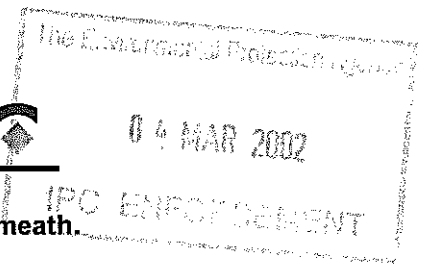


BORD NA MÓNA 
BORD NA MÓNA ENERGY LIMITED
Derrygreenagh, Rochfortbridge, Mullingar, Co-Westmeath.



Annual Environmental Report IPC LICENCE 501

March 2002

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1 Introduction

1.1 Company Details

Name: **Bord na Mona Energy Limited.**

Address: **Derrygreenagh Group
Derrygreenagh Works
Rochfortbridge
Mullingar
Co Westmeath.**

Telephone No: **044 / 22181** **Fax No: 044 / 22344**

Contact Name: **Finn Campbell**

Position: **General Manager.**

National Grid Reference: **E249450 N238140**

1.2 Activities

The Derrygreenagh Group consists of the Derrygreenagh and Ballivor Groups and Rossan Bog.

The Derrygreenagh group of bogs is located in North Offaly and Southeast Westmeath. The Derrygreenagh group comprises of 3664 acquired hectares, of which there are 1300 nett production hectares. The main catchment of these areas is the River Boyne.

The Ballivor group is made up of the bogs in the Ballivor, Carranstown, Bracklin and Lisclogher areas. There is a total of 283 hectares in production and each of these areas are linked by peatland railway to the Bord na Mona horticultural factory, situated between Ballivor and Raharney villages. Drainage from these bogs is to the Deel and Stonyford rivers, tributaries of the Boyne.

Rossan bog is situated one mile from Kinnegad village. There are currently 142 hectares in milled moss production. This bog drains to the Kinnegad River, a tributary of the River Boyne.

The Derrygreenagh Group currently employs 87 permanent and 24 seasonal workers. Transport operations are carried out on a seven day cycle throughout the year. Production operations are typically carried out over a seven day week (weather permitting) for 12 to 15 hours per day.

Peat Milling Operations.

For milled peat production the bog is laid out in a series of rectangular fields of varying length and 15m wide with drains located between. There are essentially four operations involved in milled peat production:

- Milling.
- Harrowing.
- Ridging.
- Harvesting.

Milling.

Special milling machines work there way along the fields, milling approximately 15mm of peat of the top of the bog in a pass.

Harrowing

In the course of drying, the milled peat is turned a number of times to avail of the drying conditions. This is achieved with a machine called a harrow. The milled peat is harrowed until its moisture content is down to approximately 40-50%, which can take up to two to three days, weather depending.

Ridging

The dry peat is then scraped into long ridges running down the centre of each field. This is done with a ridger, a machine consisting of a series of blades in the shape of a v that opens the full width of the field.

Harvesting

During harvesting every eleventh field is used to stockpile the peat, with this field receiving the milled peat from the five fields either side.

The milled peat is then transported via the existing network of peatland railways to one of the following locations.

- Power station (EPL)
- Horticultural Factory.

1.3 Environmental Policy



Bord na Mona Energy Limited is a commercial semi-state body with responsibility to develop Ireland's peat resources in the national interest.

Bord na Mona Energy Limited is committed to gather and make available information on all aspects of its environmental impact and to help improve understanding among the public generally of its role and the importance of Irish peatlands.

Bord na Mona Energy Limited recognises the importance of peatland conservation.

Bord na Mona Energy Limited will leave behind all areas it owns as either an economically or socially integrated resource of a high environmental value.

Bord na Mona Energy Limited seeks to conduct all aspects of its business in an environmentally sensitive value.

Bord na Mona Energy Limited will establish an environmental management system specifically addressing the following impacts.

- Discharges to water.
- Emissions to atmosphere.
- Waste disposal.
- Use of natural resources.
- Noise, vibration, odour, dust and visual effects.
- Natural environment and eco-system.

The environmental management system will be monitored, maintained and continually improved.

A system of regular environmental audits will be put in place.

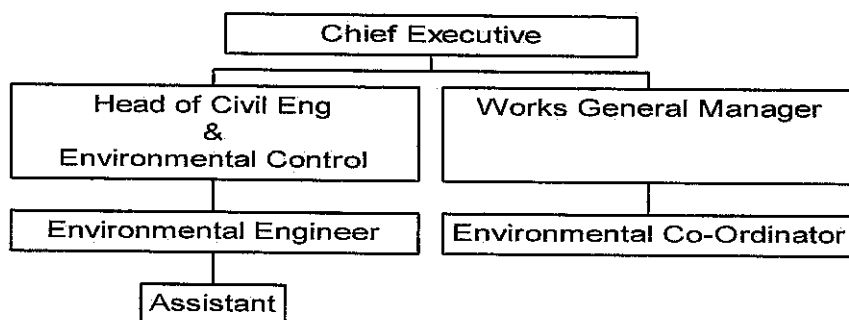
Bord na Mona Energy Limited will continue research and development into all aspects of its environmental impact.

This statement is published and is available at all locations within the division and its contents are brought to the attention of all employees.

1.4 Environmental Management of the Company

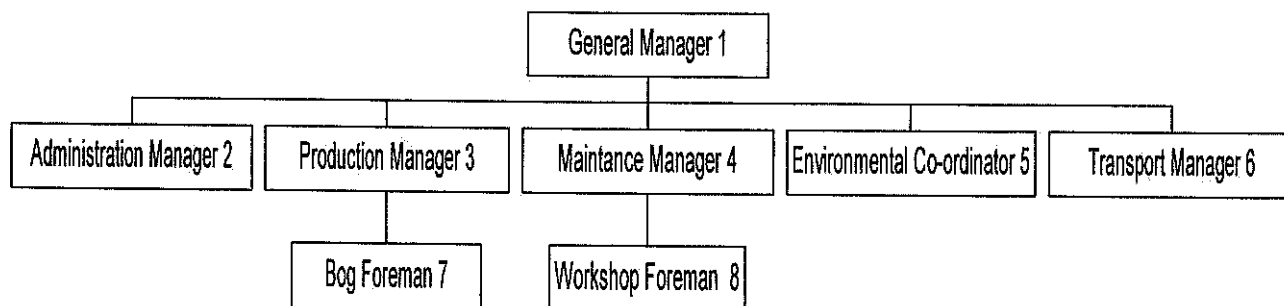
The organisational structure within Bord na Mona and the Derrygreenagh Group is presented in the flow charts below.

