ATTACHMENT NO. 7

FLORA & FAUNA REPORT
&
DIXON.BROSNAN REPORT

EIS JULY 2005

Flora And Fauna

The areas selected for land spreading of the animal slurry are typical pasture and silage grounds with a covering of grasses, the spreadlands also include arable land which is generally growing cereal crops. The lands assessed and included in this application currently receive dressings of organic or inorganic fertilisers. In the landspreading of slurry from the development the application rate will not exceed the crop nutrient requirement and any effect on flora will represent an increase in yield to the landowner. This is no different to achieving an increase in crop production through the use of artificial fertilisers. Similarly the landspreading of slurry in accordance with the recommended application rates and procedures will have no likely significant effect on flora.

The rivers, streams and lakes in the spreadlands all contain aquatic flora and fauna. If contamination did occur in any of the water bodies it could result in eutrophication of the water. Eutrophication is the death of a lake. As organic wastes find their way into a lake or stream, it depletes oxygen as it decomposes and releases nutrients (N & P). These fertilise the water making conditions unsuitable for living organisms and results in the growth of algal blooms in lakes or bacterial slimes in rivers. A 10-20 m exclusion has been included around all water bodies to ensure that there will be no deleterious effects on aquatic flora and fauna from the spreading of pig slurry.

Volumes of pig slurry will only be made available to landowners based on their crop nutrient requirements and on-farm generated slurry available as outlined in the nutrient management plans. This is to provide a positive control mechanism to mitigate against effects on flora and fauna.

Both the spreadlands and the site itself have been screened against the following legislation:

- a site placed on a list in accordance with Chapter 1 of SI 94 of 1997 (European Communities (Natural Habitats) Regulations), or
- a site where consultation has been initiated in accordance with Article 5 of the EU Habitats Directive (92/43/EEC), or
- a European site as defined in Article 2 of SI 94 of 1997

A substantial portion of the spreadlands that were assessed lie within the Wexford Slobs and Harbour NHA Site Code 712. Farm No. 3 which forms a substantial part of the North Slob Lands is located entirely within the NHA Site Code 712, however following soil sampling it is recommended that much of this land should not receive slurry until the soil phosphorous value has been reduced. The primary interest of the Slobs and Harbour is it's wintering birdlife, the site synopsis is included in **Attachment 11C.6** along with a map extract showing the extent of the NHA. The OPW were contacted in relation to the spreading of slurry on the South Slobs which is part of the same NHA and of very similar interest, this response is included in **Attachment 11C.6.**

A number of the farms included in the spreadlands are located along the edge of the Slaney River Valley NHA Site Code 781. These include farm numbers 2, 4, 8, 10, 12, 21, 23, 24 and 30. The areas of these farms that form the spreadable area are all commercially farmed areas of land. Therefore the land would previously have been receiving nutrients from inorganic fertilisers and the use of pig slurry will replace the inorganic fertilisers. In addition there is a buffer between the area were slurry will be spread and the boundary of the HNA. In all cases the buffer is 20 metres along the river and the railway line forms a buffer between the spreadable area and the NHA in the remaining areas.

It is stated in the site synopsis for the Slaney River Valley that "the ecological diversity of the site is dependent on good water quality. Runoff from intensive agricultural enterprises could have potential adverse impacts on the water quality unless they are carefully managed." Due to the requirement for intensive pig units to make an application for an Integrated Pollution Control License, from the Environmental Protection Agency the risk of runoff from intensive agricultural enterprises is removed. The Integrated Pollution Control License requires the careful management of the enterprise, this includes the preparation of nutrient management plans based on the crop requirements and the inclusion of buffer zones to avoid pollution, therefore ensuring the ecological diversity of the site is not disturbed.

