ATTACHMENT I:

AVR-SAFEWAY LTD.

LICENSE 50-1 REVIEW 2005

ENVIRONMENTAL MONITORING RESULTS AND CONCLUSIONS AND PROPOSALS FOR FUTURE MONITORING

CONTENTS

1) INTRODUCTION

AVR-Safeway is a Hazardous Waste Transfer Station Licensed by the Environmental Protection Agency (hereinafter the Agency), Waste License Number 50-1. The transfer station commenced operations on February 14, 2001. In late 2004 AVR-Safeway wrote to the Agency asking for a review of the license to allow for further expansion of the business. This document forms part of the License Review Application.

This report summarises the results of the environmental monitoring carried out at the AVR-Safeway Ltd. premises at Corrin, Fermoy, Co Cork. The information is taken from the Annual Environmental Reports and other reports forwarded to the Agency.

This report summarises the available data on the following parameters

- Air Emissions including asbestos monitoring and fugitive emissions.
- Noise
- Surface Water including the Shanowennadrimina Stream and Sediment
- Groundwater
- Local Ecology including the stream ecology
- Weather including a discussion of the data obtained from the on-site weather station.

In each case comments on the data and any observable trends are included.

2) ENVIRONMENTAL MONITORING

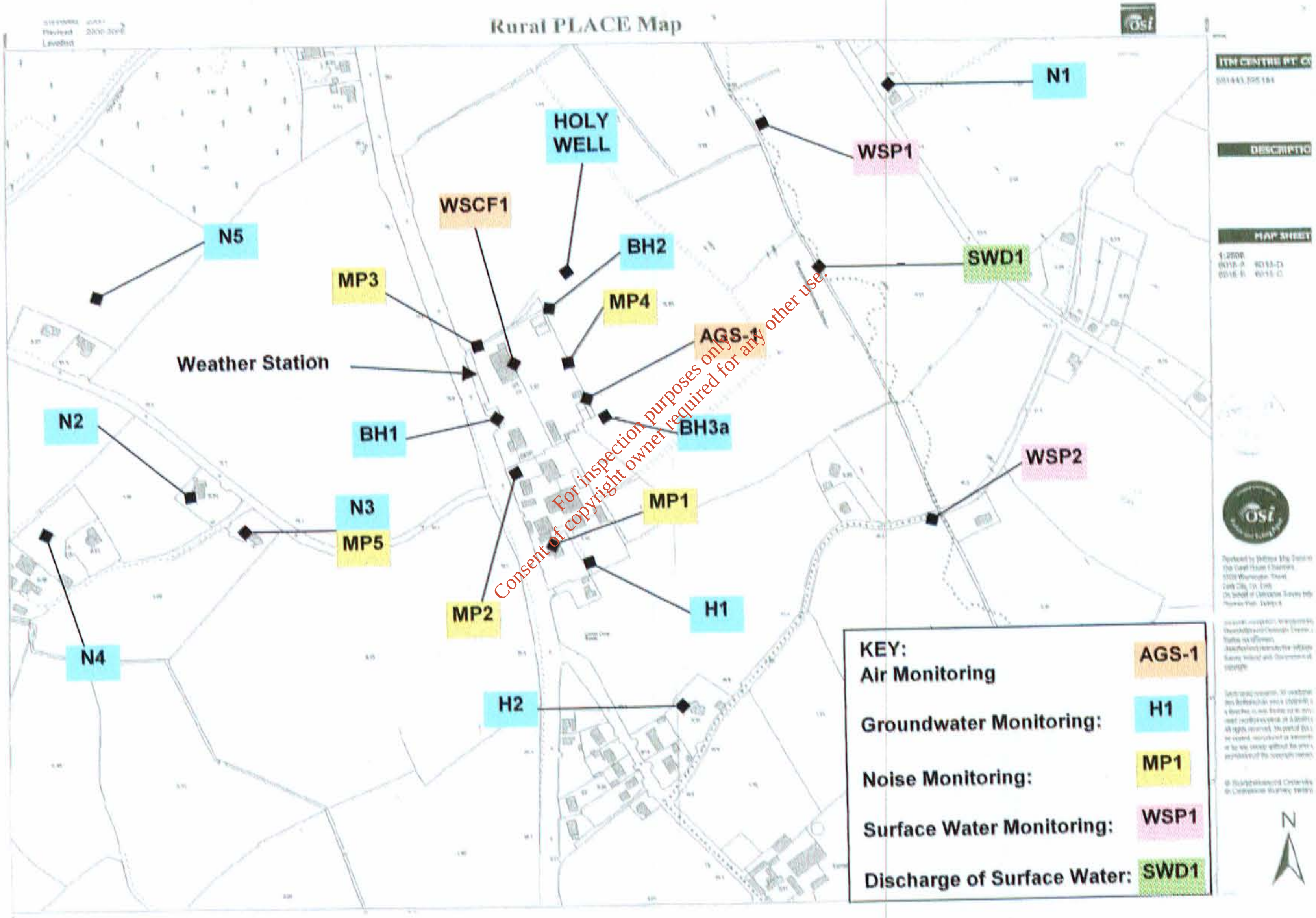
a) LOCATIONS OF MONITORING POINTS

The monitoring points used to obtain data in this report are listed in Table 2.a.1 and are recorded in Figure 2.a.1.

TABLE 3.A.1: LOCATIONS OF MONITORING STATIONS

STATION	LOCATION	GRID REFERENCE	
		EASTING	NORTHING
AIR			
AGS-1	Bund H beside AlCl tank	181432E	95150N
WSCF-1	Bund D beside warehouse	181369E	95278N
WSCF-2	In Bund R to be agreed with EPA	tbd	tbd
FUGITIVE (PID)	Various locations around site	Variable	Variable
SURFACE WATER			
WSP 1	Stream at point NE of site	181650E	95521N
WSP 2	Stream at ford SSE of site	181831E	95108N
SWD-1	Tank B	181426 E	95098N
GROUNDWATER			
BH1	Borehole on site	181390E	95219N
BH2	Borehole on NE perimeter	181422E	95338N
BH3a	Borehole on E perimeter	181505E	95216N
HOLY WELL	50 M NE of site	181435E	95389N
H1	House down gradient 100 m S	181467E	95070N
H2	House down gradient 300 m S	181566E	94878N
N1	House across stream 400 m NE	181789E	95582N
N2	House up gradient 400 m W	181028E	95122N
N3	House up gradient 350 m W	181093E	95060N
N4	House up gradient 500 m W	180919E	95091N
N5	Kingdom hall 500 m W	181019E	95378N
NOISE			
MP 1	Nearest dwelling 100 m S	181467E	95070N
MP 2	South perimeter	181407E	95141N
MP 3	North perimeter	181360E	95275N
MP 4	East perimeter	181434E	95273N
MP 5	House 350 M W	181093E	95060N

FIGURE 2a.1: LOCATIONS OF MONITORING POINTS



b) AIR EMISSIONS

i) POINT SOURCES

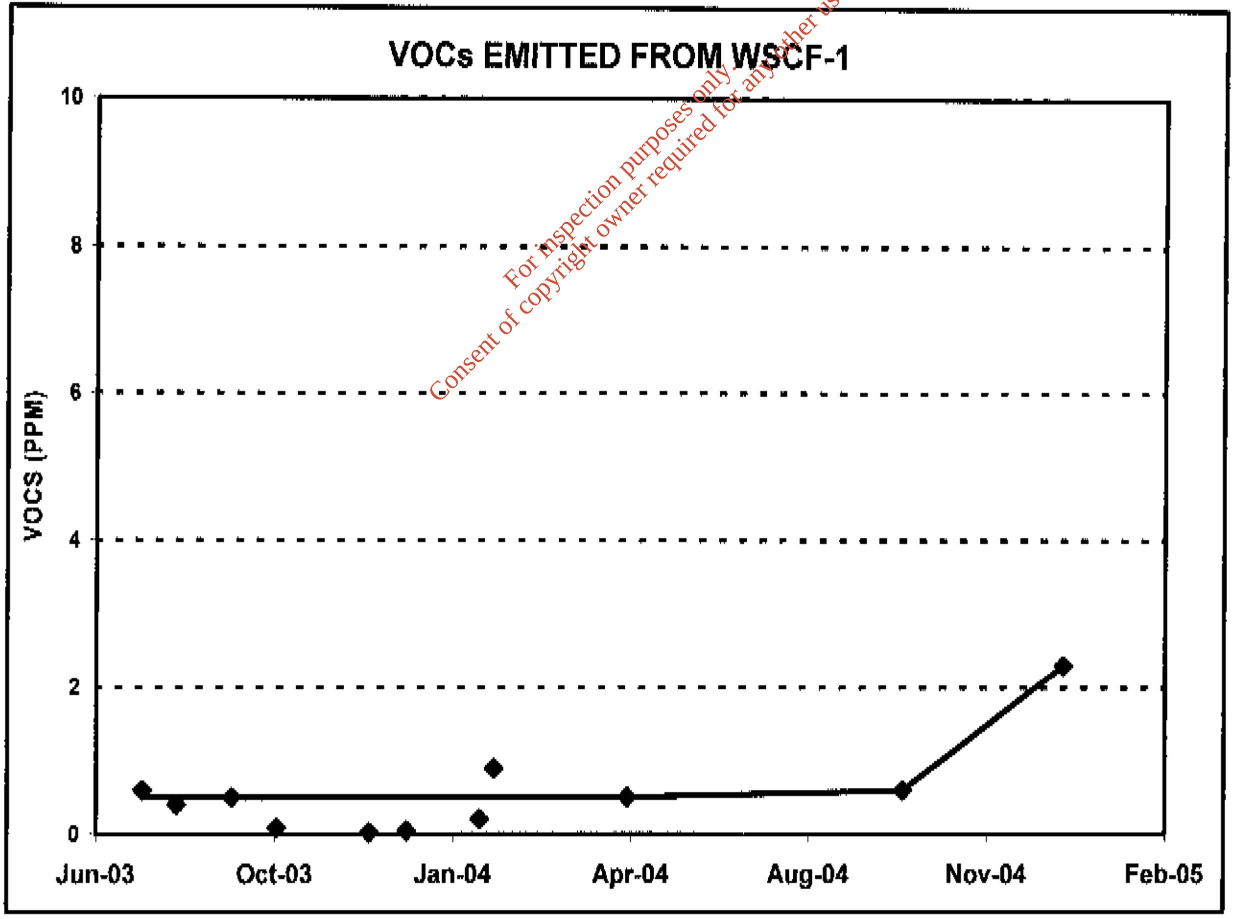
Currently there are two point sources for air emissions, the Acid Gas Scrubber (AGS-1) and the Wet Scrubber Carbon Filter (WSCF-1). The former was installed in 2001 and was monitored monthly (now quarterly) for hydrogen chloride (HCl), whilst the latter was installed in 2003 and has been monitored for HCL and volatile Organic Compounds (VOCs).

WSCF-1 is monitored only when a dichloromethane separation (the major potential source of HCl and VOCs) is underway.

At all times no HCl has been detected at the level of detection (1 ppm) from either source.

Very low levels of VOCs have been detected from WSCF-1. The results are recorded in Figure 2.b.I.1. The permit level is 10 ppm.

Figure 2.b.i.1: VOC EMISSIONS FROM WSCF 1



ii) FUGITIVE EMISSIONS

A portable photo-ionisation detector (PID) is used to monitor fugitive emissions from the site. Each working day the PID is mounted somewhere on the perimeter fence, usually downwind and the results are logged for periods of 3 to 8 hours. Each month the data is downloaded from the instrument and interpreted.

The only instance of detecting volatile compounds since monitoring started was in 2002. At the same time a complaint of an odour was made. Investigation showed that the odour and the response of the PID detector were due to slurry spreading on an adjacent field.

All air monitoring results have been reported to the Agency either as they arise, or as part of the Annual Environmental Report.

iii) ASBESTOS

Quarterly assays for airborne asbestos fibres are carried out at three locations, Bunds L,M and on the East perimeter fence. In all the tests the maximum number of fibres tentatively identified as asbestos has been 1, showing that in all tests the airborne fibre content is <0.01 fibre/m^3 air. Thus the asbestos fibre concentration at the facility is no different to the concentration at other areas in rural Ireland away from railways and airports.

All fibre monitoring results have been reported to the Agency either as they arise, or as part of the Annual Environmental Report.

iv) CONCLUSION

The emissions of HCl, VOCs and asbestos from the facility have been negligible.

v) FUTURE EQUIPMENT

An additional point source, the wet scrubber/carbon filter (WSCF-2) located in the new tank farm will operate similarly to the existing scrubber (WSCF-1) and emit an insignificant amount of VOCs to a maximum of 10 g/hr. No HCl will be emitted from this source.

Operation of the new fuel blending facility will increase the number of tanker connections and disconnections, thus increasing the possibility of fugitive emissions. Care will be taken to blow all lines free of liquid prior to making a disconnection. Using low emission connectors should give an estimated VOC emission of less than 10 g per disconnection, totalling less than 10 kg total emissions/year.

To offset this amount there will be a reduction of VOC emissions from the storage of waste solvents, which are currently stored for a short time on site in ISO tanks. These are not connected to a vent system and thus any VOCs emitted due to tank breathing are not collected. Overall it is estimated that the total net gain in VOCs from non-vehicle sources at the facility will be < 100 kg/annum at maximum capacity.

c) NOISE MONITORING

i) INTRODUCTION

Noise levels are monitored annually by an outside contractor in accordance with BS 7445: 1991, *Description and Measurement of Environmental Noise* and BS 4142: 1990 *Methods for Rating Industrial Noise Affecting Mixed Residential and Industrial Areas.* The 5 locations are recorded in Figure 2.a. 1.

All noise monitoring results have been reported to the Agency either as they arise, or as part of the Annual Environmental Report.

The results are summarised in Figures 2.c.1 (Day) and 2.c.2 (Night).