Environmental Responsibilities



Derrygreenagh Group

Environmental Responsibilities



- (1) Overall environmental responsibilities
- (2) Records of complaints and registers
- (3) All production related issues
- (4) Machine maintenance
- (5) Co-ordinating environmental affairs
- (6) All peat transportation matters
- (7) Silt pond maintenance, tea centres, codes of practice
- (8) Fuel loading, oil traps, weekly workshop inspections.

2 Summary Information

2.1 Emissions to Water Summary

2.1.1 Silt Pond Emissions

The following tables contain a summary of the emissions to surface waters from within the Derrygreenagh Group.

Silt Pond No: DH 1		SW No. 1			
Reporting Period (Jan-Dec 2001)		Dec/Jan/Feb/Mar	April/May/June	July/Aug/Sept	Oct/Nov/Dec
Parameter	Emission (mg/l)	Emission (mg/l)	Emission (mg/l)	Emission (mg/l)	Emission Limit Value (mg/l)
pH units	7.6	7.7	6.8	7.5	~
Flow (L/sec)	36.2	3.1	24	1.3	~
Suspended Solids (mg/l)	32	<5	21	<5	35mg/l
Total Solids (mg/l)	280	250	116	276	~
Total Phosphorus (mg/l)	<0.05	<0.05	<0.05	<0.05	~
Ammonia (mg/l)	1.2	1.5	1.5	2.7	~
Colour (Pt Co units)	188	100	273	200	~
COD (mg/l)	32	38	113	74	~

Silt Pond No: DM 6
Reporting Period
(Jan-Dec 2001)

SW No. 6

Parameter	Dec/Jan/Feb/Mar Emission (mg/l)	April/May/June Emission (mg/l)	July/Aug/Sept Emission (mg/l)	Oct/Nov/Dec Emission (mg/l)	Emission Limit Value (mg/l)
pH units	7.8	8.2	7.3	7.8	~
Flow (L/sec)	359.5	61.7	96.1	38.9	~
Suspended Solids (mg/l)	42	6	15	<5	35mg/l
Total Solids (mg/l)	452	412	240	204	~
Total Phosphorus (mg/l)	<0.05	<0.05	<0.05	<0.05	~
Ammonia (mg/l)	0.6	0.2	3.3	0.6	~
Colour (Pt Co units)	96	54	168	62	~
COD (mg/l)	23	20	75	44	~

Silt Pond No: TR 19
Reporting Period
(Jan-Dec 2001)

SW No. 14

Parameter	Dec/Jan/Feb/Mar Emission (mg/l)	April/May/June Emission (mg/l)	July/Aug/Sept Emission (mg/l)	Oct/Nov/Dec Emission (mg/l)	Emission Limit Value (mg/l)
pH units	7.3	7.3	5.7	7	~
Flow (L/sec)	34.2	1.2	84	23.8	~
Suspended Solids (mg/l)	51	8	15	<5	35mg/l
Total Solids (mg/l)	196	96	84	24	~
Total Phosphorus (mg/l)	<0.05	<0.05	<0.05	<0.05	~
Ammonia (mg/l)	1.2	1.9	1.2	1.6	~
Colour (Pt Co units)	282	266	226	259	~
COD (mg/l)	72	54	97	73	~

Silt Pond No: BN 36**SW No. 30****Reporting Period
(Jan-Dec 2001)**

Parameter	Dec/Jan/Feb/Mar Emission (mg/l)	April/May/June Emission (mg/l)	July/Aug/Sept Emission (mg/l)	Oct/Nov/Dec Emission (mg/l)	Emission Limit Value (mg/l)
pH units	7.1	7.6	5.9	7.2	~
Flow (L/sec)	95.4	NA	24.5	15.5	~
Suspended Solids (mg/l)	31	6	20	<5	35mg/l
Total Solids (mg/l)	88	296	112	158	~
Total Phosphorus (mg/l)	<0.05	<0.05	<0.05	<0.05	~
Ammonia (mg/l)	<0.2	2	0.6	1.0	~
Colour (Pt Co units)	140	123	233	206	~
COD (mg/l)	28	46	106	58	~

Silt Pond No: CN 39**SW No. 32****Reporting Period
(Jan-Dec 2001)**

Parameter	Dec/Jan/Feb/Mar Emission (mg/l)	April/May/June Emission (mg/l)	July/Aug/Sept Emission (mg/l)	Oct/Nov/Dec Emission (mg/l)	Emission Limit Value (mg/l)
pH units	5.7	7.8	6.5	7.3	~
Flow (L/sec)	110.3	1.2	58.9	42.6	~
Suspended Solids (mg/l)	8	8	10	<5	35mg/l
Total Solids (mg/l)	86	270	144	204	~
Total Phosphorus (mg/l)	<0.05	0.08	<0.05	<0.05	~
Ammonia (mg/l)	<0.2	0.3	0.6	0.5	~
Colour (Pt Co units)	262	288	318	287	~
COD (mg/l)	46	103	104	88	~

Silt Pond No: KD 50		SW No. 43			
Reporting Period (Jan-Dec 2001)		Dec/Jan/Feb/Mar	April/May/June	July/Aug/Sept	Oct/Nov/Dec
Parameter	Emission (mg/l)	Emission (mg/l)	Emission (mg/l)	Emission (mg/l)	Emission Limit Value (mg/l)
pH units	7	7.4	5.3	7.2	~
Flow (L/sec)	141	2.8	181	18.9	~
Suspended Solids (mg/l)	31	10	52	<5	35mg/l
Total Solids (mg/l)	158	96	124	196	~
Total Phosphorus (mg/l)	<0.05	0.1	<0.05	0.09	~
Ammonia (mg/l)	1	2	1.9	2.4	~
Colour (Pt Co units)	268	306	146	307	~
COD (mg/l)	86	84	185	110	~

2.1.2 Surface Water Discharge Monitoring Location Programme Review

The surface water discharge monitoring location programme remains the same as was submitted and accepted by the Agency in June 2000.

Pipes have been fitted at each location in order to accommodate flow metres and the provision of safe access is also ongoing.

Emission point signs have been designed and are in place.

Additional work has also being carried out at these locations as part of the ongoing silt pond upgrade programme.

Monitoring will be carried out at these same locations in the forthcoming year and reported on in next years AER.

2.1.3 Yard Run-off

The table below is a summary of the emissions to surface waters from yards and workshops within the Derrygreenagh Group. This summary is the average of the results submitted, covering the period Jan – Dec 2001.

It should be noted that the amount of emission points at Derrygreenagh have been reduced from 2 to 1 as a result of work carried out to rationalise surface water emission points.

Jan - Dec 2001		
Derrygreenagh :SWE-1		
Parameter	Average Emission (mg/l)	Emission Limit Value (ELV) (mg/l)
COD	32	~

2.1.4 Composite Sampler Programme

Attached in Appendix 1 are the results of the monitoring carried out using the composite sampler.

