Appendix A

Tánaiste Ms. Mary Harney T.D.

Dail Question No. 111

And

Correspondance from Mr. Frank Fahey's Office

DAIL QUESTION

NO.111

To ask the Tánaiste and Minister for Enterprise, Trade and Employment the reason pipelines and pumping stations within establishments are excluded from the scope of SI 476/2000 which was implemented by her on 21 December 2000, in view of the potential of such pipelines and pumping stations involving dangerous substances to create major accidents as recognised under council Directive 96/82/EC which does not exclude pipelines and pumping stations within establishments; and if she will make a statement on the matter.

- Paddy McHugh.

* For WRITTEN answer on Tuesday, 1st June, 2004.

Ref No: 16618/04

REPLY

Tánaiste and Minister for Enterprise, Trade and Employment (Ms Harney)

Statutory Instrument S.I. 476 of 2000 the 'European Communities (Control of Major Accident Hazards Involving Dangerous Substances) Regulations 2000' transposed into Irish law Article 4(d) of Council Directive 96/82/EC of 9 December 1996 on the control of major-accident hazards involving dangerous substances.

Neither S.I. No. 476 of 2000 nor Directive 96/82/EC exclude pipelines and pumping stations within establishments covered by the Directive and the Regulations.

For purposes of the Directive and the S.I. an establishment is considered to be the site within the overall landholding of an undertaking where dangerous substances are present in one or more installations.

Department of Enterprise, Trade and Employment
Roinn Fiontar Trádalá agus Fostaíochta

Office of the Minister for Labour Affair

Our Ref: 040290/MLA

22 June 2004

Mr. Brian Coyle
Block 1-1st Floor
GFSC
Moneenageisha Road
Galway

Dear Mr. Coyle,

Mr. Frank Fahey, T.D. Minister for Labour Affairs has asked me to refer to your letter of 12th May 2004, which you wrote to An Tánaiste, Ms. Mary Harney T.D. and which was subsequently passed to him for reply in regard to S.I. 476 of 2000 and Council Directive 96/82/EC. Minster Fahey has responsibility for matters relating to safety, health and welfare at work. The Minister has contacted the Health and Safety Authority (HSA) in regard to your letter and has asked me to reply as follows following receipt of the advice of the Authority.

In your letter you say there is a discrepancy between SI 476 of 2000 and Directive 96/82/EC. You are correct in quoting Regulation 4(2)(v) but it needs to be read in conjunction with the other part of that Regulation i.e. 4(2)(c) which reflects the intent of the Directives. Your point is addressed by reading Regulation 4 as follows:

4. (1) Subject to paragraph (2) of this Regulation, these Regulations shall apply to .....

(2) These Regulations shall not apply to— .....

(*c*) the occurrence outside an establishment of—

(v) the transport of dangerous substances in pipelines and pumping stations.

In regard to suitability of the location for the proposed gas terminal, Mayo County Council has granted planning permission subject to conditions. The HSA provided advice to the planning authority in the context of the requirements of SI 476 of 2000. In the event that one wishes to raise objections to the grant of permission there is recourse to An Bord Pleanála which is the normal channel for a review of planning decisions.

Davitt House, Adelaide Road, Dublin 2, Ireland
Tel: 353 1 631 3221 Fax: 353 1 631 3265 www.entemp.ie
Lo-Call telephone service (if calling from outside (01) area) - 1890 220222

The HSA view that the "establishment" is the terminal footprint, is one that was discussed and agreed with EU officials and other member states and the Authority has no reason to change its view.

The authorisation for the pipeline to the terminal was administered by the Department of Communications, Marine and Natural Resources and the HSA did not have a role in that regard. The HSA exercises an advisory role in land-use planning in the context of the application of Directive 96/82/EC and, as can be seen from the first point above, cross county- pipelines are outside the scope of this Directive.

On the basis of the evidence supplied by the applicant, Hydrogen Sulphide is not anticipated in the supply to the proposed terminal. If the terminal becomes operational and if the applicant wishes to process a gas stream containing Hydrogen Sulphide, it will require new planning permission from the local authority.

I understand a letter dated 20th May 2004 has already been sent to you from the HSA about the commissioning of the HSA to examine the effects and consequences of a pipeline failure.

I trust that the above clarifies the position in regard to your queries.

Yours sincerely,

AOIBHEANN NÍ SHUILLEABHAIN
PRIVATE SECRETARY

Appendix B

Copy of Letter from Dr. Rory O'Hanlon (Ceann Comhairle)

Regarding

Safety

of the

People from the Pipeline

A Copy of a letter received

from the HSA

Identifying their stance

on the safety of the people from the pipeline

OIFIG AN CHEANN COMHAIRLE
(Office of the Chairman of Dáil Éireann)

TEACH LAIGHEAN
(Leinster House)

BAILE ÁTHA CLIATH 2
(Dublin 2)

Paddy McHugh, T.D.,
Leinster House.

Ref.: 16620/04

31 May, 2004

Dear Paddy,

I regret that I have had to disallow the following question tabled by you :

> To ask the Minister for the Environment, Heritage and Local Government if he will communicate with Mayo County Council to ensure that a safety assessment is carried out for persons residing adjacent to the proposed high-pressure pipeline transporting dangerous substances to the proposed Gas Terminal at Bellanaboy, County Mayo adjacent to the already unstable Dooncarton Hill; and if he will make a statement on the matter.
>
> (this proposed pipeline is through blanket bog that will not effectively resist the forces in the pipeline)

The Minister has no official responsibility to Dáil Éireann for this matter which falls within the statutory remit of an Bord Pleanála.

Yours sincerely,

Dr. Rory O'Hanlon, T.D.,
Ceann Comhairle.

HEALTH AND SAFETY AUTHORITY

10 Hogan Place, Dublin 2, Ireland.
Telephone: 01-614 7000 Fax: 01-614 7020 Website: http://www.hsa.ie/osh

Mr. Brian Coyle,
Block 1,2nd Floor,
GFSC
Moneenageisha Road,
Galway.

June 15th 2004.

Dear Brian,

I acknowledge receipt of your letter ,dated 27th May 2004.

The issues associated with cross-country pipelines, apart from the safety of construction workers involved with their construction, are outside the remit of the HSA as the regulation of such activities lies with another body.

Any aspects that may relate to the proposed terminal have to be seen in the context that this matter is now before An Bord Pleanala and the Authority will not be commenting on any matter that is before the Bord..

Accordingly the Authority is not in a position to accede to your request.

Yours sincerely,

J. Colreavy

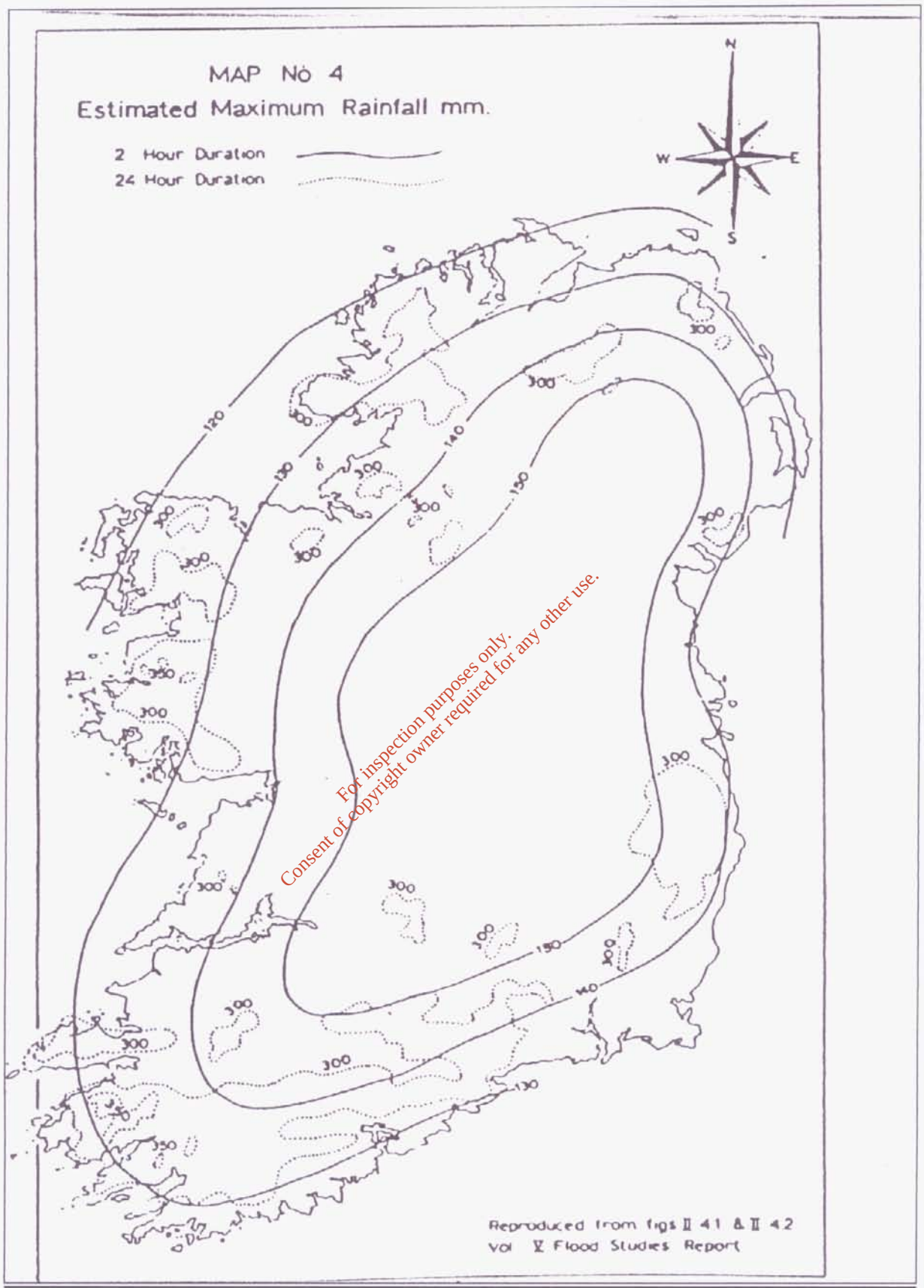
John Colreavy,
Process Industries Unit.