FIGURE 2.c.i.1: DAYTIME NOISE MONITORING

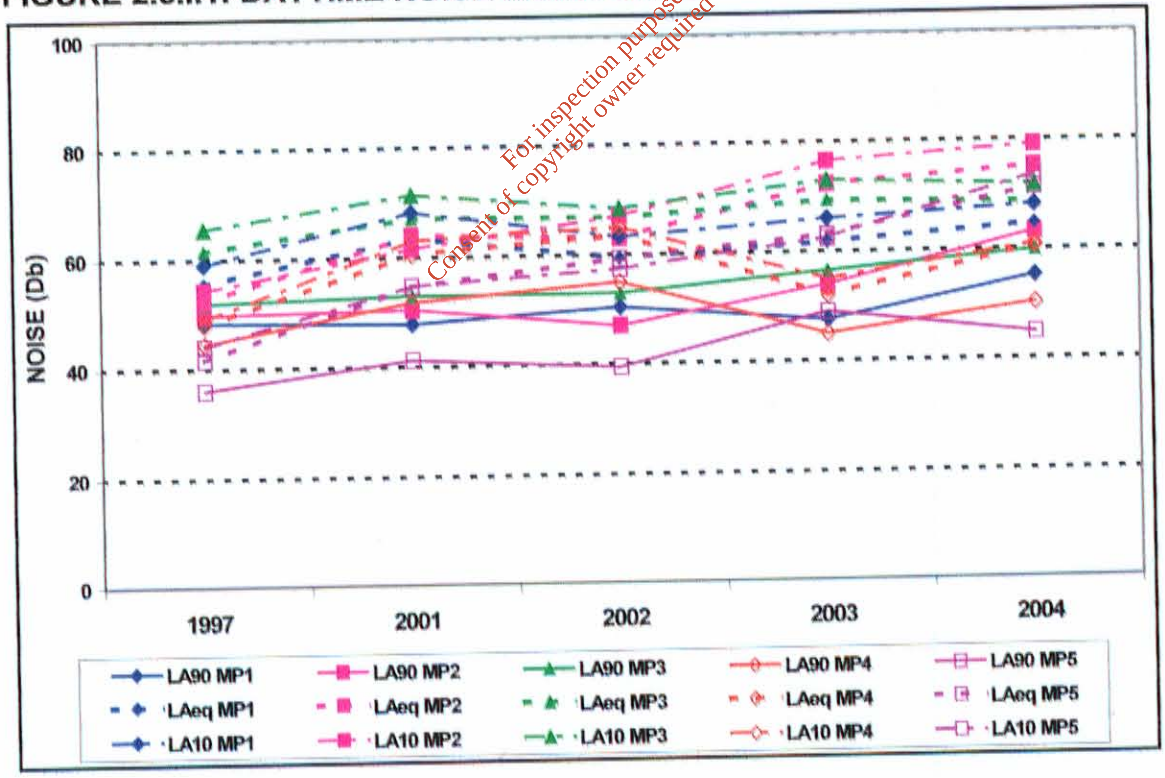


FIGURE 2.c.i.2: NIGHTTIME NOISE MONITORING

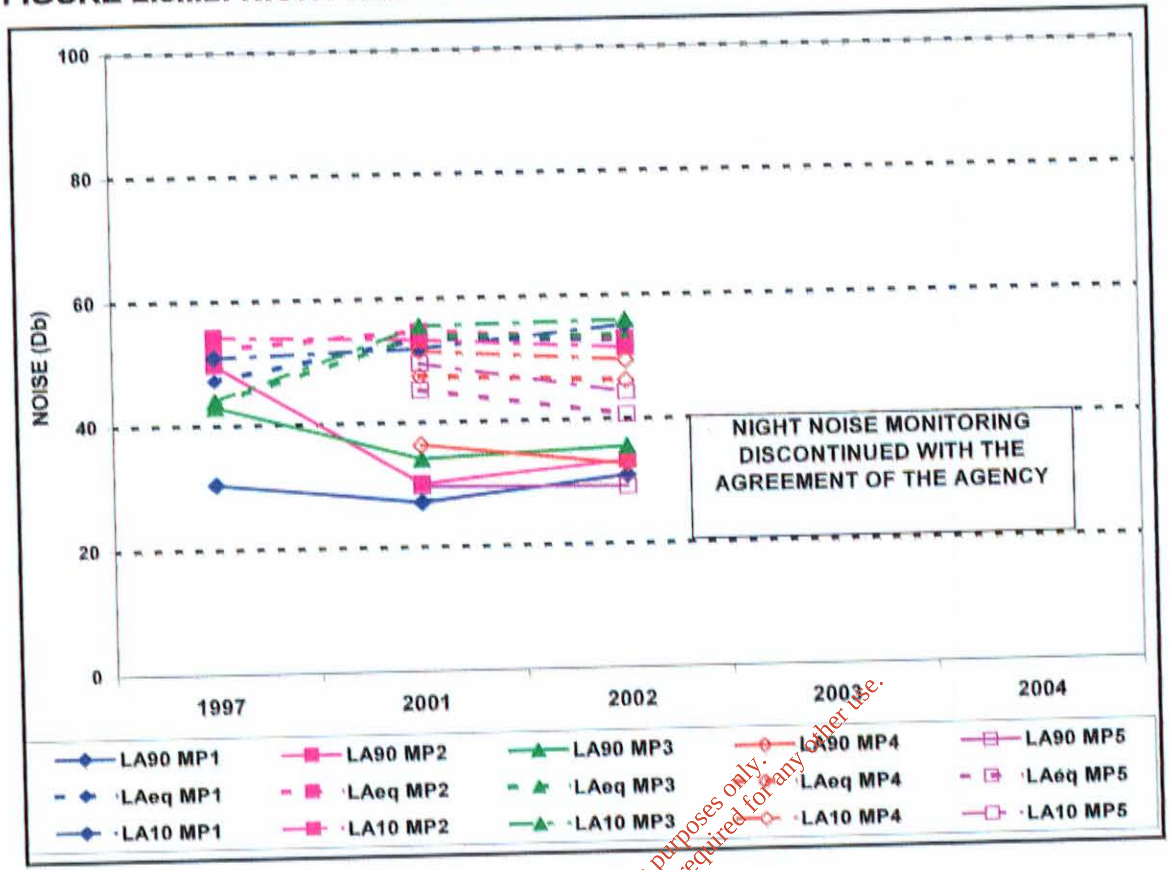
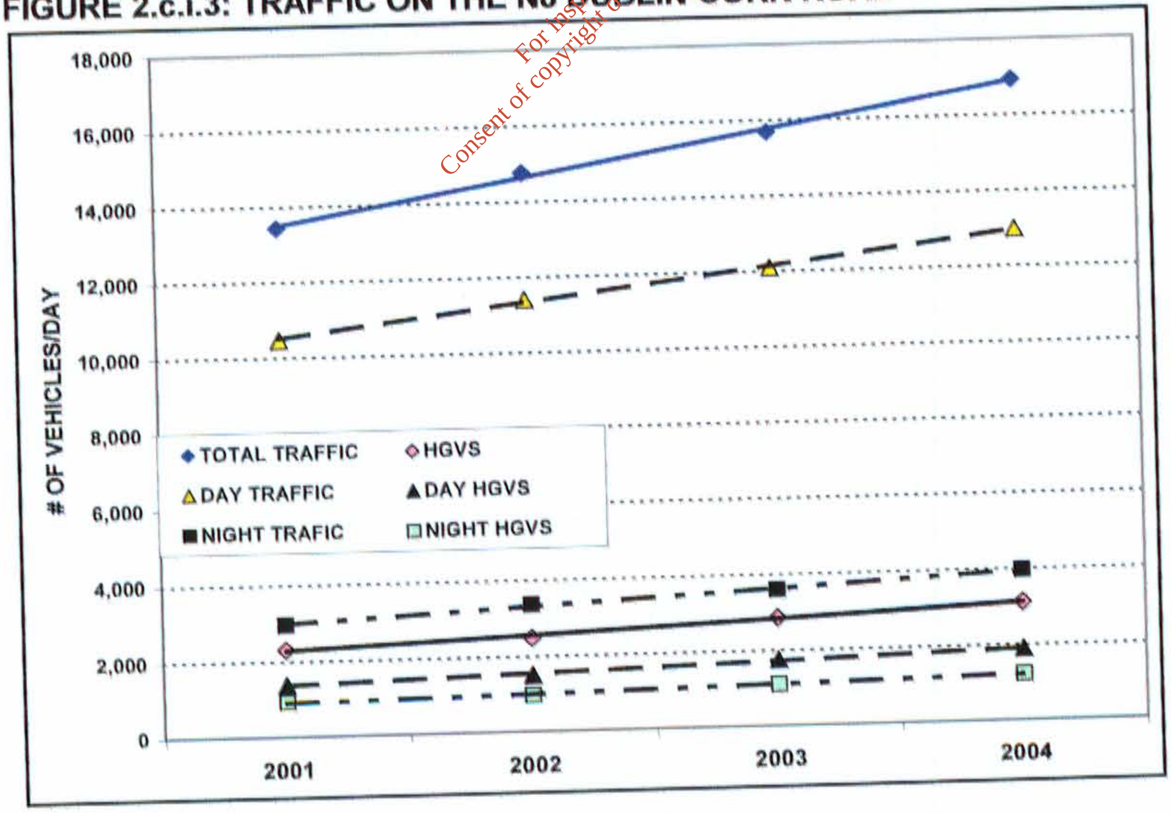


FIGURE 2.c.i.3: TRAFFIC ON THE N8 DUBLIN-CORK ROAD



ii) CONCLUSION

The site is located next to the busy N8 Dublin-Cork road. The most recent data for traffic on this road is vehicles per day over 16,000 vehicles a weekday of which over 10 % are heavy goods vehicles. Figure 1.c.3 records the average traffic on the N8 on a weekday. The data was obtained by the National Roads Authority from their counting station just north of Rathcormac. Day refers to the period from 8:00 to 19:00 and Night to the rest of the 24-hour period. This large volume of vehicles means that the noise environment in the area of the site is totally dominated by the road. The number of vehicles increased annually from 2001 to 2004 in parallel with the observed increase in noise.

The Fermoy-Rathcormac bypass is currently under construction. When opened in 2006 it will significantly reduce the number of vehicles passing alongside the site. However the new road is only about 200 m further away and significant traffic may still use the old road to avoid tolls and to access Fermoy. Thus though on-site noise will become more significant, there will still be significant traffic noise.

Onsite noise consists primarily of vehicle movements and the movement of the crane. The noise emitted by the pumps associated with the scrubbers is negligible. The addition of pumps in the new tank farm will not significantly increase the noise level. Noise mitigation measures will consist of placing permanent noise sources in less sensitive areas and the addition of noise absorbing cladding where appropriate. However it will be difficult to reduce the noise from site vehicle movements and the crane.

d) SURFACE WATER MONITORING

The only materials emitted to surface water is rain which falls on the concreted area of the site, some borehole water which is used for washing the exterior of trucks and borehole water which is used for pressure testing clean tanks. No process water, waste or internal tank washings are emitted from the site to surface water, but are collected, tested and transported to the Fermoy waste water treatment plant. Likewise material in the bunds is tested for pH odour and visual contamination before being pumped out. If it meets the discharge specification – see below – it is discharged. If not it is collected and shipped out as hazardous waste.

All water discharged from the site goes through oil and grit separators. There are 4 such separators, one for each area of the site. After leaving through the separators the water passes into a stirred tank where the conductivity, TOC and pH are continuously monitored. If the monitors detect a condition outside the set range (See Table 2.d.1, Setting on Outfall Valve) the outlet valve will automatically shut and the site management is notified by an alarm. Also, if there is a malfunction of the monitoring equipment the valve will shut and an alarm will occur. As back up to the monitoring equipment, the water can be collected, sampled and analysed in the lab before being discharged batch wise.

The limits on the discharge valve are given in Table 2.d.1, which record both the EPA mandated limits and the AVR-Safeway operating limits. The monthly maximum conductivity (in μS/cm) and TOC (in mg/l) and the maximum and minimum pHs are recorded in Figure

1.d.1, 2 and 3 respectively. The conductivity is primarily due the use of borehole water (conductivity 300 – 600 µS/cm) for washing the exterior of trucks or for pressure testing tanks. The TOC is primarily due to soluble carbon material deposited on the site or on the wheels of trucks. Both parameters show a decrease over the operation of the waste transfer station. The pH has been maintained under excellent control.

TABLE 1.d.1: LIMITS ON EFFLUENT FROM THE SURFACE WATER RUNOFF SYSTEM

PARAMETER	EPA	EPA	SETTING ON OUTFALL VALVE	
	MAXIMUM	MINIMUM	MAXIMUM	MINIMUM
CONDUCTIVITY	800 µS/cm	n.a.	600 µS/cm	n.a.
TOC	100 mg/l	n.a.	60 mg/l	n.a.
pH	9.0	6.0	8.5	6.5

FIGURE 1.d.1: CONDUCTIVITY MONITORING OF SURFACE WATER RUNOFF

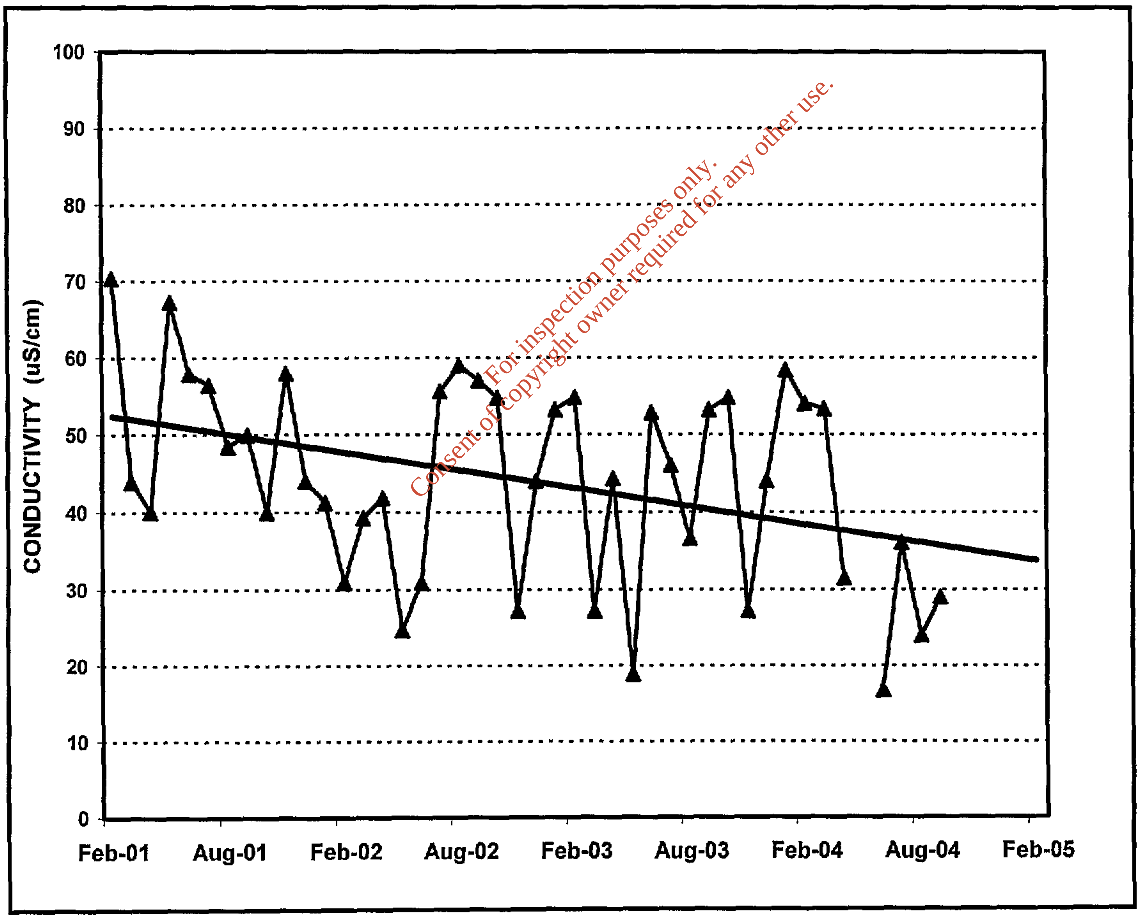


FIGURE 1.d.2: TOC MONITORING OF SURFACE WATER RUNOFF

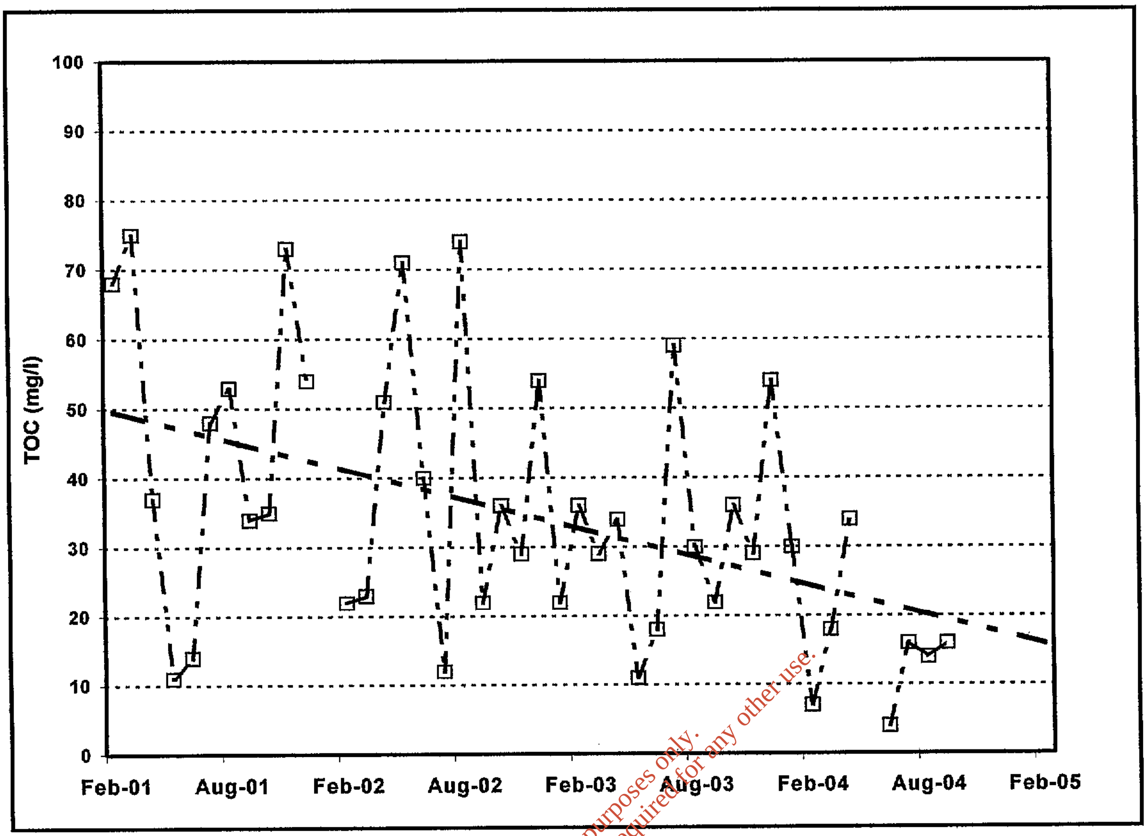
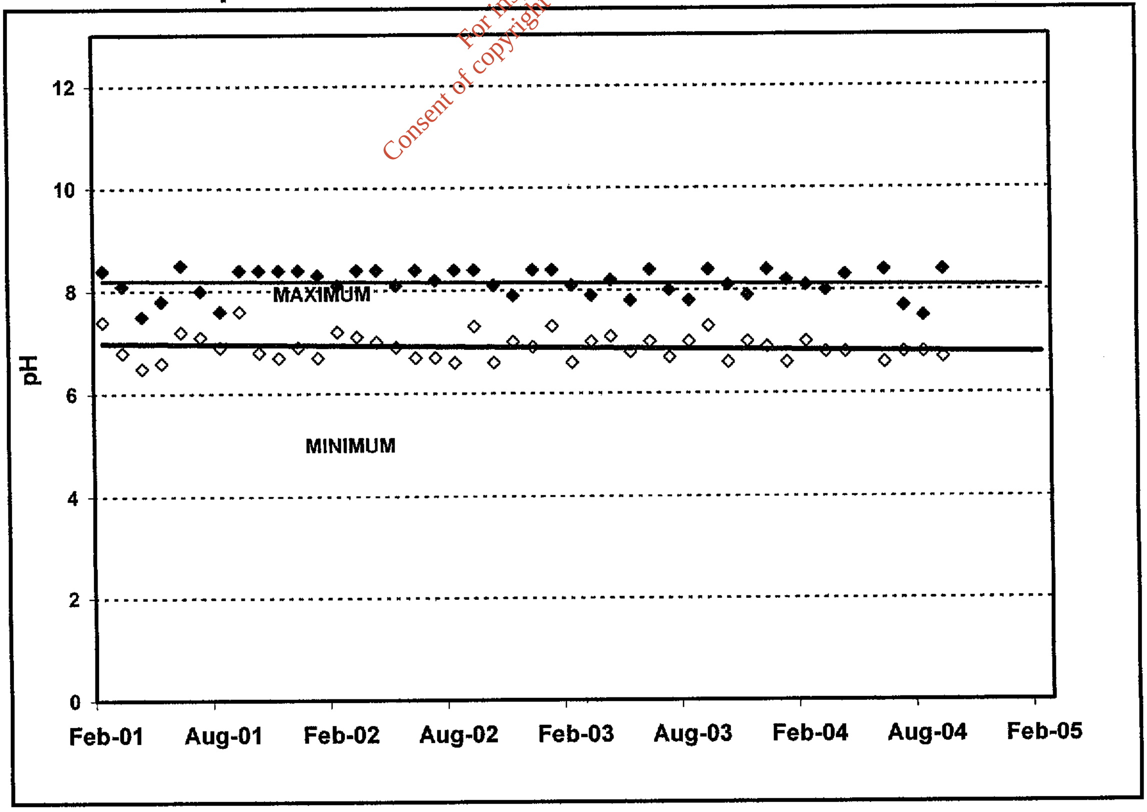


FIGURE 1.d.3: pH MONITORING OF SURFACE WATER RUNOFF



e) ANALYSIS OF THE SHANOWENNADRIMINA STREAM

Water quality testing of the stream at points above and below the outlet of the AVR-Safeway surface drain (WSP 1 and WSP 2, see plan Figure 2.1.1) is monitored quarterly. Additional tests are carried out annually. The ecology of the stream is monitored annually as is the presence of heavy metals and hydrocarbons in the sediment.

i) QUARTERLY WATER QUALITY MONITORING

The data collected from April 2001 to December 2004 are recorded in Figures 2.e.i.1 and 2. All parameters (with the exception of the suspended solids – see below) are essentially flat, indicating that the nature of the stream water has not changed over the monitoring period. Also the data from the upstream (of the outfall from the site) and downstream are very similar indicating that there was no pollution runoff from the site.

The significant variability of the ammonia results could be due to two causes:

- Scatter in the data due to the small amount measured (μg/l) and the general difficulty of preserving a sample containing a potentially volatile species.
- The primary source of ammonia in Irish rivers and streams is agricultural runoff, both from point sources and fields. This can be variable due to events and seasons. The area round the site is improved, heavily grazed pasture.

Thus the ammonia is likely to come from an agricultural source and not from the AVR-Safeway facility.