Sampling began on May 9th 2001 and has been continuous ever since.

In the attached Appendix, the results for each day of sampling are shown.

The days where there are no results can be attributed to, battery failure, pump tubing failure or no flow at the location.

A graph showing flow rates for the period is also contained in the Appendix.

2.1.5 Bunding Programme

New bunds were constructed at Derrygreenagh and Kinnegad.

Incorporated into this work was a fill area, which will satisfy condition 9.1.7 of the Derrygreenagh Licence. The bund size will satisfy condition 9.1.4.

A bund integrity test was carried out during the year and the results of this were submitted to the agency on 29th Nov in a letter Ref (DG501/Bund 001)

At present plans are in place to bund the oil store at Derrygreenagh.

2.2 Emissions to Air

2.2.1 Dust Monitoring Locations Programme

The tables below contain the dust emissions for each dust monitoring location within the Derrygreenagh Group. Monitoring took place on three separate occasions during the periods, June – July, July – August, August – September 2001.

June - July

Emission Point	Parameter	Emission (mg/m ² /day)	Emission Limit Value
DM 01	Dust	59	(350mg/m ² /Day)
DM 02	Dust	160	(350mg/m ² /Day)
DM 03	Dust	202	(350mg/m ² /Day)

July - Aug

Emission Point	Parameter	Emission (mg/m ² /day)	Emission Limit Value
DM 01	Dust	77	(350mg/m ² /Day)
DM 02	Dust	83	(350mg/m ² /Day)
DM 03	Dust	101	(350mg/m ² /Day)

Aug - Sep

Emission Point	Parameter	Emission (mg/m ² /day)	Emission Limit Value
DM 01	Dust	30	(350mg/m ² /Day)
DM 02	Dust	184	(350mg/m ² /Day)
DM 03	Dust	77	(350mg/m ² /Day)

Note: DM 01 = Toar Bog. DM 02 = Derryhinch Bog. DM 03 = Ballivor Bog.

2.2.2 Boiler Combustion Efficiency

Boiler Details

Twin Danstoker solid fuel units each rated at 725KW, fuelled by loose briquettes. Operating from Oct-Mar approximately at Derrygreenagh Works.

A boiler efficiency test was carried out on the 01/11/01. The results of this test showed the boiler to be operating at an efficiency level of 84.2%.

A full breakdown of the test is retained on file at the Derrygreenagh office.

2.3Waste Arisings**2.3.1 Hazardous Waste**

Derrygreenagh being a central location, is used as a collection point for all hazardous wastes emanating from all the areas in both the Allen and Derrygreenagh Groups. All waste oils, filters, spent batteries, etc are collected centrally at Derrygreenagh before being removed by a licenced waste contractor such as Atlas Waste Oil, Hammond Lane, Returnabatt, etc.

A system is in place where by every area has its own waste oil and filter barrel.

These barrels are painted yellow to distinguish them from ordinary barrels and are clearly marked waste filters or waste oil.

When the barrels are getting near full, the area team leader informs our Derrygreenagh stores and a truck is dispatched to collect the full barrels and replace them with empties. Any spent batteries will also be collected if the need arises.

The following table is a record of all the hazardous wastes handled by the Derrygreenagh Group from January - December 2001.

WASTE DESCRIPTION	EWG CODE	TONNES	NAME OF CONTRACTOR	DESTINATION	DATE	REJECTED CONSIGNMENTS
Empty Oil Drums	150104	88NR	Wallace Recycling	Mullingar	05/04/01	NA
Waste Oil	130202	6800L	Atlas Waste Oil	Portlaoise	17/04/01	NA
Empty Grease Drums	150104	356 kg	Shannon Environmental	Shannon	06/06/01	NA
Empty Oil Drums	150104	47NR	Wallace Recycling	Mullingar	12/06/01	NA
Waste Oil	130202	4150L	Atlas Waste Oil	Portlaoise	20/06/01	NA
Nickel Cadmium Batteries	160602	33kg	Returnbatt LTD	Kildare Town	19/07/01	NA
Nickel Cadmium Batteries	160602	173kg	Returnbatt LTD	Kildare Town	19/07/01	NA
Lead Acid Batteries	160601	160Nr	Returnbatt LTD	Kildare Town	19/07/01	NA
Waste Oil	130202	1200L	Atlas Waste Oil	Portlaoise	30/07/01	NA
Skip of Oil Filters	130601	2500kg *	Atlas Waste Oil	Portlaoise	13/11/01	NA
Asbestos Panels	170105	9	Willich Insulations	Fermoy Co Cork	15/11/01	NA
Empty Oil Drums	150104	18NR	Wallace Recycling	Mullingar	11/12/01	NA
Empty Oil Drums	150104	18NR	Wallace Recycling	Mullingar	14/12/01	NA
Empty Oil Drums	150104	10NR	Wallace Recycling	Mullingar	18/12/01	NA

Note: * Approximate weight.

2.3.2 Non-Hazardous Waste

The non-hazardous waste produced by the Derrygreenagh Group consists mainly of silt pond cleanings, mixed municipal waste and scrap metal. Midland Refuse and have a contract to collect the waste from the various tea centres across the region by way of a wheelie bin system. Rentabin Tullamore (Alina Waste) were used for skip hire although this has recently changed to a new contractor with a Local Authority Waste Permit.

In calculating the amounts of waste sent off site via wheelie bins a figure of 40kg, 110kg and 180kg was used for bin sizes 240 litre, 660 litre and 1100 litre respectively.

Silt pond cleanings are anhydrous (2% solid matter) and their weight is calculated accordingly (tonnes dry weight).

The whole waste system is at the moment being reviewed within the Derrygreenagh Group, with the option of recycling being examined to reduce the amount of waste going to landfill.

Of the total amount of non-hazardous waste produced by the Allen group, 71.5% came from silt pond cleanings, 26.5% came from scrap metal and 2 % was the result of municipal waste. Of this municipal waste 79% came from the workshops and the remaining 21% came from the tea centres.

The following table lists the quantities of the wastes generated from January-December 2001 from all of the Derrygreenagh Group.

Waste Type	Quantity (Tonnes)
Silt Pond Waste	272
Scrap Metal	100.57
Mixed Municipal Waste	8.3
Total	380.87

2.4 Energy and Water Consumption

The table below is a summary of the energy consumption for the Derrygreenagh Group, from the dates January – Decemder 2001.

Water is not included, as it is not used as part of the production process. It is only used in offices, canteens and workshops on a domestic scale.

