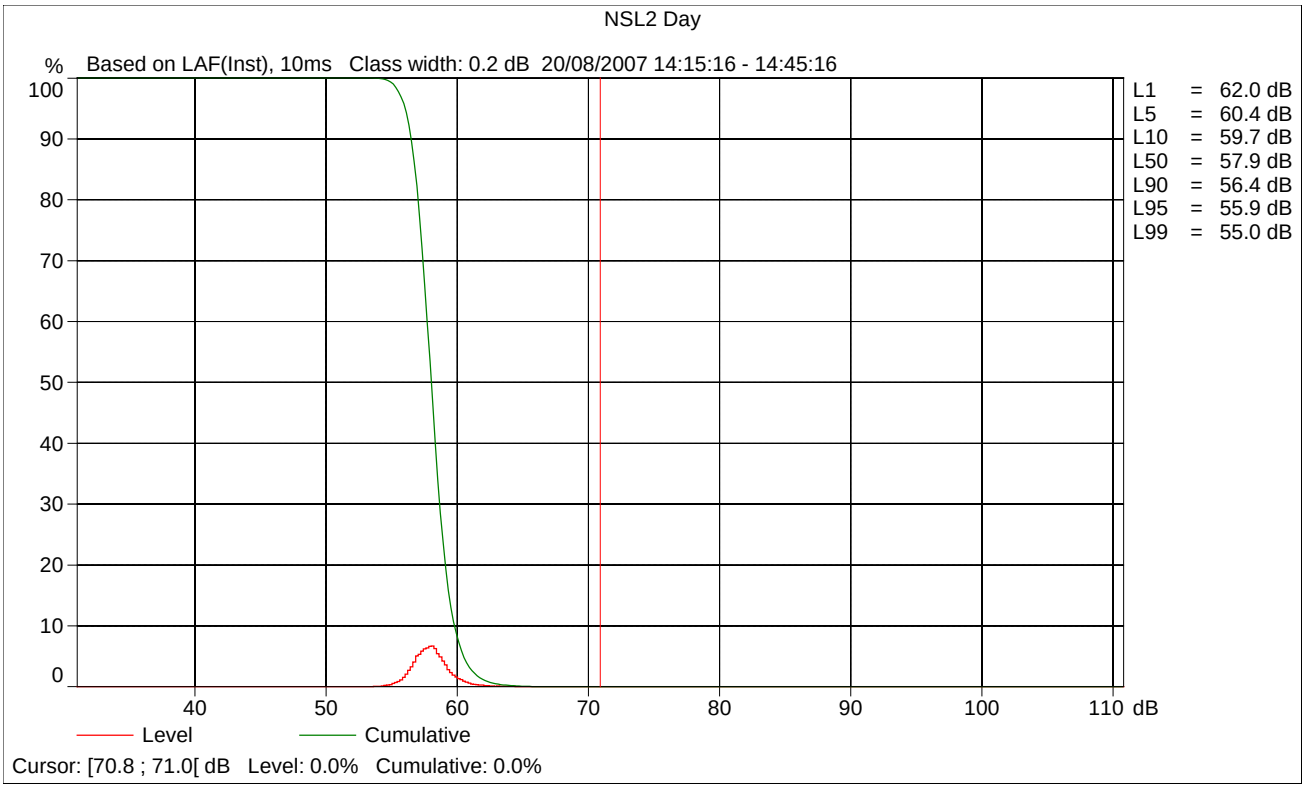

NSL1 Night
dB
20/08/2007 23:31:08 - 00:01:08
110
100
90
80
70
60
50
40
30
20
16
31.50
63
125
250
500
1000
2000
4000
8000
A
L
Hz
LLeq
Cursor: (A) Leq=40.7 dB LFMax=54.3 dB LFMin=36.6 dB


NSL1 Night
%
Based on LAF(Inst), 10ms Class width: 0.2 dB 20/08/2007 23:31:08 - 00:01:08
100
90
80
70
60
50
40
30
20
10
0
40
50
60
70
80
90
100
110 dB
L1 = 44.6 dB
L5 = 42.7 dB
L10 = 42.1 dB
L50 = 40.2 dB
L90 = 38.9 dB
L95 = 38.6 dB
L99 = 37.9 dB
Level
Cumulative
Cursor: [70.8 ; 71.0[dB Level: 0.0% Cumulative: 0.0%