Figure 2.e.i.2 shows that the amount of suspended solids in the stream water rose very significantly in the Q3 2004 sample. In fact the level was 88 ppm (off scale in Figure 2.e.i.2). The stream was so muddy that the sample was completely opaque. This was due to the construction work on the new Fermoy bypass taking place a short distance upstream. By Q4 the bulk of earthmoving had been completed and the stream was clearer, though still significantly worse than before the work started.

In summary agriculture and the construction work on the bypass have been the primary contributors to pollutant species in the stream.

FIGURE 2.e.i.1: QUARTERLY MONITORING OF STREAM - 1

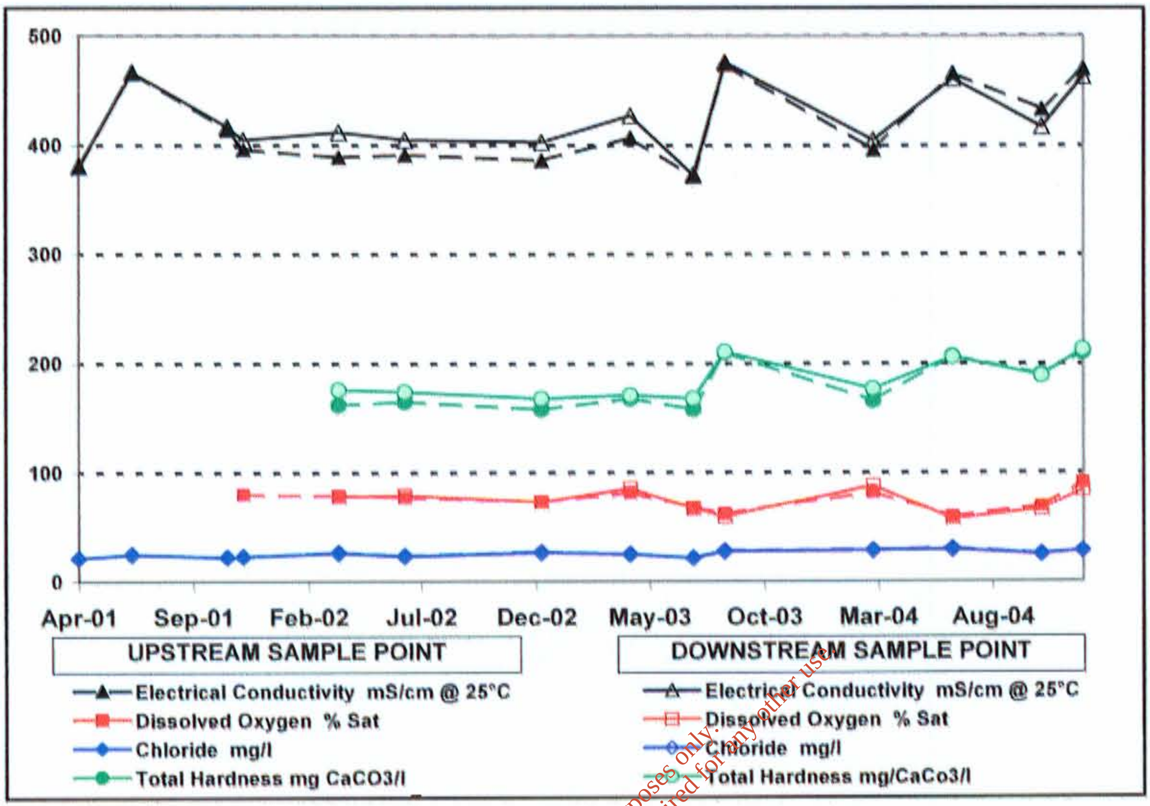
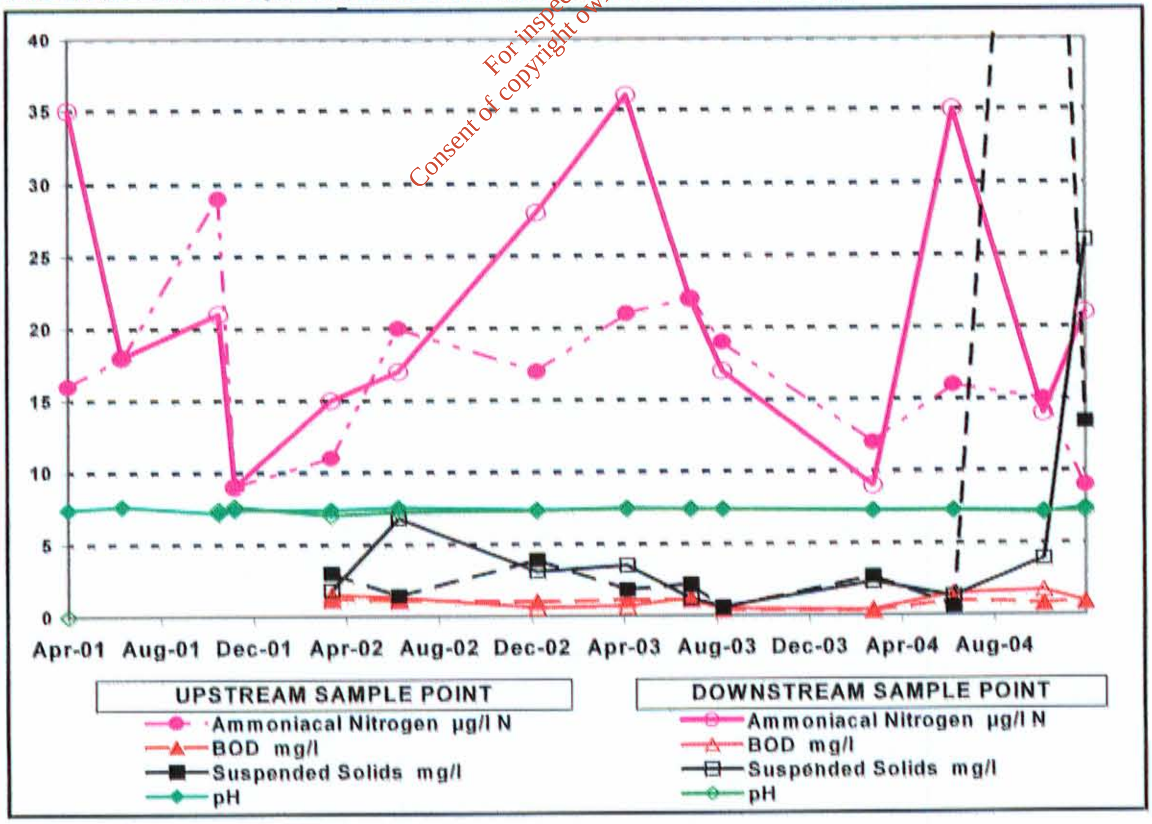


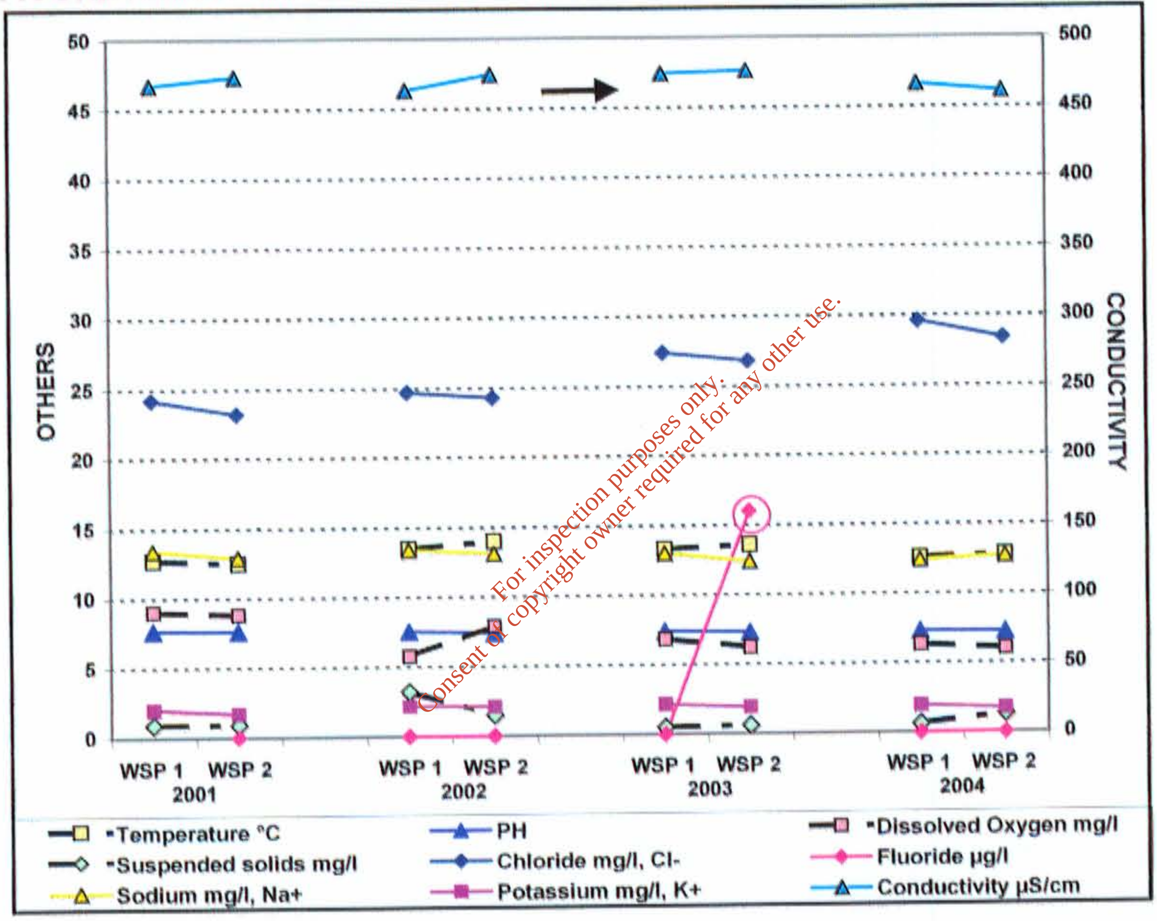
FIGURE 2.e.i.2: QUARTERLY MONITORING OF STREAM – 2



ii) ANNUAL STREAM WATER MONITORING

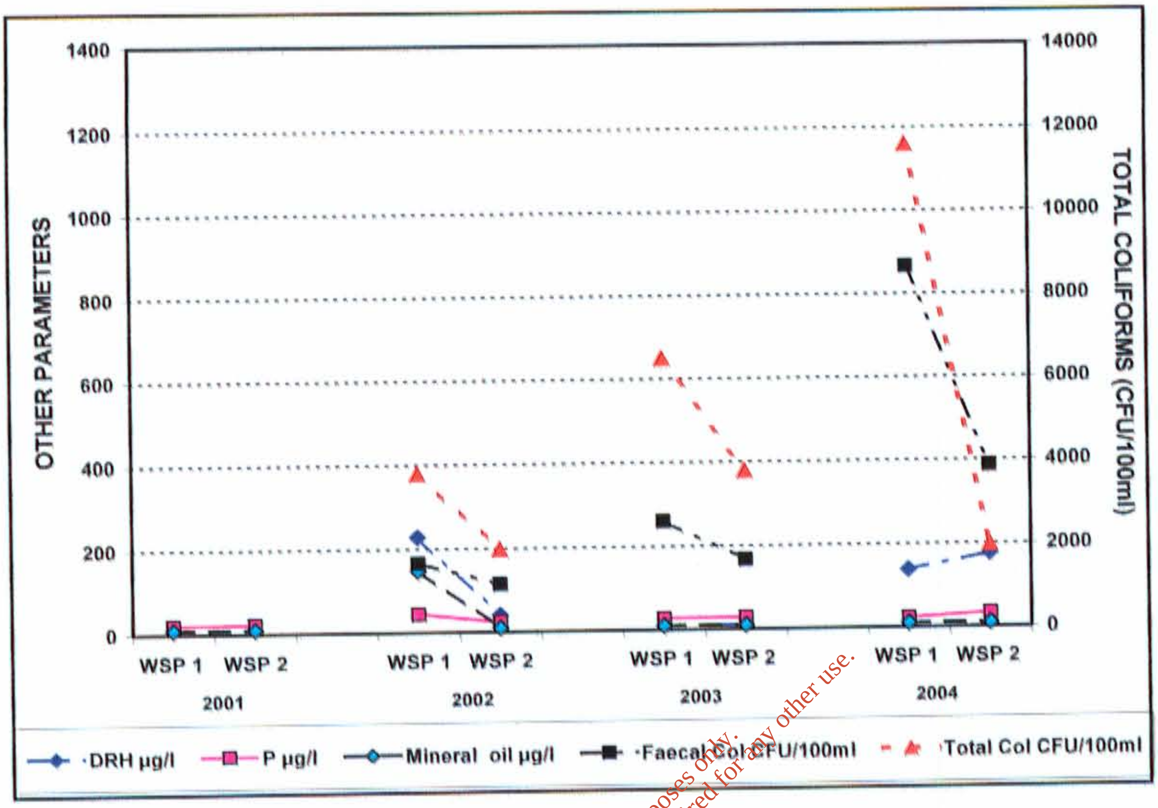
Each summer the stream water is monitored for additional parameters, particularly coliforms and metals. The results are presented in Figures 2.e.ii.1, 2, 3 and 4. Some of this data is also given under Quarterly Monitoring above. As with the quarterly data, the samples were obtained by the Aquatic Services Unit UCC, and the analyses carried out by them and other labs contracted to them.

FIGURE 2.e.ii.1: ANNUAL MONITORING OF STREAM WATER - 1



For most of the parameters in Figure 2.e.ii.1 the concentrations are the same at both sampling points indicating that there is no effect due to the transfer station. The level of fluoride in the WSP-2 sample of 2003 is anomalous and is believed by the contractor to be due to contamination. However, even if the result is real the level is significantly lower than salomnid river and drinking water standards and would pose no risk to human health or the environment. .

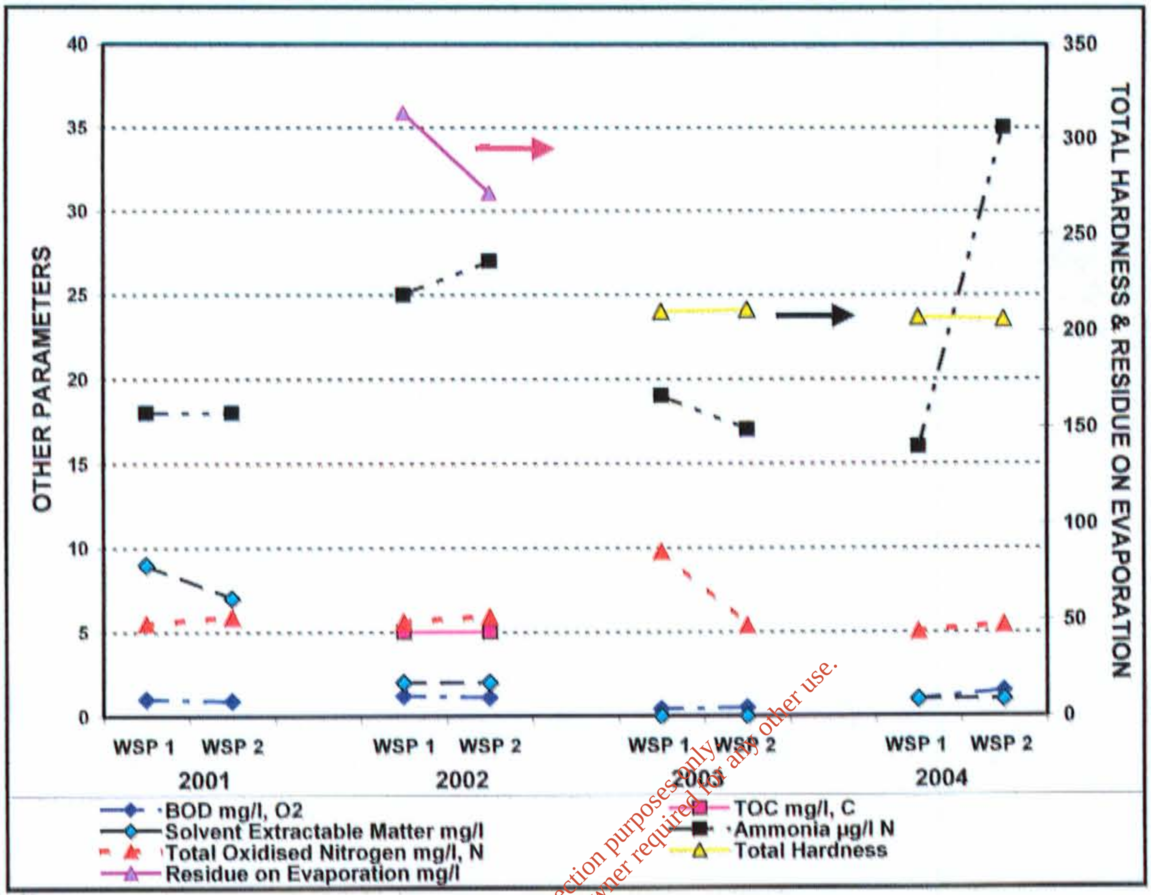
FIGURE 2.e.ii.2: ANNUAL MONITORING OF STREAM WATER - 2



Of the parameters recorded in Figure 2.e.ii.2 of primary concern is the increasing level of coliforms, both total and faecal. Coliforms were not assayed in 2001. These are quite high both above and below the transfer station and indicate the effect of agricultural run-off and perhaps leakage from sewage treatment tanks. As the levels are higher at WSP-1 the coliforms cannot be attributed to the AVR-Safeway facility. Note that the total coliforms are plotted against the right hand axis and the faecal coliforms are plotted against the left hand axis in Figure 2.c.ii.1.

Diesel range hydrocarbons (DRH) were detected in 2002 and 2004. The data indicates that the source is something other than the waste transfer facility, probably agricultural or construction machinery. Phosphorous levels were very low in all years. Mineral oil was only detected in the 2002 upstream sample and probably reflects a slight local spill of oil.