Bord na Mona Group : Derrygreenagh

IPC Licence No.: 501

Energy Consumption Summary

Fuel	Volume M ³	Tonnes	MW/Hours
Jan - Dec 2001			
Diesel	1172	972	11469
Petrol	1.311	0.989	11.84
Electricity	NA	NA	433
Peat Briquettes	NA	297	1485
Total MW/Hours			13398

2.5 Environmental Incidents, Complaints & Non-Compliances

There was one incident within the Derrygreenagh Group, which occurred in July 2001. This incident was very minor and the Agency was not informed.

Environmental Incidents	Number of Incidents
Incidents	1
Incidents requiring corrective action	1
Categories of Incident	
Odour	
Noise	
Water	
Air	1
Procedural	
Miscellaneous	

There were no complaints within the Derrygreenagh Group, in the period January - December 2001.

Environmental Complaints	Number of complaints
Complaints received	0
Complaints requiring corrective action	
Categories of complaint	
Odour	
Noise	
Water	
Air	
Procedural	
Miscellaneous	

There was two non-compliances within the Derrygreenagh Group, in the period January - December 2001.

Environmental Non-Compliance	Number of Non-Compliance
Issued by EPA	1
As a result of monitoring	1
Categories of Non-Compliance	
Odour	
Noise	
Water	1
Air	
Procedural	1
Miscellaneous	

2.6 De-Silting Report

Summary Data Table of Ponds De-Silted From Jan-December 2001

Bog	No Silt Ponds	Cleaned Once	Cleaned Twice	Cleaned >Three Times	Notes
Ballivor	10		7		
Carranstown	5	2	1		
Bracklin West	6		6		
Lisclogher	7	1			*
Kinnegad	8			8	
D/Arkin	2				**
D/Hinch	4	4			
Drumman	6	6			
Ballybeg	6	6			
Toar	6	6			

*: Bog still under development, no production.

**: Bog cut out, no production at this Bog.

% Ponds Cleaned Jan-Dec 2001

% Ponds Not Cleaned	% Ponds Cleaned Once	% Ponds Cleaned Twice	% Ponds Cleaned Thrice
22	41.6	23.3	13.1

Special long reach machines are primarily used in the cleaning of the ponds, although more conventional machines that have been working on the silt pond up-grade programme are also being used to clean ponds. However during the reporting period maintenance problems occurred with regard to the longreach machines, due to the fact of their age, parts were difficult to come by and as a result, servicing of these machines took longer than usual and this in turn led to the cleaning frequency being affected.

A new improved fortnightly inspection and cleaning roster is currently being developed.

2.7 Silt pond Up-Grade Programme

The work so far has included the construction of new ponds, the enlargement of ponds where necessary, the installation of controlled inlet and outlet pipes, and the construction of pond by-passes, to accommodate cleaning and flood conditions. Further to this, operatives cleaning ponds have been instructed to deepen the ponds if possible in order to increase the volume.

Progress so far has included programme one, and the majority of stage one of programme two.

Stage two of programme two is also ongoing. It is difficult to say exactly how long it will take to fully complete.

2.8 Bog Development and Operational Programme

The bogs in the Derrygreenagh Group are well into their productive lives, therefore there will be no development in the year 2002.

However in the Ballivor Group, Carranstown bog is currently under development, with approximately 120 acres to be developed.

It is proposed to develop initially part of this total for the 2003 production season, with no production planned at the site for 2002.

Due to the pre-mature closure of Rhode Power Station there will be no production on Drumman, Derryhinch and Toar bogs in the forthcoming production season (Summer 2002)

3.0 Management of the Activity

3.1 Environmental Management Programme Report

Project	Description	Status
Project 1 & Project 2	(1) The reduction of fugitive dust emissions. (2) The minimisation of suspended solids movement to surface waters. (3) The examination of production machine modification. (4) The results of dust monitoring.	1&3: Training complete, Codes of practice in place. 2: See appendix 2. 4: See appendix 2
Project 3	Rationalisation of surface water discharge points.	D/Hinch Bog – Under consideration Toar Bog – Not feasible Ballybeg Bog – Not feasible
Project 4	Investigation of reed bed systems for final polish of silt pond discharges.	Study complete See appendix: 3
Project 5	The separation of flood water and external runoff from production runoff.	Ballybeg Bog – Not feasible Drumman Bog – Not feasible Toar Bog – Not Feasible
Project 6	The effective spill/leak management of mobile fueling units by implementing a programme of training and adopting Codes of Practice.	1: Survey complete. 2: Procedures in place. 3: Training complete 4: ERP in place.
Project 7	Programme of bunding at all bulk diesel storage facilities	Bunding complete.
Project 8	Investigation into the reuse of silt pond waste	Study about to begin See appendix: 4
Project 9	Study into the collection storage and reuse of polyethelene covering	Project in progress See appendix: 5
Project 10	Examination of the use of reusable materials in the protection of stockpiles	Study in progress See appendix: 6
Project 11	Examination of wind power technology for pumped drainage.	Study ongoing See appendix: 7

3.2 Environmental Expenditure

The table below lists the environmental costs incurred by the Derrygreenagh Group between May-December 2000.

In calculating the environmental costs 70% of the total costs were attributed to Licence 503 and 30% to Licence 501. The Ballivor Group costs were then added to the Derrygreenagh totals.

Expenditure Related to the Operation of the Derrygreenagh IPC Licence During the Period January – December 2001	
Description	Cost (€)
Capital Costs	42,690
Plant @ €40/hour	215,300
Labour	53,820
Materials	7,514
Overheads (ESB, Phones, Consumables)	5,800
Laboratory Analysis	10,000
EPA Fees	7,403
Total	€ 342,527

3.3 Bog Rehabilitation Report

Management guidelines for the planning and implementation of cutaway bog rehabilitation have been adopted and the document is currently available for inspection on file at the Derrygreenagh office.

4.0 Summary

With regard to environmental compliance at the Derrygreenagh Group of Bogs, there were no exceedences in the quarterly grab sampling of the ponds in the Surface Water Discharge Monitoring Location Programme.

There was one non-compliance in relation to the Composite Sampler during the operation period May to the end of December. Dust monitoring results at the dust sensitive locations were also below the Emission Limit Value and there were no complaints of an environmental nature received during the reporting period.

The staff awareness through training and involvement in the operation of the licence has also improved immensely. A full programme of training and awareness has been conducted at the works and has targeted all personnel ie. office, workshop, transport and production.

Bord na Mona are participating on the three Rivers project, (Boyne, Liffey and Suir) water quality, monitoring and management.