NSL2 Day Text

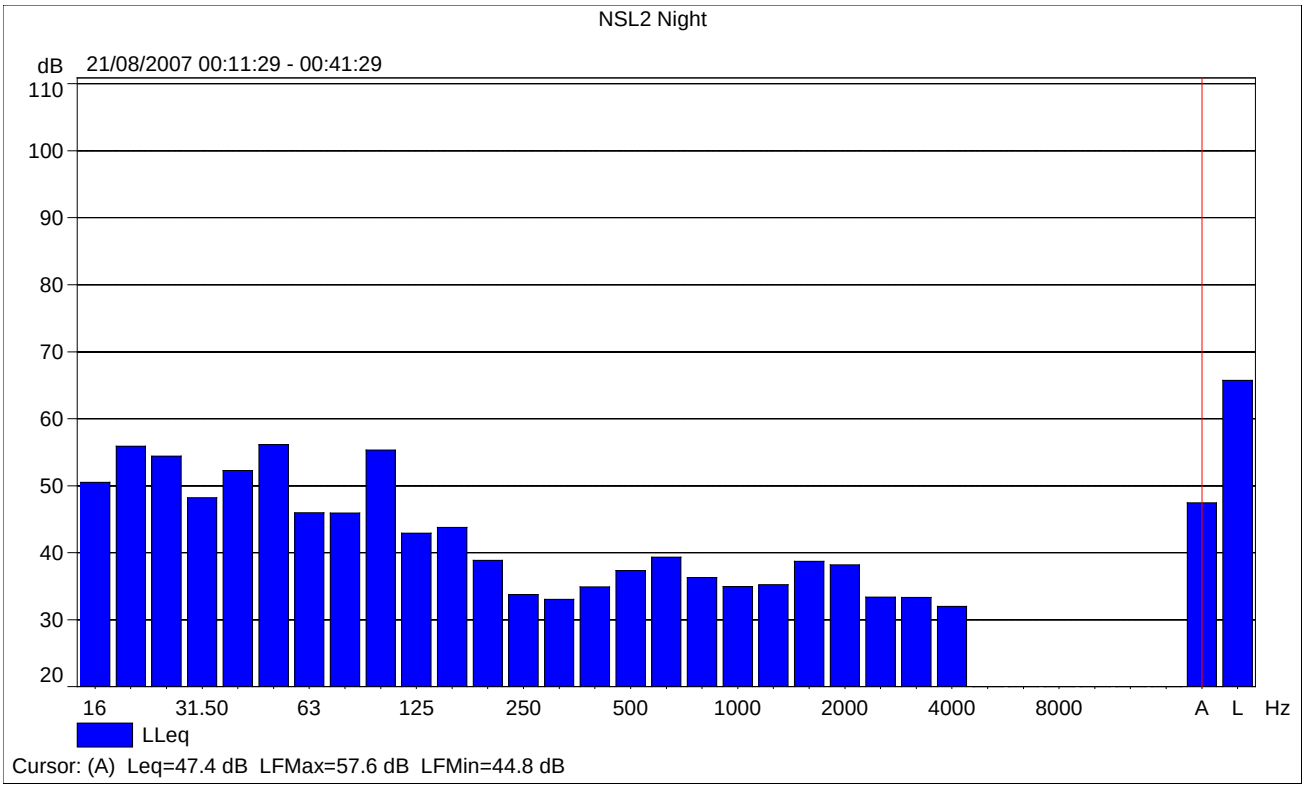
Start time	Elapsed time	Overload [%]	LAeq [dB]	LAF90 [dB]	LAF10 [dB]	LAFMax [dB]	LAFMin [dB]
Value		0.0	58.2	56.4	59.7	66.4	53.2
Time 14:15:16	0:30:00						
Date 20/08/2007							