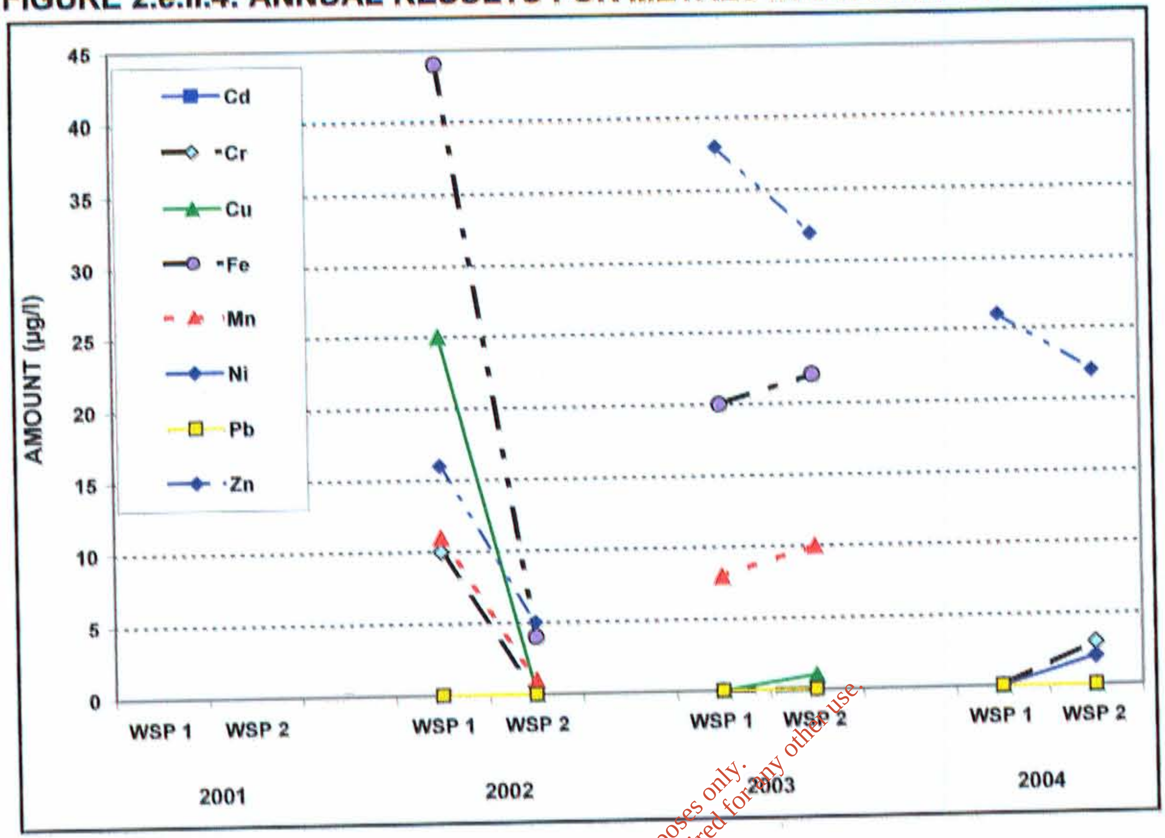
FIGURE 2.e.ii.3: ANNUALMONITORING OF STREAM WATER



Only four parameters were measured in 2001. In 2003 and 2004 the Residue on Evaporation test was replaced by the Total Hardness, expressed as mg/l $CaCO_3$. TOC was only measured in 2002.

All parameters, except ammonia, appear constant and there is no significant difference between pollutant concentrations above and below the discharge point. The variability of the ammonia results and its significance are discussed above.

FIGURE 2.e.ii.4: ANNUAL RESULTS FOR METALS IN STREAM WATER



Heavy metals were not analysed in 2001. In 2004 iron and manganese were not reported, but nickel was. The nickel concentrations were 1 and 2 µg/l at WSP 1 and WSP 2 respectively. Figure 2.e.ii.4 shows that the level of heavy metals is low (note that the units are µg/l) and there are no obvious trends. In fact the levels are very similar to ground water in the area as reported below. There are many springs leading to the Shanowennadrimina stream and are the major source of water except in heavy rain events. In all samples cadmium were non-detectible.

Overall the data indicate that the transfer station has not had had any effect on the water quality of the stream.

iii) STREAM ECOLOGY

A detailed analysis of the stream ecology is carried out annually. Large samples of water and sediment are obtained and the species living in the stream are identified and enumerated. From this data the water quality of the stream at the sample point can be determined using the EPA "Q" scale (See Table 2.iii.1); essentially the higher proportion of more sensitive species living in the water the better the quality of the water and thus the higher the 'Q' number. The 'Q' numbers determined for the stream at WSP 1 and WSP 2 are recorded in Table 2.e.iii.2.

In 2004 work started on the Fermoy bypass just upstream of the AVR-Safeway facility. Considerable disturbance of the stream has occurred and a lot of solid material has been allowed to enter the stream. When it came time to sample the stream it was found that at WSP-1 and all places between the site and the road works the silt load was so high that the water was opaque and unsuitable for sampling. The same problem existed at WSP-2. A reasonably clear sample was obtained at WSP-3, significantly further down stream from the facility and the results of this sample are recorded in Table 2.e.iii.2.

Table 2.e.iii,1: EPA 'Q' RATINGS

Q-Value	Degree of Pollution
Q5, Q4-5, Q4	Unpolluted
Q3-4	Slightly Polutted
Q3, Q2-3	Moderately Polluted
Q2, Q1-2, Q1	Serious to Gross Pollution

Table 2.e.iii.2: ECOLOGY OF THE SHANOWENNADRIMINA STREAM

EPA "Q" RATING				
SAMPLING LOCATION		2002	2003	2004
WSP1	Upstream of SWD1	Q4	Q4	N.A. Note 1
WSP2	Downstream of SWD1	Q3-Q4	Q3-Q4	Q3-Q4 Note 2
Notes				
1	Fine silt clogging strream at sample ppoint			
2	Sample taken at WSP3, further down stream from WSP2 to avoid silt			

There is evidence that the stream received some pollution between WSP-1 and WSP-2. However this is most probably due to agricultural runoff and other sources, rather than the AVR-Safeway Transfer Station.

iv) SEDIMENT ANALYSIS

Samples of the sediment (duplicates (A & B) in 2002 -4) were obtained above (WSP 1) and below (WSP 2) the outfall of surface water from the site (SWD1) and were analysed annually for six heavy metals and for hydrocarbons. The Hydrocarbon content is recorded in Table 2.e.iv.1 and the heavy metal content in Table 2.e.iv.2.

TABLE 2.e.iv.1: HYDROCARBONS IN STREAM SEDIMENT

	2001	2002	2003	2004
WSP1 TVH	<10			
WSP1 DRH	110	30		
WSP1 PRO			<0.01	<0.01
WSP2 TVH	<10			
WSP2 DRH	150	3		
WSP2 PRO			<0.01	<0.01

Diesel range hydrocarbons DRH were present in 2001 and 2002. However the data do not determine the source, other than to say that it appears to have come from upstream of the AVR-Safeway site. It also appears that they are the result of a pre 2001 spill as the level is significantly reduced in 2002 and no petroleum range hydrocarbons are detectable in 2003 and 2004.

TABLE 2.e.iv.2: HEAVY METALS IN STREAM SEDIMENT

		2001	2002		2003		2004	
			A	B	A	B	A	B
Cadmium	WSP1	1.0	0.6	1.2	0.9	1.3	1.0	1.1
	WSP2	2.5	1.4	1.2	1.8	0.7	1.3	1.4
Chromium	WSP1	10	16	28	14	16	19	28
	WSP2	23	25	26	18	11	27	22
Copper	WSP1	13	6	10	9	11	12	9
	WSP2	27	14	12	17	7	14	14
Lead	WSP1	14	13	17	15	20	15	11
	WSP2	35	20	20	21	12	17	16
Nickel	WSP1	20	27	32	17	30	30	29
	WSP2	41	41	37	35	18	33	30
Zinc	WSP1	76	74	84	88	105	105	107
	WSP2	159	101	116	129	94	106	90

There is significant scatter in the heavy metals data (Table 2.e.iv.2). There are no obvious trends, but there is a wide variation in the data from year to year and site to site. UCC Aquatic Services Unit were concerned about this and investigated further. They determined that the measured heavy metal content of the sediment depended inversely on the particle size of the sediment. Figures 2.e.iv.1 and 2 show the heavy metal content of the sediment plotted against the fraction of the smallest particles (< 180 micron) obtained by sieve analysis. The sieve analysis information was not available for the 2001 samples. Though the correlations are not perfect (correlation coefficients in the range 0.71 to 0.86) there are definite trends in the data; the increasing slopes indicate that the metal content/kg of sediment depends inversely on the particle size. This can readily be explained in two ways:

- Assuming that the heavy metals are evenly dispersed over the surface of the sediment particles; the smaller the particle the higher the surface area per kilogram and thus the higher the metal content.
- The smaller particles are composed of more adsorbent clay like minerals and thus the heavy metals are preferentially adsorbed onto them from the water.

FIGURE 2.e.iv.1: CORRELATION IN SEDIMENT METAL CONTENT WITH PARTICLE SIZE – LEAD, ZINC AND CADMIUM

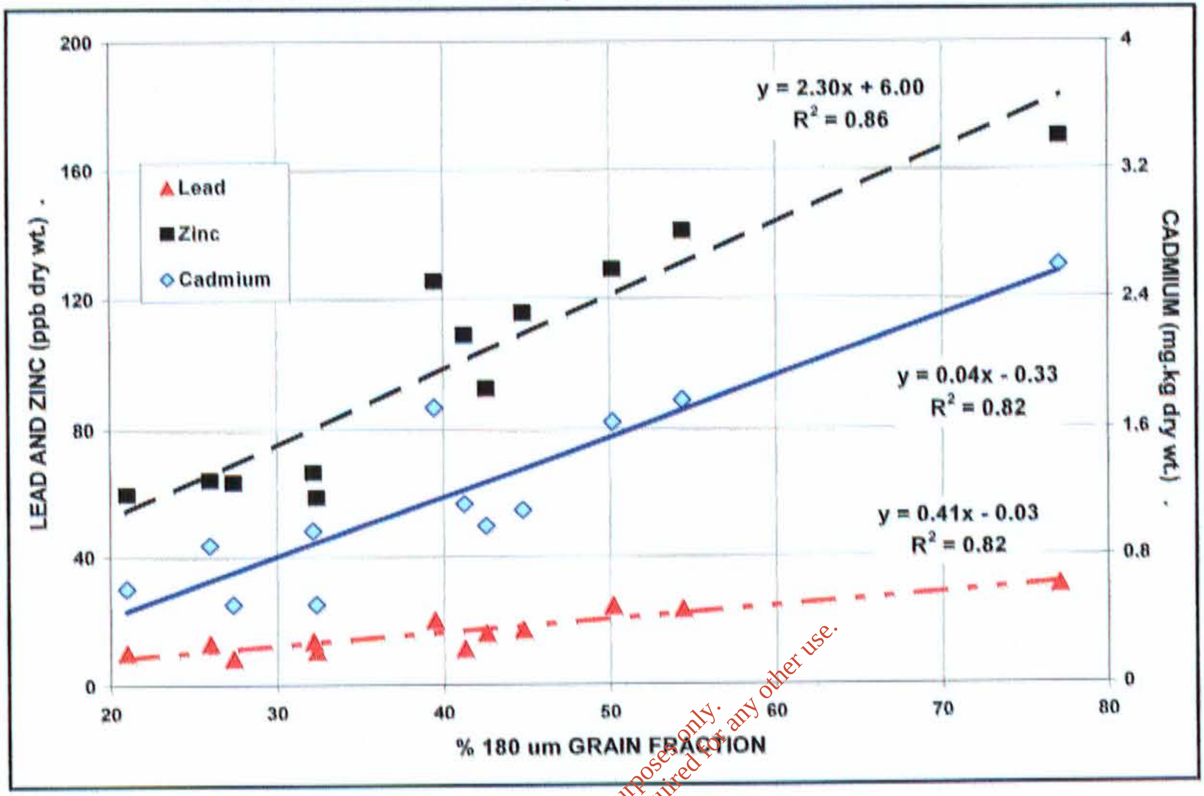
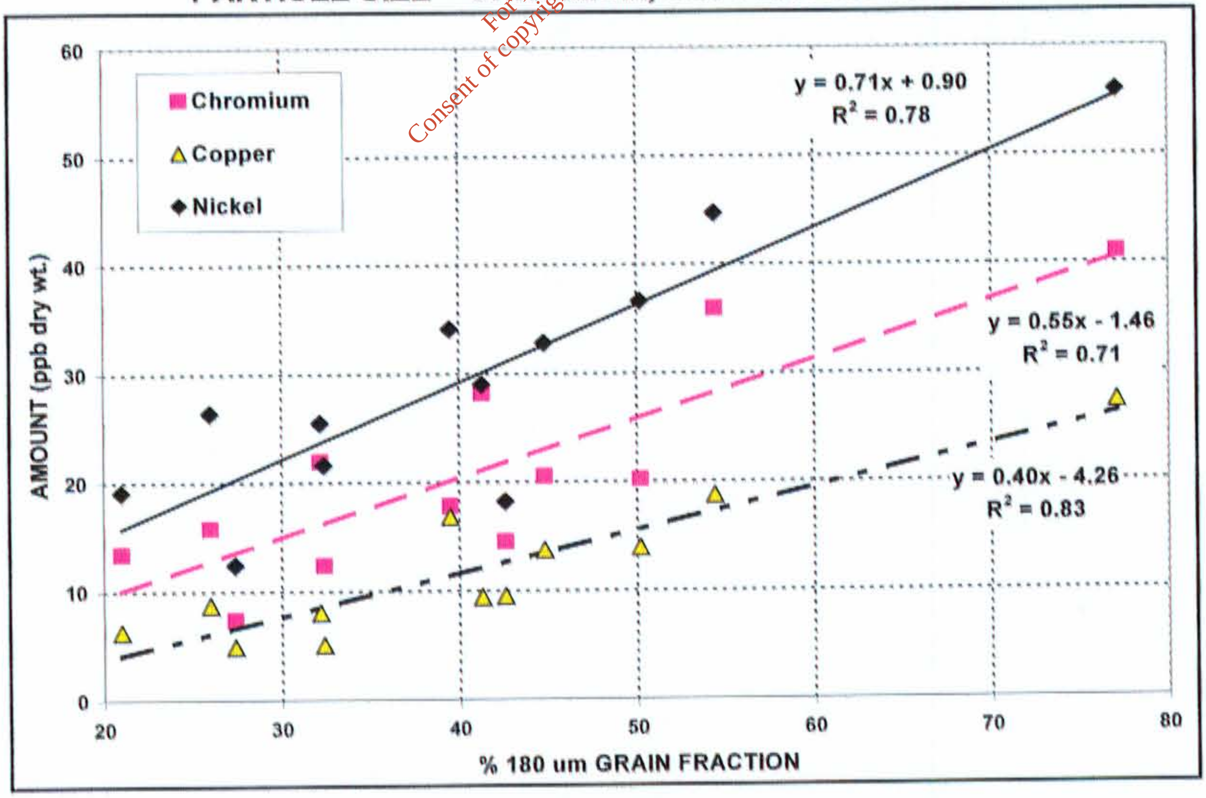


FIGURE 2.e.iv.4: CORRELATION IN SEDIMENT METAL CONTENT WITH PARTICLE SIZE – CHROMIUM, COPPER AND NICKEL



If the heavy metal data is corrected for the varying particle size distributions (this is only approximate as only the fraction < 180 mesh is available) and then plotted, one obtains Table 2.e.iv.3).

TABLE 2.e.iv.3: HEAVY METALS IN STREAM SEDIMENT CORRECTED FOR PARTICLE SIZE

			2002		2003		2004	
			A	B	A	B	A	B
Cadmium	**WSP1**		0.5	1.0	1.0	1.6	1.1	1.1
	WSP2		0.9	0.6	1.7	0.5	1.8	2.6
Chromium	**WSP1**		12	22	15	20	21	28
	WSP2		16	13	18	7	36	41
Copper	**WSP1**		5	8	10	14	14	9
	WSP2		9	6	17	5	19	27
Lead	**WSP1**		11	14	16	24	17	11
	WSP2		13	10	20	8	23	31
Nickel	**WSP1**		22	26	18	37	33	29
	WSP2		26	19	34	12	45	56
Zinc	**WSP1**		59	67	92	129	116	109
	WSP2		64	60	125	64	141	170

The scatter in the data is less and overall it can be seen that there are no trends in heavy metal concentrations in the sediment with either time or location. Any heavy metal contamination of the sediment of the Shanowennadrimina stream is thus not due to activities on the AVR-Safeway site.

f) GROUNDWATER MONITORING

i) QUARTERLY MONITORING

The 3 on-site boreholes are monitored quarterly by an outside contractor, the Aquatic Services Unit, UCC. The results are presented in Figures 2.f.i.1 - 6. The data for each borehole is plotted on the same scale, so that comparison is easy. Only the measurable numerical parameters are recorded.

Figures 2.f.i.1 – 6 show that all parameters have remained the same with the possible exception of chloride, which shows a slight increase of 1 – 1.5 mg/l per annum. This increase is not followed by a similar increase in sodium and/or potassium, so the source is not sodium chloride, which could be used as road salt. Calcium chloride, from winter road salt is a possible cause, but little is used in Ireland. The most likely cause is acid rain, HCl precipitating from the atmosphere and being percolated into the ground water.