Appendix C

Flood Studies Report

Map No. 4 Enlarged

Note Rainfall Intensity at Terminal could vary from 60 –120mm/hr



Appendix D

Large Scale Picture of Flooding arising

from a

rainfall duration of less than two hours on the 19th of September 2003,

Note Rainfall Intensity at Terminal could vary from 60 –120mm/hr

Appendix E

A copy of the response from

Mr. Iain Douglas (SP MCC)

in relation to initial request dated

20th of April 2004,

My subsequent reminder letters on the 28th of April and 8th of June 2004

It took Two Months and Three Letters to obtain this information

COMHAIRLE CONTAE MHAIGH EO

Aras an Chontae, Caislean a 'Bharraigh, Contae Mhaigh Eo.
Teileafóin (094) 90 24444 Fax (094) 90 23937
www.mayococo.ie

Your Ref. Our Ref.

23rd June, 2004

Mr Brian Coyle,
Block 1m, 2nd Floor,
GFSC,
Moneenageisha Road,
GALWAY

Dear Mr Coyle,

Further to your letter of the 8th June, 2004 regarding the Health and Safety Authority report and its availability to the public prior to the Planning Authorities decision.

Section 38 (3) of the Planning and Development Act 2000 specifically states that copies only of:

(a) the permission documents and publications
(b) submission or observations

shall be made available for inspection during a planning application.

The HSA is required to provide "Technical Advice" as stated in Section 34(8) of the Planning and Development Act 2000 and Article 137 (3) (f) of the Planning and Development Regulations 2001. Thus, the technical advice of the Health and Safety Authority is specifically not a submission or observation under Section 38 (1) (b) of the Planning and Development Act 2000.

Yours sincerely,

Iain Douglas
pp **Iain Douglas**
Senior Planner

ID/DG

Appendix F

Copy of the

Public Notice by Shell

for the

Onshore Gas Pipeline,

Verification Completion and Construction

Dear Sirs

QUALIFICATION SYSTEM FOR

THE PROVISION OF ONSHORE GAS PIPELINE DESIGN VERIFICATION/COMPLETION AND CONSTRUCTION SERVICES FOR THE CORRIB GAS FIELD DEVELOPMENT PROJECT IRELAND

PREQUAL NO. CORRIB/104.04

EU Notice 2004/S 108-089956

Please find attached a copy of the qualification system rules and questionnaire issued in response to your recent application to qualify according to the requirements of the system, which Shell has established solely for the contract it intends to award for the provision of onshore gas pipeline design verification/completion and construction services for the Corrib Gas Field Development Project, Ireland.

You are invited to complete and return such questionnaire (one original, one copy and one CD of the document) to the undersigned no later than **10.30 am on Tuesday, 22nd June, 2004** at the address stated below:

Shell E&P Ireland Limited,
Corrib House,
52 Lower Leeson Street,
Dublin 2,
Republic of Ireland

In addition, Shell shall send said questionnaire electronically to assist in the preparation of your hard copy response. The text contained on said electronic version should in no way be altered or amended from the original except for the insertion of the applicant's responses where necessary. Failure to complete properly and return the questionnaire by the due date may result in the rejection of your application.

The information provided in such questionnaire will be used by Shell to assess your suitability for inclusion on the qualification system as a "Qualified Person" for the Category/Categories specified in the attached document utilising the criteria contained therein.

Please note that Shell has commenced activities for the Corrib Field Development and in the third quarter of 2004 intends to issue a bid invitation for the services specified in the first paragraph. The bidders list for such bid invitation will be compiled from those potential contractors who have qualified under the rules of Shell's qualification system. However, should you become a "Qualified Person", we would emphasise that this qualified status does not guarantee your inclusion on the bidders list.

Applicants should note that Shell will operate/manage the Corrib Gas Field Development from its offices in Ireland.

Should you have any queries regarding the qualification system rules and questionnaire, please do not hesitate to contact the undersigned by email at jim.mcmanus@shell.com

Yours faithfully
For and on behalf of Shell E&P Ireland Limited

J. McManus
Contracts Manager

Enc. Questionnaire

Appendix G

Amendments to the Seveso II Directive

DIRECTIVE 2003/105/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL

of 16 December 2003

amending Council Directive 96/82/EC on the control of major-accident hazards involving dangerous substances

THE EUROPEAN PARLIAMENT AND THE COUNCIL OF THE EUROPEAN UNION,

Having regard to the Treaty establishing the European Community, and in particular Article 175(1) thereof,

Having regard to the proposal from the Commission [1],

Having regard to the opinion of the European Economic and Social Committee [2],

After consulting the Committee of the Regions,

Acting in accordance with the procedure laid down in Article 251 of the Treaty in the light of the joint text approved by the Conciliation Committee on 22 October 2003 [3],

Whereas:

(1) Directive 96/82/EC [4] aims at the prevention of major accidents which involve dangerous substances and the limitation of their consequences for man and the environment, with a view to ensuring high levels of protection throughout the Community in a consistent and effective manner.

(2) In the light of recent industrial accidents and studies on carcinogens and substances dangerous for the environment carried out by the Commission at the Council's request, the scope of Directive 96/82/EC should be extended.

(3) The cyanide spill that polluted the Danube following the accident at Baia Mare in Romania in January 2000 has demonstrated that certain storage and processing activities in mining, especially tailings disposal facilities, including tailing ponds or dams, have potential to produce very serious consequences. The Commission communications on the safe operation of mining activities and on the sixth environment action programme of the European Community have therefore highlighted the need for an extension of the scope of Directive 96/82/EC. In its resolution of 5 July 2001 [5] on the Commission Communication on the safe operation of mining activities, the European Parliament also welcomed the extension of the scope of that Directive to cover risks arising from storage and processing activities in mining.

(4) The proposal for a directive on the management of waste from the extractive industries may be a relevant framework for measures relating to those waste management facilities which present an accident risk but which are not covered by the present Directive.

(5) The 'fireworks accident' at Enschede in the Netherlands in May 2000 has demonstrated the major accident potential arising from storage and manufacture of pyrotechnic and explosive substances. The definition of such substances in Directive 96/82/EC should therefore be clarified and simplified.

(6) The explosion at a fertiliser plant in Toulouse in September 2001 has raised awareness of the accident potential arising from the storage of ammonium nitrate and ammonium nitrate-based fertilisers, in particular of material rejected during the manufacturing process or returned to the manufacturer (off-specs). The existing categories of ammonium nitrate and ammonium nitrate-based fertilisers in Directive 96/82/EC should therefore be reviewed with a view to include 'off-specs' material.

(7) Directive 96/82/EC should not be applied to sites of end-users where ammonium nitrate and ammonium nitrate-based fertilisers, which on delivery conformed to the specification in that Directive but subsequently have become degraded or contaminated, are temporarily present prior to removal for reprocessing or destruction.

(8) Studies carried out by the Commission in close cooperation with the Member States support extending the list of carcinogens with appropriate qualifying quantities and significantly lowering the qualifying quantities assigned to substances dangerous for the environment in Directive 96/82/EC.

(9) For establishments which subsequently fall within the scope of Directive 96/82/EC, it has been shown necessary to introduce minimum periods for notifications and the establishment of major accident prevention policies, safety reports and emergency plans.

(10) The experience and knowledge of relevant staff in the establishment can greatly assist in the drawing up of emergency plans, and all staff in an establishment and persons likely to be affected should be appropriately informed on safety measures and actions.

[1] OJ C 75 E, 26.3.2002, p. 357 and OJ C 20 E, 28.1.2003, p. 255.
[2] OJ C 149, 21.6.2002, p. 13.
[3] Opinion of the European Parliament of 3 July 2002 (OJ C 271 E, 12.11.2003, p. 315), Council common position of 20 February 2003 (OJ C 102 E, 29.4.2003, p. 1) and position of the European Parliament of 19 June 2003 (not yet published in the Official Journal). Legislative resolution of the European Parliament of 19 November 2003 (not yet published in the Official Journal) and decision of the Council of 1 December 2003.
[4] OJ L 10, 14.1.1997, p. 13.
[5] OJ C 65 E, 14.3.2002, p. 382.

(11) The adoption of Council Decision 2001/792/EC, Euratom of 23 October 2001 establishing a Community mechanism to facilitate reinforced cooperation in civil protection assistance interventions [1] highlights the need to facilitate reinforced cooperation in civil protection assistance interventions.

(12) It is useful, in order to facilitate land-use planning, to draw up guidelines defining a database to be used for assessing the compatibility between the establishments covered by Directive 96/82/EC and the areas described in Article 12(1) of that Directive.