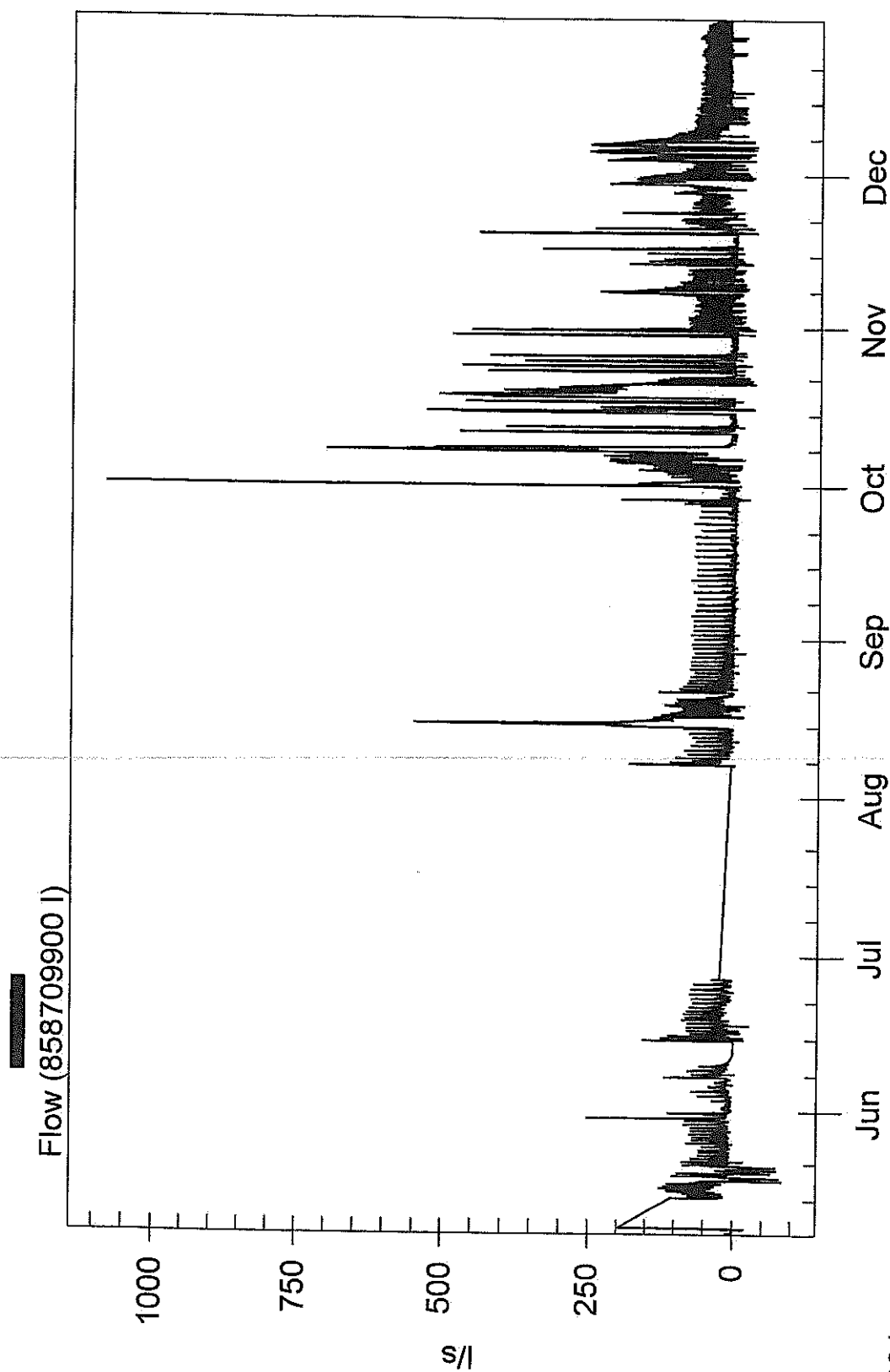
Bord na Mona are also involved in catchment management on the River Barrow.

Bord na Mona Energy Ltd would like to take this opportunity to advise the Environmental Protection Agency of its continued commitment to improving its environmental performance by adopting cleaner production methods and improving its environmental protection measures.

APPENDIX 1

Derrygreenagh Flow Rates

From May 8/091 to Dec.31/01



Bord Na Mona Energy Ltd, Derrygreenagh Group, Rochforbsbridge, Mullingar Co Westmeath.

Composite Sampler Results

Month	pH	COD mg/l	Ammonia as N mg/l	Parameters			Colour	Flow	COD Kg/Day	Ammonia as Kg/Day	Daily Totals		Suspended	Total
May 2001				Phosphoru mg/l	Solids mg/l	Total Solids mg/l	Pt Co units	Daily Total (litres)			Phosphorus Kg/Day	Solids Kg/Day		Solids Kg/Day
1														
2														
3														
4														
5														
6														
7														
8														
9								329370						
10								7623477						
11								9338112						
12								9338112						
13								9338112						
14								9338112						
15					21	410		9338112				196.10	3828.63	
16					27	410		3561203				96.15	1460.09	
17					22	364		5859278				128.90	2132.78	
18					5	326		5763613				28.82	1878.94	
19					26	102		114849				2.99	11.71	
20								1306812						
21	8.2	68	1.2	0.05	34	480		-1431617	-97.35	-1.72	-0.07	-48.67	-687.18	
22						464		928125				62.18	430.65	
23						486	94	2301294				230.13	1118.43	
24								1618716						
25						498		1870496				108.49	931.51	
26					29	492		1755410				50.91	863.66	
27					29	416		2257230				65.46	939.01	
28	8.4	64	1	0.05	25	474		1909902	122.23	1.91	0.10	47.75	905.29	
29					6	214		2268529				13.61	485.47	
30						582	75	2115511				188.28	1231.23	
31					28	490		3517178				98.48	1723.42	

A minus figure usually means the pond was flooded or backflowing

Bord Na Mona Energy Ltd, Derrygreenagh Group, Rochforbsbridge, Mullingar Co Westmeath.

Composite Sampler Results

Month	pH	COD mg/l	Ammonia as N mg/l	Parameters			Total Solids mg/l	Colour Pt Co units	Flow Daily Total (litres)	COD Kg/Day	Ammonia as Kg/Day	Daily Totals	
				Total Phosphorus mg/l	Suspended Solids mg/l	Total Solids mg/l						Total Phosphorus Kg/Day	Suspended Solids Kg/Day
June 2001													
1					22	514			1799015				39.58
2					25	490			839568				20.99
3					8	532			786146				6.29
4	8.3	58	1	0.05	6	568		73	1386033	80.39	1.39	0.07	8.32
5					26	500			1969142				51.20
6					30	456			1732472				51.97
7					22	460			1405486				30.92
8					5	454			2890984				14.45
9					9	472			2759718				24.84
10					12	460			2085601				25.03
11	7.8	54	0.8	0.05	6	488		86	805046	43.47	0.64	0.04	4.83
12						456			275237				17.06
13									137605				
14						524			77808				4.20
15					11	248			2738742				30.13
16					10	362			3003235				30.03
17					6	330			2400243				14.40
18	8.1	57	1.4	0.05	6	224		82	2857967	162.90	4.00	0.14	17.15
19					5	468			2967938				14.84
20					12	396			2956563				35.48
21					10	438			2904737				29.05
22					13	440			2348008				30.52
23					11	444			1873888				20.61
24					10	468			1968810				19.69
25	8.4	65	1.1	0.05	12	436		86	1924502	125.09	2.12	0.10	23.09
26						470			1616276				84.05
27					36	462			812967				29.27
28						428			607081				32.18
29									607081				
30									607081				

A minus figure usually means the pond was flooded or backflowing

Bord Na Mona Energy Ltd, Derrygreenagh Group, Rochforbsbridge, Mullingar Co Westmeath.