FIGURE 2.f.i.1: BOREHOLE 1 MONITORING - 1

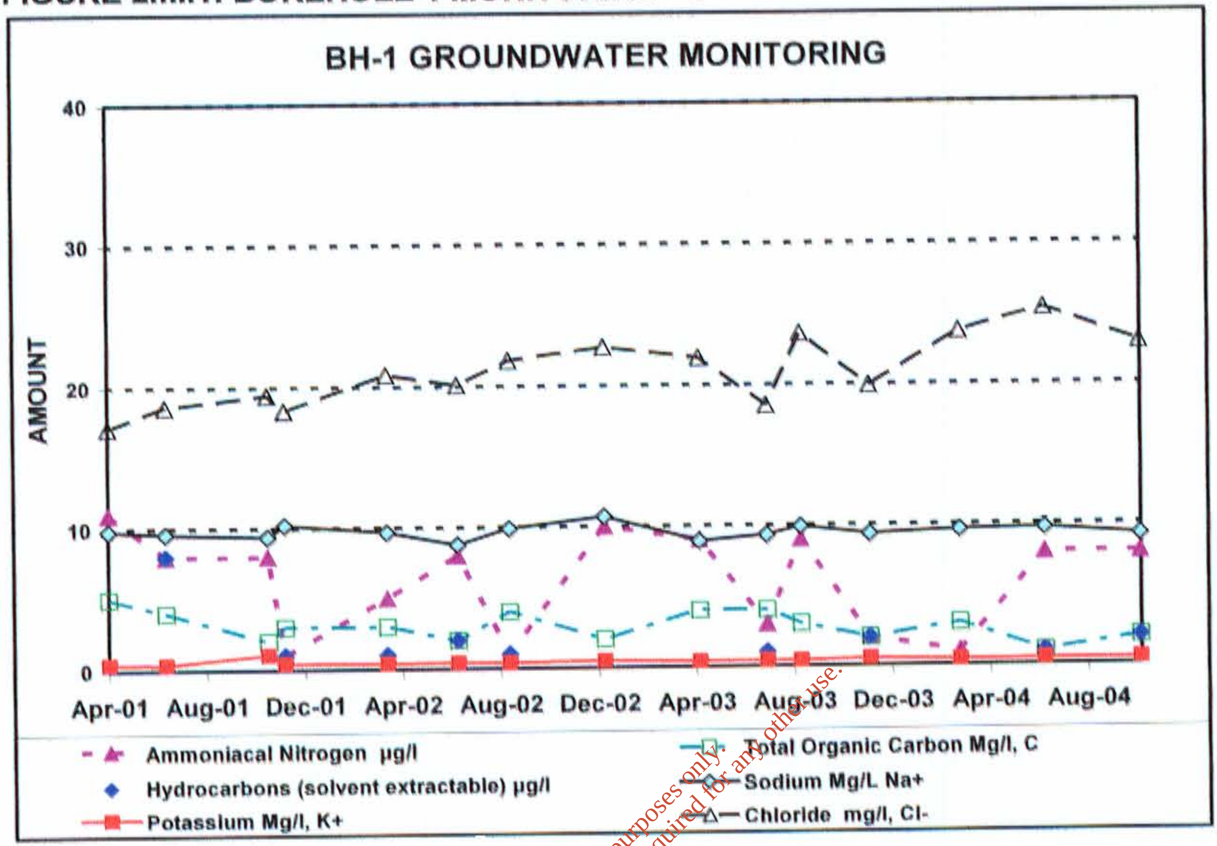


FIGURE 2.f.i.2: BOREHOLE 1 MONITORING - 2

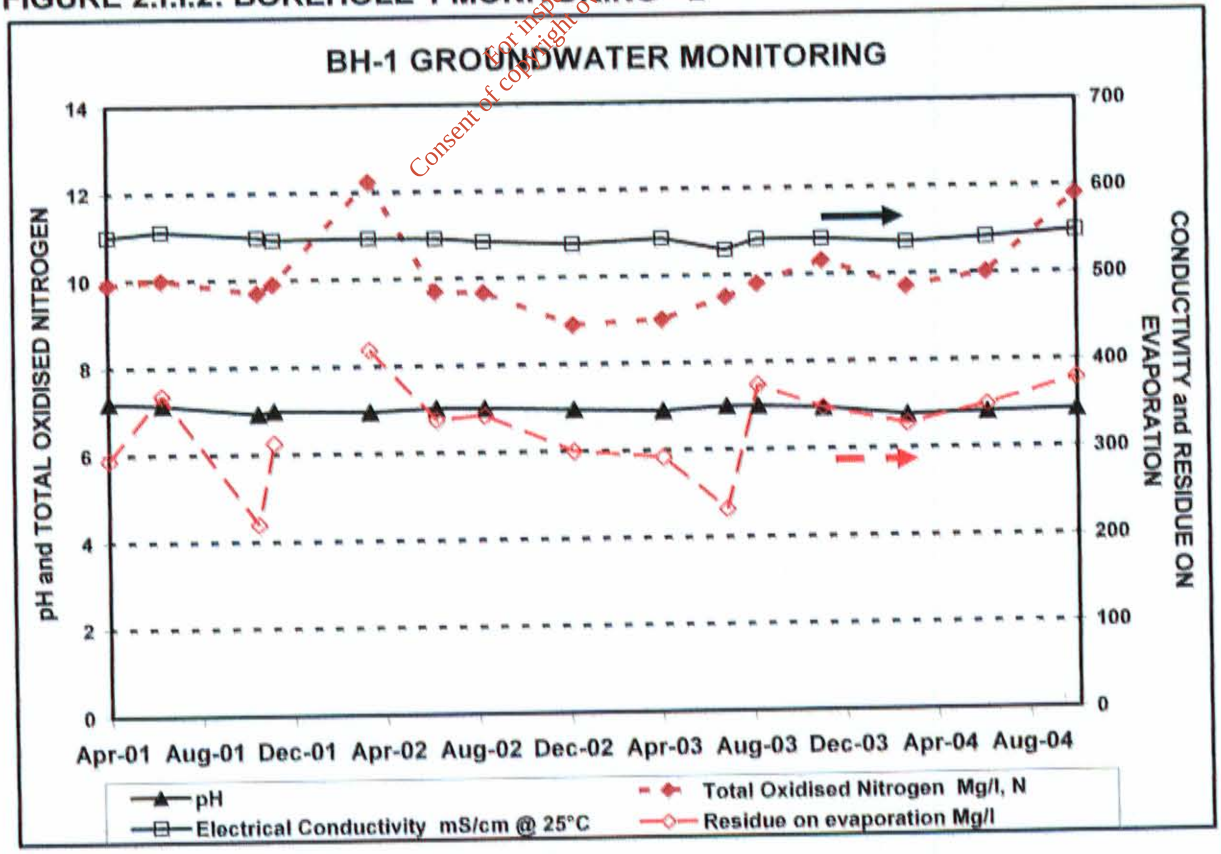


FIGURE 2.f.i.3: BOREHOLE 2 MONITORING - 1

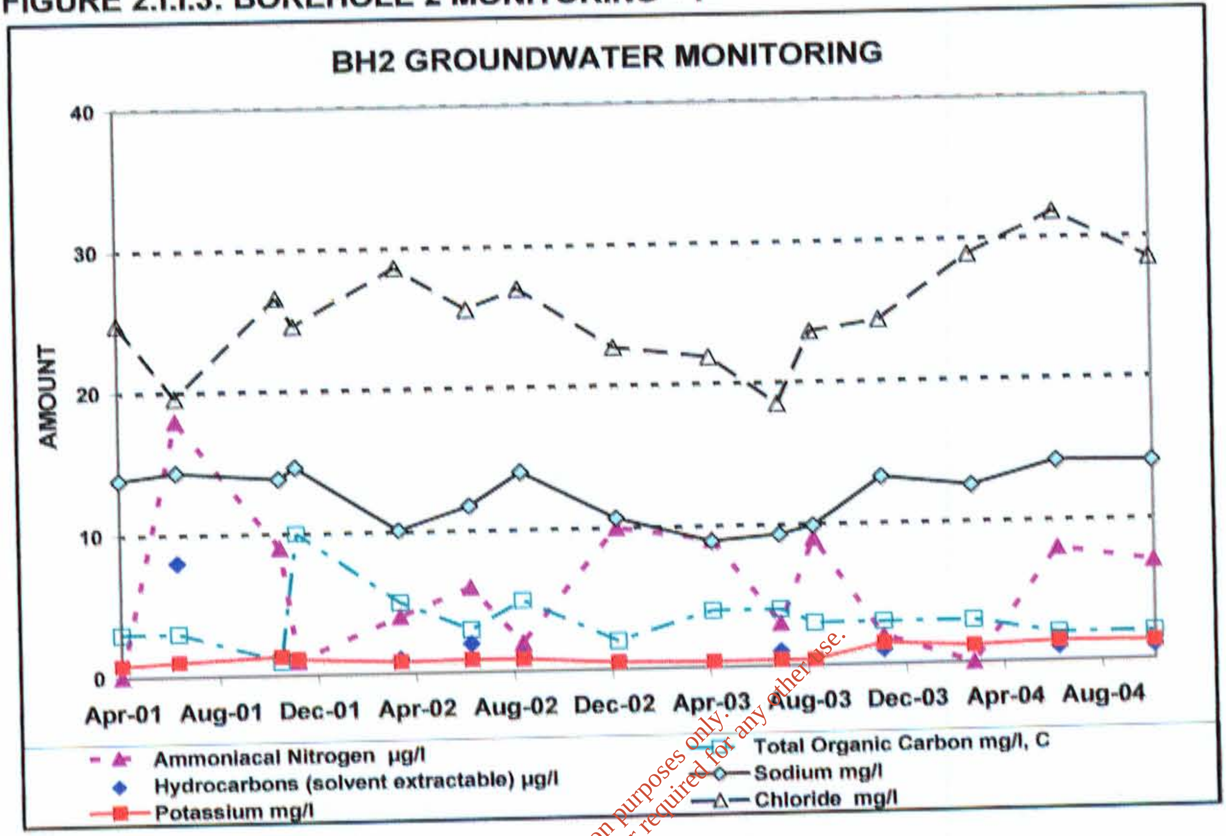


FIGURE 2.f.i.4: BOREHOLE 2 MONITORING - 2

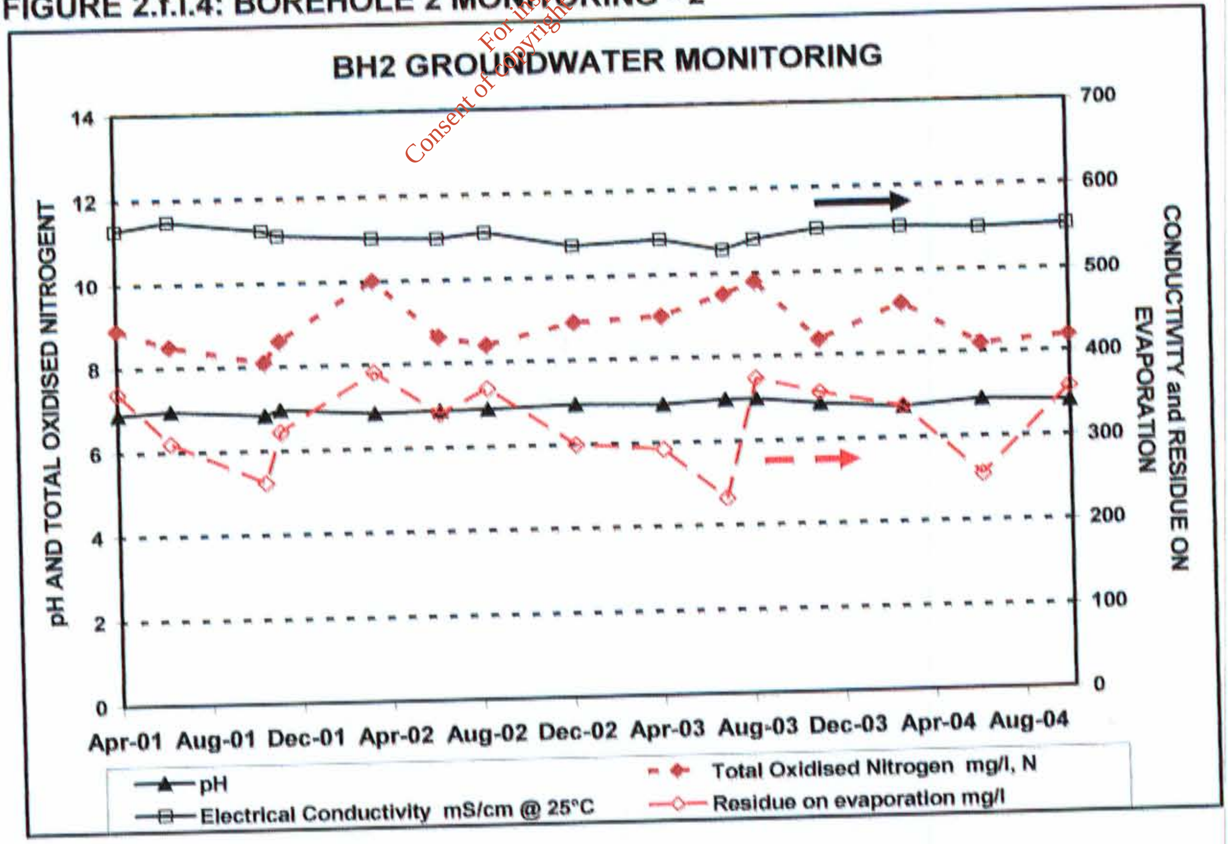


FIGURE 2.f.i.5: BOREHOLE 3 MONITORING - 1

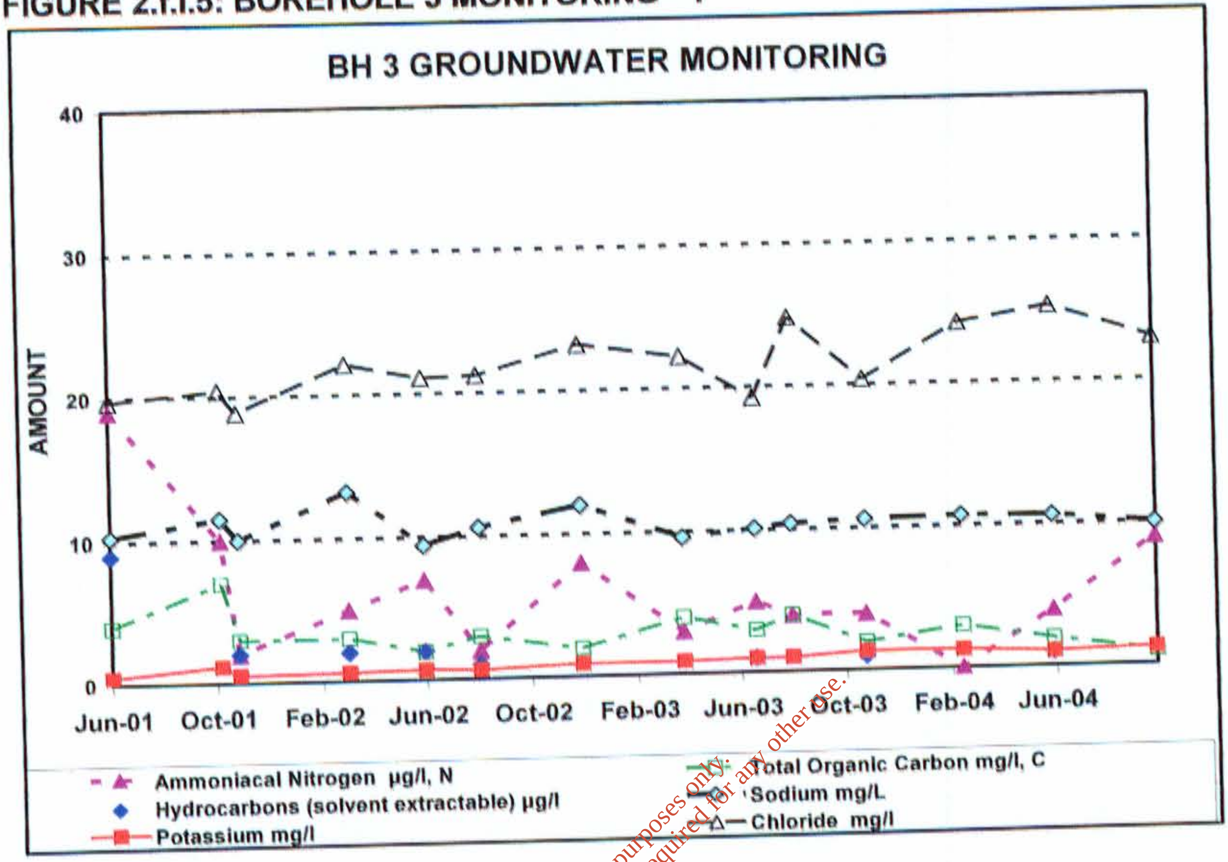
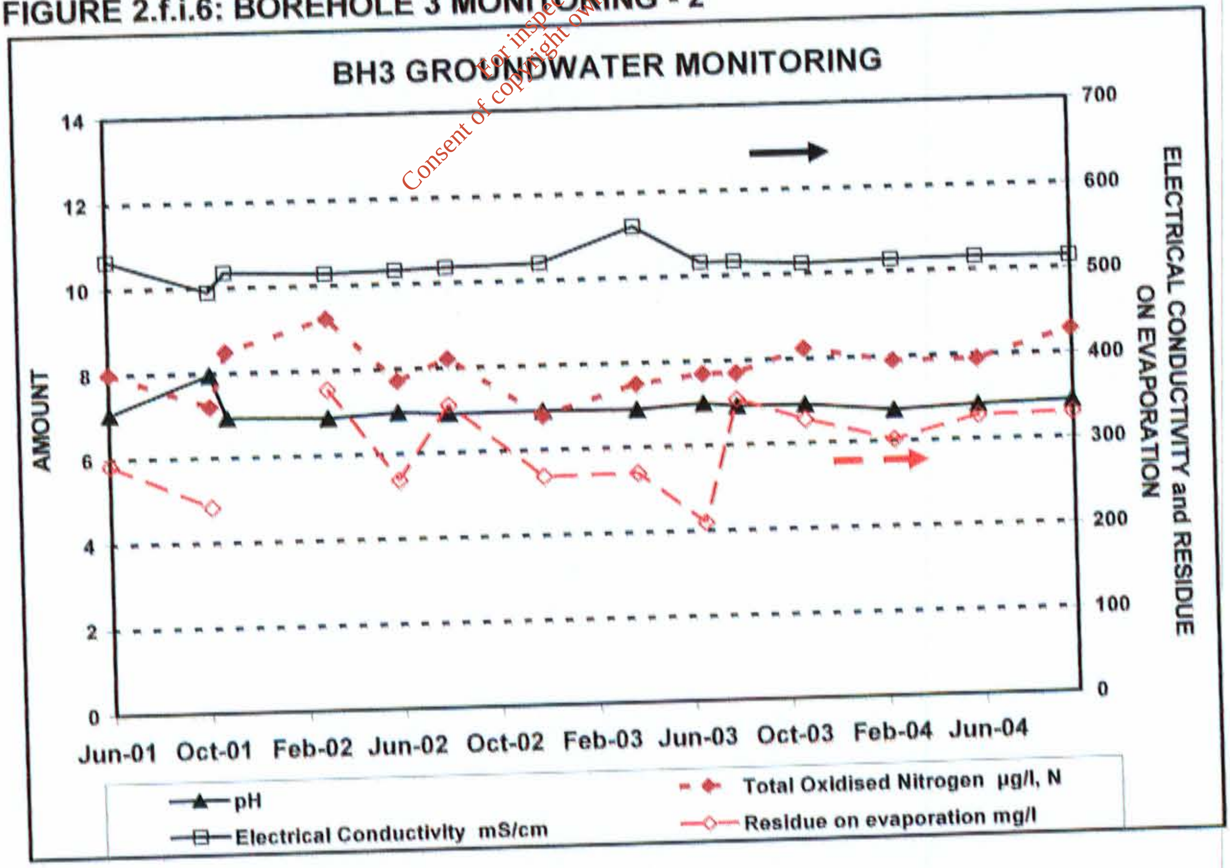


FIGURE 2.f.i.6: BOREHOLE 3 MONITORING - 2



Each sample is also monitored for odour and visually inspected. In all cases the samples have been odourless, clear and colourless. Each sample is also analysed for mercury, mineral oil, and diesel range hydrocarbons. No mercury or mineral oil was detected in any sample.

