S. 37

File With _____

SECTION 131 FORM

Appeal NO:_PL 16.207212. **Defer Re O/H** ☐

TO:SEO

Having considered the contents of the submission ~~dated~~/ received 05/10/04 from Michael O'Seghin and Others I recommend that section 131 of the Planning and Development Act, 2000 be/not be invoked at this stage for the following reason(s):. No new issues.

E.O.: Kieran Somers **Date:** 05/10/04

To EO: _____

Section 131 not to be invoked at this stage. ☑

~~Section 131 to be invoked – allow 2/4 weeks for reply.~~ ☐

S.E.O.: M. Dunlea **Date:** 6/10/04

S.A.O: _____ **Date:** _____

M _____

Please prepare BP _____ **- Section 131 notice enclosing a copy of the attached submission to:** _____

Allow 2/4weeks – BP_____

EO: _____ **Date:** _____

AA: _____ **Date:** _____

CORRESPONDENCE FORM

Appeal No: PL 16.207212.

M r Fagan.

Please treat correspondence received on 05/10/04. **as follows:**

1. **Update database with new agent for Applicant/Appellant** _____

2. **Acknowledge with BP** 23.

3. Keep copy of Board's Letter ☐

Response to section. 131.

1. **RETURN TO SENDER with BP** _____

2 Keep Envelope: ☐

3. Keep Copy of Board's letter ☐

Amendments/Comments

4. Attach to file

(a) R/S ☐ (d) Screening ☐

(b) Mapping ☐ (e) Inspectorate ☐

(c) Processing ☐

RETURN TO EO ☑

Plans Date Stamped ☐

Date Stamped Filled in ☐

EO: Kieran Somers

Date: 05/10/04.

AA: James Fagan

Date: 6/10/04

To:- **An Bord Pleanála.**

Your ref.:- **PL 16.207212**

P.A.Reg.Ref.:- **P03/3343**

Contents

1. Observations on the further information submitted to An Bord Pleanála by TPA on behalf of Shell E & P Ireland Ltd. in response to the requests by An Bord. (22 pages)

2. Typescript of interview on MWRadio with Dr. M. Flanagan EPA, Castlebar, Co. Mayo.

3. C.D. of interview with Dr. Flanagan.

4. "Introduction to Indices" submitted by the Applicant to Mayo County Council in June 2001, to modify/comlement Ballinaboy Bridge Terminal EIS, Appendix J1 of April 2001.

Health Warning.

(Given the emphasis in the further information on the experience gleaned by AGEC at Derrybrien, it behoves us to look carefully at the "Document Approval Form", preceding the "Final Report on Derrybrien Windfarm Post-landslide Site Appraisal" prepared by AGEC for ESBI: File Reference Number 378_099.)

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Your. Ref.: PL 16.207212
P.A.Reg.Ref: P03/3343

Observations on further information supplied to An Bord Pleanála on behalf of Shell E & P Ireland Ltd., dated August 31st, 2004, re development of a Gas refinery/terminal at Ballinaboy and a waste peat dump/deposition site at Srahmore, both in the Barony of Erris.

Observations by:- **Micheál Ó Seighin and others.**
Contact:- **Micheál Ó Seighin, Ceathrú Thaidhg, Béal an Átha, Co. Mhaigh Eo.**
Contact E-mail:- **moseighin@eircom.net**
Contact Phone:- **097/88961**

Observations on further information dated August 31st 2004

(page nos. refer to TPA submission documents.)

p.2

1.2 General Commentary:- We notice that the applicant is more comfortable with quiet back-room negotiations, and in that misinterprets the purpose and methodology of An Bord Pleanála. We do not believe that such private negotiations between developer and for example Mayo County Council serves the public good.

We do not question the collective engineering skill of ARUP and AGEC in normal civil engineering terms, but we would point out that this project is exceptional in every way, and presents a reality that has never been faced before. We do object to the claim that "*ARUP investigated the causes of the Derrybrien landslide on behalf of a group of residents*" which implies an involvement that did not exist. Suffice it to say that after the single visit by Mr. Byrne and Mr. Mason representing ARUP the community members they claim to have represented decided their interests were better served by more obviously objective representation. To use such a visit dishonestly as a reference case for the advantage and benefit of another of their clients, who really is one, is to admit the paucity of their real expertise in this matter. It further illustrates how advocacy and not scientific objectivity is the motivating force of such involvement in this sorry saga.

p.4

Item 1."*The risk assessment in Appendix 3A of Section 3 of Vol. 1..*"

Not alone must "*minimising and controlling geotechnical risks*" "*specifically address the geotechnical requirements of the proposed development*" it must also take cognisance of the site, the situation, the climate, extreme weather events and the tendency towards wetter weather and more extreme weather events. While it is true that "*The site investigation undertaken on the Ballinaboy site has been extensive*" one is moved to ask "How come after all this extensive investigation over four years (excavators working on site since April 2000) not intended by the developer as the initial applications clearly show, there are still large questions unanswered and uncertainties abound?.

"*The purpose of the design (is) to reduce these risks to an acceptable level.*" is rather tongue in cheek. The purpose of the design now being presented is to try to get a failed concept through the planning process: the sentence itself is unfinished, as it does not specify to whom the risks apply and what "acceptable" implies in reality for them; as for example local residents, residents near the upstream pipeline, Carrowmore Lake and Erris regional water system, users of the public road.

p.5 Is the applicant saying that the "*early design phase*" was last October when the Glengad and Derrybrien events took place? 'Tis amazing how fast some people can work! (As a matter of interest there was no event in Pollathomas: there was in Glengad and Gort a' Chairn.)

The risk register does show all the signs of a "brain storm" - debris everywhere and nothing prioritised, so that if this doesn't work, that surely will. (I still don't know how you re-stiffen stabilised peat that has refused to stiffen.) The only possibility excluded is blasting on the site, and Mayo County Council have covered this for the Applicant.

Actual risk numbers are "*indicative*" only. Very good. This means if they turn out to be wrong then you allowed for that by saying they are only indicative. What about a statistical margin of error, backed up by the required formulae and inputs? But this is not risk analysis: this "further information" request was not intended to be a press release to a tabloid. The information requested is not given.

"*An acceptable level was considered to be one which was as low as reasonably practicable i.e a risk* ***that could not be reduced further without additional resources*** *which would be considered extraordinary and disproportionate to the credible consequences of a hazard.*" (our emphasis)

This effectively states that the applicant is working on the basis of BATNEEC (best available techniques without entailing excessive costs) and not BAT (best available technology). The Protection of the Environment Act 2003 (PEA) has replaced the IPC system with the European IPPC (Directive 96/61/EU). With this replacement, the basis for licensing changes from BATNEEC, permitted under the 1992 EPA Act, to BAT: BAT now forms the technical basis for the IPPC. The intention of the developer to ignore Irish and European law in this instances nullifies this application for planning permission, the more so by its' blatant admission of intentionality. Taking the quotation at its literal value I do not know of any extra resources imaginable that would be "disproportionate" to damage inflicted on health, livelihoods and potable water in any area. "*Additional resources*" must be taken in the context of a market for gas now priced by the $50+ spot market price per barrel, in contrast with $10 when this project was announced as commercial: it was "commercial" at $10: what superlative should one use for $50+?

The paragraph beginning "*in addition to* " describes an engineering and not a planning blueprint. While "make it up as you go along" is a perfectly reasonable rule of thumb for normal middle-of-the-road conventional engineering projects it is not acceptable for unprecedented large-scale projects of huge damage potential: especially when, as in this case, safe alternatives are available. Likewise the Clayton Manual, highly respected guidebook for the construction industry, enclosed does not even once mention peat, shallow or deep, illustrating further how exceptional this crazy proposal is and how

irrelevant peat is to the list of funders of the publication - from AMEC to ARUP to Bovis to Brown and Root(Halliburton), headliners all of the international construction industry, who are not slow in demanding value for their shillings - and rightly so.

p.6

The risk of hazards occurring together is not answered. Comment on possible failure of settlement ponds does not address the potential rainfall:-

1. "*The general pattern for future precipitation changes is for wetter winters and wetter summers in Northern Europe*"

"*Four out of five of the wettest years experienced at Malin Head have occurred in the 1990s.*"

"*Recent years have seen some of the most intense events with 1998 being the wettest year in the synoptic records for the whole country.*"

"*Variations in precipitation can be caused by a change in the frequency of precipitation events,* ***changes in the intensity of precipitation per event*** *or a combination of both.*"(our emphasis).