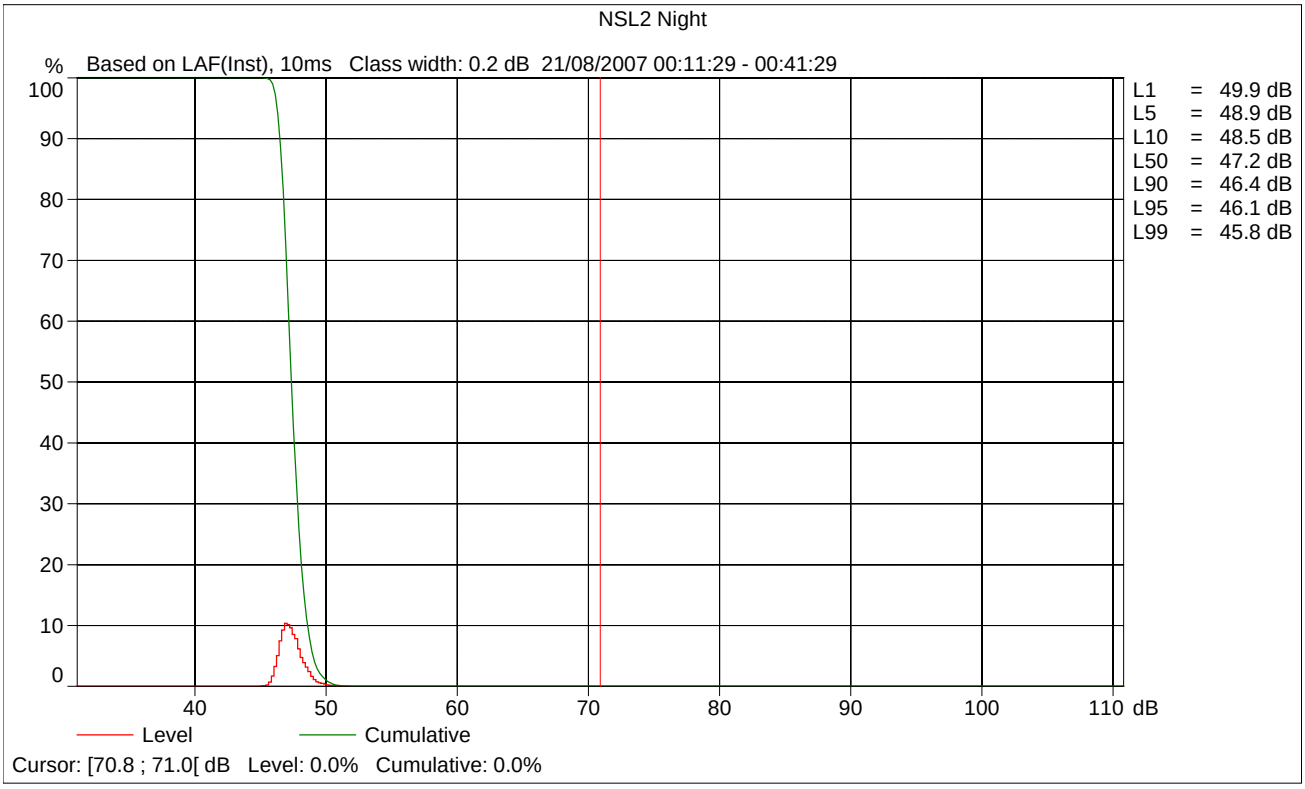




NSL2 Night Text

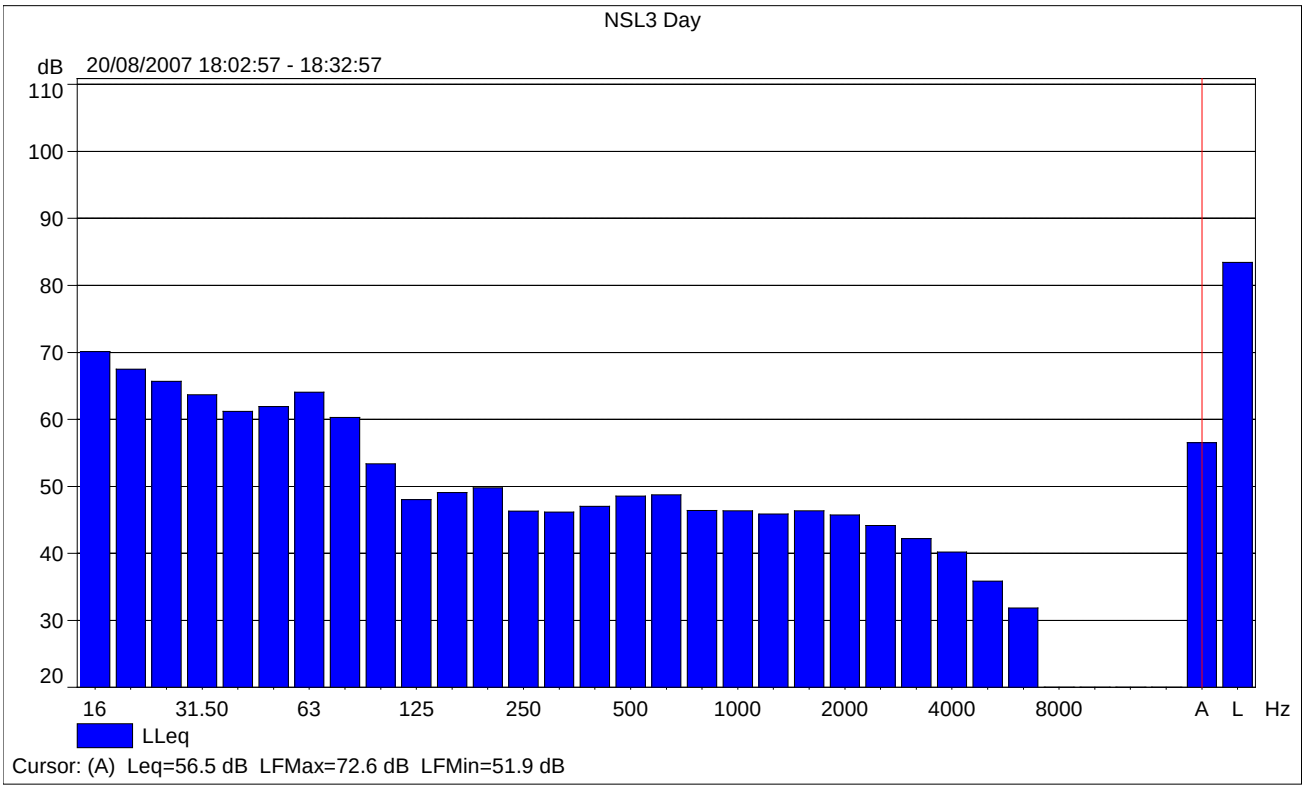
Start time	Elapsed time	Overload [%]	LAeq [dB]	LAF90 [dB]	LAF10 [dB]	LAFMax [dB]	LAFMin [dB]
Value		0.0	47.4	46.4	48.5	57.6	44.8
Time 00:11:29	0:30:00						
Date 21/08/2007							