(13) There should be an obligation on Member States to supply the Commission with minimum information concerning the establishments covered by Directive 96/82/EC.

(14) It is appropriate at the same time to clarify certain passages in Directive 96/82/EC.

(15) The measures provided for in this Directive have been the subject of a public consultation process involving interested parties.

(16) Directive 96/82/EC should therefore be amended accordingly,

HAVE ADOPTED THIS DIRECTIVE:

Article 1

Directive 96/82/EC is hereby amended as follows:

1. Article 4 is amended as follows:

   (a) Points (e) and (f) are replaced by the following:

   '(e) the exploitation (exploration, extraction and processing) of minerals in mines, quarries, or by means of boreholes, with the exception of chemical and thermal processing operations and storage related to those operations which involve dangerous substances, as defined in Annex I;

   (f) the offshore exploration and exploitation of minerals, including hydrocarbons;'

   (b) The following point shall be added:

   '(g) waste land-fill sites, with the exception of operational tailings disposal facilities, including tailing ponds or dams, containing dangerous substances as defined in Annex I, in particular when used in connection with the chemical and thermal processing of minerals.'

2. Article 6 is amended as follows:

   (a) The following indent is added in paragraph 1:

   '— for establishments which subsequently fall within the scope of this Directive, within three months after the date on which this Directive applies to the establishment concerned, as laid down in the first subparagraph of Article 2(1).'

   (b) The following indent is inserted after the first indent of Article 6(4):

   '— modification of an establishment or an installation which could have significant repercussions on major accident hazards, or'.

3. The following paragraph is inserted in Article 7:

   '1a. For establishments which subsequently fall within the scope of this Directive, the document referred to in paragraph 1 shall be drawn up without delay, but at all events within three months after the date on which this Directive applies to the establishment concerned, as laid down in the first subparagraph of Article 2(1).'

4. Article 8(2)(b) is replaced by the following:

   '(b) provision is made for cooperation in informing the public and in supplying information to the authority responsible for the preparation of external emergency plans.'

5. Article 9 is amended as follows:

   (a) The first subparagraph of paragraph 2 is replaced by the following:

   '2. The safety report shall contain at least the data and information listed in Annex II. It shall name the relevant organisations involved in the drawing up of the report. It shall also contain an updated inventory of the dangerous substances present in the establishment.'

   (b) The following indent is inserted between the third and fourth indents of paragraph 3:

   '— for establishments which subsequently fall within the scope of this Directive, without delay, but at all events within one year after the date on which this Directive applies to the establishment concerned, as laid down in the first subparagraph of Article 2(1).'

   (c) In paragraph 4, the reference to 'the second, third, and fourth indents' becomes 'the second, third, fourth and fifth indents' respectively.

   (d) The following point is added to Article 9(6):

   '(d) The Commission is invited to review by 31 December 2006 in close cooperation with the Member States, the existing "Guidance on the Preparation of a Safety Report".'

6. Article 11 is amended as follows:

   (a) The following indent is added to points (a) and (b) of paragraph 1:

   '— for establishments which subsequently fall within the scope of this Directive, without delay, but at all events within one year after the date on which this Directive applies to the establishment concerned, as laid down in the first subparagraph of Article 2(1).'

[1] OJ L 297, 15.11.2001, p. 7.

(b) Paragraph 3 is replaced by the following:

'3. Without prejudice to the obligations of the competent authorities, Member States shall ensure that the internal emergency plans provided for in this Directive are drawn up in consultation with the personnel working inside the establishment, including long-term relevant subcontracted personnel, and that the public is consulted on external emergency plans when they are established or updated.'

(c) The following paragraph is inserted:

'4a. With regard to external emergency plans, Member States should take into account the need to facilitate enhanced cooperation in civil protection assistance in major emergencies.'

7. Article 12 is amended as follows:

(a) The second subparagraph of paragraph 1 is replaced by the following:

'Member States shall ensure that their land-use and/or other relevant policies and the procedures for implementing those policies take account of the need, in the long term, to maintain appropriate distances between establishments covered by this Directive and residential areas, buildings and areas of public use, major transport routes as far as possible, recreational areas and areas of particular natural sensitivity or interest and, in the case of existing establishments, of the need for additional technical measures in accordance with Article 5 so as not to increase the risks to people.'

(b) The following paragraph is inserted:

'1a. The Commission is invited by 31 December 2006, in close cooperation with the Member States, to draw up guidelines defining a technical database including risk data and risk scenarios, to be used for assessing the compatibility between the establishments covered by this Directive and the areas described in paragraph 1. The definition of this database shall as far as possible take account of the evaluations made by the competent authorities, the information obtained from operators and all other relevant information such as the socioeconomic benefits of development and the mitigating effects of emergency plans.'

8. Article 13 is amended as follows:

(a) The first subparagraph of paragraph 1 is replaced by the following:

'1. Member States shall ensure that information on safety measures and on the requisite behaviour in the event of an accident is supplied regularly and in the most appropriate form, without their having to request it, to all persons and all establishments serving the public (such as schools and hospitals) liable to be affected by a major accident originating in an establishment covered by Article 9.'

(b) Paragraph 6 is replaced by the following:

'6. In the case of establishments subject to the provisions of Article 9, Member States shall ensure that the inventory of dangerous substances provided for in Article 9(2) is made available to the public subject to the provisions of paragraph 4 of this Article and Article 20.'

9. The following paragraph is inserted in Article 19:

'1a. For establishments covered by this Directive, Member States shall supply the Commission with at least the following information:

(a) the name or trade name of the operator and the full address of the establishment concerned; and

(b) the activity or activities of the establishment.

The Commission shall set up and keep up to date a database containing the information supplied by the Member States. Access to the database shall be reserved to persons authorised by the Commission or the competent authorities of the Member States.'

10. Annex I is amended as set out in the Annex.

11. In Annex II, point IV part B is replaced by the following:

'B. Assessment of the extent and severity of the consequences of identified major accidents including maps, images or, as appropriate, equivalent descriptions, showing areas which are liable to be affected by such accidents arising from the establishment, subject to the provisions of Articles 13(4) and 20.'

12. In Annex III, point (c) is amended as follows:

(a) point (i) is replaced by the following:

'(i) organisation and personnel — the roles and responsibilities of personnel involved in the management of major hazards at all levels in the organisation. The identification of training needs of such personnel and the provision of the training so identified. The involvement of employees and of subcontracted personnel working in the establishment.'

(b) point (v) is replaced by the following:

'(v) Planning for emergencies — adoption and implementation of procedures to identify foreseeable emergencies by systematic analysis, to prepare, test and review emergency plans to respond to such emergencies and to provide specific training for the staff concerned. Such training shall be given to all personnel working in the establishment, including relevant subcontracted personnel.'

Article 2

1. Member States shall bring into force the laws, regulations and administrative provisions necessary to comply with this Directive before 1 July 2005. They shall forthwith inform the Commission thereof.

When Member States adopt these measures, they shall contain a reference to this Directive or shall be accompanied by such a reference on the occasion of their official publication. The methods of making such reference shall be laid down by Member States.

2. Member States shall communicate to the Commission the text of the main provisions of national law which they adopt in the field covered by this Directive.

Article 3

This Directive shall enter into force on the day of its publication in the *Official Journal of the European Union*.

Article 4

This Directive is addressed to the Member States.

Done at Brussels, 16 December 2003.

For the European Parliament	*For the Council*
The President	*The President*
P. COX	G. ALEMANNO

ANNEX

Annex I to Directive 96/82/EC is hereby amended as follows:

1. The following points are added to the introduction:

'6. For the purposes of this Directive, a gas is any substance that has an absolute vapour pressure equal to or greater than 101,3 kPa at a temperature of 20 ° C.

7. For the purposes of this Directive, a liquid is any substance that is not defined as a gas and that is not in the solid state at a temperature of 20 • C and at a standard pressure of 101,3 kPa.'

2. In the table in Part 1:

(a) the entries relating to 'Ammonium nitrate' are replaced by the following:

'Ammonium nitrate (see note 1)	5 000	10 000
Ammonium nitrate (see note 2)	1 250	5 000
Ammonium nitrate (see note 3)	350	2 500
Ammonium nitrate (see note 4)	10	50'

(b) the following entries are inserted after the entries relating to 'Ammonium nitrate':

Potassium nitrate (see note 5)	5 000	10 000
Potassium nitrate (see note 6)	1 250	5 000'

(c) the entry relating to 'The following CARCINOGENS' is replaced by the following:

'The following CARCINOGENS at concentrations above 5 % by weight: 4-Aminobiphenyl and/or its salts, Benzotrichloride, Benzidine and/or salts, Bis (chloromethyl) ether, Chloromethyl methyl ether, 1,2-Dibromoethane, Diethyl sulphate, Dimethyl sulphate, Dimethylcarbamoyl chloride, 1,2-Dibromo-3-chloropropane, 1,2-Dimethylhydrazine, Dimethylnitrosamine, Hexamethylphosphoric triamide, Hydrazine, 2- Naphthylamine and/or salts, 4-Nitrodiphenyl, and 1,3 Propanesultone	0,5	2'

(d) the entry relating to 'Automotive petrol and other petroleum spirits' is replaced by the following:

'Petroleum products: (a) gasolines and naphthas, (b) kerosenes (including jet fuels), (c) gas oils (including diesel fuels, home heating oils and gas oil blending streams)	2 500	25 000'

(e) (i) Notes 1 and 2 are replaced by the following:

'1. Ammonium nitrate (5 000/10 000): fertilisers capable of self-sustaining decomposition

This applies to ammonium nitrate-based compound/composite fertilisers (compound/composite fertilisers containing ammonium nitrate with phosphate and/or potash) in which the nitrogen content as a result of ammonium nitrate is

— between 15,75 % (1) and 24,5 % (2) by weight, and either with not more than 0,4 % total combustible/organic materials or which fulfil the requirements of Annex II of Directive 80/876/EEC,

— 15,75 % (3) by weight or less and unrestricted combustible materials,

and which are capable of self-sustaining decomposition according to the UN Trough Test (see United Nations Recommendations on the Transport of Dangerous Goods: Manual of Tests and Criteria, Part III, subsection 38.2).