"*The greatest daily rainfall at any of the synoptic stations was at Valentia on 1 November 1980 when 116mm was recorded.*"

"*Studies in other countries on rainfall intensities have found that countries which experience a significant increase or decrease in monthly and seasonal precipitation have found this change to be related directly to a change in the same sign in heavy and extreme events,*"

"*Such changes in rainfall climatology, should they be accompanied by changes in extreme events, may have widespread implications, especially for flood hazard and water resource managers, planners and engineers.*"

(Climate change in Ireland: recent trends in temperature and precipitation...*Laura McElwain and John Sweeney, Dept. of Geography, NUI Maynooth.)*

2. "*I wouldn't like to label individual events as the result of climate change, because they have always occurred. What is changing is the probability of such events occurring. They are likely to continue to be more evident in the future.*" (Professor John Sweeney, Maynooth., Sunday Times 28/09/03.)

3. "*It is clear that an amount of rainfall of the order of 80mm fell on the slopes of Dooncarton and Barrnachuille Mountains in a period of two hours.*"

"*not less than 80mm of rainfall*"

"*Met Éireann conclude that 'In the vicinity of Pollathomas rainfall amounts of 82mm would be expected to occur only once every 100 years* ***in a 24 hour period***'" (our emphasis).

(Report on Landslides at Dooncarton,Glengad, Barrnachuille and Pollathomais, Co. Mayo, on Sept. 19th 2003....*Tobin Consulting Engineers.)*

(The national school at Inver where the only on-ground measurements were taken was outside the main area affected by the downpour, so the reading of 89.3mm in 24 hours must be taken to be logarithmically less than the actual precipitation on Dún Chiortáin and Gort a Chalra itself.)

p.7 The dependence on settlement ponds, a la Bord na Móna to solve every water based problem that arises or is brought to the notice of the developers forms a mantra of optimism. We wish to refer to our earlier submissions regarding the historical and ongoing failure of this technology to do the job it is employed to do. Settlement ponds a la Bord na Móna don't work when needed, i.e. in fairly extreme conditions.

In the "*Introduction to Appendices*" submitted by the Applicant as part of the April 2001 EIS and dated (stamped) 05/06/2001, (Source 1 enclosed) it is stated that 10cm/sec is the maximum flow that should be allowed in silt ponds so as to avoid re-suspension of silt particles, and that this figure is agreed by Bord na Móna and accorded with Finnish practice. We cannot find how this limit is proposed to be achieved during extreme rainfall conditions such as we have experienced in this area, and keeping in mind that the silt ponds proposed are the only defence of Carrowmore Lake from potential run-off damage.

p.8 "*The slope on the Ballinaboy bridge site is benign (2 degrees)*" We refer to article in Scéal na Móna, the Bord na Móna in-house magazine for March of this year, which we included in our appeal to An Bord Pleanála : "*obviously the Tullywood incident is totally different to those at Pollathomas and Derrybrien, since no incline is involved.*" Also to the AGEC report on Derrybrien which reports 10.5.3 "*Slope angles between 2 and 4 degrees, with a mean value of about 3.2 degrees*", in the context of the comment by BMA Geoservices Ltd. in their report to Galway County Council on the Derrybrien incident "*our analysis indicates that the slope was stable prior to construction activity.*"

The effort to equate Ballinaboy with Glengad and Derrybrien is self defeating. "*historically bog-slides have often been caused by man - by loading crest of slope or excavating at toe*" This is the conclusion AGEC came to vis a vis Derrybrien: is this the only experience this engineering team, AGEC and ARUP have of peat, and then after the event?: of course it is for no more is available. It is worth noting that AGEC seems to have taken and transmitted to others an interpretation of the Derrybrien event that is not entirely born out by the facts reported by them. In *Appendix A, Geotechnical Mapping Sheets* from *Derrybrien Windfarm: Final Report on Landslide* by AGEC, not all of the sheets support the opinion expressed by AGEC that the weight of the arisings was <u>entirely</u> responsible for the landslides. Not all of the mapping sheets provide sufficient information to make a judgement, but some that do present an inconsistent picture: -

Site Reference T4	Arisings to the West	Tension cracks or Failure to the East.
T12	South	North and East
T37	East and South	East and West
T45	East and West	South-West.
T49	none	North

The majority of the Mapping Sheets do not provide the required information to enable any conclusion to be extracted of blame to the arisings or not: some of them do support the proposition. Even a simple walkover suggests considerable complexity.
Further to the danger of extrapolating from Derrybrien in the absence of proven generic parameters is the Report to Galway County Council by BMA Geoservices Ltd., Carlow, of whose report the Executive Summary by Galway County Council says "*The main conclusion is broadly in line with that of AGEC in their analysis of the probable cause of the landslides*" - AGEC represented ESBI. BMA state that their analysis methods are based on Bishop (1955) and Janbu (1957) neither of whose studies refers to peat. They work to the same stated BS 6031 1981 as AGEC. We cannot find any published report by ARUP on the Derrybrien event, but a letter does exist.

Of course AGEC and ARUP are confident that all aspects of the project have been dealt with appropriately. They were equally confident with the first application (October 2000) which was subsequently not proceeded with; and with the ponding arrangements of April 2001; and with the waste water outlet plus its load to be discharged in the middle of Broadhaven Bay; and that the road from Bangor (L1204) was not suitable for heavy traffic; and with the release of surface water from the terminal works to the Ballinaboy river and Carrowmore Lake through a perforated drain; and with scattering the liquid peat among the trees. Of course: this is advocacy. This is why we have since December 2000 asked for a Government funded independent EIS to replace advocacy with scientific and commercial method.
p.8
2.2 Item 2: **Peat Stabilisation,**
An Bord asked for field tests to verify in this case the possibility that peat stabilisation with cement and other elements can work, recognising the pre-eminence of the Farrell/Habib report in this matter. The Applicant did not come up with field tests.
2.2.1 We notice that the minimalist approach advanced by Minister Fahy (the establishment is the terminal footprint, not even the site) is taken one step further by the applicant. Now "*all the peat within the terminal footprint will be removed*" so the other buildings and car parks that will be built over stabilised peat are to be ignored. I do not know whether the Bord intended this minimalisation.
p.9
2.2.2. We are not in a position to say "*the factor of safety against failures during construction is often superior to alternative methods*" without it being illustrated as fact not opinion: does it also mean "the factor of safety is also often inferior to alternative methods"? It means nothing. Verbosity.
"*a number of these other methods have been retained as contingencies*" this is ridiculous and makes a mockery of the planning process. It means effectively doing a Robert Bruce on the proposal, but changing the spider every time.
p.10
2.2.3 Sheet Piles V Peat Stabilisation:- "*Peat stabilisation is proven technology for both temporary and permanent, and is used on projects in England, Scandinavia, Japan, America, Canada*

and the Netherlands." So is wallpaper paste proven technology but not for laminating stressed beams. This kind of comment without detail is wasting time: what about scale, site, situation, use, history post application etc.? There is a problem with sheet piles in bog:- In a fax - marked Urgent - from David Puller of WS Atkins to Lawrence Bayard of Kvaerner, EIS April 2001, Appendix J1, under Appendix D4, W.S.Atkins - Site Drainage and Settlement Pond Design :- "*There is a further reason why the extraction of the sheet piles may be necessary (or at least advisable) and that is the potential damming effect of such a long barrier could have to groundwater flow.*" The corollary of this is that downstream of the piles, the peat, no longer fed from above, can drain away, shrink and thus leave cracks parallel to the pile line, allowing access to sudden water pressures in severe rainfall events as happened at Glengad, (according to Tobin, the GSI, Professor Williams NUI Galway (Sunday Times, 28/09/03 et al), Professor John Sweeney Maynooth (author of EPA's 2003 climate change report, etc), but because of a dry summer.) The access road line serves the same purpose for Derrybrien, with arisings adding to the push.
Sheet piles also interfere with the flow lines within peat and the effect of this is again not in the text books because sensible engineers have traditional avoided deep bog sites, and so the knowledge is not available.