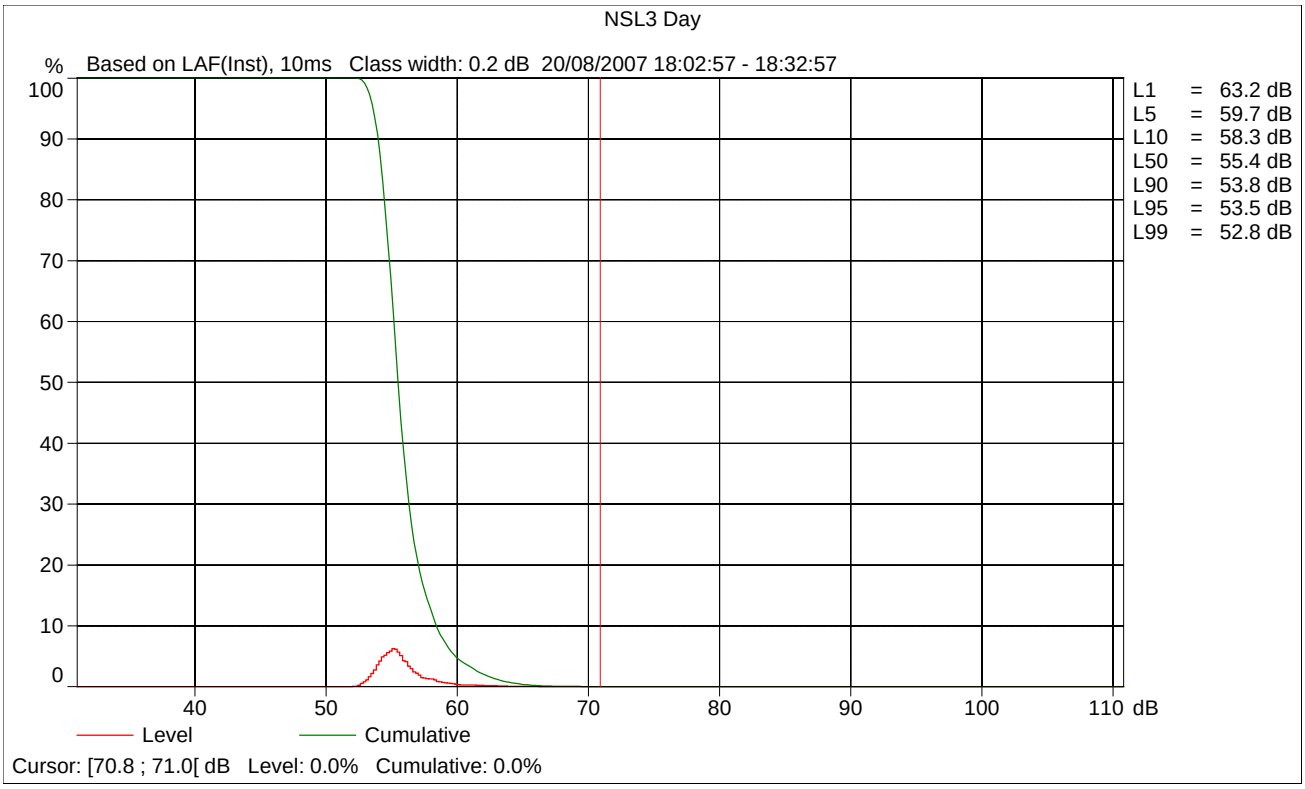

NSL2 Night
dB
21/08/2007 00:11:29 - 00:41:29
110
100
90
80
70
60
50
40
30
20
16
31.50
63
125
250
500
1000
2000
4000
8000
A
L
Hz
LLeq
Cursor: (A) Leq=47.4 dB LFMax=57.6 dB LFMin=44.8 dB


NSL2 Night
%
Based on LAF(Inst), 10ms Class width: 0.2 dB 21/08/2007 00:11:29 - 00:41:29
100
90
80
70
60
50
40
30
20
10
0
40
50
60
70
80
90
100
110 dB
L1 = 49.9 dB
L5 = 48.9 dB
L10 = 48.5 dB
L50 = 47.2 dB
L90 = 46.4 dB
L95 = 46.1 dB
L99 = 45.8 dB
Level
Cumulative
Cursor: [70.8 ; 71.0[dB Level: 0.0% Cumulative: 0.0%