Composite Sampler Results

August 2001	pH	COD mg/l	Ammonia as N mg/l	Total Phosphorus mg/l	Suspended Solids mg/l	Total Solids mg/l	Colour Pt Co units	Flow Daily Total (litres)	COD Kg/Day	Ammonia as Kg/Day	Total Phosphorus Kg/Day	Suspended Solids Kg/Day	Total Solids Kg/Day
1								607081					
2								607081					
3								607081					
4								607081					
5								607081					
6	7.6	56	1.1	0.07	9	440	111	607081	34.00	0.67	0.04	5.46	267.12
7					8	410		545490				4.36	223.65
8					5	386		6193691				30.97	2390.76
9					6	412		3322533				19.94	1368.88
10					6	434		1964966				11.79	852.80
11					5	450		2156978				10.78	970.64
12					5	448		1961030				9.81	878.54
13	8.2	59	2.7	0.25	7	418	90	1926921	113.69	5.20	0.48	13.49	805.45
14					5	438		1609170				8.05	704.82
15					10	222		7908786				79.09	1755.75
16					7	274		22809900				159.67	6249.91
17					5	342		8392378				41.96	2870.19
18					5	398		3756532				18.78	1495.10
19					5	370		2988439				14.94	1105.72
20	8	67	2	0.05	5	386	170	4268899	286.02	8.54	0.21	21.34	1647.80
21					5	434		1950336				9.75	846.45
22					5	438		2910411				14.55	1274.76
23					5	460		2319306				11.60	1066.88
24					5	604		2552861				12.76	1541.93
25					13	456		1561298				20.30	711.95
26					5	508		2236700				11.18	1136.24
27	8.3	58	1.6	0.05	6	516	106	1662949	96.45	2.66	0.08	9.98	858.08
28					8	400		1335402				10.68	534.16
29					7	436		1407372				9.85	613.61
30					10	404		1794764				17.95	725.08
31					8	396		1498757				11.99	593.51

A minus figure usually means the pond was flooded or backflowing

Bord Na Mona Energy Ltd, Derrygreenagh Group, Rochforbdsbridge, Mullingar Co Westmeath.

Composite Sampler Results

September 2001	pH	COD mg/l	Ammonia as N mg/l	Total Phosphoru mg/l	Suspended Solids mg/l	Total Solids mg/l	Colour Pt Co units	Flow Daily Total (litres)	COD Kg/Day	Ammonia as Kg/Day	Total Phosphorus Kg/Day	Suspended Solids Kg/Day	Total Solids Kg/Day
1					5	444		1157500				5.79	513.93
2					7	422		1260885				8.83	532.09
3	8.2	51	1.2	IS	5	440	82	1134871	57.88	1.36		5.67	499.34
4					24	398		1194251				28.66	475.31
5					5	424		1221137				6.11	517.76
6					14	428		1053025				14.74	450.69
7					10	452		919176				9.19	415.47
8					NA			955316					
9					NA			716214					
10	7.7	40	1.1	0.05	5	464	78	854328	34.17	0.94	0.04	4.27	396.41
11					18	442		489119				8.80	216.19
12					15	470		941862				14.13	442.68
13					13	484		1063738				13.83	514.85
14					7	476		1243499				8.70	591.91
15					12	460		955662				11.47	439.60
16	8.1	46	1.4	0.05	9	464	64	614803	28.28	0.86	0.03	5.53	285.27
17					NA			502364					
18					NA			411005					
19					NA			729170					
20					NA			592217					
21					NA			666123					
22					NA			191026					
23					NA			1011456					
24	8	39	1.7	0.05	5	468	74	593855	23.16	1.01	0.03	2.97	277.92
25					NA			546132					
26					NA			363024					
27					8	434		315784				2.53	137.05
28					NA	484		2298250				96.53	1112.35
29					NA			1256877					
30					33	306		539601				17.81	165.12

A minus figure usually means the pond was flooded or backflowing

Bord Na Mona Energy Ltd, Derrygreenagh Group, Rochfordsbridge, Mullingar Co Westmeath.

Composite Sampler Results

November 2001	pH	COD mg/l	Ammonia as N mg/l	Total Phosphorus mg/l	Suspended Solids mg/l	Total Solids mg/l	Colour Pt Co units	Flow Daily Total (litres)	COD Kg/Day	Ammonia as Kg/Day	Total Phosphorus Kg/Day	Suspended Solids Kg/Day	Total Solids Kg/Day
1					5	390		8659302				43.30	3377.13
2					6	412		4020629				24.12	1656.50
3					5	422		4059637				20.30	1713.17
4					5	458		3408766				17.04	1561.21
5	8.2	52	2.1	0.05	7	404	114	3003877	156.20	6.31	0.15	21.03	1213.57
6					5	402		3484998				17.42	1400.97
7					5	254		3201347				16.01	813.14
8					5	310		10883490				54.42	3373.88
9					8	326		6926824				55.41	2258.14
10					5	272		5306752				26.53	1443.44
11					5	84		4297295				21.49	360.97
12	8.2	65	1.9	0.05	8	128	160	4604395	299.29	8.75	0.23	36.84	589.36
13					7	346		1667897				11.68	577.09
14					7	404		4267856				29.87	1724.21
15					20	416		2393259				47.87	995.60
16					8	356		1431889				11.46	509.75
17					NA	NA		4396882					
18					NA	NA		249570					
19	7.9	60	2.2	0.05	12	358	130	311510	18.69	0.69	0.02	3.74	111.52
20					5	416		5573800				27.87	2318.70
21					5	452		3983426				19.92	1800.51
22					6	352		4615916				27.70	1624.80
23					5	358		1820315				9.10	651.67
24					5	420		5242528				26.21	2201.86
25	8.1	68	1.9	0.05	5	346	195	4895712	332.91	9.30	0.24	24.48	1693.92
26					5	414		4816267				24.08	1993.93
27					5	358		4406860				22.03	1577.66
28					5	348		6044126				30.22	2103.36
29					6	226		7701463				46.21	1740.53
30					5	258		12893480				64.47	3326.52

A minus figure usually means the pond was flooded or backflowing

APPENDIX 2

Environmental Management Programme Report

Project 1.