2.2.4 Peat Stabilisation Design Process "*Field trials have not yet been undertaken because it is considered that planning permission is required in advance of such work*" How law abiding!. Decision is taken first, and then the means to achieve the end is sought. If at first you don't succeed try something else. We wonder if it occurred to the promoter to look for planning permission for the field trials, given the 4 years of the process: we are sure that Mayo County Council would co-operate. Request not answered.

p.11
2.2.5 "solid" "in layman's terms" the stabilised peat does not become: stable. The examples referred to in response to Item 11 of the request for further information have already been dealt with by us and show in particular no distinction between peat and soft soil. Other deficiencies are equally pointed out.

2.2.6 Comparison of Habib and Farrell with Ballinaboy tests: We fail to see the point of this section in the context of the request by the Bord. We don't know what is meant by "peat types". We note the recognition of the weakness of peat the deeper one goes. We fail to see the field trials requested. The tests done are a repeat of the Farrell and Habit tests but done in a hurry which tend to show that Farrell and Habib are on to something - they are. The Farrell and Habib study is the first step in a tight scientific study of the viability of this approach: this repeat does not advance on that - neither does it hinder. Unlike Farrell and Habib we are not told the storage and transport condition of the samples or the times elapsing or air pressures control if transport was by plane, when homogenising occured, etc. "*No interaction was observed between the hydrated cementation products and the organic matter*" does not surprise anyone, except that n o heating was observed, which is a major surprise.

It is necessary to point out again the conclusions of the EuroSoilStab study being discussed - *Some Experiences on the stabilisation of Irish peats* by Habib and Farrell:-

1. "*Most of the data available on soft soil stabilisation projects relate to the stabilisation of soft clays with small amounts of organic matter.*"

2, "*Even if successfully treated the stabilised peat is a new material that has not been investigated previously, thus little is known about the mechanisms involved in its stabilisation*"

3. "*Furthermore, the main assumptions currently used in the design of the deep soil stabilisation systems such as the equal strain theory .. were initially developed for lime-stabilised soft clays, and their validity for organic soils, peat in particular, is still not known and remains to be verified.*"

4. "*it seems that, for the cement-stabilised peat, creep could be associated with a structural breakdown.*"

5. "*the soil is still undergoing chemical changes between 28 and 90 days curing time.*"

6. "*for the stabilised column the strength varied along the column and was significantly lower than expected near the base.*"

7. "*Some lumps of unstabilised peat were observed at the base of the stabilised column and this could account for the low shear strength measured.*"

8. "*the stiffness of the stabilised column is very non-linear and dependent on the confining stress.*"

9. "*The experience gained from the six field tests performed within the EuroSoilStab project showed that the strength achieved in the field for stabilised columns in organic soils was much lower than that achieved in the laboratory.*"(Design Guide:Soft Soil Stabilisation.)

10. "*Trial field tests are recommended to obtain appropriate values for the design undrained shear strength as well as for estimating the strength reduction factor between the field and the laboratory.*"

The difficulty of avoiding "*lumps of unstabilised peat*" when mixing and homogenising such an enormous area/depth/volume of peat (7 above) is unsurmountable - one cannot treat such a material mass with a hand mixer - with implications for shear-strength. How is mixing/homogenising to be affected in operational conditions, if even in the laboratory and dealing with very small samples it is proving so very difficult? The project here being proposed, while dependent on unproven dynamics has enormous implications if the technology fails. This is a risk too far.

In the field, this proposed site is a small part of an organic whole which the implementation of the proposal would affect, as the amputation of a hand affects an entire mammal organism.

p.14

2.2.8 **Contingency Measures**

"*It is the professional opinion of ARUP* " etc.: We do not wish to be forced to again and again point out that this mantra of "*professional opinion*" draws attention to the flexibility of the holding of this opinion. All previous applications had the similar imprimatur of the same and other experts - peat to be a mushy soup if you moved it: no it will be solid; road to Ballinaboy (L1204) not suitable yes it is

suitable: perforated drains suitable no not suitable: waste outlets discharging with heavy metal load into Broadhaven Bay no outside Broadhaven Bay: the currents in Broadhaven Bay will wash out the waste no the currents are actually washing in: no need to remove extra mercury yes we must remove mercury. It is ARUP et al who are advancing contradictory positions re. the same physical elements and not us. The result however is no trust whatsoever in the "professional opinion" as expressed.

If what is proposed doesn't work "*contingency measures*" will, i.e. work it out as you go along. This means that the applicant is seeking permission from the planing authority to try anything and everything and also that the actual details of the application do not count. "*It is not considered likely*" that more peat will need to be removed than is suggested but if it is what harm, bang on, boys. If the peat is not stabilised with the first shot, just re-stabilise it, i.e. re-mix "solid" peat/cement by re-mixing etc. In God's name 'tis not an A.I. event - when the cow doesn't take call in the bull-man again? The contingency measures as "*re-stabilisation of the under-performing area*" are overkill in a burst of desperation, as the futility of the discourse becomes more and more evident.

"*in the event that no other alternative is workable*" excavation and removal of more peat can be adopted - or indeed something else. Nothing is ruled out: this is not an application, 'tis a hydra, truly a brain-storm. "*These issues will be resolved by pre-works site trials*": after four years of intensive messing on the site with no solution in sight, a deus ex machina is required (in this case pre-works trials) to solve the difficulties. (" We can do it, I tell you: yes we can! Please!")

p.15

2.2.9 "*This technique is used daily worldwide*" on deep bog sites, draining on to SACs and into the potable source water for the entire area, on a site that is a central part of an organic whole, where the origin of some of the streams is unknown after 4 years of expertise? This reminds me of some of the more vulgar definitions of optimism a la Carruthers.

Do we understand properly that the piling supports of the ground beneath the car-parks and the administration buildings are to be removed after "*the early part of the construction phase*"? We note that Farrell and Habib say "*the stiffness of the stabilised soil is very non-linear and dependent on the confining stress*": when the piling is gone where is the confining stress? There is a whole new world of potential here as we noted in our appeal to An Bord.

p.16

2.2.10 **Factual info. from Site Investigation.** But there is no ***on site*** *investigation.* "*the results from the laboratory study* "(carried out by SGI) **do not** "*confirm the feasibility of stabilising the peat on the terminal site*". All that is "confirmed", in so far as it is, is that peat **from** the terminal site - or indeed any other peat - can indeed be stabilised, under laboratory conditions. Until on-site comprehensive tests are carried out and analysed independently, it is not possible to comment on the feasibility of <u>this</u> stabilisation on <u>this</u> site: and there are no generic standards.

2.3 **Environmental Effect of Peat Stabilisation.**

p.11 "A very important part of sustainability is the impact of building materials on the environment. There is no doubt about the influence of e.g. concrete on the environment especially the ground water." (Wolfgang Brameshuber *Concrete re-cycling and use of industrial by-products.)*

The main difficulty as always in dealing with this proposal is the lack of experience, knowledge and research into immediate and long-term effect of concrete on a liquid peat environment. Still less is there any knowledge accumulated on the effect of peat concrete (= stabilised peat) on the water environment and connected ecology. We know that the flow lines within the peat body are disoriented by such treatment, but have no idea in what way or to what extent. We can guess at the limits of alkaline influence, even where the flow rates are speeded up as in this case by the extensive drainage work carried out by Shell operatives since this appeal. The key note of this project is uncertainty.

p.19 2.3.2.2.**Effects on groundwater**. The reference to Holma Bog reminds one that one swallow does not make a summer (it can be significant, of course) and more importantly that the level of knowledge of bog dynamics is so low that no parameters exist to enable a generic treatment of a bog deposit: every piece of bog, every dynamic whole, must be examined in operation until sufficient knowledge is accumulated that legitimises generalisation.