NSL3 Day Text

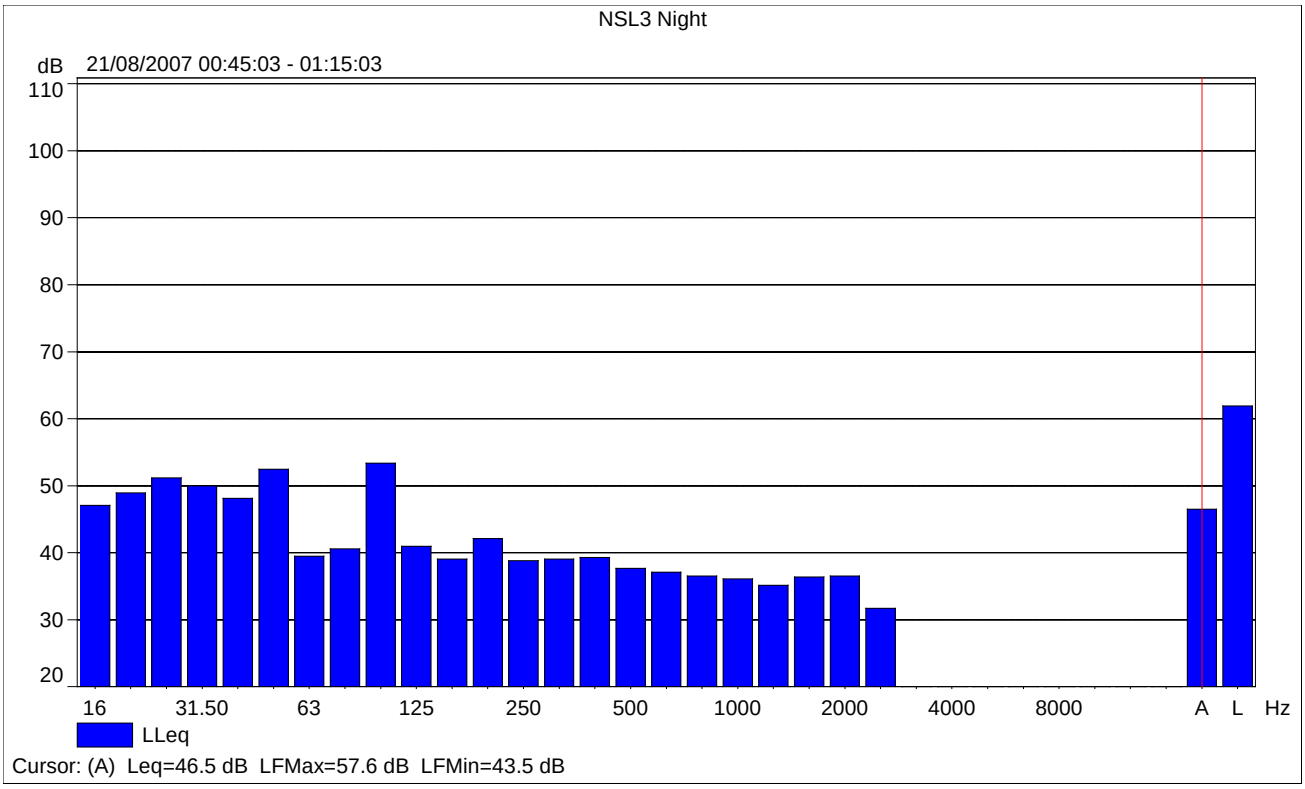
Start time	Elapsed time	Overload [%]	LAeq [dB]	LAF90 [dB]	LAF10 [dB]	LAFMax [dB]	LAFMin [dB]
Value		0.0	56.5	53.8	58.3	72.6	51.9
Time 18:02:57	0:30:00						
Date 20/08/2007							