The site synopsis of the NHA site along the Slaney River is also included in **Attachment 11C.6.**

Carl Dixon, The Cedars
Bridewood Ovens
Co. Cork Ireland
Tel (021) 4875389
Fax (021) 4377947
GSM 086 8511437

Dixon . Brosnan
environmental consultants

email: dixonbrosnan@eircom.net

Damian Brosnan, Dun Eoin
Ballinrea Rd. Carrigaline
Co. Cork Ireland
Tel (021) 4377947
Fax (021) 4377947
GSM 086 8131195

An assessment of possible impacts on water quality and ecology.

1. Ecology

The Slaney River has been designated as a candidate SAC under the European Habitats Directive and supports a number of important habitats and species. A site synopsis for this site is included in Appendix 1 of this report. In addition to the terrestrial habitats located within the site boundaries there are a number of important aquatic/semi-aquatic habitats including alluvial wet woodlands, floating river vegetation, estuaries and tidal mudflats (priority habitats on Annex I of the E.U. Habitats Directive). Important aquatic fauna includes Sea Lamprey, River Lamprey, Brook Lamprey, Freshwater Pearl Mussel, Twaite Shad, Atlantic Salmon and Otter which are listed on Annex II of the Habitats Directive. Wexford Harbour provides extensive feeding grounds for wading birds and Little Terns, which are listed on Annex I of the E.U. Birds Directive have bred here in the past. In addition the Slaney is a designate river under the European Communities (Quality of Salmonid Waters) Regulations 1978 and is an important salmon and trout fishery. The site synopsis for the site provided by the National Parks and Wildlife Service (Appendix 1) notes that "*waste water outflows, runoff from intensive agricultural enterprises, a meat factory at Clohamon and a landfill site adjacent to the river and further industrial development upstream in Enniscorthy and in other towns could all have potential adverse impacts on the water quality unless they are carefully managed*".

2. Water Quality

The EPA carries out biological monitoring on watercourses in Ireland and published results are available for 2001. Table 1. shows the results from 2001 in comparison with those from previous years.

River and Code : **SLANEY** **12/S/02**
Tributary of : Sea - Wexford Harbour OS Catchment No: 175
OS Grid Ref : S 975 314 Date(s) Surveyed : 20/08/01

Stations No.	Biological Quality Ratings (Q Values) 1971	1975	1979	1981	1983	1984	1987	1991	1995	1998	2001
0100	-	-	5	-	-	4	4	5	4-5	5	4-5
0200	-	-	4	-	-	4-5	4-5	5	5	4-5	4
0400	-	-	4-5	-	-	4-5	4	4-5	4-5	5	4-5
0600	-	-	4	-	-	4-5	4-5	4-5	4-5	5	4-5
0700	5	5	4	-	-	4-5	4	3	4-5	4-5	4
0770	-	-	-	-	-	-	-	-	4-5	4-5	4
0900	5	5	4	-	-	4-5	4	4	4	4	4
1020	-	-	-	-	-	-	-	4	4-5	4-5	4
1100	-	-	-	-	-	4	4	4	4-5	4-5	4-5
1200	5	4-5	4-5	5	4-5	4-5	4-5	4	4-5	4-5	4-5
1290	-	-	-	-	-	-	4	4	4	4-5	4-5
1400	4-5	4-5	3-4	3-4	3-4	3-4	3-4	3-4	3-4	3-4	3-4
1500	4	4	4	4	-	3-4	4	-	-	-	-
1530	-	-	-	-	-	-	-	3-4	3-4	4	-
1600	-	-	-	-	-	3-4	3-4	3-4	3-4	4-5	3-4
1800	4-5	4	4	4	-	3-4	3-4	4	3-4	4-5	4
1900	4-5	-	3-4	3	3-4	3	3	3	3-4	-	-
2000	5	3-4	3-4	3-4	3-4	3	3	3	3-4	3-4	3-4
2100	5	4	4	-	-	3-4	4	3	3-4	3-4	3-4
2200	-	4-5	4	-	-	3-4	4	3-4	-	-	-
2220	-	-	-	-	-	-	-	-	3-4	4	4