Appendix 3A Geotechnical Risk Register...

The qualitative scales used are derived from Clayton: as we have pointed out Clayton never once mentions peat and so credibility of derivatives from his fine work as indicative for Probability, Impact or Risk is not very high. "*tolerable level*" does not easily translate to deep bog from mineral soils. Neither the experience nor the knowledge exists to justify the risks of his peat based project

One is reminded of Restoration Verse:-

A little learning is a dangerous thing
Drink deep or taste not the Pierian spring,
Its' shallow draughts intoxicate the brain,
But drinking largely sobers us again... Pope.

James II did not heed it and made way for William of Orange.

What does this scale of impact mean:- in terms of

i. short term human health;
ii. long-term human health;
iii human safety;
iv death of 1 person;
v. incapacitation of one person;
vi. death of 2 persons or 5.

What do these impact abstracts mean in the reality of this site and affected population? When the scales are put in concrete real terms off the pages of a textbook the risk reality changes. Even the textbook admits that the impact can't be changed - on say Carrowmore Lake, the base destination for the

phosphate stored on the site until disturbed/leached, put into free flow by new drainage. The one thing that is definitive is **uncertainty** and the potential for damage is very great.

All the hazards listed have two things in common, two things that in effect are actually one:-

1. Run-off and bog movement to base in Carrowmore lake;
2. Dependence on settlement ponds to solve every difficulty and absorb every hazard.

Even after 4 years there is still so much uncertainty, increasing rather than modifying with increased knowledge. History teaches that the ponds don't work in wet weather!

There is still no answer to the build up of water above the pile line and the drying away downslope, increasing instability. Uncertainty.

Why have Mayo County Council attached conditions for blasting when the applicant specifically denies that any blasting will occur?

Expanded Geotechnical Risk Register...Arup

This is a fine document based on Clayton largely, and so the construction is naturally the focus and where most analytic attention is directed. As we point out elsewhere, Clayton does not refer to peat, so much of the derivatives from Clayton are in the nature of off-the-peg purchases for non-standard size bodies = misfit. However the intensity of the work is appreciated.

The dangers highlighted are mostly to the workers and to the cost of the project, as befits a construction project, but here there is much more, and every hazard has a domino effect, leading mostly to Carrowmore Lake.

One emission is that of the most serious hazard of all, one queried by Mayo County Council and not answered then or not answered since then. That is the pipeline itself, both upstream and downstream within the site. Not alone the danger posed by the pipeline itself in deep bog, but the more severe dangers when the pipeline is operational. We do not wish to repeat what we have already in our earlier submission dealt with but we believe that unless 'tis is dealt with the rest of the verbiage on safety and hazard watching is a waste of time. The only "structure" that can exert immediate and emergency pressure on the peat is the upstream pipe with its accompanying umbilical and waste pipes, within the site and the downstream pipeline carried refined gas. The upstream pipeline is a vibrator of enormous magnitude, quite likely, almost inevitably, the trigger for sliding peat. Given the absence of reference to peat in Clayton and the paucity of experience in construction in peat available, this shyness is not surprising, but it should not be allowed to pass.

No.1 Bord na Móna has experience unparalleled in long term development of bog - 6-8 years preparation before removing a shovel-full. This is completely different to what is proposed here where there is n o time for mistakes. Secondly the settlement ponds on which all the ground measures for the safety of Carrowmore Lake depend only work in dry weather - definitely not in extreme conditions

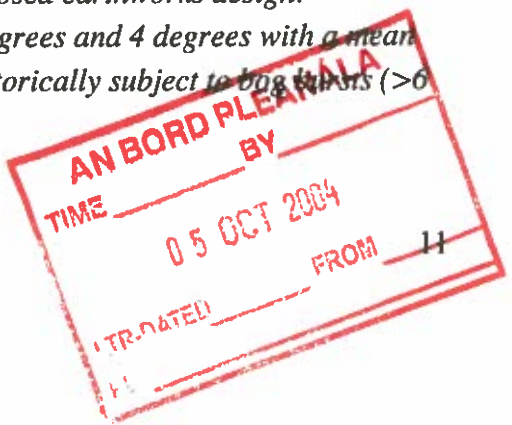
which the experts tell us are likely to become more and more common. Thirdly, milled peat, the BnaM staple, is dynamically a different material to wet peat: there is no comparison. Fourthly, windrowing is the discourse of further drying out powdered peat cut from an inch - one inch - of bog that has been drained for 6 years or more: it is not relevant to what is proposed here. The experience of BnaM in traversing soft ground is indisputable.

No2. The experiences of failure seem to indicate that failure occurs not necessarily between mineral soils and peat, but low down in the peat mass itself.

No.5. The Derrybrien failure is not as simple as "*just below the access road.*" Such simplification is dangerous. Although the Derrybrien area presents a scenario that can be repeated at Ballinaboy, and shares many features including the confidence of the designers that everything is under control, peat mechanics are uncharted territory.
"*A surcharge load of 30kPa has been used*" = proper practice but . There are serious contradictory technological positions involved here that have not been solved, which yet again illustrates the primitive state of the engineering knowledge of peat dynamics. The experts -SGI etc - all attest to the necessity of surcharging the peat to get full benefit from stabilisation: this is the laboratory finding. AGEC, however, in its Final Report on Derrybrien Post-Landslide Site Appraisal, p. 13/25 10.4 **Stability Load** Cases has this to say:- "*Following placing of load there will be a reduction in FoS(*factor of safety*) though over the long term there will be a consolidation of the underlying in situ peat.*" (We note the emphasis by the Applicant in the latest presentation on FoS as an all-embracing approach.)
We have no knowledge to guide us or Clayton on the implications, if any, of the contradiction between surcharging being necessary and surcharging lowering the short-term FoS.

No 19. WE bring to the notice of An Bord an aspect of material quantities that we have referred to previously and that has not been answered. "*Allowance has been made for the removal of the soft cohesive material that is unsuitable for treatment and use as a fill material.*" We presume that this refers to dóib and other such materials. But where is it to go? Or has another nice little arrangement been made with Mayo County Council, off the planning record, to deal with what is a substantial amount of ill-defined and undefined material. Where is it to be dumped? By what road route? Or is it exempt from planning regulations as regards waste or other?
We would like details and literature to back up "*Laboratory trial show that with a cement binder the majority of the cohesive mineral soil can be successfully treated for use as fill material.*"

No.20. "*The lessons learned from Derrybrien has informed the proposed earthworks design.*"
AGEC reporting on Derrybrien 10.5.3 :- "*Slope angles between 2 degrees and 4 degrees with a mean value of about 3.2 degrees.*" "*Slope on the site is less than those historically subject to bog bursts (>6 degrees) or bog slides (>3 degrees.)*



Does this indicate that the AGEC/ARUP combination has really learned mush from Derrybrien.
Also Tullywood Bog Reference:- "*Obviously the Tullywood incident is totally different to those at Pollathomas and Derrybrien since no incline is involved.*" (Scéal na Móna. March 2004)

"*Global stability calculations have been carried out to show that the site presently has a high degree of stability.*"
Likewise, BMA Geoervices Ltd., reporting to Galway County Council on Derrybrien event:- "*our analysis indicates that the slope was stable prior to construction activity.*"
Likewise, Saorgus Energy Ltd., in its EIS accompanying request for planning permission for Derrybrien Wind Farm:- "*No impacts of an exceptionally severe nature (e.g. contamination of an aquifer, destruction of a unique habitat) are possible through the construction and operation of this project.*" and also
Saorgus Energy in applying for an extension to the wind farm:- "*No effects of a severe nature (e.g. contamination of an aquifer destruction of a unique habitat) are possible through the construction and operation of this project.*"
Saorgus, with the best of technology and intentions and with pre-construction positive indicators, was wrong, but found out too late.