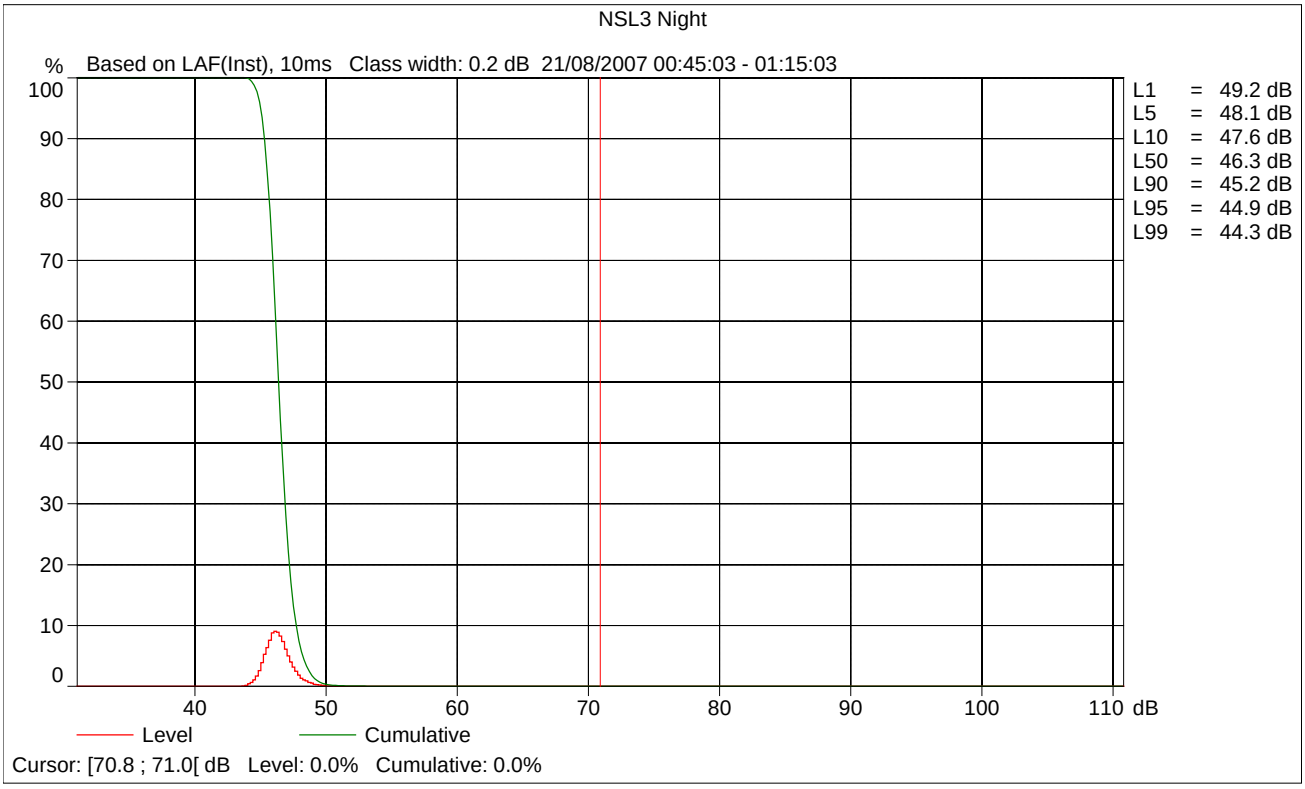




NSL3 Night Text

Start time	Elapsed time	Overload [%]	LAeq [dB]	LAF90 [dB]	LAF10 [dB]	LAFMax [dB]	LAFMin [dB]
Value		0.0	46.5	45.2	47.6	57.6	43.5
Time 00:45:03	0:30:00						
Date 21/08/2007							


NSL3 Night
dB
21/08/2007 00:45:03 - 01:15:03
110
100
90
80
70
60
50
40
30
20
16
31.50
63
125
250
500
1000
2000
4000
8000
A
L
Hz
LLeq
Cursor: (A) Leq=46.5 dB LFMax=57.6 dB LFMin=43.5 dB


NSL3 Night
%
Based on LAF(Inst), 10ms Class width: 0.2 dB 21/08/2007 00:45:03 - 01:15:03
100
90
80
70
60
50
40
30
20
10
0
40
50
60
70
80
90
100
110 dB
L1 = 49.2 dB
L5 = 48.1 dB
L10 = 47.6 dB
L50 = 46.3 dB
L90 = 45.2 dB
L95 = 44.9 dB
L99 = 44.3 dB
Level
Cumulative
Cursor: [70.8 ; 71.0[dB Level: 0.0% Cumulative: 0.0%

APPENDIX 4C Certification

CERTIFICATE OF CALIBRATION

ISSUED BY **Bruel & Kjaer**

DATE OF ISSUE 2 NOVEMBER 2006

CERTIFICATE NUMBER 15523

UKAS CALIBRATION
0174

Brüel & Kjær UK Ltd.

Bedford House · Rutherford Close · Stevenage · Hertfordshire · SG1 2ND
Telephone: 01438 · 739100 · Fax: 01438 · 739199
E-Mail: service@bkgb.co.uk

APPROVED SIGNATORY

Name: R. DIX

Signature:

SOUND LEVEL METER VERIFICATION
IN ACCORDANCE WITH THE PROCEDURE GIVEN IN BS7580:Part 1:1997

CLIENT: **ESB GENERATION SERVICES**
MONEYPOINT
KILRUSH
CO CLARE
IRELAND

DATE EQUIPMENT RECEIVED: **13 OCTOBER 2006**

CALIBRATION DATE: **2 NOVEMBER 2006**

BRUEL & KJAER REF.No.: **91135**

Sound Level Meter, Bruel & Kjaer Type:	**2260**	Serial No.:	**2001649**
Aplication Module, Bruel & Kjaer Type:	**BZ7201**		
Microphone, Bruel & Kjaer Type:	**4189**	Serial No.:	**2021213**
Calibrator, Bruel & Kjaer Type:	**4231**	Serial No.:	**2084922**
With Adaptor Type:	**UC0210**		
Calibrator Calibration Certificate No.:	**15499**	Dated:	**25/10/2006**

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a level of confidence of approximately 95%. The uncertainty calculation has been carried out in accordance with UKAS requirements.