On a few occasion apparently significant amounts of diesel range hydrocarbons have been found (See Table 2.f.i.1). Generally there has been < 10 µg/l. The positive results form no pattern and have been attributed by the contractors (UCC Aquatic Services unit) to be due to problems with sample contamination, possibly when being taken or in the analysis lab. In situations where all three samples obtained at one time show the same level of a contaminant, it is safe to say that this is an artefact. The leaching in and out of 150 µg/l diesel range hydrocarbons into ground water in 3-month periods is unlikely. Finally the solvent extractable hydrocarbon is always in the low single µg/l range. The DRH would also be detected in this assay, though poorly quantified.

TABLE 2.f.i.1: DIESEL RANGE HYDROCARBONS IN GROUNDWATER

	Jun-01	Nov-01	Mar-02	Jun-02	Aug-02	Dec-02	Apr-03	Jun-03	Aug-03	Nov-03	Feb-04	Jun-04	Oct-04
BH 1	<10	<10	<10	<10	50	<10	13	<10	79	20	<10	132	<10
BH 2	<10	n/a	<10	<10	151	<10	13	<10	79	20	<10	<10	<10
BH 3	<10	<10	<10	<10	43	<10	17	<10	40	20	<10	n.a.	<10

UNITS ARE µg/l
n.a. = Not assayed

ii) ANNUAL MONITORING

The boreholes and also wells at a number of neighbouring houses are sampled annually for a different series of tests. The full suite of data, including analytical methods, from the annual samples obtained from the boreholes, the Holy Well (H.W.) and neighbouring domestic wells (locations shown on the plan Figure 2.a.1) are recorded in Tables 2.f.ii.2-4.

Table 2.f.ii.2: GROUNDWATER QUALITY – BH-1

(Sheet 1 of 2) Monitoring Point/ Grid Reference: **BH1 181390E 95209N**

Parameter	**Results (mg/l)**				**Sampling method[2] (grab, drift etc.)**	**Units**	**Analysis method / technique**
	Date 2001	**Date 2002**	**Date 2003**	**Date 2004**			
pH	7.13	7.01	6.99	6.81	Grab		Calibrated pH meter
Temperature	11.7	0	13.5	12.7	Grab	°C	Calibrated thermometer
Conductivity	556	542	541	541	Grab	µS/cm @25C	Meter after APHA 1989 Method 2510-B
Ammonia	8	1	9	8	Grab	µg/l N	Automated Lachat Method
Residue on Evaporation	368	342	374	349	Grab	mg/l	WTW OXI 320 DO meter
Cadmium	<0.4	<0.4	<0.4	<0.4	Grab	µg/l	ICP USN
Chromium	9	1	1	1	Grab	µg/l	ICP USN
Chloride	18.6	21.8	23.6	25.3	Grab	mg/l	ICP USN
Copper	8	7	5	12	Grab	µg/l	ICP USN
Cyanide	-	-	-	<0.05	Grab	µg/l	APHA 4500A,B,C 1999
Fluoride	<10	5	15	12	Grab	µg/l	KONE Autoanalyser
Iron	<50	2	12	-	Grab	µg/l	ICP USN
Lead	<5	<5	<1	<1	Grab	µg/l	ICP USN
Manganese	<1	1	1	-	Grab	µg/l	ICP USN
Mercury	<0.05	<0.05	<0.05	<0.05	Grab	µg/l	Cold vapour AAS
Phosphorous	0.26	0.024	0.023	0.024	Grab	mg/l	Murphy and Reilly Method
Potassium	0.39	0.4	0.43	0.43	Grab	mg/l	Lachat IC

GROUNDWATER QUALITY – BH-1 (SHEET 2 OF 2)

Parameter	Results (mg/l)				Sampling method^2 (grab, drift etc.)	Normal Analytical Range^2	Analysis method / technique
	Date 2001	Date 2002	Date 2003	Date 2004			
Sodium	9.6	9.9	9.9	9.7	Grab	mg/l	Lachat IC
Zinc	31	28	66	68	Grab	µg/l	
TOC	4	4	3	1	Grab	CFU/100ml	Persulphate digestion NDIR analysis
Total Oxidised Nitrogen	10.0	9.7	9.8	10.0	Grab	CFU/100ml	APHA 1989 Method 4500-NO_2-B
Faecal Coliforms	0	1	0	0	Grab	µg/l	Membrane Method
Total Coliforms	0	0	0	0	Grab	mg/l	Membrane Method
Diesel Range Hydrocarbons	231	50	79	132	Grab	µg/l	GC/MS
Residue on Evaporation	368	342	374	349	Grab	µg/l	Gravimetric
16 PAH	158	230	<10	<10	Grab	µg/l	GS/MS after liquid/liquid extraction
USEPA 6 PAH	14	40	<10	<10	Grab	µg/l	
EU Water 4 PAH	<10	0	<10	<10	Grab	µg/l	
Semivolatiles	<1	<1	<1	-	Grab	µg/l	GC/MS

Table 2.f.ii.3: GROUNDWATER QUALITY – BH-2

(Sheet 1 of 2) Monitoring Point/ Grid Reference: **BH2 1814220E 95338N**

Parameter	**Results (mg/l)**				**Sampling method[2] (grab, drift etc.)**	**Units**	**Analysis method / technique**
	Date 2001	**Date 2002**	**Date 2003**	**Date 2004**			
pH	6.96	6.88	6.82	6.88	Grab		Calibrated pH meter
Temperature	11.7	0	11.8	12.5	Grab	°C	Calibrated thermometer
Conductivity	575	556	557	550	Grab	µS/cm @25C	Meter after APHA 1989 Method 2510-B
Ammonia	14	2	<1	8	Grab	µg/l N	Automated Lachat Method
Residue on Evaporation	368	369	366	225	Grab	mg/l	WTW OXI 320 DO meter
Cadmium	<0.4	<0.4	<0.4	<0.4	Grab	µg/l	ICP USN
Chromium	9	<1	1	3	Grab	µg/l	ICP USN
Chloride	19.6	27	30	31.8	Grab	mg/l	ICP USN
Copper	<5	<5	2	<1	Grab	µg/l	ICP USN
Cyanide	-	-	-	<0.05	Grab	µg/l	APHA 4500A,B,C 1999
Fluoride	<10	<10	10	<10	Grab	µg/l	KONE Autoanalyser
Iron	<50	2	71	-	Grab	µg/l	ICP USN
Lead	<5	<5	<1	<1	Grab	µg/l	ICP USN
Manganese	1	3	3	-	Grab	µg/l	ICP USN
Mercury	<0.05	<0.05	<0.05	<0.05	Grab	µg/l	Cold vapour AAS
Phosphorous	0.31	0.024	0.027	0.036	Grab	mg/l	Murphy and Reilly Method
Potassium	1.02	0.86	1.21	1.39	Grab	mg/l	Lachat IC

GROUNDWATER QUALITY – BH-2 (SHEET 2 OF 2)

Parameter	Results (mg/l)				Sampling method[2] (grab, drift etc.)	Normal Analytical Range[2]	Analysis method / technique
	Date 2001	Date 2002	Date 2003	Date 2004			
Sodium	14.4	14.1	14.1	14.2	Grab	mg/l	Lachat IC
Zinc	13	11	67	6	Grab	µg/l	
TOC	3	5	4	2	Grab	CFU/100ml	Persulphate digestion NDIR analysis
Total Oxidised Nitrogen	8.5	8.4	8.1	8.2	Grab	CFU/100ml	APHA 1989 Method 4500-NO_2-B
Faecal Coliforms	0	17	0	0	Grab	µg/l	Membrane Method
Total Coliforms	0	0	0	2	Grab	mg/l	Membrane Method
Diesel Range Hydrocarbons	<10	151	40	<10	Grab	µg/l	GC/MS
Residue on Evaporation	368	369	366	225	Grab	µg/l	Gravimetric
16 PAH	296	230	<10	<10	Grab	µg/l	GS/MS after liquid/liquid extraction
USEPA 6 PAH	102	40	<10	<10	Grab	µg/l	
EU Water 4 PAH	55	0	<10	<10	Grab	µg/l	
Semivolatiles	<1	<1	<1	-	Grab	µg/l	GC/MS

Table 2.f.ii.4: GROUNDWATER QUALITY – BH-3a

(Sheet 1 of 2) Monitoring Point/ Grid Reference: **BH3a 181502E 95216N**

Parameter	Results (mg/l)				Sampling method^2 (grab, drift etc.)	Units	Analysis method / technique
	Date 2001	Date 2002	Date 2003	Date 2004			
pH	7.04	6.91	6.91	6.82	Grab		Calibrated pH meter
Temperature	11.9	0	13	11.6	Grab	°C	Calibrated thermometer
Conductivity	533	518	516	515	Grab	µS/cm @25C	Meter after APHA 1989 Method 2510-B
Ammonia	10	2	4	4	Grab	µg/l N	Automated Lachat Method
Residue on Evaporation	368	356	354	328	Grab	mg/l	WTW OXI 320 DO meter
Cadmium	<0.4	<0.4	<0.4	<0.4	Grab	µg/l	ICP USN
Chromium	8	<1	1	2	Grab	µg/l	ICP USN
Chloride	19.7	21.2	24.8	25.3	Grab	mg/l	ICP USN
Copper	<5	<5	4	<1	Grab	µg/l	ICP USN
Cyanide	-	-	-	<0.05	Grab	µg/l	APHA 4500A,B,C 1999
Fluoride	<10	<10	14	20	Grab	µg/l	KONE Autoanalyser
Iron	<50	8	11	-	Grab	µg/l	ICP USN
Lead	<5	<5	<1	<1	Grab	µg/l	ICP USN
Manganese	3	1	1	-	Grab	µg/l	ICP USN
Mercury	<0.05	<0.05	<0.05	<0.05	Grab	µg/l	Cold vapour AAS
Phosphorous	0.024	0.026	0.025	0.026	Grab	mg/l	Murphy and Reilly Method
Potassium	0.49	0.61	1.02	1.03	Grab	mg/l	Lachat IC

GROUNDWATER QUALITY – BH-3A (SHEET 2 OF 2)

Parameter	**Results (mg/l)**				**Sampling method^2 (grab, drift etc.)**	**Normal Analytical Range^2**	**Analysis method / technique**
	Date 2001	**Date 2002**	**Date 2003**	**Date 2004**			
Sodium	10.3	10.6	10.4	10.6	Grab	mg/l	Lachat IC
Zinc	<5	13	42	35	Grab	µg/l	
TOC	4	3	4	2	Grab	CFU/100ml	Persulphate digestion NDIR analysis
Total Oxidised Nitrogen	8.0	8.2	7.7	7.9	Grab	CFU/100ml	APHA 1989 Method 4500-NO_2-B
Faecal Coliforms	0	2	0	0	Grab	µg/l	Membrane Method
Total Coliforms	0	0	0	2	Grab	mg/l	Membrane Method
Diesel Range Hydrocarbons	<10	43	40	148	Grab	µg/l	GC/MS
Residue on Evaporation	368	356	354	328	Grab	µg/l	Gravimetric
16 PAH	230	230	2514	<10	Grab	µg/l	GS/MS after liquid/liquid extraction
USEPA 6 PAH	40	40	365	<10	Grab	µg/l	
EU Water 4 PAH	<10	0	13	<10	Grab	µg/l	
Semivolatiles	<1	<1	<1	-	Grab	µg/l	GC/MS

Table 2.f.ii.5: GROUNDWATER QUALITY – H-1

(Sheet 1 of 2) Monitoring Point/ Grid Reference: **H1 181467E 95070N**

Parameter	Results (mg/l)				Sampling method^2 (grab, drift etc.)	Units	Analysis method / technique
	Date 2001	Date 2002	Date 2003	Date 2004			
pH	7.15	7.07	7.03	6.91	Grab		Calibrated pH meter
Temperature	12.7	0	15	14.1	Grab	°C	Calibrated thermometer
Conductivity	509	503	501	5.02	Grab	µS/cm @25C	Meter after APHA 1989 Method 2510-B
Ammonia	8	2	2	5	Grab	µg/l N	Automated Lachat Method
Residue on Evaporation	242	299	301	269	Grab	mg/l	WTW OXI 320 DO meter
Cadmium	<0.4	<0.4	<0.4	<0.4	Grab	µg/l	ICP USN
Chromium	9	1	<1	2	Grab	µg/l	ICP USN
Chloride	16.9	18.6	20.3	20.8	Grab	mg/l	ICP USN
Copper	<5	<5	2	3	Grab	µg/l	ICP USN
Cyanide	-	-	-	<0.05	Grab	µg/l	APHA 4500A,B,C 1999
Fluoride	<10	<10	<10	<10	Grab	µg/l	KONE Autoanalyser
Iron	<50	4	27	-	Grab	µg/l	ICP USN
Lead	<5	<5	<1	1	Grab	µg/l	ICP USN
Manganese	<1	<1	3	-	Grab	µg/l	ICP USN
Mercury	<0.05	<0.05	<0.05	<0.05	Grab	µg/l	Cold vapour AAS
Phosphorous	0.026	0.025	0.026	0.025	Grab	mg/l	Murphy and Reilly Method
Potassium	0.56	0.51	0.56	0.57	Grab	mg/l	Lachat IC

GROUNDWATER QUALITY – H-1 (SHEET 2 OF 2)

Parameter	Results (mg/l)				Sampling method^2 (grab, drift etc.)	Normal Analytical Range^2	Analysis method / technique
	Date 2001	Date 2002	Date 2003	Date 2004			
Sodium	9.5	9.3	8.8	8.6	Grab	mg/l	Lachat IC
Zinc	5	14	34	29	Grab	µg/l	
TOC	3	3	4	1	Grab	CFU/100ml	Persulphate digestion NDIR analysis
Total Oxidised Nitrogen	6.0	6.4	5.5	5.6	Grab	CFU/100ml	APHA 1989 Method 4500-NO_2-B
Faecal Coliforms	0	0	0	0	Grab	µg/l	Membrane Method
Total Coliforms	0	0	0	0	Grab	mg/l	Membrane Method
Diesel Range Hydrocarbons	<10	37	<10	159	Grab	µg/l	GC/MS
Residue on Evaporation	242	299	301	269	Grab	µg/l	Gravimetric
16 PAH	147	230	<10	<10	Grab	µg/l	GS/MS after liquid/liquid extraction
USEPA 6 PAH	0	40	<10	<10	Grab	µg/l	
EU Water 4 PAH	<10	0	<10	<10	Grab	µg/l	
Semivolatiles	73	121	<1	-	Grab	µg/l	GC/MS

Table 2.f.ii.6: GROUNDWATER QUALITY – H-2

(Sheet 1 of 2) Monitoring Point/ Grid Reference: **H2 181566E 94878N**

Parameter	**Results (mg/l)**				**Sampling method^2 (grab, drift etc.)**	**Units**	**Analysis method / technique**
	Date 2001	**Date 2002**	**Date 2003**	**Date 2004**			
pH	7.13	7.27	7.04	6.86	Grab		Calibrated pH meter
Temperature	15.5	0	13	13.6	Grab	°C	Calibrated thermometer
Conductivity	452	448	443	445	Grab	µS/cm @25C	Meter after APHA 1989 Method 2510-B
Ammonia	5	0	1	7	Grab	µg/l N	Automated Lachat Method
Residue on Evaporation	228	292	252	349	Grab	mg/l	WTW OXI 320 DO meter
Cadmium	<0.4	<0.4	<0.4	<0.4	Grab	µg/l	ICP USN
Chromium	8	<1	1	1	Grab	µg/l	ICP USN
Chloride	16.8	18.4	20.7	21.4	Grab	mg/l	ICP USN
Copper	<5	<5	2	<1	Grab	µg/l	ICP USN
Cyanide	-	-	-	<0.05	Grab	µg/l	APHA 4500A,B,C 1999
Fluoride	<10	<10	<10	<10	Grab	µg/l	KONE Autoanalyser
Iron	<50	8	23	-	Grab	µg/l	ICP USN
Lead	<5	<5	<1	<1	Grab	µg/l	ICP USN
Manganese	2	2	6	-	Grab	µg/l	ICP USN
Mercury	<0.05	<0.05	<0.05	<0.05	Grab	µg/l	Cold vapour AAS
Phosphorous	0.022	0.02	0.03	0.027	Grab	mg/l	Murphy and Reilly Method
Potassium	0.8	0.63	0.83	0.81	Grab	mg/l	Lachat IC

GROUNDWATER QUALITY – H-2 (SHEET 2 OF 2)

Parameter	Results (mg/l)				Sampling method[2] (grab, drift etc.)	Normal Analytical Range[2]	Analysis method / technique
	Date 2001	Date 2002	Date 2003	Date 2004			
Sodium	10.6	10.7	10.3	10.3	Grab	mg/l	Lachat IC
Zinc	6	10	35	33	Grab	µg/l	
TOC	3	3	3	2	Grab	CFU/100ml	Persulphate digestion NDIR analysis
Total Oxidised Nitrogen	2.5	3.0	2.7	2.9	Grab	CFU/100ml	APHA 1989 Method 4500-NO_2-B
Faecal Coliforms	0	0	0	0	Grab	µg/l	Membrane Method
Total Coliforms	0	0	0	1	Grab	mg/l	Membrane Method
Diesel Range Hydrocarbons	<10	303	<10	175	Grab	µg/l	GC/MS
Residue on Evaporation	228	292	252	349	Grab	µg/l	Gravimetric
16 PAH	170	230	<10	<10	Grab	µg/l	GS/MS after liquid/liquid extraction
USEPA 6 PAH	21	40	<10	<10	Grab	µg/l	
EU Water 4 PAH	<10	0	<10	<10	Grab	µg/l	
Semivolatiles	<1	155	<1	-	Grab	µg/l	GC/MS

Table 2.f.ii.7: GROUNDWATER QUALITY – N-1

(Sheet 1 of 2) Monitoring Point/ Grid Reference: **N1 181789E 95582N**

Parameter	**Results (mg/l)**				**Sampling method[2] (grab, drift etc.)**	**Units**	**Analysis method / technique**
	Date 2001	**Date 2002**	**Date 2003**	**Date 2004**			
pH	6.01	5.81	6.33	5.68	Grab		Calibrated pH meter
Temperature	12.7	0	13	12.4	Grab	°C	Calibrated thermometer
Conductivity	153	162	360	168	Grab	µS/cm @25C	Meter after APHA 1989 Method 2510-B
Ammonia	4	0	6	10	Grab	µg/l N	Automated Lachat Method
Residue on Evaporation	48	172	232	119	Grab	mg/l	WTW OXI 320 DO meter
Cadmium	<0.4	<0.4	<0.4	<0.4	Grab	µg/l	ICP USN
Chromium	6	<1	<1	<1	Grab	µg/l	ICP USN
Chloride	21.0	20.8	29.9	24.0	Grab	mg/l	ICP USN
Copper	33	34	2	5	Grab	µg/l	ICP USN
Cyanide	-	-	-	<0.05	Grab	µg/l	APHA 4500A,B,C 1999
Fluoride	<10	5	75	<10	Grab	µg/l	KONE Autoanalyser
Iron	<50	4	14	-	Grab	µg/l	ICP USN
Lead	<5	<5	<1	<1	Grab	µg/l	ICP USN
Manganese	3	2	2	-	Grab	µg/l	ICP USN
Mercury	<0.05	<0.05	<0.05	<0.05	Grab	µg/l	Cold vapour AAS
Phosphorous	0.048	0.43	0.152	0.043	Grab	mg/l	Murphy and Reilly Method
Potassium	1.13	0.99	2.03	1.31	Grab	mg/l	Lachat IC