Managing Geotechnical Risk (Clayton)
No mention of peat, in spite of the wide variety of construction sponsors of this manual.
"*hazard identification is fundamentally a different process - rather than using the data to predict the likely ground conditions, the purpose is to speculate about unfavourable conditions that might be encountered, and to use experience to produce a catalogue of the risks that must be managed in order to achieve relative certainty during construction.*" (Clayton. p.35) Unfortunately the approach thus recommended by Clayton has one element absent - the experience is not available on which to be called to produce the necessary catalogue of risks, as the project is uncharted territory. Clayton does not deal with peat - this project is not in the textbooks.
"*The desk study and walk-over survey are the two essential components of ground investigation. Other parts (for example, boring, drilling and testing) may sometimes be omitted, but these parts of the site investigation process must always be carried out.*" (Clayton. p.38) This again emphasises how incomplete Clayton is, if the project is large and peat-based. The desk study and the walk over have shown very little of the dynamics of this site to the applicants even after 4 years. Further Mayo County Council engineers on two visits to the site failed to locate an artesian well recently bored and reported to them - so much for walk-over. However, it is understandable that engineers would try to package the product in the packing to which they are used.
There is nothing in Clayton that could approach the hazard of the upstream pipeline on site, trenched with an umbilical containing acids under high pressure and a power line as well as the waste outlets,

the pipeline containing untreated natural gas under pressures of from 350 Bar to an operating pressure of 150 Bar (the interconnector to Scotland is at 70 BAR). All this vibrating in deep bog: where is this hazard rationalised away?

Appendix 3A

1. Commission:- This is a repeat of Habib and Farrell research but under less stringent conditions in collection and delivery of product. It does help to verify some of Habib and Farrells conclusions, although that report is short on conclusions and long on science and keeps within the limits of justifiable deduction.

"The results from the laboratory testing and earlier experiences will finally lead to a proposal for binder type and binder quantities to be used in field trials in situ." But this is the info that An Bord has requested. The approach is first get the go-ahead: then do whatever suits as one goes along with no regulatory limitations. Not everyone accepts that an engineering company or series of companies should be given total freedom to make things up as they go along.

There is no advance on Habib and Farrell.The research by Habib and Farrell has not yet reached the stage where it could suggest that the depth of origin of the samples had a major influence on differences in stability recorded: very early days. Jumping the gun is not justified by the experience available.

2.5 No recording or comment on temperature increase because of chemical reaction? Was none observed?

2.8. *"The water content were determined on remains from the cutting of the sample"* We don't understand? How old is sample at this stage? What variations of air pressure has it gone through? etc.

Annexes

It is a pity SGI did not use its English language templates to present the readings: it would have saved a little time. Especially as SGI in conjunction with The National Deep Mixing Program in the U.S. have produced some fine translations *"having significant potential to advance U.S. understanding of key DSM processes."* (Caltrans' GeoResearch Group (GRG), April 2003, GRG Vol 1, No. 5) Of particular quality is Report 3: Stabilisation of Organic Soils by Cement and Pozzolanic Reactions - Feasibility Study.

Appendix 4

Letter from SGI

Terms of reference very limited and on our understanding not relevant to the request for further information.

"The aim .. is to give advice on choice of binder etc"

"*The methodology used in this case is laboratory testing.*" No field testing.
"*The results .. will finally lead to a proposal for binder quantity to be used in field trials.*"
"*The field trials..*" *etc.*

Appendix 5.

Potential Leaching from stabilised soil.

no author.

There is no disagreement evidently but that cement mixing has an effect on environment. The only question, given site and location, is how much? For example the huge disturbance involved in mixing and homogenising must lead to a further large increase in phosphates - how much? Immediately the dependence on settlement ponds becomes no. 1, with their record of failure; and the leaching into Carrowmore Lake, already severely compromised. The settlement ponds will solve it! The settlement ponds will solve it! The settlement ponds will solve it! toor-a la!

The importance of issues under discussion is determined by location, location, location.
i.e. site to Ballinaboy River - Carrowmore Lake - Muincheann River - Abhainn Mhór Tullaghán Bay.
- regional water supply

(All new proposed NHAs.)
There can be no absolute objection to concrete nor opposition for opposition's sake but where an unresolved issue is identified the location context kicks in (apart from SACs etc).The importance of process is central and follows location. Any one change within the environment, eg change to Ph., is a trigger and must change dynamic and so on. The site and its dynamic is not isolated: it is part of a dynamism determined by its location and the movement of surface water to newly deepened and sunk drains. Whatever is locked in the undisturbed peat then becomes available to the leaching process at Ballinaboy and Srahmore.

Observations on Further Information dated September 15th 2004

p.3
1.2 There is again an appeal for "*direct communication and interaction*" with An Bord, illustrating the set up most congenial to the applicant, a set up that has already achieved substantial changes to the transport arrangements in private consultations with the local Superintendent of Gardai and with Mayo County Council, without referral to the planning process. The unsuitability of the project for the proposed location is suggested by the need felt by the applicant, after 4 years of expertise, for further "*direct communication and interaction*". The extended oral hearing surely gave sufficient space for such communication.
p.4
2.1 We notice further statutory changes being implemented after further "*direct communication and interaction*" between the applicant and Mayo County Council: seldom has statute been so looked on as

a convenience for a commercial company. It should be strange that this invention of a one-way traffic system was not included in the application for planning permission. We are entitled to ask what further "adjustments" are planned to sideline the planning process, what further material modifications have "*been subject to detailed consultation and agreement between the applicant and ...Mayo County Council*" being aware that An Bord Pleanála is not an implementation body and that Mayo County Council is the body that is. Did we hear the word "transparency" or did it appear in the new County Development Plan? Surely not. Evidently Mayo County Council and Superintendent McNamara and the applicant take the view that by naming a road L12044 it is no longer Bóithrín a' Churaigh but becomes the property of the ciphers who never have used and never will use this facility.

p.5

2.1.2 The imposed one way system is ridiculous. Within the last three years we have witnessed a minor crash where Bóithrín a' Churaigh (L12044) meets L1204 (broken windscreen and some bumper damage, no doubt recorded by the local Superintendent of the Gardai) and a more serious one where the grotto now is, at the junction of R313 and L1204, where a heavy car coming from Belmullet crashed sideways at speed into a car coming from Bangor and turning right onto the L1204 (no doubt a record of the accident is kept by the local etc.) We, who live 16 miles from the proposed one way system, have personally witnessed these two accidents: no doubt there are many more we know nothing about. The one way system proposed will not in anyway change the flow lines operative turning right onto Bóithrín a' Churaigh (L12044), merely implement a slight parallel translation. The junction of Bóithrín a' Churaigh (L12044) and L1204 is a double blind corner: just 50 yards north from this junction towards Ballinaboy, a little boy in recent years (November 1980: he would now be 28 years old) was killed just coming off the school bus in the afternoon: it was no one's fault - just the blindness of the corner and environs. What is proposed is crazy and these pause lines are a nightmare, given one HV every minute at least for the duration.

The junction L1204/R314, i.e. Ballinaboy crossroads proposes to impose a totally unacceptable burden on the local families who have children and older people to provide for: we note that Superintendent McNamara or the engineers of the Roads' Section of Mayo County Council nor the local County Councillors or/and their families will not be affected by this crazy proposal.

It is totally unacceptable and an abdication of democratic responsibility to hand over control of the public roads to the operatives of a commercial company: **mo chlann féin do dhíol a máthar** and for nothing in return. It is lunacy to be in a position where this whole caper depends for its implementation on a stretch of bóithrín that has barely road for an ass cart.

We are at a loss to see how the junction of Bóithrín a' Churaigh (L12044) and L1204 can be made safe, even by the standards of this project, without compulsorily acquiring land - but of course that can be changed later in friendly communication with Mayo County Council.