Version (2.10 15/10/01 Type 2260)2.00 10/01/01 TYPE 2260

Appendix 6: Bunding Programme

Transformers

Transformer ID	Oil (m3)	Likelihood	Severity	Risk	Status	Comment	Next Test due
M&P trafo	0.24	L	L	L	Not Holding	Repairs during Unit 4 outage 2007	tba
T101	28.38	L	M	M	Holding	Cert. Tar/2005/09	Sep-08
UT1	5.32	L	L	L	Holding	Cert. Tar/2005/10	Sep-08
UT2	5.32	L	L	L	Holding	Cert. Tar/2005/12	Sep-08
T102	28.38	L	M	M	Holding	Cert. Tar/2005/11	Sep-08
T2003	84.45	L	M	M	Holding	Cert. Tar/2005/01	Feb-08
UT3	9.61	L	L	L	Holding	Cert. Tar/2005/01	Feb-08
UT4	9.61	L	L	L	Holding	Repairs completed Cert required.	tba
T2004	84.45	L	M	M	Holding	Cert. Tar/2005/02	Mar-08
HOT4	0.99	L	L	L	Not Holding	Repairs during Unit 4 outage 2007	tba
HOT10	0.99	L	L	L	Not Holding	One part failed. Modified for temp. Generator.	tba
HOT3	0.99	L	L	L	Not Holding	Repairs during Unit 4 outage 2007	tba
HOT2	0.99	L	L	L	Holding	Cert. Tar/2005/06	Mar-08
HOT1	0.39	L	L	L	Holding	Cert. Tar/2005/06	Mar-08
HOT8	0.39	L	L	L	Holding	Cert. Tar/2005/06	Mar-08
HOT6	0.39	L	L	L	Holding	Cert. Tar/2005/06	Mar-08
ST11	0.39	L	L	L	Holding	Cert. Tar/2005/06	Mar-08
HOT7	0.39	L	L	L	Holding	Cert. Tar/2005/04	Mar-08
ISLAND OIL FARM	0.24	L	L	L		Concrete floor	
HOT 11	0.39	L	L	L	Holding	Cert. Tar/2005/05	Mar-08
T2101	56.36	L	M	M	Not Holding	Property of National Grid - W P 2007	tba
T2102	56.36	L	M	M	Not Holding	Property of National Grid - W P 2007	tba
T210X Spare	59.09	Very L	M	L	Not Holding	Corporate decision required on its future	tba
HotX Spare	0.99	Very L	L	L		Purchase portable bund - 2007 Programme	tba
HOT 12 Spare	0.99	Very L	L	L		Purchase portable bund - 2007 Programme	tba

Oil Bunds

Liquid	Quantity (Tonnes)	Likelihood	Severity	Risk	Status	Comment	Next Test due
Diesel	300T	L	M	M	Holding	Cert. Tar/2005/08	Sep-08
HFO	100KT	L	M	M		Study complete. Submitted to EPA	N/A
HFO	160 KT	L	M	M		Study complete. Submitted to EPA	N/A
HFO/Lub		L	L	L	Holding	Cert. Tar/2005/01	Feb-08
Insulating oil	< 5T	L	L	L	Not Holding	Property of National Grid - W P 2007	tba

Chemical Bunds

Chemical	Quantity (Tonnes)	Likelihood	Severity	Risk	Status	Comment	Next Test Due
Sulphuric Acid	50 T	L	M	M	Holding	Cert. Tar/2006/03	Nov-09
Caustic (30% Conc.)	100 T	L	M	M	Holding	Cert. Tar/2005/13	Nov-08
Caustic (47% Conc.)	100 T	L	M	M	Holding	Cert. Tar/2005/14	Nov-08
Fuel Additives store		L	L	L	Holding	Cert. Tar/2005/03	Mar-08
Hypochlorite	22T	L	L	L	Holding	Cert. Tar/2006/02	Jul-09
Ammonia	7 T	L	L	L	Holding	Cert. Tar/2006/01	Apr-09
Hydrazine	1.5 T	L	L	L	Holding	Cert. Tar/2005/03	Mar-08
Neut. Sump Acid	37T	L	L	L	Holding	Cert. Tar/2005/15	Sep-08
Neut. Sump Caustic	33T	L	M	M	Holding	Cert. Tar/2005/07	Sep-08
Boiler Waste 1		L	L	L	Holding	Cert. Tar/2004/01	Mar-07
Boiler Waste 2		L	L	L			

Appendix 7: Oil Farm Bund Report