2. Ammonium nitrate (1 250/5 000): fertiliser grade

This applies to straight ammonium nitrate-based fertilisers and to ammonium nitrate-based compound/composite fertilisers in which the nitrogen content as a result of ammonium nitrate is

— more than 24,5 % by weight, except for mixtures of ammonium nitrate with dolomite, limestone and/or calcium carbonate with a purity of at least 90 %,

— more than 15,75 % by weight for mixtures of ammonium nitrate and ammonium sulphate,

— more than 28 % (4) by weight for mixtures of ammonium nitrate with dolomite, limestone and/or calcium carbonate with a purity of at least 90 %,

and which fulfil the requirements of Annex II of Directive 80/876/EEC.

3. Ammonium nitrate (350/2500): technical grade

This applies to:

— ammonium nitrate and preparations of ammonium nitrate in which the nitrogen content as a result of the ammonium nitrate is

— between 24,5 % and 28 % by weight, and which contain not more than 0,4 % combustible substances,

— more than 28 % by weight, and which contain not more than 0,2 % combustible substances,

— aqueous ammonium nitrate solutions in which the concentration of ammonium nitrate is more than 80 % by weight.

4. Ammonium nitrate (10/50): "off-specs" material and fertilisers not fulfilling the detonation test

This applies to:

— material rejected during the manufacturing process and to ammonium nitrate and preparations of ammonium nitrate, straight ammonium nitrate-based fertilisers and ammonium nitrate-based compound/composite fertilisers referred to in notes 2 and 3, that are being or have been returned from the final user to a manufacturer, temporary storage or reprocessing plant for reworking, recycling or treatment for safe use, because they no longer comply with the specifications of Notes 2 and 3;

— fertilisers referred to in note 1, first indent, and Note 2 which do not fulfil the requirements of Annex II of Directive 80/876/EEC.

5. Potassium nitrate (5 000/10 000): composite potassium-nitrate based fertilisers composed of potassium nitrate in prilled/granular form.

6. Potassium nitrate (1 250/5 000): composite potassium-nitrate based fertilisers composed of potassium nitrate in crystalline form.'

(ii) the note relating to polychlorodibenzofurans and polychlorodibenzodioxins becomes note 7.

(iii) the following footnotes appear below the table entitled 'International Toxic Equivalent Factors (ITEF) for the congeners of concern (NATO/CCMS)':

'(1) 15,75 % nitrogen content by weight as a result of ammonium nitrate corresponds to 45 % ammonium nitrate.

(2) 24,5 % nitrogen content by weight as a result of ammonium nitrate corresponds to 70 % ammonium nitrate.

(3) 15,75 % nitrogen content by weight as a result of ammonium nitrate corresponds to 45 % ammonium nitrate.

(4) 28 % nitrogen content by weight as a result of ammonium nitrate corresponds to 80 % ammonium nitrate.'

3. In Part 2:

(a) entries 4 and 5 are replaced by the following:

'4. EXPLOSIVE (see note 2) where the substance, preparation or article falls under UN/ADR Division 1.4	50	200
5. EXPLOSIVE (see note 2) where the substance, preparation or article falls under any of: UN/ADR Divisions 1.1, 1.2, 1.3, 1.5 or 1.6 or risk phrase R2 or R3	10	50'

(b) entry 9 is replaced by the following:

'9. DANGEROUS FOR THE ENVIRONMENT risk phrases:		
i) R50: "Very toxic to aquatic organisms" (including R50/53)	100	200
ii) R51/53: "Toxic to aquatic organisms; may cause long term adverse effects in the aquatic environment"	200	500'

(c) In the notes:

(i) Note 1 is replaced by the following:

'1. Substances and preparations are classified according to the following Directives and their current adaptation to technical progress:

Council Directive 67/548/EEC of 27 June 1967 on the approximation of the laws, regulations and administrative provisions relating to the classification, packaging and labelling of dangerous substances(1),

Directive 1999/45/EC of the European Parliament and of the Council of 31 May 1999 concerning the approximation of laws, regulations and administrative provisions of the Member States relating to the classification, packaging and labelling of dangerous preparations (2).

In the case of substances and preparations which are not classified as dangerous according to either of the above directives, for example waste, but which nevertheless are present, or are likely to be present, in an establishment and which possess or are likely to possess, under the conditions found at the establishment, equivalent properties in terms of major-accident potential, the procedures for provisional classification shall be followed in accordance with the relevant article of the appropriate Directive.

In the case of substances and preparations with properties giving rise to more than one classification, for the purposes of this Directive the lowest qualifying quantities shall apply. However, for the application of the rule in Note 4, the qualifying quantity used shall always be the one corresponding to the classification concerned.

For the purposes of this Directive, the Commission shall establish and keep up to date a list of substances which have been classified into the above categories by a harmonised Decision in accordance with Directive 67/548/EEC.'

(ii) Note 2 is replaced by the following:

'2. An "explosive" means:

— a substance or preparation which creates the risk of an explosion by shock, friction, fire or other sources of ignition (risk phrase R2),

— a substance or preparation which creates extreme risks of explosion by shock, friction, fire or other sources of ignition (risk phrase R3), or

— a substance, preparation or article covered by Class 1 of the European Agreement concerning the International Carriage of Dangerous Goods by Road (UN/ADR), concluded on 30 September 1957, as amended, as transposed by Council Directive 94/55/EC of 21 November 1994 on the approximation of the laws of the Member States with regard to the transport of dangerous goods by road (3).

Included in this definition are pyrotechnics, which for the purposes of this Directive are defined as substances (or mixtures of substances) designated to produce heat, light, sound, gas or smoke or a combination of such effects through self-sustained exothermic chemical reactions. Where a substance or preparation is classified by both UN/ADR and risk phase R2 or R3, the UN/ADR classification shall take precedence over assignment of risk phrases.

Substances and articles of Class 1 are classified in any of the divisions 1.1 to 1.6 in accordance with the UN/ADR classification scheme. The divisions concerned are:

Division 1.1: "Substances and articles which have a mass explosion hazard (a mass explosion is an explosion which affects almost the entire load virtually instantaneously)."

Division 1.2: "Substances and articles which have a projection hazard but not a mass explosion hazard."

Division 1.3: "Substances and articles which have a fire hazard and either a minor blast hazard or a minor projection hazard or both, but not a mass explosion hazard:

(a) combustion of which gives rise to considerable radiant heat; or

(b) which burn one after another, producing minor blast or projection effects or both."

Division 1.4: "Substances and articles which present only a slight risk in the event of ignition or initiation during carriage. The effects are largely confined to the package and no projection of fragments of appreciable size or range is to be expected. An external fire shall not cause virtually instantaneous explosion of virtually the entire contents of the package."

Division 1.5: "Very insensitive substances having a mass explosion hazard which are so insensitive that there is very little probability of initiation or of transition from burning to detonation under normal conditions of carriage. As a minimum requirement they shall not explode in the external fire test."

Division 1.6: "Extremely insensitive articles which do not have a mass explosion hazard. The articles contain only extremely insensitive detonating substances and demonstrate a negligible probability of accidental initiation or propagation. The risk is limited to the explosion of a single article."

Included in this definition are also explosive or pyrotechnic substances or preparations contained in articles. In the case of articles containing explosive or pyrotechnic substances or preparations, if the quantity of the substance or preparation contained is known, that quantity shall be considered for the purposes of this Directive. If the quantity is not known, then, for the purposes of this Directive, the whole article shall be treated as explosive.'

(iii) in note 3(b)(1), the second indent shall be replaced by the following:

'— substances and preparations which have a flash point lower than 55 °C and which remain liquid under pressure, where particular processing conditions, such as high pressure or high temperature, may create major-accident hazards;'

(iv) note 3(c)(2) is replaced by the following:

'2. gases which are flammable in contact with air at ambient temperature and pressure (risk phrase R12, second indent), which are in a gaseous or supercritical state, and'

(v) note 3(c)3 is replaced by the following:

'3. flammable and highly flammable liquid substances and preparations maintained at a temperature above their boiling point.'

(vi) note 4 is replaced by the following:

'4. In the case of an establishment where no individual substance or preparation is present in a quantity above or equal to the relevant qualifying quantities, the following rule shall be applied to determine whether the establishment is covered by the relevant requirements of this Directive.

This Directive shall apply if the sum

$q_1/Q_{U1} + q_2/Q_{U2} + q_3/Q_{U3} + q_4/Q_{U4} + q_5/Q_{U5} + \ldots$ is greater than or equal to 1,

where q_x = the quantity of dangerous substance x (or category of dangerous substances) falling within Parts 1 or 2 of this Annex,

and Q_{UX} = the relevant qualifying quantity for substance or category x from column 3 of Parts 1 or 2.