"*encouraging the use of the L5284*" This is the scenic route a la County Development Plan. The road surface is treacherous with water filtering off the hill - Cnoc na Scollap. It is very little above the surface of the lake, even in dry weather. It is twisted as the mentality that would propose it as a working route. It is not at all suitable for HVT - even when the L1204 was declared unsuitable for

HVT, not even Mayo County Council Roads engineers were demented enough to propose this as an alternative. The junction with the R314, between the funeral parlour and the supermarket is a menace. The extra distances and difficult surfaces we will be encouraged to use in emergencies - espc. hospital - ensures that we will not take kindly to the "encouragement" of Shell or Bord na Móna wage earners at critical times. Only dire desperation would generate this chancers' charter. Apart from the danger, inconvenience and distance being imposed by this XXXXXXX there are the substantial extra costs being imposed on people who do not, unlike the Superintendent and the Road Section engineers, get travelling expenses or tax allowances for their godlike peregrinations..

"*non-construction traffic*" has it occurred to the applicant that there is a largely tax led building boom in Erris at the moment, and that there is construction traffic apart from Shell's to be considered?

It is implied that the arrangement suggested is preferred by the present incumbent of the Gardai Superintendent's office, Mr. Tony McNamara. It is relevant to ask if this is a personal arrangement or one that has written agreement from his superiors and binding on his successors?

p.9

2.1.4 "*Field trials by Bord na Móna .. show that the proposed windrowing period is sufficient*" *etc* This is not true: windrowing is a technique used in the drying of milled peat, a completely different matter. Equating windrowing with this panic generated response proposed is to equate the Mona Lisa with on-line pornography.

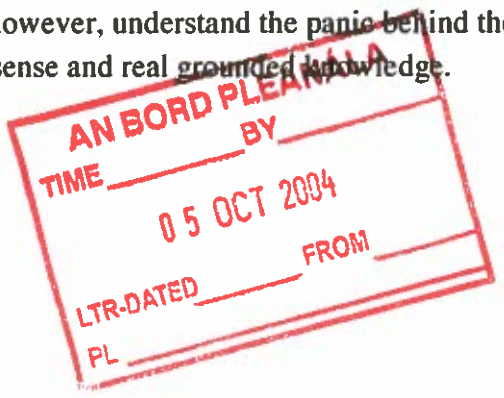
"*generous freeboard between the sides and tailgate and the payload*" The problem of nuclear fusion is solved: the mushy soup will stay away from the tailgate and sides of the containers spinning along because Daddy Tom Phillips Associates will tell it so. We are impressed.

Surely the Sweeper - this is beginning to sound like a commentary on Winnie the Pooh - must use a vehicle to travel to where he/she is required or what? The traffic directors presumably have real material modes of transport?

"*to effectively form a lay-by*" No lay-bys are to be constructed (but of course a little chat can be had with Mayo County Council if you need/want one: tell them you want a lay-by pronto, and pronto down tools and you have a lay-by. Very impressive.) So, when is a lay-by not a lay-by? I love Lego too.

p.10

2.1.6 "it is intended that all traffic would abide by the one-way system": we who have used Bóithrín a' Churaigh (L12044) for over 50 years require that the legal underpinning of this brain seizure be made conveniently available. We are the same people who avoid Bóthar an Locha (L5284) like the plague treating it on a need to use basis, because it is a very difficult and dangerous route: there will be no summonses for speeding on Bóthar an Locha. We do, however, understand the panic behind these inexplicable proposals, devoid as they are of common sense and real grounded knowledge.



p.11

2.1.8 "*co-ordinate movement of timber along the L1204*" Is the arrangement with Mr. Seamus OConnor - whoever that may be - as described, a private one, or is it a documented Coillte decision, as distinct from the little arrangements the applicant apparently favours? The difference is major - even forestry people get hit by trees!. This paragraph is just bull. It is not evident that the transport schedules of Coillte have different levels of busyness throughout the year: it is not realistic in diurnal cycles. If the arrangement with Mr. Seamus O Connor is to cancel forestry activities for the two years or so duration of the project, then say so, and publish the compensation being paid - for otherwise this is a direct subsidy by a state company to the commercial sector, as is the uncosted shenanigans of the Superintendent of the Gardaí and of Mayo County Council. It is an insult to the collective intelligence of us and of An Bord to suggest that movement of timber can be confined to "*windows of time*" when the rain falls - this is Erris, for God's sake! There are different average speeds in question: different tachograph realities: different labour contracts. This is pure and simple advocacy, divorced from any objective reality except the implication that if it does not work we'll try something else.

"*nearest pull-in point*" is this a lay-by or not a lay-by: bull. No mention or consideration of emergency traffic. By what legal roundabout are we to be "*subject*" to the dictates of the "*traffic director*", an employee and agent of a commercial company?

p.12

2.1.10 Corrections still required after 4 years.

p.13

2.2.3 Phosphate "*might be re-mobilised*" It is probable that phosphate has already been re-mobilised by the four year juggling and recent drainage activities undertaken by the applicant while the project is under appeal. For the second year running, Carrowmore Lake has bloomed from surplus phosphate, and fishing has been prohibited: the first banning was in 2001.

"*some of the areas highlighted as elevated are now outside the proposed zone of excavation*" Instead of reducing the flow of phosphate this excavation increases as it speeds up the drainage from the areas not currently being excavated. This kind of reasoning excludes the reality that this entire site is one drainage reality with its base level in Carrowmore Lake: any improvement in the drainage as by the removal of peat, speeds up the drainage flow from the entire site within the drainage basin. By restricting " *discussion in the response to Item 6*" to "*results from the outside of the footprint*" the applicant is pretending that the footprint is in some way isolated from the remainder of the site, whereas in reality any water, from footprint or no drained to the river by on-site activity is a source of nutrient overload, whether from excavated peat or no, where high levels of for example phosphates are stored. This is especially true given the drainage approach and activities already implemented by the applicant outside planning permission. The very high concentrations of phosphates being released to Carrowmore Lake and Sruth Mhada Conn must contribute to the on-going enrichment.

The acrotelm "*where most phosphorous was thought to remain*" "most" "was thought" very scientific indeed, after 4 years.

p.15

2.2.5 Is not a response to Item 7 requested. No sources are given for what is suggested: no literature: the implication is that the answer is not available, which is typical of this impossible project, where precedents are lacking.

p.16

2.2.7 This response to Item 8 is long and wet, but does not at all answer the question. Even the references supplied are misleading. We consider the request by An Bord to be very simple - 'what is the point above which phosphate concentration is considered to be environmentally unacceptable.' Unacceptable by whom may leave some uncertainty but the question itself is straightforward, even if the answer is not. The applicant did not make a distinction between "environmentally acceptable" and " environmentally unacceptable" because it is not an issue for the applicant - it is for Carrowmore Lake and for us. The comment that "*This is further clarified below in relation to phosphate levels in soil(peat) and run-off water from the site*" is deliberate deception because the clarification referred to relates to mineral soils and not peat and to agriculture not the environment affected. (Why can't the applicant get it into his skull that there is a definitive difference between mineral soils and peat?)
It is frightening that although "*there is no record of any application of fertiliser to the site during the last five growing seasons*" the Ballinaboy river is still the biggest contributor to phosphate in Carrowmore Lake (Source 2, EPA). Of course the excavation process is presenting and will continue to mobilise phosphate build up in the peat for leaching through the drainage system both on site on to Carrowmore Lake and in Srahmore, and thence to the Muincheann River and on to Tullaghan NHA.

The discussion by the applicant of farm nutrient profile is really a distraction and marginally relevant to the issue under discussion. In the first place the manual currently used by Teagasc field officers is "*Nutrients and Trace Elements Advice for Grasslands and Tillage Crops.*" ed, Brian S. Coulter. However the information is still in its basic form relatively unchanged from the manual resurrected by the Applicant. However again, the Soil PIndex given while accurate, is that which applies to mineral soils: there is a different 4 Class index for Peat, where, for example, Class 2 is 11 - 20 mg/L, and not 3.1-6 mg/L as shown. It would seem that the information accessed by the Applicant is, to say the least, incomplete or misunderstood.
The existence of 2 indices illustrate the difficulty in dealing with nutrients, phosphates in this instance. The difficulty is the conflict between the requirements of viable agriculture on peat and the sustainability of a safe environment. Agriculture on peat is almost hydroculture and phospates and other nutrients leach rapidly in the flow of water to the drainage system insited. This flow reduces the supply of nutrients available to growing plants, i.e. most fertiliser applied is wasted, not used by growing plants and must go somewhere = into the water environment. Consequently the levels required and tolerated by agriculture in peat are very high, much higher, as the 2 indices show, than for standard mineral soil agriculture, because so large a portion of the applied nutrients are wasted and does not become available for the plants. Where fertiliser has been added in accordance with the perfectly sensible - for agriculture - stipulations of the peat index, there is massive overload for the environment.