Condition 5.4 of the Derrygreenagh licence calls for an emission limit of 350mg/m²/day in accordance with the Batneec guidelines, with regard to dust emissions from milled peat production bogs. Condition 2.2.2 (iv) of the Environmental Management Programme calls for the reduction of fugitive dust emissions during loading and transfer operations on the bog and during unloading operations at the tippler and works yard areas. Also Condition (v) calls for the provision of measures to protect dust sensitive areas.

Project Summary:

The Environmental code of Practice for Bord na Mona Works which is included in Attachment no.10 of the Attachments Folder, under the Derrygreenagh application documents, cover the control of fugitive dust emissions.

1. Training for operatives at the various production cycles will be carried out to cover all locations and the existing dust sensitive locations in the Derrygreenagh group (Toar, Ballivor & Derryhinch). This will also incorporate a system of Cleaner Production Methods training, so as to implement the Codes of Practice in relation to dust and increase the awareness of Bord na Mona's production personnel to fugitive dust emissions and waste minimisation.
2. The programme will also include examining production machines, regarding process modifications and improved process control with the objective of increasing production efficiency, while reducing emissions. This will be carried out, with technical assistance from the Research & Development dept.
3. Procedures will be prepared so as to ensure compliance with condition 5.5 of the licence, in relation to dust control.
4. The results from the monitoring of the dust sensitive locations in accordance with condition 5.3 of the licence, will also be examined and used in improving process control

Project Report:

(3) With regard to examining production machines, in relation to process modifications and improved process control, it is proposed to examine three elements of the peat harvester in relation to dust control. Once a production field has been milled, harrowed, ridged it is ready for lifting on the belt of a peat harvester and deposited into a central stockpile for storage or sale. During this process, dust can be generated at various points on the harvester, ie the belt transfer points, the potato chain elevator and while discharging onto the stockpile.

It is proposed to assess these dust sensitive points on the machine by investigating methods of covering or dust proofing these locations on the lift of the harvester and on the jib. Trials on the suitability and benefits of this dust suppression system will be assessed in Monettia bog, in the Boora group of bogs. Here its performance and environmental benefits will be assessed along side existing harvesters and a report will be submitted on its feasibility in the Annual Environmental Report 2003.

It is proposed to start the pilot project by March 31st.

(4) There were no non-compliances or complaints in relation to dust during the production year past. This would indicate that the training given to operatives and the codes of practice adopted were a success. See dust monitoring results section 2.2.1 in the body of the report.

Environmental Management Programme Report

Project 2.

Schedule 1 (i) of the Derrygreenagh licence calls for an emission limit of 35mg/litre in accordance with the Batneec guidelines, with regard to silt emissions from milled peat production bogs. Condition 2.2.2 (i) of the Environmental Management Programme calls for the minimisation of suspended solids movement to surface water systems via peatland surface water drainage channels during development and operation of boglands, to be addressed.

Project Summary:

1. The program will look at improving process control and will involve a programme of cleaner production methods being implemented in the various stages of the production cycle, as waste minimisation measures.
2. A large part of the programme will involve training for management and operatives involved at the various stages of a production cycle i.e. milling, harrowing, ridging, harvesting, loading, ditching etc.
3. Procedures will be prepared, which will highlight the best practice in milled peat production. These procedures will be used to implement the Codes of Practice in peat production and will assist in waste minimisation.
4. Process modification will also be examined with the assistance of the Research & Development Dept, which may improve the efficiency of the production machines, reducing the amount of milled peat lost as silt.

Project Report:

With regard to process modifications, to reduce peat loss on the bog, inspections will be carried out during the next production season, to see what improvements can be effected to reduce losses and leakages of peat from Millers, Harrows, Ridgers & Harvestors. These machines will be tested at Monnetia in the Boora Group and will involve looking at belt seals, hydraulic harrows, ridger blades, offset millers etc.

These modifications will be examined along side existing machines to quantify any benefits that may be achieved. A report on this project will be submitted as part of the 2002 AER.

Environmental Management Programme Report

Project 4.

Condition 2.2.2 (iii) calls for the Investigation of reed-bed systems for final polish of silt pond discharges to be addressed. Condition 9.1.7.

Project Summary:

This project will be a desk-based study to examine the different types of reed-beds in use and the different types of wastewater's that are suitable for final polishing.

1. An Engineer will be appointed to examine and research existing systems that may be in use, and assess their suitability, advantaged/disadvantages etc to the Bord na Mona situation. He/She will liaise with 3rd level Institutions who may be carrying out research into reed-bed systems and their applications for final polishing of wastewater.
2. If the above research shows that demonstrating the effectiveness or not of the system, warrants a pilot area to be selected and a reed-bed constructed, then a test area will be selected
3. If the research shows that the system is not suitable for final polishing of silt pond discharges, the rationale for this will be included in the AER.

Project Report:

The potential for using reedbed systems for the final polishing of silt pond discharges.

The installation of reedbed treatment systems for the final polishing of silt pond waste is not, in most respects, a feasible option for Bord na Mona. The results collected from composite samplers at two sites (Allen and Blackwater) and also from grab samples at these sites (see report on silt pond efficiency) indicate that BOD, suspended solids, phosphorus and ammonia values are below environmental quality standards given by the EPA. The Lough Ree, Lough Derg study found similar results except that ammonia levels emanating from the worked bog were high. This meant that ammonia levels in the little Cloghan River were elevated downstream of the operational site. If reedbeds could be proven to significantly reduce ammonia from silt pond discharges their installation would be justified, however for the greater part, discharges from worked bogs into catchments satisfy environmental quality standards and literature shows that ammonia removal efficiency is unreliable and unpredictable (Jing *et. al.*, 2001, Steer *et. al.*, 2002, Luederitz *et. al.*, 2001). TMER results (Luederitz *et. al.*, 2001) would indicate that reedbed treatment systems would not be a desirable option for the final polishing of silt pond waste. Practical problems would also arise in terms of site accessibility and the difficulty of working with peat.

Silt removal efficiency trial of Bord na Mona settlement ponds.

The results of efficiency tests from this study indicate that the Barnaran and Creggan ponds were not very efficient but as explained, water entering the ponds in most cases had low suspended solid concentrations. As the amount of silt entering the pond increased, the representative efficiency of the ponds was revealed. Despite this, the requirements of the license were still fulfilled in terms of concentrations of suspended solids in the outflow from the pond.