This Directive shall apply, with the exception of Articles 9, 11 and 13, if the sum

$q_1/Q_{L1} + q_2/Q_{L2} + q_3/Q_{L3} + q_4/Q_{L4} + q_5/Q_{L5} + \ldots$ is greater than or equal to 1,

where q_x = the quantity of dangerous substance x (or category of dangerous substances) falling within Parts 1 or 2 of this Annex,

and Q_{LX} = the relevant qualifying quantity for substance or category x from column 2 of Parts 1 or 2.

This rule shall be used to assess the overall hazards associated with toxicity, flammability, and eco-toxicity. It must therefore be applied three times:

(a) for the addition of substances and preparations named in Part 1 and classified as toxic or very toxic, together with substances and preparations falling into categories 1 or 2;

(b) for the addition of substances and preparations named in Part 1 and classified as oxidising, explosive, flammable, highly flammable, or extremely flammable, together with substances and preparations falling into categories 3, 4, 5, 6, 7a, 7b or 8;

(c) for the addition of substances and preparations named in Part 1 and classified as dangerous for the environment (R50 (including R50/53) or R51/53), together with substances and preparations falling into categories 9(i) or 9(ii);

The relevant provisions of this Directive apply if any of the sums obtained by (a), (b) or (c) is greater than or equal to 1.'

(vii) the following footnotes appear at the end of the notes:

'(1) OJ 196, 16.8.1967, p. 1. Directive as last amended by Regulation (EC) No 807/2003 (OJ L 122, 16.5.2003, p. 36).

(2) OJ L 200, 30.7.1999, p. 1. Directive as amended by Commission Directive 2001/60/EC (OJ L 226, 22.8.2001, p. 5).

(3) OJ L 319, 12.12.1994, p. 7. Directive as last amended by Commission Directive 2003/28/EC (OJ L 90, 8.4.2003, p. 45).'

Our Ref: 04-025-041006-01RP
ABP Ref: PL 16.207212 Letter dated 17th September 2004

Observation

Following Applicants Response

To

An Bord Pleanala Request For Further Information

Prepared by

Brian Coyle BE, CEng, MIEI, MIStructE

Date 6th October 2004

Introduction

I commend An Bord Pleanála for their close examination of the submissions and outline my observations in relation to the applicant's recent submission as requested by the Board on the 17th September 2004.

Observations made in this submission are supported by picture evidence identifying where a peat slide can occur and the reasons for such peat failure contrary to the applicants justifications. Larger scale pictures of the photos included in the body of the report are included in Appendix 1.

The purpose of the enclosed video is to focus on the geotechnical risks mentioned by the applicant and other risks that have yet to be identified and addressed in the event of a gas explosion.

Appendix 2 contains observations on the applicants risk register and outlines additional risks that must be addressed

Aside Note:

For comparative purposes relating to private clients, for the development of commercial / residential developments it is not unusual for private developers to incur a cost of €1.5-2 million on temporary works to enable the construction of a project that cost €15-20 million i.e. (10% of the project cost) even when the temporary works are no longer required once the project is complete.

I want to take this opportunity to highlight large temporary work cost incurred by private clients for the benefit of protecting adjoining properties and maintaining specific ground conditions, water table level and quality during construction. The budget of a private client cannot be compared to that of multi-national companies and neither should the attitude or cost that must be incurred to ensure extensive safety measures relating to all Hazards that exist.

All hazards must be highlighted and adequately addressed.

Observation to Applicants Response to Item No. 1

The applicant has stated that their 'Geotechnical Risk Register identifies and lists the main credible geotechnical risks for both **construction** and **operational phases** as well as **health and safety**, **environmental,** cost and programme risks... following 'brainstorming' sessions.' The applicant has stated that the key benefit of preparing the risk register is the identification and consideration of potential geotechnical risks within the design.

In this regard the applicant have extended the Geotechnical Risk Register to include the operational phase. All risks are not geotechnical and must be identified; reduced and assigned before a final decision is made (Clayton Report, HSE). Additional more concerning geotechnical risks are identified in Appendix 2 of this submission.

Access across soft ground has been identified as a risk by the applicant but has not been extended to the operational phase. During the operational phases, heavy fuel articulated trucks will undoubtedly use the permanent access road and they are comparable if not heavier than most construction trucks.

A video copy of a Sky news report (approx 5 minutes long) following the Brussels gas pipeline explosion is provided to identify the need for alternative permanent access and standing areas across saturated peat in the event of an Industrial accident e.g gas explosion at the terminal site.
Therefore, the risk of failure of the access road to perform its intended function should be extended to include the operational phase.

The news report confirms that vibrations from the gas pipeline explosion could be felt miles away thus identifying the high risk of dislodging Gabion retaining wall construction. The pipeline that exploded would be similar to the Bord Gáis distribution pipeline. I seriously feel that a reinforced concrete wall, which is adequately tied and anchored to the bedrock in order to prevent disproportionate collapse, should replace the proposed gabion retaining wall construction.

Also the risk that trees poses on the gas terminal in relation to fire spread.
The planting of trees should be avoided to prevent fire spread as they are only required for visual purposes. I believe that the reduction to the risk of fire spread is more important than visual impact.

A gas explosion can also have a detrimental effect on the stabilised peat beneath the access roads as excessive

forces local to an explosion can cause the failure of stabilised peat and hence the road. Intense heat from a gas explosion has not been examined on the proposed stabilised peat. Before proceeding I suggest that this short video be viewed. The video itself highlights many other geotechnical and general operational risks that have yet to be addressed. Discussions that I had with European officials confirmed that they have already begun preparing guideline documentation to be implemented in Standards, Guidelines and EU Directives following the disaster in Ath, Brussels.

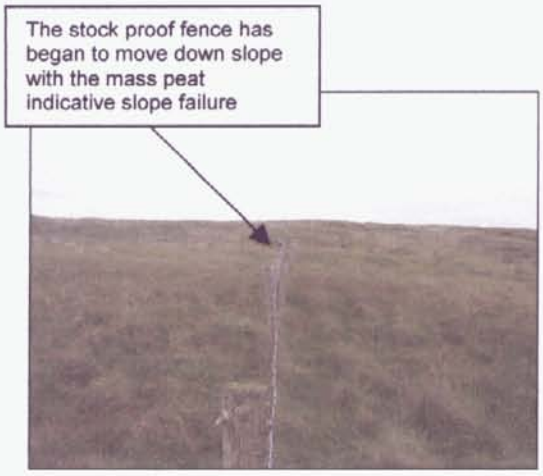
The following points are extracted from the published document titled 'Managing Geotechnical Risk (Clayton) Improving Productivity in UK Building and Construction- published by Thomas Telford Publishing. This document forms the basis for which the applicant has prepared the risk register and also forms a basis for this submission.

- *Geotechnical Risk is defined as the risk posed to construction by the ground or groundwater conditions at a site.*
- *All types of risks should be considered at an early stage, as part of the general risk management process for a project*
- *Clearly ground related risk is just one class of risk that must be dealt with.*
- *The law requires that systems be put in place to ensure the health and safety of those who will construct and those who will ultimately use a new construction .* I would expect that the law also cover those that could be potentially affected by the construction of the proposed project.
- *Risks can be managed, minimised, shared, transferred, or accepted. They cannot be ignored.*
- *Designers should also recognise the limited accuracy of many geotechnical design calculations.*
- *Residual Risk can then be focused on a suitable ownership (during construction, commissioning, and use) defined.*
- *If a major geotechnical risks remain after design then the project may not be able to proceed.*
- *If the degree of risk is 9-12 then the risk level is substantial the action required is that work must not start until risk has been reduced.*
- *If the degree of risk is > 13 then the risk level is intolerable and the action required is that work must not start until risk has been reduced. If risk cannot be reduced, project should not proceed.*

Indicative failure of Peat Slopes

Sometimes there are clear indicators of gradual/possible peat slope failure that are usually not recognised by experienced designers/engineers and cannot be detected from analysis.

The following photograph demonstrates this. When the commonage was striped into individual fields (approx 12 years ago) for local farmers in the area the stock proof fence was placed in straight lines. Since then, and following gradual slope movement the stock proof fence is moving down slope at a variable rate. Larger scale picture is included in the Appendix 1



The stock proof fences including timber stakes are inclined in both directions. The sheep wire is extremely taught and deformed to reflect the tension that is imposed on it from the displaced timber stakes. This is evident from a site visit.

This is an indication that a large slope failure will occur in this section of peat at some future date. There is little or no 'on-the ground indication yet' of this failure occurring however; it is evident that it is occurring at a gradual rate. This gradual but occurring failure would not be immediately obvious from a general site visit if the fence were not there.
Global analysis would probable justify satisfactory stability of this section of bog as it has taken many years to move.

The Clayton report 'Managing Geotechnical Risk Chapter 5 Page 33' state the fact that designers should also recognise the limited accuracy of many geotechnical design calculations.

Due to the variable composition of peat across the country and indeed within a small section of bog it is not possible to determine its long-term behaviour.

Contrary to what the applicant says, the lessons learned from the Pollathomas (Dooncartoon) Landslide have not been fully incorporated into the basis of the proposed terminal earthworks design. The applicant is intending to overwhelmingly change the natural composition, consolidation, and permeability of the body of the peat at the proposed terminal site and at the Srahmore site. Based on past events the proposal put forward by the applicant is a recipe for a major disaster.