GROUNDWATER QUALITY – N-1 (SHEET 2 OF 2)

Parameter	Results (mg/l)				Sampling method^2 (grab, drift etc.)	Normal Analytical Range^2	Analysis method / technique
	Date 2001	Date 2002	Date 2003	Date 2004			
Sodium	13.6	13.2	13.8	12.7	Grab	mg/l	Lachat IC
Zinc	55	41	70	39	Grab	µg/l	
TOC	3	2	3	<1	Grab	CFU/100ml	Persulphate digestion NDIR analysis
Total Oxidised Nitrogen	5.2	6.0	6.1	6.4	Grab	CFU/100ml	APHA 1989 Method 4500-NO_2-B
Faecal Coliforms	0	0	0	0	Grab	µg/l	Membrane Method
Total Coliforms	0	722	0	0	Grab	mg/l	Membrane Method
Diesel Range Hydrocarbons	106	115	<10	162	Grab	µg/l	GC/MS
Residue on Evaporation	48	172	232	119	Grab	µg/l	Gravimetric
16 PAH	156	0	<10	<10	Grab	µg/l	GS/MS after liquid/liquid extraction
USEPA 6 PAH	0	0	<10	<10	Grab	µg/l	
EU Water 4 PAH	<10	0	<10	<10	Grab	µg/l	
Semivolatiles	<1	<1	<1	-	Grab	µg/l	GC/MS

Table 2.f.ii.8: GROUNDWATER QUALITY – N-2

(Sheet 1 of 2) Monitoring Point/ Grid Reference: **N2 181028E 95122N**

Parameter	**Results (mg/l)**				**Sampling method^2 (grab, drift etc.)**	**Units**	**Analysis method / technique**
	Date 2001	**Date 2002**	**Date 2003**	**Date 2004**			
pH	6.48	6.26	6.3	6.19	Grab		Calibrated pH meter
Temperature	12.9	0	14	10.7	Grab	°C	Calibrated thermometer
Conductivity	429	346	450	246	Grab	µS/cm @25C	Meter after APHA 1989 Method 2510-B
Ammonia	7	0	1	10	Grab	µg/l N	Automated Lachat Method
Residue on Evaporation	208	241	316	227	Grab	mg/l	WTW OXI 320 DO meter
Cadmium	<0.4	<0.4	<0.4	<0.4	Grab	µg/l	ICP USN
Chromium	14	<1	<1	1	Grab	µg/l	ICP USN
Chloride	27.0	25.3	33.1	30.0	Grab	mg/l	ICP USN
Copper	10	9	4	2	Grab	µg/l	ICP USN
Cyanide	-	-	-	<0.05	Grab	µg/l	APHA 4500A,B,C 1999
Fluoride	<10	<10	19	27	Grab	µg/l	KONE Autoanalyser
Iron	<50	1	19	-	Grab	µg/l	ICP USN
Lead	<5	<5	<1	<1	Grab	µg/l	ICP USN
Manganese	5	1	8	-	Grab	µg/l	ICP USN
Mercury	<0.05	<0.05	<0.05	<0.05	Grab	µg/l	Cold vapour AAS
Phosphorous	0.013	0.162	0.017	172	Grab	mg/l	Murphy and Reilly Method
Potassium	2.19	1.78	2.12	1.99	Grab	mg/l	Lachat IC

GROUNDWATER QUALITY - N-2 (SHEET 2 OF 2)

Parameter	Results (mg/l)				Sampling method^2 (grab, drift etc.)	Normal Analytical Range^2	Analysis method / technique
	Date 2001	Date 2002	Date 2003	Date 2004			
Sodium	15.0	13.9	13.1	13.9	Grab	mg/l	Lachat IC
Zinc	30	23	74	46	Grab	µg/l	
TOC	3	2	3	1	Grab	CFU/100ml	Persulphate digestion NDIR analysis
Total Oxidised Nitrogen	9.7	5.5	10.8	5.5	Grab	CFU/100ml	APHA 1989 Method 4500-NO_2-B
Faecal Coliforms	0	1	0	1	Grab	µg/l	Membrane Method
Total Coliforms	0	488	0	4040	Grab	mg/l	Membrane Method
Diesel Range Hydrocarbons	<10	1120	<10	145	Grab	µg/l	GC/MS
Residue on Evaporation	208	241	316	227	Grab	µg/l	Gravimetric
16 PAH	239	230	230	<10	Grab	µg/l	GS/MS after liquid/liquid extraction
USEPA 6 PAH	82	40	40	<10	Grab	µg/l	
EU Water 4 PAH	<10	0	0	<10	Grab	µg/l	
Semivolatiles	<1	<1	<1	-	Grab	µg/l	GC/MS

Table 2.f.ii.9: GROUNDWATER QUALITY – N-3

(Sheet 1 of 2) Monitoring Point/ Grid Reference: **N3 181093E 95060N**

Parameter	Results (mg/l)				Sampling method^2 (grab, drift etc.)	Units	Analysis method / technique
	Date 2001	Date 2002	Date 2003	Date 2004			
pH	6.47	6.33	5.88	5.83	Grab		Calibrated pH meter
Temperature	13.3	0	13	12.6	Grab	°C	Calibrated thermometer
Conductivity	394	448	151	199	Grab	µS/cm @25C	Meter after APHA 1989 Method 2510-B
Ammonia	3	3	0	8	Grab	µg/l N	Automated Lachat Method
Residue on Evaporation	166	356	109	133	Grab	mg/l	WTW OXI 320 DO meter
Cadmium	<0.4	<0.4	<0.4	<0.4	Grab	µg/l	ICP USN
Chromium	16	<1	<1	<1	Grab	µg/l	ICP USN
Chloride	23.6	31.4	22.3	25.2	Grab	mg/l	ICP USN
Copper	<5	10	50	2	Grab	µg/l	ICP USN
CN	-	-	-	<0.05	Grab	µg/l	APHA 4500A,B,C 1999
Fluoride	<10	5	<10	<10	Grab	µg/l	KONE Autoanalyser
Iron	<50	2	36	-	Grab	µg/l	ICP USN
Lead	<5	<5	<1	<1	Grab	µg/l	ICP USN
Manganese	1	4	3	-	Grab	µg/l	ICP USN
Mercury	<0.05	<0.05	<0.05	<0.05	Grab	µg/l	Cold vapour AAS
Phosphorous	0.175	0.017	0.044	0.13	Grab	mg/l	Murphy and Reilly Method
Potassium	2.06	2.16	1.12	0.61	Grab	mg/l	Lachat IC

GROUNDWATER QUALITY – N-3 (SHEET 2 OF 2)

Parameter	Results (mg/l)				Sampling method[2] (grab, drift etc.)	Normal Analytical Range[2]	Analysis method / technique
	Date 2001	Date 2002	Date 2003	Date 2004			
Sodium	14.3	15.2	13.1	11.6	Grab	mg/l	Lachat IC
Zinc	9	30	186	38	Grab	µg/l	
TOC	4	4	2	1	Grab	CFU/100ml	Persulphate digestion NDIR analysis
Total Oxidised Nitrogen	5.2	9.7	4.9	0.1	Grab	CFU/100ml	APHA 1989 Method 4500-NO_2-B
Faecal Coliforms	0	0	0	0	Grab	µg/l	Membrane Method
Total Coliforms	0	0	0	22	Grab	mg/l	Membrane Method
Diesel Range Hydrocarbons	<10	1185	<10	140	Grab	µg/l	GC/MS
Residue on Evaporation	166	356	109	133	Grab	µg/l	Gravimetric
16 PAH	276	230	<10	<10	Grab	µg/l	GS/MS after liquid/liquid extraction
USEPA 6 PAH	41	40	<10	<10	Grab	µg/l	
EU Water 4 PAH	<10	0	<10	<10	Grab	µg/l	
Semivolatiles	<1	<1	<1	-	Grab	µg/l	GC/MS

Table 2.f.ii.10: GROUNDWATER QUALITY – N-4

(Sheet 1 of 2) Monitoring Point/ Grid Reference: **N4 180919E 95091N**

Parameter	**Results (mg/l)**				**Sampling method[2] (grab, drift etc.)**	**Units**	**Analysis method / technique**
	Date 2001	**Date 2002**	**Date 2003**	**Date 2004**			
pH	6.08	**N**	5.93	6.29	Grab		Calibrated pH meter
Temperature	13.1	**o**	13	13.4	Grab	°C	Calibrated thermometer
Conductivity	212		213	460	Grab	µS/cm @25C	Meter after APHA 1989 Method 2510-B
Ammonia	18	**S**	8	22	Grab	µg/l N	Automated Lachat Method
Residue on Evaporation	106	**a**	136	304	Grab	mg/l	WTW OXI 320 DO meter
Cadmium	<0.4	**m**	<0.4	0.9	Grab	µg/l	ICP USN
Chromium	4	**p**	1	<1	Grab	µg/l	ICP USN
Chloride	20.9	**l**	26.5	28.2	Grab	mg/l	ICP USN
Copper	<5	**e**	4	9	Grab	µg/l	ICP USN
Cyanide	-		-	<0.05	Grab	µg/l	APHA 4500A,B,C 1999
Fluoride	<10		79	<10	Grab	µg/l	KONE Autoanalyser
Iron	<50		58	-	Grab	µg/l	ICP USN
Lead	<5		15	<1	Grab	µg/l	ICP USN
Manganese	2151		2318	-	Grab	µg/l	ICP USN
Mercury	<0.05		<0.05	<0.05	Grab	µg/l	Cold vapour AAS
Phosphorous	0.001		0.005	0.008	Grab	mg/l	Murphy and Reilly Method
Potassium	0.59		0.61	2.56	Grab	mg/l	Lachat IC

GROUNDWATER QUALITY - N-4 (SHEET 2 OF 2)

Parameter	Results (mg/l)				Sampling method[2] (grab, drift etc.)	Normal Analytical Range[2]	Analysis method / technique
	Date 2001	Date 2002	Date 2003	Date 2004			
Sodium	11.9	N	11.9	14.2	Grab	mg/l	Lachat IC
Zinc	21	o	105	129	Grab	µg/l	
TOC	4		3	1	Grab	CFU/100ml	Persulphate digestion NDIR analysis
Total Oxidised Nitrogen	0.1	S	0.4	13.9	Grab	CFU/100ml	APHA 1989 Method 4500-NO_2-B
Faecal Coliforms	0	a	0	0	Grab	µg/l	Membrane Method
Total Coliforms	0	m	0	0	Grab	mg/l	Membrane Method
Diesel Range Hydrocarbons	<10	p	<10	142	Grab	µg/l	GC/MS
Residue on Evaporation	106	l	136	304	Grab	µg/l	Gravimetric
16 PAH	167	e	<10	<10	Grab	µg/l	GS/MS after liquid/liquid extraction
USEPA 6 PAH	11		<10	<10	Grab	µg/l	
EU Water 4 PAH	<10		<10	<10	Grab	µg/l	
Semivolatiles	<1		<1	-	Grab	µg/l	GC/MS

Table 2.f.ii.11: GROUNDWATER QUALITY – Holy Well

(Sheet 1 of 2) Monitoring Point/ Grid Reference: **Holy Well 181435E 95389N**

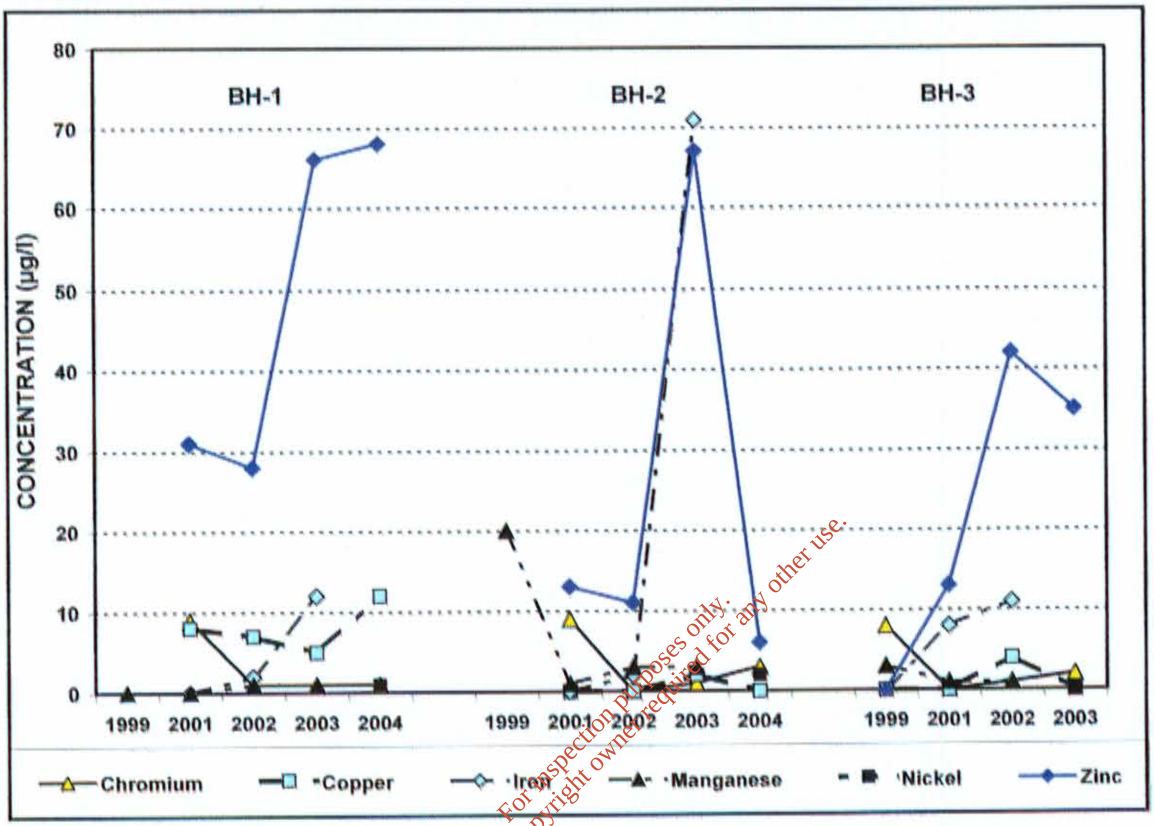
Parameter	Results (mg/l)				Sampling method[2] (grab, drift etc.)	Units	Analysis method / technique
	Date 2001	Date 2002	Date 2003	Date 2004			
pH	6.99	6.87	6.85	6.74	Grab		Calibrated pH meter
Temperature	11.3	0	11	11	Grab	°C	Calibrated thermometer
Conductivity	564	549	549	545	Grab	µS/cm @25C	Meter after APHA 1989 Method 2510-B
Ammonia	8	11	2	4	Grab	µg/l N	Automated Lachat Method
Residue on Evaporation	326	396	354	303	Grab	mg/l	WTW OXI 320 DO meter
Cadmium	<0.4	<0.4	<0.4	<0.4	Grab	µg/l	ICP USN
Chromium	9	<1	1	1	Grab	µg/l	ICP USN
Chloride	25.9	26.2	28.4	29.5	Grab	mg/l	ICP USN
Copper	<5	<5	4	2	Grab	µg/l	ICP USN
CN	-	-	-	<0.05	Grab	µg/l	APHA 4500A,B,C 1999
Fluoride	0	5	16	<10	Grab	µg/l	KONE Autoanalyser
Iron	<50	2	11	-	Grab	µg/l	ICP USN
Lead	<5	<5	<1	<1	Grab	µg/l	ICP USN
Manganese	2	1	2	-	Grab	µg/l	ICP USN
Mercury	<0.05	<0.05	<0.05	<0.05	Grab	µg/l	Cold vapour AAS
Phosphorous	0.024	0.052	0.033	0.021	Grab	mg/l	Murphy and Reilly Method
Potassium	0.88	0.82	0.93	0.88	Grab	mg/l	Lachat IC

GROUNDWATER QUALITY – HOLY WELL (SHEET 2 OF 2)

Parameter	Results (mg/l)				Sampling method^2 (grab, drift etc.)	Normal Analytical Range^2	Analysis method / technique
	Date 2001	Date 2002	Date 2003	Date 2004			
Sodium	13.1	13.5	13.1	12.4	Grab	mg/l	Lachat IC
Zinc	<5	7	42	29	Grab	µg/l	
TOC	2	3	3	2	Grab	CFU/100ml	Persulphate digestion NDIR analysis
Total Oxidised Nitrogen	8.9	8.6	8.5	8.9	Grab	CFU/100ml	APHA 1989 Method 4500-NO_2-B
Faecal Coliforms	0	2	0	0	Grab	µg/l	Membrane Method
Total Coliforms	200	1200	722	59	Grab	mg/l	Membrane Method
Diesel Range Hydrocarbons	<10	617	32	125	Grab	µg/l	GC/MS
Residue on Evaporation	326	396	354	303	Grab	µg/l	Gravimetric
16 PAH	167	230	329	<10	Grab	µg/l	GS/MS after liquid/liquid extraction
USEPA 6 PAH	0	40	<10	<10	Grab	µg/l	
EU Water 4 PAH	<10	0	<10	<10	Grab	µg/l	
Semivolatiles	<1	<1	<1	-	Grab	µg/l	GC/MS

For the onsite boreholes only those results not discussed above under "Quarterly Monitoring" are mentioned here. Figure 2.f.ii.1 records the heavy metal concentrations. Also included in Figure 2.f.ii.1 are data obtained in 1999 as part of the licensing process. (Response to Queries from the EPA, Article 16 Compliance Requirements).

FIGURE 2.f.ii.1: HEAVY METALS IN ON-SITE GROUNDWATER



The levels of heavy metals are very low except for zinc, which is normally present in the local groundwater. However, even the zinc is low compared with drinking water standards. The wide variation in the levels of zinc is not readily explained. The large amount of iron found in BH-2 in 2003 is probably due to contamination during sampling. Metals are generally lower on the down gradient boreholes (BH-2 and BH-3a) than in the up-gradient one (BH-1), showing that the metals are not the result of contamination by the transfer station.