Sampling Station No.	Location
0100	Seskin Br
0200	Kelsha Br
0400	Waterloo Br
0600	Tuckmill Br
0700	Just d/s Baltinglass Br
0770	Maiden's Ford
0900	Ford u/s Rathvilly
1020	1km d/s Rathvilly Br
1100	Rathmore Br
1200	Moatabower Br
1290	0.5km u/s Tullow Br

Sampling Station No.	Location
1400	Ford 3km d/s Tullow Br
1500	Aghade Br
1530	W of Ballinastraw
1600	Kilcarry Br
1800	Slaney Br Bunclody
1900	Clohamon Br
2000	1.3km d/s Clohamon Br
2100	Ballycarney Br
2200	Scarawalsh Br
2220	Just W of Salsborough Br

Results indicate that water quality in the upper reaches is satisfactory however lower Q values were recorded at certain locations downstream of Tullow. The EPA report for 2001 (Interim Report on The Biological Survey of River Quality: Results of the 2001 Investigations) notes that impacts are associated with drainage, sewage and inputs from agriculture.

3. EPA Discussion document

The EPA discussion document (**Anaerobic Digestion: Benefits for Waste Management, Agriculture, Energy, and the Environment Discussion Document 2005**) notes that *"in addition to the benefits of energy recovery and displacement of greenhouse gas emissions from fossil fuels anaerobic digestion produces several beneficial outcomes"* Of the beneficial outcomes listed the following are considered relevant to water quality:

- *AD reduces the organic pollution potential of animal slurries. Tests of animal slurries from pilot and farm scale digesters show a reduction of 55% of BOD for cattle slurry, 75% for pigs and 80% for poultry slurries.*

- *An appreciable portion of the geology of the country is of a karst limestone composition which makes groundwater particularly vulnerable to pollution. The lower pollution potential of AD processed slurries will provide additional protection to groundwater.*

- *AD increases the proportion of nutrients immediately available for uptake by plants. During the digestion process nutrients are mineralised which allows improved plant uptake. For instance digestate has 25% more accessible inorganic nitrogen (NH4-N) and a higher pH value than untreated liquid manure although some research suggests that in excess of 80% of the nitrogen in digestate can be available to plants. Total N, P and K content in the digested compound remain unchanged compared to the constituent slurries but dry matter is considerably reduced making slurry thinner, which ammonia (NH4-N) content and pH rises.*

- *Depending on the mixture of slurries (e.g. cattle, pig, poultry etc) the nutrient balance of digestate may be more balanced for agricultural application. AD transforms organic bound nutrients to a mineral form, which is readily available for crops. With a better nutrient balance and more accessible nutrients the requirement for artificial fertilisers may be lessened which results in a cost saving to farmers.*

Discussion/ Conclusion

As detailed above the Slaney river supports a number of important habitats and species and results of the biological monitoring programme provide indications of ecological stress from a variety of sources in the lower reaches of the river system.

As detailed in the discussion document produced by the EPA there are considerable advantages to the use of anaerobic digestion systems provided they are correctly managed.

It is also noted that phosphorus is generally considered the limiting factor in freshwaters and that 70% of the P content will be retained within the solid material. It is intended that a significant proportion of the solid material will be sold to customers not involved in agriculture and therefore a significant proportion of the phosphorus will be removed from this agricultural system.

Not withstanding the advantages of using digestate it is important that it is spread as part of a nutrient management plan for the spread lands and with due regard to the Nitrates Directive, REPS specifications and the "Code of good farm practice".

Adequate buffer zones are required for drains and streams and effective separation of clean and soiled water is essential.