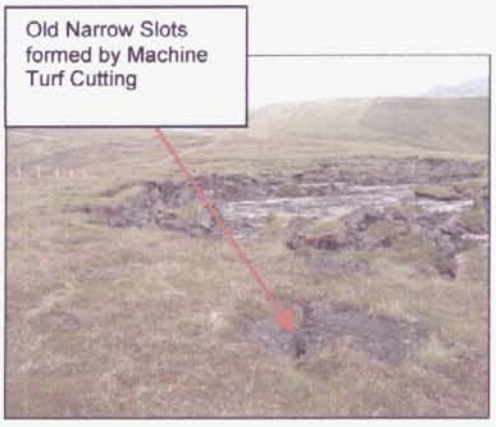
The high risk of developing in blanket bog together with the uncertainty of long-term consequential effects should have been enough for all design team members to advise their client at a very early stage that this is undoubtedly the wrong site. It is obvious that the current planning documentation was well into its preparation when the Dooncartoon and Derrybrien landslides occurred.

The Dooncartoon and Derrybrien landslides occurred in September and October 2003 the application for the terminal was lodged in December 2003. Investigations and reports into the landslide especially into the Dooncartoon landslide are still being produced.
It is worrying and certainly not credible for the applicant to state '*It should be noted that the Pollahomish and Derrybrien events occurred in the early design stage*'

Peat Slope failure at Pollathomas (Dooncartoon Hill) on a Relatively Flat Crest of a Hill contrary to applicants justification.

Mans interference with the bog at Dooncartoon hill has not been indicated as a cause for peat slope failure by the applicant. This is concerning and indicates the lack of investigation

During August 2004, I carried out a walk through survey of the landslide that occurred in September 2003. A relatively dry shrinkable skin had formed on the exposed faces of the disturbed peat. The depth of bog on the sheltered slope was thicker (1.8m) than the depth of bog on the exposed slope facing the Atlantic Ocean mainly due to the increase and decomposition of vegetation growth and formation of peat through thousands of years on the sheltered side.



This is concerning and indicates the lack of understanding from the persons that carried out the so-called in-depth investigation into the reasons why the peat slope failed. The applicant has identified only some of the reasons (favourable reasons on his part) for the numerous Dooncartoon peat slides.

source www.peatlandsni.co.uk

The above picture shows the machine used to cut the turf.

The Vertical slots (Cracks) that were formed by machine turf cutting are clearly visible and are easily recognised by persons familiar with turf cutting. They are not drying out or shrinkable cracks arising from the Dry Summer!

It was clear that Mans interference was one of the primary reasons for the failure of this section of Bog. 'Machine Turf' cut at the top of the hill formed slots in the bog approximately 1.5m apart. Tracking across the peat surface reduced its permeability. Water collected locally within the slots thus increasing the hydrostatic pressure causing downward slope failure. This is contrary to reasons given by the applicant to justify the low probability of Bog Slide in the Risk Register. It is obvious that water did not pond at the top of this slope, yet the bog slide occurred. The 'cracks' in this area are not formed from the Drying out of the bog as suggested by the applicant. The low probability adopted by the applicant (P=1) after the control is better associated with the stability of rock than that of organic saturated peat.

Hydrostatic pressure within the peat mass can build if the peat is consolidated or altered in any way (stabilisation) from its natural formation. This implies that differential permeability and differential hydrostatic pressure will be developed within the peat mass resulting in varying hydrostatic pressure and hence slope failure.

Designers should also recognise the limited accuracy of many geotechnical design calculations

'Managing Geotechnical Risk (Clayton) Chapter 5 Page 33'

Also, the increase mass of the stabilised soil at the proposed gas terminal site arising from the injection of thousands of tonnes of cement is concerning as it can impose a greater load on the adjacent peat. Trenching in the peat for pipework will provide 'collecting and ponding' areas for water thus increasing and varying the hydrostatic pressure within the mass of the peat-thus slope failure.

Failure of peat slopes following trenching and placing services in peat can occur

It is clear in the above photo that mans interference with Bog contributed to this section of failure also. A trench was formed where an electrical cable was laid. The well-recognised yellow danger tape is clearly visible embedded within the body of the peat during backfilling. The tape was placed once the electrical line was laid. The failed section of peat is directly along the trench where the cable was laid. It has laid there for many years in the peat and long term effects from mans interference cannot be ignored.

Trenching for all pipework and services, including peat stabilisation at the proposed terminal site will involve a major part of the works and will dramatically effect the natural composition, permeability, hydrostatic pressure within the body of the peat, irrespective of surface water drainage thus resulting in peat slope failure based on past events.

In most failure instances on the Dooncartoon hilll the failed peat section is not immediately underlain by bedrock as suggested by the applicant bedrock is visible in some areas.

Risk of Pipeline Failure due to Geotechnical Risk and third party activity must be considered and dealt with adequately to avoid a disaster like the pipeline explosion that occurred in Brussels

Data is not available nor does it exist to justify the low risk rating of the failure of an extremely high-pressure gas pipeline surrounded in blanket bog. Published standards do not cover such proposal in blanket bog. One cannot justify a credible solution or prescribe the probability of occurrence in the absence of such data.

Pictures are included in this report to demonstrate;

- Failures of peat slopes can occur at the top of a crest contrary to the conclusion of the applicant
- Peat slopes can fail in areas where surface water drainage is adequate and ponding cannot occur contrary to the conclusion of the applicant.
- Peat slope failure at Dooncartoon have occurred on slopes less than 30-40 degrees contrary to the justification made by the applicant
- Peat slopes do fail when the natural water seepage through the peat is altered either by consolidation (heavy traffic, stock piling etc) or modification (stabilisation)
- Peat slope failure can be initiated by slip circle failure on a flat site due to overburden hydrostatic pressure.
- Peat slope failure can occur gradually and may not be immediately obvious from a site visit and may need to be investigated over many years (10)
- *The Clayton report 'Managing Geotechnical Risk Chapter 5 Page 33' state the fact that designers should also recognise the limited accuracy of many geotechnical design calculations.*
- *Peat slope failures do occur along trenches where duct work/pipe work have been placed.*

I have been informed by people involved in the design of gas pipelines from well to terminal that third party verification of the design is always carried out.
In Section 5.10 of the HSA report 'Land use planning advice for MCC' the author also states that the operator has committed to the appointment of a recognised independent third party verification team that will include an assessment of all aspects of work deemed critical to the safe and reliable functioning of the terminal. Some aspects of the design are still ongoing and I believe that very little third party verification have been carried out for this project.

Observation to Applicants response to Item No. 2
Peat Stabilisation

Peat stabilisation has its advantages but it also contains many uncertainties as it primarily depends on the composition and decomposition of the peat. Even if successfully treated, the stabilised peat is a new material with unknown long-term consequence with constant chemical changes taking place. Tests conducted concluded that large variations in strength are possible from sample to sample and from lab test to field test and from top to base (as high as 50%).

Huttunen and Kujala (1996) reported that the strength achieved by stabilisation decreased with advanced decomposition in all types of peat tested and this is also recognised and agreed in the Hebib and Farrell Report. In their submission the applicant has stated that lower down and closer to the interface between the peat and the mineral soil the peat becomes increasingly decomposed and amorphous with little tensile strength. This implies that the strength of the stabilised peat will decrease from the top layers to the bottom layers- which is quite concerning. Hebib and Farrell have stated that Secondary compression of stabilised peat is subject to further investigation involving pore pressure dissipation, i.e. the effect the long term performance of the stabilised peat has yet to be established. The report states that, for the cement-stabilised peat, creep could be associated with a structural breakdown of the stabilised peat.

Hebib and Farrell examined the effect of initial preloading on stabilised peat. It was concluded that preloading the sample produced a greater strength than the specimens that were not preloaded.
The load applied on the sample test was vertical, constant and static for a specified time thus did not vary during the hydration process allowing the chemical process and bonding of materials to take place. No lateral load or vibration load was applied. Stabilisation occurring on site will be affected by dynamic loading and vibrations arising from the constant construction traffic either adjacent to the stabilised peat (initially) or on top of the stabilised peat during curing process. This is concerning as the chemical and bonding process are ultimately affected thus reducing the stabilised strength of the peat allowing creep and structural breakdown to occur as stated above. The effects of applying a varying load (vertical or lateral including vibration) during the 'curing' process has not been examined and can have a consequential effect on strength of the stabilised peat. Intense heat or ground vibrations from an Industrial accident have not been examined on stabilised peat.

Hebib and Farrell report states that 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. This was mainly ascribed to the lesser homogeneous mixing achieved in the field compared to the laboratory. A strength reduction factor of 20-50% was reported for the strengths achieved in the field compared to those measured on laboratory-mixed specimens. Therefore great caution should be taken when extrapolating data obtained from laboratory-mixed specimens.