The two sectors, agriculture and environment, are at logger-heads over the high levels of nutrients recommended by the agricultural sector for peat. Efforts based on on-going research, not on ad hoc considerations, are ongoing to reach an accommodation, in the context of on the one hand changing agricultural practices, and on the other awareness of the requirements of the environment, which sustains us all. Nothing is certain except that present usage is severely damaging. In the handbook "*Soil Index System and Soil Levels for Nutrients and Trace Elements*" used commonly by practitioners, the following is on page 11:- "*pending further research to determine suitable P Index Categories for peats the agronomic uptake and responses at these levels for agriculture, it is advised:-*
(a) to apply P only in the growing season and then not in large amounts but in a number of small applications; and
(b) not to build up the soil P level on grassland above Index 2 to minimise possible losses of nutrients to the environment."

It must be noted in fairness that the over-liberal use of phosphates from the 1950s to the 1980s occurred previous to the realisation of the extent of environmental damage caused by the inevitable leaching. The conflict between the requirements of the two sectors will take long-term measures as well as hard decisions if sustainability is to be assured.

It seems likely and the evidence increasingly points in that direction, that the disturbance of the Ballinaboy site by on-going work of the applicant trying to pre-drain the site, has presented for leaching large deposits of phosphate, of whatever origin, which are showing on the hot-spot readings on site and in the high levels in the Ballinaboy River, being carried to Carrowmore Lake.
The applicant seems to propose that only phosphate over 10mg/L is available for leaching: this again is a total misreading of reality and a lack of knowledge of scientific and material processes. All the phosphate exposed for leaching is available for leaching - not just the over tens! In Carrowmore Lake the under tens don't go into one corner and the rest out to play. In actual fact the conditions now present on the site and on-going are ideal for leaching phosphate - even purgative. Excavation of one sort or another has been going on on this site, if intermittently, since Spring of 2000with consequect peat disturbance.

p.17
Water.
It is evident that the concentrations are much too high for safety. "*there is theoretically the potential for ortophosphate concentrations found on site to constitute a risk to adjacent and surrounding surface water bodies.*" The potential is not alone theoretical: it is real and evident and the position goes way beyond potential.
"*the drainage system captures all surface water*" (ALL?) no amount of verbals hides the fact that Carrowmore Lake is the base line for the drainage of this entire area. The "*extensive field monitoring*" by NWR Fisheries, and the Marine institute and the EPA (every week) has not kept the bloom from the cheeks of Carrowmore Lake up 'til now, and these are dedicated (in the statutory sense) bodies.

Enclosed on CD is an interview on MWRadio with Dr. Michael Flanagan of EPA for County Mayo and a partial typescript. Following on initial hesitancy and an obvious fear of committing himself to anything he makes the following points:-

1. The Ballinaboy River is the biggest contributor of phosphates to Carrowmore Lake.
2. The EPA etc does not know the source of the phosphates. but
3. They are coming from somewhere!
4. There is a problem

The interview illustrates the strange ambilalence even public servants can have in dealing with the powerful.

At the start of the interview, Dr Flanagan states "*We're monitoring the feeder streams* (Ballinaboy River) *on a weekly basis.*"

Then in answer to the question:-"*Is there any link to your knowledge is there any relationship between works carried out there* (i.e. on Shell site at Ballinaboy) *and phosphorous levels in the Ballinaboy River?*"

Dr. Flanagan replies "*Well, most of the phosphate levels we have measured we would have measured prior to the work commencing in the Ballinaboy area. So whatever work that has commenced in that area wouldn't yet be reflected in our results.*"

Now:-The work on the gas refinery proposed site has been on-going for four years since last April. However, even a more restrictive view, confined to the extensive drainage since planning permission was appealed, has been going on since late May - early June 2004. But the effect of such work would not yet appear in the EPA's weekly monitoring of the Ballinaboy River's entrance to Carrowmore Lake? Are we being stupid or something?

The interview illustrates that even in 1973-74 there were slightly elevated levels of phosphates in the lake: the Shell site was since the fifties being run by the Agricultural Institute as an experimental station, and had been copiously fertilised: though no one in 1973 noticed any connection.

There is no intensive farming in the catchment: and in 1998 there was a 30% reduction in sheep stocking rates which reduced both organic and non-organic inputs to the nutrient base.

EPA:- "*From the analysis so far the main culprit seems to be the Ballinaboy.*"
MWR:- "*Is there an explanation for that?*"
EPA:- "*Not at the present time. We don't have a specific explanation for it, except that there is orthophosphate getting in from some source.*"

(It should be noted that Dr. Flanagan did not "*dismiss the idea that the cause of the increase* (in phosphate levels) *is related to any recent work being carried out in the area*: this is the headline of the news editor. He gave a nonsensical answer and then said he didn't know. When he mentions that a couple of years ago the Ballinaboy River was classed as oligotrophic, he meant that the figures published by him, the EPA, for 1997 and 1999 described the water in the Ballinaboy as Class A, that is the top grade. What happened since: no new forestry: no new farming - less in fact: the terminal project began working in late spring, 2000, excavating, cutting trees to make way for pipeline.)

The Applicant makes clear that there has been no spreading of fertilisers on the site in the last five years: No planting for much longer, as Coillte was refused planning permission for planting in 1997, on foot of an objection by the Fisheries, specifying danger to watercourses.

We, Micheál Ó Seighin and Others do not believe that the answers supplied by the Applicant to the request by An Bord Pleanála for further information is adequate. Therefore on this ground and on grounds previously submitted by us and others we request that An Bord accedes to our request that planning permission for this project as submitted be refused.

Micheál Ó Seighin. Ceathrú Thaidhg.

Uinsionn mac Graith, Ceathrú Thaidhg.

Caitlín Uí Sheighin Ceathrú Thaidhg.

Uinsionn mac Graith, Ros Dumhach

Treasa Ní Ghearraigh, Ceathrú Thaidhg.

Bríd Ní Sheighin, Ceathrú Thaidhg.

Dáta: 3 /10 /2004

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Nutrients & Trace Elements Advice for Grasslands & Tillage Crops.-Brian S. Coulter, Ed.

Soil Index System & Soil Levels for Nutrients & Trace Elements.

Brameshuber: Concrete Recycling and use of industrial by-products.

Interview, Midwest Radio with Dr. Michael Flanagan, EPA.

Subject:- Phosphates and Carrowmore Lake.

Intro:-

Dr Mike Flanagan of the EPA confirmed to MWR news this afternoon that the lake is highly enriched in phosphorous, however he dismissed the idea that the cause of the increase is related to any recent work being carried out in the area.

Dr. Flanagan has been speaking to Liamy McNally:-

"The EPA have a contract with MCC,to do whatever monitoring the local authority requires and part of that monitoring includes Carrowmore Lake. At present the EPA along with the NWRFB are doing some monitoring of the lake. We're monitoring the lake on a monthly basis and the feeder streams ...on a weekly basis.

Liamy:-What have the findings been over the last few months?

Fist of all let me give you a little bit of background on Carrowmoe Lake.

The first monitoring work that was done on the lake was done in 1973-74 and that was done by An Foras Forbartha. and subsequently they published a report in 1975. The findings of that report were that the phosphates, orthophosphate and total phosphorous were relatively abundant and that the chlorophyll values, that is the values that reflect the growth of planctonic algae, were higher than would be expected for this kind of lake.

there isn't much intensive farming in the catchment area of the lake. About 20% of the catchment area is afforested. and there may be an input of phosphorous from the fertilisation of the forestry areas.