Slaney River Valley (000781)
SITE NAME: Slaney River Valley

SITE CODE: 000781

This site comprises the freshwater stretches of the Slaney as far as the Wicklow Mountains; a number of tributaries the larger of which include the Bann, Glasha, Clody, Derry, Derreen, Douglas and Carrigower Rivers: the estuary at Ferrycarrig and Wexford Harbour. The site flows through the counties of Wicklow, Wexford and Carlow. Towns along the site but not in it are Baltinglass, Hacketstown, Tinahely, Tullow, Bunclody, Camolin, Enniscorthy and Wexford. The river is up to 100 m wide in places and is tidal at the southern end from Edermine Bridge below Enniscorthy. In the upper and central regions almost as far as the confluence with the Derry River the geology consists of granite. Above Kilcarry Bridge, the Slaney has cut a gorge into the granite plain. The Derry and Bann Rivers are bounded by a narrow line of uplands which corresponds to schist outcrops. Where these tributaries cut through this belt of hard rocks they have carved deep gorges, more than two miles long at Tinahely and Shillelagh. South of Kildavin the Slaney flows through an area of Ordovician slates and grits.

The site is a candidate SAC selected for alluvial wet woodlands, a priority habitat on Annex I of the E.U. Habitats Directive. The site is also selected as a candidate SAC for floating river vegetation, estuaries, tidal mudflats and old oak woodlands, all habitats listed on Annex I of the E.U. Habitats Directive. The site is further selected for the following species listed on Annex II of the same directive - Sea Lamprey, River Lamprey, Brook Lamprey, Freshwater Pearl Mussel, Twaite Shad, Atlantic Salmon and Otter.
Floating river vegetation is found along much of the freshwater stretches within the site. Species present here include Pond Water-crowfoot (Ranunculus peltatus), Water-crowfoot (Ranunculus spp.), Canadian Pondweed (Elodea canadensis), Broad-leaved Pondweed (Potamogeton natans), Water Milfoil (Myriophyllum spp.), Common Club-rush (Scirpus lacustris), Water-starwort (Callitriche spp.), Hemlock Water-dropwort, Fine-leaved Water-dropwort (Oenanthe aquatica), Common Duckweed (Lemna minor), Yellow Water-lily (Nuphar lutea), Unbranched Bur-reed (Sparganium emersum) and the moss Fontinalis antipyretica. Two rare aquatic plant species have been recorded in this site: Short-leaved Water-starwort (Callitriche truncata), a very rare, small aquatic herb found nowhere else in Ireland; and Opposite-leaved Pondweed (Groenlandia densa), a species that is legally protected under the Flora Protection Order, 1999.

Good examples of wet woodland are found associated with Macmine marshes, along banks of the Slaney and its tributaries and within reed swamps. Grey Willow (Salix cinerea) scrub and pockets of wet woodland dominated by Alder (Alnus glutinosa) have become established in places. Ash (Fraxinus excelsior) and Birch (Betula pubescens) are common in the latter and the ground flora is typical of wet woodland with Meadowsweet (Filipendula ulmaria), Angelica (Angelica sylvestris), Yellow Iris, Horsetail (Equisetum spp.) and occasional tussocks of Greater Tussock-sedge (Carex paniculata). These woodlands have been described as two types: one is quite eutrophic, is dominated by Willow and is subject to a tidal influence. The other is flushed or spring-fed subject to waterlogging but not to flooding and is dominated by Alder and Ash.

Old oak woodlands are best represented at Tomnafinnoge though patches are present throughout the site. At Tomnafinnoge the wood is dominated by mature, widely spaced Sessile Oak (Quercus petraea), which were planted around 1700, with some further planting in 1810. There is now a varied age structure with overmature, mature and young trees; the open canopy permits light to reach the forest floor and encourages natural regeneration of Oak. As well as Oak, the wood includes the occasional Beech (Fagus sylvatica), Birch (Betula sp.), Rowan (Sorbus aucuparia) and Scots Pine (Pinus sylvestris).