The sample concluded that the permeability of the cement-stabilised peat was of the same order or lower than the original peat depending on the stress state acting during curing, with preloaded specimens yielding lower permeability. Therefore, it can be concluded that the permeability of the stabilised soil is virtually unknown and difficult to determine in field tests.
The consequence of this is that hydrostatic pressure can build up within the peat mass irrespective of surface water drainage. The mass of the stabilised peat can impose lateral earth pressure on adjacent sections. Access across soft ground during the stabilisation process will affect the natural permeability of the naturally formed bog. All of this has the potential to cause a bog slide.
Traffic travelling on the edge of stabilised peat will impose an eccentric edge load on the stabilised peat and this could result in lateral edge failure. The tests conducted in the lab were confined on all sides.
Published results do not provided edge load performance of stabilised peat.
Also the observed compression of the cement-stabilised peat in published tests was mainly one-dimensional (Habib and Farrell)

Observation to Applicants response to Item 3

Environmental Impact of Peat Stabilisation

The applicant makes reference to leaching from stabilised soils and uses the Holma Bog is Sweden to confirm that it was not possible to detect any leaching about 1m from the stabilised soil. The orientation of the stabilised section of soil in Sweden relative to the general movement of water within the soil mass has not been identified and therefore leaching could be occurring adjacent to the stabilised soil or even within the stabilised soil as the permeability of the stabilised soil could be greater than the original soil. Therefore leaching would not be detectable 1m away, but could still be occurring.

In the geotechnical risk register the applicant suggest that Soil Stabilisation would pose an environmental hazard. Given that the site is within the catchment area of Carrowmore Lake and within close proximity to it, it would be advisable to apply the best available technology to protect the Environment rather than a technique that has many uncertainties and still requires further testing.

Observation to Applicants response in relation to Roads

I believe the issues relating to the roads are not the main deciding factor for this project.
It is imperative that emergencies occurring in the local area that requires immediate hospital attention in Castlebar can be adequately addressed with no time delay along the proposed haulage routes.

I would suggest that a third party road safety audit be carried out to check the submitted information. Third party verification is readily requested by planning authorities irrespective of road type (i.e. national, secondary, local etc)

Observation to Applicants response in relation to Phosphorus

The quality of water in Carrowmore lake had depleted considerably since site investigation for this project began. The site investigation has definitely contributed to this pollution. The applicant has tried to block bog holes and change the water level on the site in many occasions. Local people have reported the applicant's vigorous efforts in trying to alter the watercources, digging larger trial holes and blocking the saturated bog hole.
It is unimaginable what short or long term impact the construction work would have on the Environment (streams, lakes, rivers)

High levels of Calcium (1622 mg/l) Magnesium (1170mg/) Potassium (144mg/L) including Sodium (326mg/l) were recorded from the peat samples used in the Hebib and Farrell testing. This too is a concern for water contamination.

Approximately 405,000,000 litres of water is contained within the 450,000m^3 of blanket bog. This is contaminated water. Due to the elevated high water table, and following the excavation process water will pour into the excavation through the adjoining saturated blanket bog and mineral soil. Also the fractured rock will allow water to pass through. The entire excavation will become on big pool of water as the water level reaches equilibrium. Continuous pumping of water will be required to allow construction. This combined with heavy rainfall will undoubtedly cause environmental problems.

Appendix 1

Larger Scale

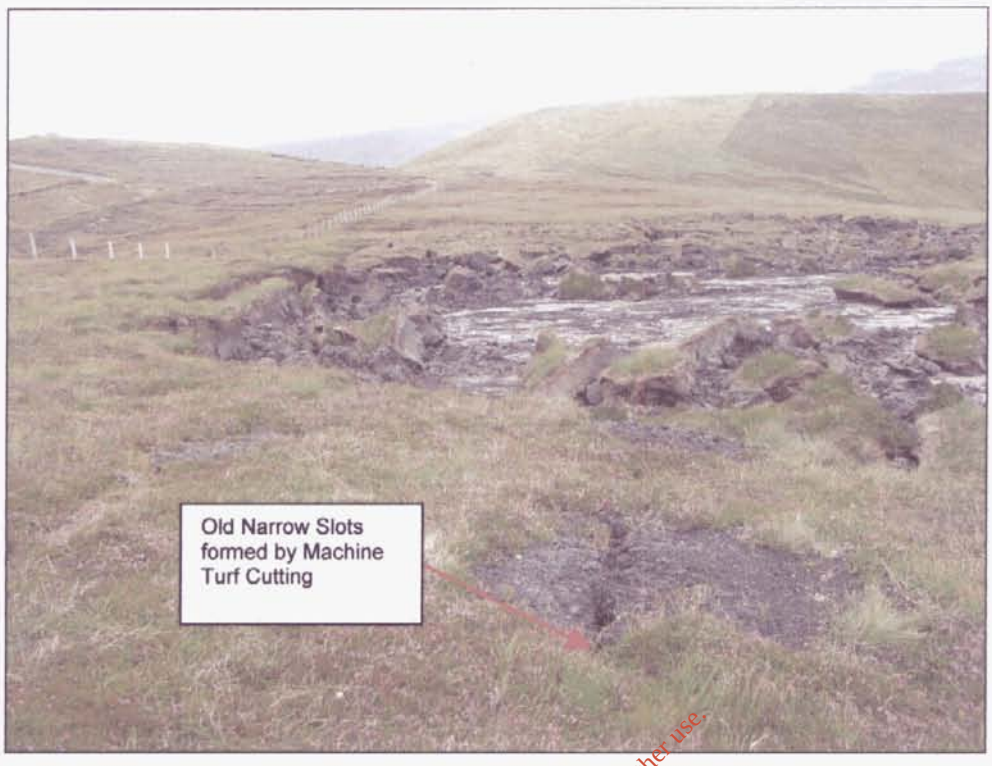
of the

Photographs

contained within

the

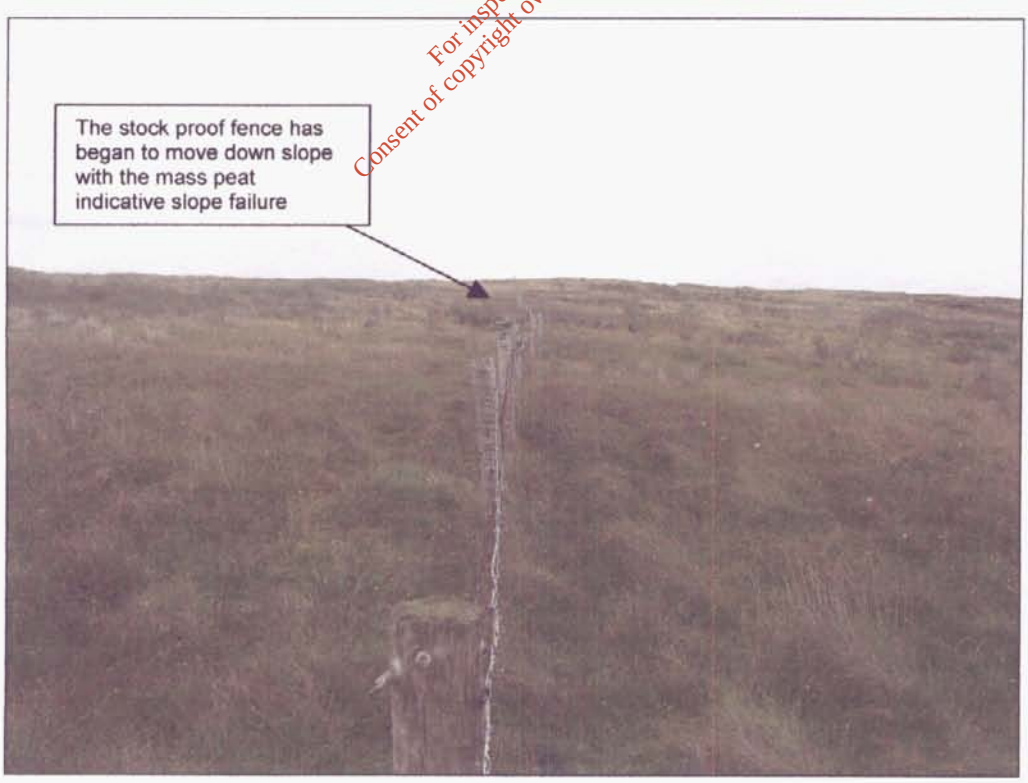
main body of the report



Picture indicates the failure of Bog at the top of crest. This failure did not result in water ponding on the surface. The failure was caused by mans interference with blanket bog and the impact of such on the hydrostatic pressure within the body of the peat.

The Vertical slots (Cracks) that were formed by machine turf cutting are clearly visible and are easily recognised. They are not shrinkage cracking as suggested by the applicant.

It is clear in the above photo that mans interference with Bog contributed to this section of failure also. The trenching route for the electrical ductwork clearly failed after many years after installation. The electrical ductwork did not impose any stresses on the blanket bog and still failure occurred. The proposed pressure pipeline routes across and through blanket bog will undoubtedly exert forces and temperature differential in the formed trench, thus increasing the probability of the hazard of trench failure.



It is clear from the previous picture that peat slope failure is gradually occurring at this location as the stock proof fencing is gradually moving down slope and deforming. The stakes were

installed in a straight line during the wiring of the commonage. The timber stakes have deformed in both directions and the wire fence is extremely taught arising from the displacement. These indicators are quite easy to recognise but are not usually identified by engineers.