The results achieved in this test are not typical as previous tests by Hannon and Coffey (1980) and Harkins (1991) have shown silt ponds to be highly efficient at removing peat silt. This is due to the fact that the majority of the silt is retained on the bog in the old sod trenches in the case of Barnaran, while Creggan bog is pumped drainage with the silt being retained in the pump sump. It is proposed to sample another pond, which is a more representative example of a gravity drained system, in the coming year. Operational practices and improved maintenance of the ponds would also ensure greater silt removal efficiency.

APPENDIX 4

Environmental Management Programme Report

Project 8.

Condition 2.2.2 (vii) of the EMP calls for an investigation into the reuse of silt pond waste.

Project Summary:

The difficulty with reusing peat silt is the contamination of the peat by subsoil, because of the location of the silt ponds. This results in high ash content.

1. The project will select 1 to 2 ponds in the Bord na Mona Energy Ltd group, with a view to examining the possibilities of silt containment in intermediate settlement ponds.
2. Examine the methods used for extracting the silt and the physical make-up of the silt once it has been mechanically taken from the silt pond with regard to contamination.
3. Methods for incorporating the silt back into the stockpiles will be examined for feasibility, effectiveness etc.
4. Alternative uses for the silt will also be explored, either for further use within Bord na Mona Energy Ltd, or for public use.

Two suitable ponds will be introduced to the project on a phased basis, to conduct trials. The results from the first pond will determine whether a second test site worth exploring.

Project Report:

Suitable locations for examining the possibility of reusing silt pond waste will be selected prior to the 2002 production season and monitored in the second half of the year.

APPENDIX 5

Environmental Management Programme Report

Project 9.

Condition 2.2.2 (viii) of the EMP calls for the collection, storage, and reuse of polythene covering to be explored.

Project Summary:

1. The project will initially be in the form of desk based study, to examine the methods available for the removal, collection and the storage of the stockpile covering.
2. It will also cover research into the development of a Bord na Mona specific machine/method for the effectiveness and economical removal of the covering
3. Polythene reuse will be examined in relation to reuse in Bord na Mona Energy Ltd, other divisions in Bord na Mona Ltd, or other industry.

The collection and reuse of the material will also be examined in conjunction with the licensed waste contractor, engaged to recycle the used polythene covering. The company is actively pursuing these objectives with Shabra Plastics and is also exploring other outlets for the waste polythene.

Project Report:

Trials were carried out by a private company (Banner Re-cycling) on the baling of used polythene for removal to a recycling depot. The loose polythene is brought to the nearest hard stand on site and is baled into approx. 400 kg square bales. It is then in a suitable form for transportation for recycling. The company will soon have a dedicated machine for Bord Na Mona use.

Baling took place at Boora and Coolnamona and this will be extended to all Works.

Bord Na Mona have an agreement with Shabra Plastics Ltd. (Monaghan) to re-cycle this polythene and during the year 2001, 185 Tonnes was delivered to them. Shabra use this high grade material to manufacture a raw material in bead form for use in other industries.

We are at present in discussions with two companies regarding re-cycling our used polythene into Bio-Bead for use by Bord Na Mona Environmental Ltd in its products.

APPENDIX 6

Environmental Management Programme Report

Project 10.

Condition 2.2.2 (ix) of the EMP calls for an examination of the use of reusable material for stockpile protection.

Project Summary:

1. This project will be initially in the form of a desk-based study, to examine the various materials on the market, which may suit stockpile protection.
2. It will re-examine previous Bord na Mona research into alternative stockpile protection measures and assess any advances in technology.
It will take into account, the methods of application, life of the product, methods of removal, recyclability, and economics etc and its suitability to Bord na Mona's requirements

This will be reported, on a quarterly basis, to the Head of Civil Engineering & Environmental Control and the results of the research documented.

Project Report:

Currently Bord na Mona use 350 gauge, 89 micron, low density black polythene for stockpile protection for a variety of reasons.

1. Weight per roll of polythene, is suitable for transport on the bog, where low bearing pressures are important.
2. It is also suitable for handling and covering of the stockpile on the bog and when removing during peat sales.
3. The polythene is also suitable for baling for recycling (see project 9).

Bord na Mona have also commissioned a study on biodegradable polymers used in the manufacture of film. The objectives of the study are to compare biodegradable films to polyethylene film for use as peat protective cover. The comparison will be based on product performance, end of life, degradation processes, product shelf life and cost.

The report will detail the current state of the art in commercially available biodegradable polymers. Polymer converters manufacturing biodegradable film will also be detailed. The comparison of biodegradable polymers to polyethylene will also be reported with particular emphasis on the performance requirements of Bord na Mona

The project, which is being carried out by the Polymer Development Centre, in The Athlone Business & Technology Park, has commenced since 11/02/02, and a report is due by 11/03/02

Environmental Management Programme Report

Project 11.

Condition 2.2.2 (x) of the EMP calls for the examination of wind power technology for pumped drainage.

Project Summary:

- 1 It will also involve examining previous research carried out by Bord na Mona and assessing changes in technology.
The project will initially be in the form of desk based study, to examine the technology availability, the pumping requirements of the various licensed activities, wind regimes, and the suitability of bogs for the installation of wind powered pumps.

Project Report:

Previous studies into utilising wind power technology for pumped drainage in Bord na Mona have show it to be unfeasible, for a number of reasons.

1. In order for a wind powered pump to operate when required ie. after periods of rainfall, wind is required. As rainfall is not always accompanied with high winds, a separate electrical pump would be required , therefore installation costs would be higher as both systems would be required on site. The requirement for a reliable and responsive pumping system is very important when operating in a production bog as it provides for the drainage of the catchment in situations where gravity drainage is no longer possible. The drainage is important in order to maintain the production fields for production operations and for the protection of existing stock on the bog.
2. Typical Bord na Mona pumping capacity is approx 2.47 l/sec/hectare. Wind pumping capacity of one wind pump investigated was found to be 20,000 to 40,000 litres depending on water head, which converts to 0.46l/sec, which is less than one fifth of the Bord na Mona requirements.
3. Wind regimes on BNM bogs at low heights are not suitable for wind power due to low wind speeds and obstacles on the bog surface and surrounding land such a forestry plantations which create "wind shade".
4. Due to the lack of wind data availability for the majority of Ireland, a wind test mast would have to be installed at each site to assess the potential wind regime. This would have to remain on site for 12mths to establish reliable wind speed data. These test masts would also require planning permission.
5. All wind turbines, regardless of hub height require planning permission from the local authority, and may require some environmental monitoring, or even an EIS.

However, regardless of the above, Bord na Mona is advances advances in technology regarding wind energy, and will continue to monitor and examine any possible uses in pumped drainage.