The shrub layer is well-developed with Hazel (Corylus avellana) and Holly (Ilex aquifolium) occurring. The ground layer consists of Great Wood-rush (Luzula sylvatica) and Bilberry (Vaccinium myrtillus), with some Bracken (Pteridium aquilinum) and Brambles (Rubus fruticosus agg.). Herbaceous species in the ground layer include Primrose (Primula vulgaris), Wood-sorrel (Oxalis acetosella), Common Cow-wheat (Melampyrum pratense) and Bluebell (Hyacinthoides non-scripta). Many of the trees carry an epiphytic flora of mosses, Polypody Fern (Polypodium vulgare), and lichens such as Usnea comosa, Evernia prunastri, Ramalina spp. and Parmelia spp.

Tomnafinnoge Wood is a remnant of the ancient Shillelagh Oak woods, and it appears that woodland has always been present on the site. In the past, the wood was managed as a Hazel coppice with Oak standards, a common form of woodland management in England but not widely practised in Ireland. The importance of the woodland lies in the size of the trees, their capacity to regenerate, their genetic continuity with ancient woodland and their historic interest. The nearest comparable stands are at Abbeyleix, Co. Laois and Portlaw, Co. Waterford.

Below Enniscorthy there are several areas of woodland with a mixed canopy of Oak, Beech, Sycamore (Acer pseudoplatanus), Ash and generally a good diverse ground flora. Near the mouth of the river at Ferrycarrig is a steep south facing slope covered with Oak woodland. Holly and Hazel are the main species in the shrub layer and a species-rich ground flora typical of this type of Oak woodland has abundant ferns - Dryopteris filix-mas, Polystichum setiferum, Phyllitis scolopendrium - and mosses - Thuidium tamariscinum, Mnium hornum, Eurynchium praelongum.

North of Bunclody, the river valley still has a number of dry woodlands though these have mostly been managed by the estates with the introduction of Beech and occasional conifers. The steeper sides are covered in a thick scrub from which taller trees protrude. At the southern end of the site, the Red Data Book species Yellow Archangel (Lamiastrum galeobdolon) occurs. Three more Red Data Book species have also been recorded from the site: Basil Thyme (Acinos arvensis), Blue Fleabane (Erigeron acer) and Small Cudweed (Filago minima). A nationally rare species Summer Snowflake (Leucojum aestivum) is also found within the site.

Mixed woodlands occur at Carrickduff and Coolaphuca in Bunclody. Oak trees, which make up the greater part of the canopy, were originally planted and at the present time are not regenerating actively. In time, if permitted, the woodland will probably go to Beech. A fair number of Yew (Taxus baccata) trees have also reached a large size and these, together with Holly give to the site the aspect of a south-western Oak wood.

The site is considered to contain a very good example of the extreme upper reaches of an estuary. Tidal reedbeds with wet woodland are present in places. The fringing reed communities support Sea Club-rush (Scirpus maritimus), Grey Club-rush (S. tabernaemontani) and abundant Common Reed (Phragmites australis). Other species occurring are Bulrush (Typha latifolia), Reed Canary-grass (Phalaris arundinacea) and Branched Bur-reed (Sparganium erectum). The reed-swamp is extensive around Macmine, where the river widens and there are islands with swamp and marsh vegetation.

Further south of Macmine are expanses of intertidal mudflats and sandflats and shingly shore often fringed with a narrow band of salt marsh and brackish vegetation. Narrow shingle beaches up to 10 m wide occur in places along the river banks and are exposed at low tide. Upslope the shingle is sometimes colonised by Saltmarsh Rush (Juncus gerardi), Townsend's Cord-grass (Spartina townsendii), Common Saltmarsh-grass (Puccinellia maritima), Sea Aster (Aster tripolium), Hemlock Water-dropwort (Oenanthe crocata) and Himalayan Balsam (Impatiens glandulifera).

Wexford Harbour is an extensive, shallow estuary which dries out considerably at low tide exposing large expanses of mudflats and sandflats. The harbour is largely sheltered by the Raven Point to the north and Rosslare Point in the south.

Other habitats present within the site include species-rich marsh in which sedges such as Carex disticha, Carex riparia and Carex vesicaria are common. Among the other species found in this habitat are Yellow Iris (Iris pseudacorus), Water Mint (Mentha aquatica), Purple Loosestrife (Lythrum salicaria) and Soft Rush (Juncus effusus). Extensive marshes occur to the west of Castlebridge associated with the tidal areas of the River Sow.