Liamy:-Looking back over the monitoring you have done over the last few months what generally have been the findings"

Generally the findings are that the Ballinaboy River and the Glenturc Beag are the biggest culprits. The Ballinaboy in particular for it accounts for the drainage of more than 28% of the catchment.

From the analysis so far the main culprit seems to be The Ballinaboy. The mean orthophosphate levels are higher than you would expect for a river in that part of the county if you like.

Liamy: - Is there an explanation for that?

Not at the present time. We don't have a specific explanation for it. except that there is orthophosphate getting in from some source. There doesn't seem to be very much intensive farming in that area. There may be a few point sources. So we're not really

pointing the finger at forestry but we suspect that at least some of this phosphorous may be coming from forestry.

Liamy:- Now some people in the place are worried about works that have been carried out around the Ballinaboy gas refinery. And I suppose link that with a recent request from An Bord Pleanála looking for more information from Shell.
Is there any link to your knowledge, is there any relationship between works carried out there and phosphorous levels in the Ballinaboy River?
Well most of the phosphate levels we have measured we would have measured prior to the work commencing in the Ballinaboy area. So whatever work that has commenced in that area wouldn't yet be reflected in our results.
The only thing we have been measuring so far is the inputs at the point where the rivers and streams enter the lake. to find out where the most likely input source of phosphorous is. It needs further investigation to identify the phosphorous further up the Ballinaboy River

Liamy: Who would carry out this further investigation?
Well 'tis the responsibility of Mayo Co. Co. but Mayo Co. Co. have lots of lakes to monitor so they cant really concentrate on, don't really have the manpower to concentrate on one lake in particular. There is some concern about Carrowmore Lake particularly from the fishing point of view and the abstraction of drinking water. of the deterioration in the water as a whole. The water in the lake now is classified as euthrophic or highly euthrophic, which means enriched, in terms of phosphorous and chlorophyll. And in the past a couple of years ago it was class as oligotrophic, which means it was un-enriched or very clean. And there are a few things that have happened in the meantime. First of all there has been an increase in phosphorous in some of the incoming streams, for reasons we don't know yet. In addition to that there was a storm in July of 1997 which contributed which contributed a huge volume of sediment enriched with nutrients into the lake at that stage This sediment can now act as a source of phosphorous in addition to the incoming phosphorous. So we have a contribution from two sources if you like.

(The above is a typescript of most of he interview with Dr. Flanagan: the entire interview is on the C.D. enclosed. The interview was held early in September 2004 - on the 10th we think.)

E.I.S. Ballinaboy Bridge Terminal April 01.

INTRODUCTION TO APPENDICES

Peat Extraction during Construction at Bellanaboy Bridge Terminal

As noted in Section 3 of the EIS and in the foregoing text relating to peat management, the performance criteria relating to silt pond operations and their capacity are based upon those quoted in the IPC license issued by the EPA for the Oweninny works at Bellacorick. The justification of those criteria are presented within this introduction. Other calculations relating to silt pond design and silt separation that follow within this technical appendix J1 are presented for information purposes only in order to show the thought processes followed and are not definitive in respect of the final proposed design.

Management of Surface Water Run-off

A cut-off drain in the form of a perimeter ditch will be constructed around the site working area and the peat deposition areas, as the first task in the construction process. This drain will collect any runoff and groundwater which escapes from the cut face of the peat excavation and from within the peat during its excavation. Silt ponds will be constructed linked into this perimeter drain in order to allow silt load in the runoff waters to settle out prior to releasing the water into the local watercourses.

Further details of the peat removal process and impacts on the water environment are presented in the main text of Appendix J1 and sections 3 and 9 of the EIS.

Settlement pond design

The settlement ponds will treat the surface run-off water from the site initially during construction and then during operation. During operation the main requirement is to deal with drainage and run off from the peat deposition areas. This water is expected to contain peat fragments and some silt. It is proposed that four pairs of ponds will be constructed to treat the run-off. One pair will be located in the south western corner of the Terminal plant site. These will deal with runoff from the Terminal. A second pair will be located on the northern edge of the NE peat deposition area to deal with runoff arising there. Two further pairs will be installed on the southern edge of the eastern peat deposition area.

As well as allowing peat and silt to settle out, the ponds have been designed to store run-off water resulting from high rainfall events thus minimising erosion damage that may result from peak channel flows. Water collected in the ponds following a high rainfall event will be released slowly and in a controlled manner.

PL1900

Inflow to the ponds and outflow from the ponds will be controlled. All ponds will be inspected on a regular basis, initially daily after first construction and once operation has stablised at least weekly, and de-silted when necessary.

Each of the settlement pond units have been designed so as to work in pairs, with the volume of input split equally between both. This allows the ponds to effectively de-silt the run-off from a 1 in 100 year storm event with a 20 per cent redundancy. The inlet to the ponds is designed in such a way that either of the ponds can be shut off for de-silting which will only be carried in minimal flow conditions. The pond being desilted will be shut off, the flow being directed to the parallel pond.

The ponds have been designed with the following performance criteria, based upon those in use at the Oweninney Works at Bellacorrick as stated in the IPC licence for that facility granted to Bord na Mona:

- they have been sized on the basis of 75m³ per nett hectare of bog that they are managing on the basis that they are only de-sludged once per year. This includes a conservative allowance for storm water storage. This sizing is also conservative given that it is intended to de-sludge the ponds at least twice a year during construction.

- The amount of silt sludge generated is estimated in Bord na Mona research at 75m³ per hectare of bog for the Bellacorrick area that a silt pond services. For Midland bogs, 48m³ per hectare is used. A minimum residence time of 6 hours has been found by Bord na Mona to be desireable for silt settlement. Storage to a depth of 2m below the invert will be provided. If a silt pond is 8m wide, a size that allows easy de-silting by long reach excavators, and has silt storage capacity of 2m below invert then, for every metre run of pond, there will be 16m³ of storage. It follows therefore that a 4.7m length of pond is required, per hectare of bog, per annum for silt storage:

  75/(8x2) = 4.7m

  If the ponds are cleaned twice a year then the requirement becomes 2.35m length per hectare of bog

- the target suspended solids concentration of the runoff water will be 35mg/l;

- the maximum target flow velocity in each pond will be 0.6cm/sec. Bord na Mona study suggests <10cm/sec;

- the maximum runoff velocity into the local water courses in an extreme event will not exceed 90 l/sec. based upon the calculated run-off volume that would be produced following a 60 minute 1 in 100 year rainfall event as defined by Met Eireann for the Belmullet weather station.

The performance criteria were derived using the following properties of peat and knowledge gained over many years of working peat by Bord na Mona:

- Peat silt particles have a low specific gravity 1.02-1.04. Because of this, accumulation and settling will only take place under quiescent conditions i.e. very low flow velocities. Bord na Mona have found that the flow rate must be kept below 15 cm/sec to avoid the re-suspension of silt particles. Independent work on silt pond design in Finland (IVO Engineering) indicates that 10 cm/sec is the maximum flow that should be allowed in a silt pond. This supports the Bord na Mona experience.

- In order to determine the quantities of silt, Bord na Mona conducted a daily sampling and analysis programme over one year. This included analysis of rainfall records and bog operations (Harkins internal Bord na Mona report). The results of this work confirmed that a second pond, situated to be able to run in parallel to the first pond (as proposed at the Bellanaboy Bridge Terminal), would allow the pond system to operate even when one was out of use during de-silting. This study, referred to as the Harkins study by Bord na Mona, showed that if properly maintained, the ponds are effective at reducing the suspended solids within the surface runoff from peatlands to less than 30 mg/l for 80% of the time and to less than 100 mg/l for 98% of the time. The main difficulty noted was the need to ensure that regular and effective de-sludging takes place.

The design of the silt ponds at the Bellanaboy site is such it provides for significant redundancy over and above that which is provided in the Bord na Mona Oweninny works at Bellacorick. In this regard, it is anticipated that total suspended solid levels at the discharge point from the Bellanaboy ponds will not exceed 35 mg/l at all times.