Turning to the off-site wells the picture is similar to that reported above, the ammonia fluctuating widely, and the sodium and potassium being relatively constant. The conductivity in N1 and N3 fluctuates widely and it is possible that the 2003 samples were transposed for these sites. No simple explanation can be put forward why the conductivity at the up gradient locations should fluctuate while that lower down does not. Also noticeable is the increase in chloride in the ground water (except at N3), as reported above under the quarterly monitoring of the on-site boreholes..

The presence of coliforms in the Holy Well is not surprising as it is located in a cow pasture. However the presence of coliforms in the well water, especially at N2 is worrying. This data has been reported to the householder. Very low levels of coliforms have been detected in the wells in the valley bottom (BH1-3, H1 and H2).

Also significant is the decrease in the amount of solvent extractable matter in all the wells after the first year. The reason for this is possibly due to a change in the method.

Cadmium was assayed in all the water samples. None was found to a detection level of 0.05 µg/l.

The heavy metal analyses fall into 2 groups. The Holy Well and H1 and H2 are all in the valley bottom, whilst N-1, N-2 and N-3 are further up the slopes. All have low levels of heavy metals with the exception of the zinc in N-3. This spike like the variation between the on-site boreholes is not readily explained. The data perhaps indicate that the levels of zinc in the valley bottom ground waters are slightly lower.

In contrast the data for N4 are quire different. N4 is a domestic well located near to N2 to the west of the site. However the look of the land around the properties is quite different, indicating a difference in geology or some other parameter.The reasons why the manganese levels should be 100 times higher are not obvious. It is possibly because the water from this well appears to be slightly reducing, as reflected by the higher levels of ammonia and the generally lower levels of oxidised nitrogen. This explanation was proposed by the Aquatic Services Unit of UCC. This would mobilise the manganese where the possible oxidation states are +2 and +4. The former is generally significantly more soluble. Also in the 2004 sample both the ammonia and oxidised nitrogen is high. It is possible that the presence of significant amounts of ammonia is helping the solubilise the manganese, forming a complex with the Mn^{2+} ions and making them more soluble.

iii) CONCLUSION

All the above data indicate that the operation of the transfer station has not had any effect on the groundwater in the last 4 years. Also where data from 1999 is available, there has been little change in the groundwater from before the transfer station commenced operations in February 2001.

g) ECOLOGICAL MONITORING

The ecology of the area surrounding the AVR-Safeway site is monitored annually by an outside contractor. A flora and fauna study is carried out and the results recorded. Especial care is taken to note all bird species present. No effects on the local ecology that cannot be readily explained by other activities in the area, for example the removal hedges and other agricultural activities, the ongoing construction of the Fermoy bypass, and the increase in traffic on the N8 Dublin-Cork road, have been observed. The full ecological reports are forwarded to the Agency when received.

The only uncommon or protected species that have been observed in the environs of the facility are:

- Bats
- Otter

- Stonechat
- Common Gull

The site itself is of little ecological interest. However the hedges on neighbouring farmland, especially that bordering the stream comprise a valuable site for mammals and birds and should be retained.

h) METEROLOGICAL MONITORING

A weather station has been in operation since 2001 on the AVR-Safeway site. The parameters recorded and comments about them are reported in Table 2.h.1. The weather data is recorded every twenty minutes and logged in a data collector, from which it is downloaded from time to time. Unfortunately, without the purchase of expensive conversion software only the raw data can be readily examined. Thus it is relatively easy to find out the relevant data for a particular time and day, but not to do statistics on it. From a qualitative examination of the data it appears that the temperature (min and max), the wind speed and direction and the rainfall are probably reasonably accurate. However the evaporation and humidity data appear meaningless. This is probably due to the fact that the equipment for these tests is more sensitive and really requires specially trained personnel to maintain and calibrate it.

TABLE 2.h.1: METEROLOGICAL PARAMETERS RECORDED

PARAMETER	COMMENTS
WIND SPEED	Appears reasonable
WIND DIRECTION	Appears to be quite accurate despite the location of the equipment.
TEMPERATURE MAX MIN	Correlates quite well with other local observations
PRECIPITATION	Correlates with operators' experience
EVAPORATION RATE	Meaningless. High evaporation rates have been recorded during rain events.
RELATIVE HUMIDIDTY	Meaningless. Low humidity has been recorded during rain events.

Overall, the wind speed and particularly the direction can be useful in determining the source of complaints etc. The other parameters do not appear to hold out much use for the safe and environmentally sound operation of the facility.

3) RESOURCE USAGE

See Attachment G.2.

4) INCIDENTS AND COMPLAINTS

All incidents and complaints are recorded in Table 4.1.

AVR-SAFEWAY INCIDENTS AND COMPLAINTS 2001 TO DATE		
2001	**NO INCIDENTS**	**NO COMPLAINTS** 2 Requests for further information were received and the requested information was dispatched to the satisfaction of the requestor.
2002	**1 INCIDENT** Drums of contaminated absorbent material were received on site after hours from Cork County Fire Brigade following a clean up of a spill.	**2 COMPLAINTS** Odour detected by a neighbour. Investigated and found to be resulting from slurry spreading on an adjacent field. The odour was detected by the PID fugitive emissions monitor. Concern was expressed regarding the landscaping around the site. Discussion were carried out with the individual involved and it was agreed the planting carried out was still very immature
2003	**1 INCIDENT** A vehicle transporting asbestos to the AVR-Safeway site was involved in an accident and some packages containing asbestos were deposited in a field. AVR-Safeway and Southcoast transport personnel collected the packages and as a precautionary measure removed a layer of topsoil. Subsequent monitoring of the site by Asbestos Consultancy services showed that there was no contamination at the site.	**NO COMPLAINTS**
2004	**NO INCIDENTS**	**NO COMPLAINTS**

Both incidents were the result of off site accidents. In the first AVR-Safeway responded to an emergency request from Cork Fire Brigade to accept, outside the licensed operating hours of the facility, a load of contaminated absorbent material from the clean up of a spill. In the second AVR-Safeway responded to an off-site road accident, which resulted in the spillage of some wrapped asbestos.

There have been very few complaints, in fact none from the closest residents to the facility, with whom AVR-Safeway have an excellent relationship.

In addition from time to time AVR-Safeway receives queries from the EPA in response to enquiries from members of the public. None of these have been in the form of a complaint. All have been answered as promptly and as fully as possible.

ATTACHMENT 1.2:

REVIEW OF THE ENVIRONMENTAL IMPACT OF PROPOSED FUEL BLENDING PLANT

1.2.1: Introduction

AVR-Safeway Ltd. proposes the construction of a 550,000 l facility for the blending of compatible liquid wastes to make secondary fuel at their Corrin, Fermoy site. The facility is described in detail in a separate document "Mixing and Blending Facility Design and Operation".

This document presents an analysis of the possible environmental impact of the proposed fuel blending facility. Each of the following potential impacts is discussed and mitigation methods, if appropriate, are described.

- Archaeology, Landscape and Ecology
- Geology and Hydrology
- Water
- Air
- Human Beings:
  - Visual Impact
  - Noise
  - Employment
  - Traffic
  - Other Nuisances
- Resources
  - Water
  - Power/Energy
- Emergency Response

1.2.2: Archaeology, Landscape and Ecology

The new facility will be located on an underutilised area of the existing AVR-Safeway Ltd. site. This area is already developed, being paved and curbed, and is used for the temporary parking of HGVs. The site is already lit at night and no additional lighting will be required.

MITIGATION:
No mitigation measures are required.

CONCLUSION
There will be no impact of the new facility on the archaeology, landscape and ecology of the Corrin area.

1.2.3: Geology and Hydrology

The geology and hydrology of the site was examined in detail in the original Environmental Impact Statement (RPS Carins Ltd. October 1997). The specific findings were not questioned. The Corrin site is located on an area of sedimentary rocks of the Upper Devonian (Old Red Sandstone) period. There is between 6 and 12 meters of overburden, muddy sands and thing gravels.

The old red sandstone is deemed to be to a locally significant aquifer. Thus groundwater contamination is an issue. This is addressed under Water below.

CONCLUSION:
There is no risk of geological events, earthquake, subsidence etc. that could impact the structural integrity of the facility. There has never been any underground mining in the area.

I.2.4: Water

The new facility has the potential to affect both ground and surface waters. This is due to the possibility of spills, both major due to overfilling a tank, to the rupture of a line or the failure of a tank, and minor, due to leaking hoses, valves, pumps, connections and flanges. Each of these is addressed and mitigation methods are outlined below.

MITIGATION

The following mitigation measures will be made:

1. OVERFILL PROTECTION
   - Flow meters (2) will be installed and calibrated to monitor the movement of liquids into and between the tanks. A computer program will monitor the transfers and maintain a real time inventory of the tank contents.
   - To prevent overfilling the control system will only allow a measured amount of material to be loaded on to tankers before stopping the pump.
   - A level gauge (radar or similar) will be installed on T-4 the blending tank. This is the one most likely to become overfilled. The gauge will allow real time monitoring of the actual level in this tank.
   - All tanks will be the same height (6 m). Thus over-filling will not occur in the case of level equilibration due to a failed valve etc.
   - Additionally each tank including tankers being loaded will be fitted with a high level alarm switch which will trigger and turn off all pumps and thus stop flows, when the volume in the tank reaches 95% of capacity.

2. BUNDING
   - The facility will be surrounded by an impervious bund constructed of materials compatible with the materials to be stored and handled in it. The bund will be of a volume greater than 110% of the largest tank contained in it, i.e. > 220,000 l.
   - All activities related to the fuel blending process will take place inside this bunded area, except the unloading and loading of tankers.

- The loading and unloading of tankers will take place in a separate bund, alongside the facility bund. This bund will be sloped towards the facility bund to facilitate the movement of tankers.
- The contents of all bunds will be tested for evidence of pollution before being pumped out. Contaminated water will be disposed of as hazardous waste. Uncontaminated water will be removed via the existing site oil/and grit interceptors to surface waters.
- The bunds will be tested visually for cracks and other imperfections monthly. A written record of these inspections will be maintained.
- Full impermeability testing of the bunds will be carried out before the introduction of wastes into the facility and thereafter every three years. Detailed written records of bund testing will be maintained and reported to the EPA.

3. HOSES, FLANGES VALVES AND PUMPS
   - Hoses will be managed is such a way that they do not become damaged, by kinking for example. When connected care will be taken to prevent stretching or the use of tight bends.
   - Hoses will be inspected each time before use and any defects will be repaired of replaced immediately.
   - Flanges will be constructed to code, with Teflon® type gaskets.
   - Valves, flanges and pumps will be inspected at least weekly (daily in the case of pumps) to check for leaks.
   - Ball valves will be used where there is the possibility of a spill where a valve leaks through.
   - Valves and pumps will be maintained according to the manufacturers' recommendations.
   - Materials of construction of wetted valve and pump components will be chosen such that they are compatible with the material being pumped.
   - After installation or repair all lines will be pressure tested for leaks before being entered into or returned to service.

4. TANKS
   - All tanks will be constructed of stainless steel to ASTM or equivalent specification.
   - Tanks will be visually inspected for corrosion and other problems monthly. A full inspection record will be maintained.
   - Tanks will be inspected and maintained in line with the manufacturers recommendations.
   - No material that is not compatible with stainless steel at ambient temperatures will be stored in the tanks. If any doubt exists, corrosion analyses will be carried out before potentially corrosive materials are introduced.
   - Welded corrosion coupons will be installed in all tanks and inspected annually.
   - All tanks will be fitted with PVRVs (pressure and vacuum relief vents) to prevent over pressurization or

- PVRVs will be inspected, tested and maintained according to the manufacturer's recommendations.
- All tank inlet nozzles will be fitter with check valves to prevent back flow.
- All tanks will be fitted with high-level alarms to prevent overfilling.

5. SPILL CONTROL
    - All spills will be contained and cleaned up as soon as possible.
    - Major leaks will be pumped into tanks, both permanent and mobile using the existing movable submersible pump.
    - Absorbent pillows will be used to remove small spills. The pillows will be stored nearby and, if contaminated will be disposed of as hazardous waste.

I.2.5: Air

Air quality can be impacted by emissions during accidents, spills etc. See above for details of proposed spill prevention and containment methods.

Additionally air emissions can be generated by fugitive releases.

MITIGATION METHODS

- All tanks will be fitted with conservation vents connected to a wet scrubber/carbon absorber to prevent emissions.
- All tanks and drums will be kept closed unless being filled or emptied or cleaned.
- All flanges, pumps, valves etc. will be checked visually for leaks weekly, and for fugitive emissions of VOCs annually and repairs made.
- The material balance of the facility will be checked monthly for losses due to fugitive emissions.

I.2.6: Human Beings

A. VISUAL IMPACT

The installation of 5 tanks will create a visual impact, but this will be minimal because:

- The new tanks will be located close to the existing 3 large firewater retention tanks, which are taller than those proposed.
- The new tanks will be of a size consistent with the existing structures on the site.
- The new tanks will be grey coloured to blend in with the existing structures on the Corrin site.
- The existing landscaping will screen the new tanks from view.

Overall the visual impact of the proposed fuel blending facility is deemed to be minimal.

B. NOISE

The installation will increase the noise generated on site because of additional vehicle movements and the noise of the equipment.

Additional on-site movements due to the new facility will be a maximum of 12 per day, moving tankers or loads of drums to and from the facility. At present there are between 30 and 40 movements on site each day. Many of these will be replaced by movements to and from the new facility. There will also be a maximum of 4-5 additional HGV movements to the site daily (See below for a fuller analysis of traffic movements). Much of the waste to be blended will be sourced from existing customers. These wastes are already received on site and often stored. With the new facility there will be less need to load/unload tanks from their trailers, thus reducing the operation, and hence the noise of the crane.

Two new centrifugal pumps will be installed in the proposed facility which will generate some additional noise. The pumps will be run semi-continuously as they will be used in recirculation mode to mix the tanks as well as transfer the contents. A new positive displacement pump, mounted in Bund P will be used to unload tankers

Noise in the locality of the site is dominated by traffic noise from the adjacent N-8, a very busy primary road. Though most of the traffic be moved further from the site by the construction of the bypass it will still be very close and dominate the noise environment. Additionally the nearby toll point and slip road will increase noise in the locality as vehicles accelerate away.

MITIGATION:
The following mitigation methods will be employed to minimise noise generated by operations related to the proposed fuel blending facility:

- The centrifugal pumps will be housed in a pump house constructed of sound absorbing material.
- Pumps will be installed in accordance with the manufacturers' recommendations to minimise noise.
- All vehicles and equipment on site will be properly maintained to minimise noise.
- No to/from and on-site traffic movements will take place at night.
- The current site noise limits of 55 (Day) and 45 (night) dB will be strictly adhered to.
- Current noise monitoring programmes will be continued.

CONCLUSION:
It is considered that any increase in noise nuisance due to the new facility will be minimal, once the above mitigation measures are employed.

C. EMPLOYMENT

It is estimated that an additional two employees will be required to operate the facility.

D. TRAFFIC

It is estimated that there will be aN additional 4 – 5 heavy goods vehicle (HGV) traffic movements a day entering the site, due to the increased business generated by the new fuel blending facility. This compares with the > 20 heavy goods traffic movements currently. There are 16,000 traffic movements along the N-8 past the facility daily, at least 5 % of which are HGVs. The construction of the new Fermoy/Rathcormac bypass will reduce the traffic on the existing Fermoy to Rathcormac road, but access to the site will be from the bypass at the adjacent interchange..

The employment of an additional 2 people will not seriously add to the car journeys to and from the site, which already employs upwards of fifty people. It is intended to provide additional parking in the near future.

E. OTHER NUISANCES

The proposed fuel blending facility will not attract vermin.

Litter will not be significantly increased by the new facility. Current litter prevention and removal procedures will be adequate to cope with any additional load.

I.2.7: Resources

A. WATER

Water will only be consumed on site for fire fighting and wash down. It is intended to use recycled water from other on-site activities for both these purposes where possible.

B. POWER/ENERGY

Energy will be consumed by the pumps and by the associated vehicle movements. Pumps will be selected to be as energy efficient as possible and only used when necessary. The lower power pump will be used to maintain mixing on a tank for longer periods. Vehicle movements will be kept to a minimum consistent with safe and efficient operation of the facility.

I.2.8: Emergency Response

The Site Emergency Response Procedures are recorded in SW 409. This procedure will be updated and revised to include details of the response to incidents in the blending facility. The 2 principal emergencies that are likely to arise due to the blending facility are a spill and fire.

A. SPILLS

With all spills care will be taken to ensure that no sources of ignition are present. In all cases the appropriate PPE, skin, eye and breathing protection, will be used when tackling spills. The site Procedure SW 313 Spillage Procedure details the procedures to be followed in the event of a spill. To summarise:

Minor spills (1 foot diameter, source < 25 litres) will be cleaned up using absorbent and the contaminated absorbent will be disposed of as hazardous waste to a licensed facility.

Medium sized spills (1 – 10 feet diameter, source >25 < 200 litres) will be dealt with by site personnel. They will be pumped up and placed in a drum for disposal as hazardous waste. The final drops of material will be absorbed with spill pillows, which will be sent for disposal as above.

Major spills (> 10 feet diameter and > 200 litres) will be contained by the bunds. The fire brigade will be called and all sources of energy in the blending facility de-energised. Especial care will be taken to avoid sources of ignition and preparations will be taken to fight any fire.

SW 313 will be modified to include extra requirements for dealing with a major spill in the blending facility bunds. This will include the following:

- Foam will be sprayed on the spill to reduce evaporation and the risk of a vapour fire/explosion.
- As far as possible, spilled material will be pumped up using a movable submersible pump, or a diaphragm pump, and hoses and to undamaged tanks in the blending facility or into mobile tanks.
- The spilled material will be tested as to its suitability for fuel blending and will be recycled or disposed of to licensed facilities accordingly.

B. FIRE

AVR-Safeway Ltd has the following fire fighting facilities on site:

- Fire extinguishers, both foam and dry powder.
- On site fire engine.
- Emergency vehicle with foam maker machine.

SW 314 details the procedures to be followed in case of a fire. It will be revised in consultation with the County Fire Officer to account for the additional issues raised by the blending facility. The following will be addressed at a minimum:

- In all cases when fire occurs in the blending facility, however minor, the fire services will be called immediately.
- Before the fire brigade arrive the plant personnel will only tackle the fire if it is safe to do so. Foam or dry powder extinguishers will be used.
- If appropriate water will be sprayed on tanks close to the fire to cool them.
- Any spill of flammable material will be blanketed with foam to prevent ignition.