The site supports populations of several species listed on Annex II of the EU Habitats Directive including the three Lampreys - Sea Lamprey (Petromyzon marinus), River Lamprey (Lampetra fluviatilis) and Brook Lamprey (Lampetra planeri), Otter (Lutra lutra), Salmon (Salmo salar), small numbers of Freshwater Pearl Mussel (Margaritifera margaritifera) and in the tidal stretches, Twaite Shad (Alosa fallax fallax). A survey of the Derreen River in 1995 estimated the population of Freshwater Pearl Mussel at about 3,000 individuals. This is a significant population, especially in the context of eastern Ireland. The Slaney is primarily a spring salmon fishery and is regarded as one of the top rivers in Ireland for early spring fishing. The upper Slaney and tributary headwaters are very important for spawning.

The site supports important numbers of birds in winter. Little Egret are found annually along the river. This bird is only now beginning to gain a foothold in Ireland and the south-east appears to be its stronghold. Nationally important numbers of Black-tailed Godwit, Teal, Tufted Duck, Mute Swan, Little Grebe and Black-headed Gull are found along the estuarine stretch of the river. The mean of the maximum counts over four winters (1994/98) along the stretch between Enniscorthy and Ferrycarrig is: Little Egret (6), Golden Plover (6), Wigeon (139), Teal (429), Mallard (265), Tufted Duck (171), Lapwing (603), Shelduck (16), Black-tailed Godwit (93), Curlew (81), Red-breasted Merganser (11), Black-headed Gull (3030), Goldeneye (45), Oystercatcher (19), Redshank (65), Lesser Black-backed Gull (727), Herring Gull (179), Common Gull (67), Grey Heron (39), Mute Swan (259) and Little Grebe (17). Wexford Harbour provides extensive feeding grounds for wading birds and Little Terns, which are

listed on Annex I of the E.U. Birds Directive have bred here in the past.

The Reed Warbler, which is a scarce breeding species in Ireland, is regularly found in Macmine Marshes but it is not known whether or not it breeds in the site. The Dipper also occurs on the river. This is a declining species nationally.

The site supports many of the mammal species occurring in Ireland. Those which are listed in the Irish Red Data Book include Pine Marten, Badger, Irish Hare and Daubenton's Bat. Common Frog (Rana temporaria), another Red Data Book species, also occurs within the site.

Agriculture is the main landuse. Arable crops are important. Improved grassland and silage account for much of the remainder. The spreading of slurry and fertiliser poses a threat to the water quality of this salmonid river and to the populations of Annex II animal species within it. Run-off is undoubtedly occurring, as some of the fields slope steeply directly to the river bank. In addition, cattle have access to the site in places. Fishing is a main tourist attraction along stretches of the Slaney and its tributaries and there are a number of Angler Associations, some with a number of beats. Fishing stands and styles have been erected in places. Both commercial and leisure fishing takes place. There are some gravel pits along the river below Bunclody and many of these are active. There is a large landfill site adjacent to the river close to Hacketstown and at Killurin. Boating, bait-digging and fishing occur in parts of Wexford Harbour.

Waste water outflows, runoff from intensive agricultural enterprises, a meat factory at Clohamon and a landfill site adjacent to the river and further industrial development upstream in Enniscorthy and in other towns could all have potential adverse impacts on the water quality unless they are carefully managed. The spread of exotic species is reducing the quality of the woodlands.

The site supports populations of several species listed on Annex II of the EU Habitats Directive, and habitats listed on Annex I of this directive, as well as important numbers of wintering wildfowl including some species listed on Annex I of the EU Birds Directive. The presence of wet and broad-leaved woodlands increases the overall habitat diversity and the occurrence of a number of Red Data Book plant and animal species adds further importance to the Slaney River site.

16.01.2003