Appendix 2

Additional Geotechnical Risks

Geotechnical Risk Register

No.	Hazard	Cause	Impact	Before Control			Operational Control	After Control			Justification for Hazard/ Probabilities
				P	I	R		P	I	R	
1A, 7A	Inadequate Access to the Terminal Site Within Site Boundaries. Hazard resulting in Domino Effect due to inadequate access to affected area	Permanent Access Failure during the operational phase. Access becomes blocked, arising from dislodged Material (Peat, or Debris) in the event of an explosion or peat stabilisation failure arising from continued heavy loads arising from Heavy Articulated Fuel Trucks (Condensate used as Commercial Fuel)	Not Possible to gain sufficient access to the affected area in the event of an emergency. Health and Safety Risk to the Terminal Staff and Public, Environmental Risk also	4	4	16	This Credible Hazard is not addressed by Applicant and therefore operational control measures are not known	?	4	>8	It is imperative that adequate and alternative access including emergency vehicle standing areas be provided for all possible credible events that can occur. Alternative Access especially along the South and South West Corner of the site would reduce the probability of a primary access becoming blocked or crossing over saturated peat. Bord Pleanala has recgonised the need for alternative access routes for emergency vehicles in previous applications. I have included a video copy of a news report that identifies the risks and hazard arising from a gas explosion.
2A	Unexpected Ground Conditions (Short and Long term Hazard)	Stockpiling of Peat and construction material causes excessive overpressure on the soft soil/ peat. This can occur at the main terminal site or at the deposition site in Srahmore. The Overburden pressure affects the natural permeability of the peat and hence water pressure buildup in the body of the peat	Contamination of Ground water entering local Water courses, Health and Safety Risk to Construction Workers and Public, Excavation and removal of more materials	3	4	12		?	4	>4	Overloading Weak Bog is one of the reasons for the Derrybrien Bog Failures and the applicant also states this. A failure slope can occur within the body of the peat irrespective of the peat surface slope (Slip Circle). The peat will be deposited permanently at the Srahmore site unlike the window rows of peat that are removed periodically by Bord Na Mona

No.	Hazard	Cause	Impact	Before Control			Operational Control	After Control			Justification for Hazard/ Probabilities
				P	I	R		P	I	R	
8A	Failure of Gabion Walls. Hazard to the Terminal Infrastructure, Construction Workers, Terminal Buildings and Staff and Ultimately could cause Major Accident	The High Gabion Wall is imposing a high differential bearing pressure and hence settlement on the weak mineral soil. High overburden pressure on saturated soft soil. Differential Base pressures across the width of the gabion wall foundation thus causing instability of the gabion wall mass and hence failure. Gas Pipeline fails and explodes and dislodge free-standing gabion structure. Hydrostatic pressure builds up due to collection of sediment build up in drainage pipework at the back of retaining wall or the reduced permeability of the consolidated peat arising from surcharge loading.	The impact of this hazard is on Terminal Infrastructure (Gas Pipework, Piperacks, Access Roads, Gas Tanks etc) and important electrical controls.	3	5	15	None Specified by applicant	?	5	>10	All elements of a critical retaining wall should be adequately tied to prevent disproportionate collapse in the event of an accident. The individual elements should not be free to move or dislodge especially since these elements are so critical when the gas is stored on site. This is best achieved using Reinforced Concrete Structures. The best available Technology for this Hazard is not Loose Gabion Structures. Concrete Retaining Walls anchored into bedrock with adequate drainage would be a more integral retaining structure and best available technology. The risk is too high and can be reduced by reinforced concrete structure
10A	Failure of Slopes Excavated in Rock Hazard effects the entire Terminal Building and operations including Terminal staff, the environment and the Public	Potential Block Failure not detected during the excavation process as such block fracture was behind excavated face.		3	4	12	None Specified by applicant The impact of such a Hazard should not change either before or after the control as suggested by the Applicant in Hazard No. 10.	?	4	> = 8	The applicant has identified a possible failure mechanism within the rock mass i.e. block failure. They expect potential block slippage to be detected during the excavation process, which would suggest the potential for such to arise as they say the rock contains joints and fractures. The impact before and after any control measures should remain the same with this Hazard. The impact becomes worse during the operational phase of the building not better as suggested by the applicant.

No.	Hazard	Cause	Impact	Before Control			Operational Control	After Control			Justification for Hazard/ Probabilities
12A	Foundation Failure. Failure of buildings etc constructed on Stabilised Peat (Operational Phase). This can also produce an Environmental Hazard	Stabilised peat and/or Concrete piles within peat not capable of resisting loads especially from Lateral Wind Loads and Gradual deformation / movement of surrounding peat thus long-term stability impact	Flare Stack becomes unstable and fails. Risk to Terminal Staff and Public arising from Domino Effect	5	4	20	This Credible Hazard is not addressed by Applicant and therefore operational control measures are not known. The applicant has only addressed the construction hazard of other elements constructed on stabilised peat		4	>10	*Extract from Hebib and Farrell:It is well recognised that organic soils can retard or prevent the proper hydration of binders such as cement in binder-soil mixtures. 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. Similarly,many questions remain to be answered regarding its mechanical behaviour in terms of compressibility, permeability, and shear strength. It seems that , for the cement-stabilisation peat, creep could be associated with structural breakdown. Tsutsuki and Kuwatsuka, as quoted in Stevenson (1996) reported that the strength achieved by stabilisation decreased with advanced decomposition in all types of peat tested and this is in agreement with the findings obtained in the present study (Hebib & Farrell).* I believe that the foundation of all buildings including the flare stack should be on sound mass foundations to bedrock. The lateral stability of piled foundations in peat is unpredictable and therefore the stability of the structures is questionable especially the Flare Stack. The peat mass could also impose lateral pressure thus causing the piles to bend and/or move. For the sake of a few additional cubic meters of peat it would be advisable to remove the peat especially under the high flare stack
16A	Ground Failure around High Pressure Gas Pipework within the site boundaries even though it can also occur outside the site boundaries. Picture Evidence of trench failure included in the main body of the report	Local failure of blanket bog surrounding Pipeline.	Gas Explosion similar to the Brussels Pipeline Explosion with Dramatic Domino Effects, Environment, Terminal Workers, General Public, Forest Fires	4	5	20	This Credible Hazard is not addressed by Applicant and therefore operational control measures are not known. Gas Pipeline Failure below ground.	4*	5	20	The applicant has identified the hazard of ground failure around trenches for drainage pipe work during construction. It is clear from this report that trench failure following backfilling can also occur during operations phase. All credible hazards should be identified and not ignored. Data is not available on the structural stability of High Pressure Gas Pipelines in Peat and therefore lower probabilities cannot be applied even after the control since data is not available. If the pipeline was supported/surrounded with rock terrain along its length then the probability of failure of the supporting rock could be classified as Negligible (ie P=1), If the pipeline was supported and surrounded with a clay/ gravels terrain along its full length then the probability of slope failure of the supporting soil could be classified as Unlikely (ie P =2) as the properties and predications of that type of soil is better known than organic peat. The probability of the failure of the blanket bog around gas pipeline and ultimately the failure of the pipeline is increased for the following reasons; Mans interference with bog has led to bog failures- well know. Picture evidence of the failure of blanket bog along a service trench is included in the main body of the report, mainly because the permeability of the material in the service trench is different to that of the surrounding undisturbed blanket bog.

No.	Hazard	Cause	Impact	Before Control			Operational Control	After Control			Justification for Hazard/ Probabilities
16A cont											Trenching through peat affects the permeability and natural drainage of the peat thus increasing / decreasing / water pressure within peat- trench side /slope failure. Stabilised peat is an unknown material with unpredicted long term performance,. Stabilisation of peat surrounding the pipeline affects the natural permeability of the insitu peat; Variable High pressure pipeline imposes dynamic pressure on the surrounding/supporting material/structure, thus resulting in consolidation, creep, settlement, mass peat movement and hence secondary suppport system movement. Refer also to 12A.
16B	Failure of Gas Pipeline. Pin-hole occurs in Gas Pipework within the site. Similar to the Gas Pipeline Explosion in Brussels and New Mexico	Lateral or Vertical Ground Movement causing slight structural defect in Pipework or Piperack causing small fracture. Inadequate long-term connection of pipework. Structural Stability of Pipework in Peat not adequately addressed. Pipeline Damaged from Third party activity.	Gas Explosion similar to the Brussels Pipeline Explosion with Dramatic Domino Effects	4	5	20	This Credible Hazard is not addressed by Applicant and therefore operational control measures are not known.	4*	5	20	The applicant has identified the hazard of ground failure around drainage pipe work. This is a credible geotechnical hazard and can also occur around Gas Pipelines. Data is not available on the structural stability of High Pressure Gas Pipelines in Peat and therefore lower probabilities cannot be applied even after the control. Refer to Justification for Hazard / Probabilities 12A Gradual Mass Peat slope movement can occur without major on ground evidence.

No.	Hazard	Cause	Impact	Before Control			Operational Control	After Control			Justification for Hazard/ Probabilities
18A	Failure of Ponds Inadequate settlement in Pond, Environmental Hazard (Construction and Long Term Hazard)	High Velocity of Water Flowing through the settlement pond causing settled solids to suspend and be discharged	Impact to Lake, streams and rivers.	4	4	16	Applicant has not addressed this Credible Hazard at Srahmore and therefore operational control measures are not known.		4	>8	It is recognised that settlement ponds do not continuously perform their intend function. The North Western Fisheries Board has stated that they will be delighted when the industrial peat process comes to an end as they can then begin to clean the sediment from the rivers. The exposed cutaway bog in Srahmore together with the proposed deposited peat from Bellanaboy will contain tonnes of sediment that can escape into the streams and rivers, during periods of prolonged and intense rainfall.
20A	Bog Slides Construction and Long term Hazard	Mans interference affecting the Natural water Flowline/Flownets that currently exist in the Bog. Hydrostatic water pressure build-up below surface water drainage levels. Natural composition of Blanket bog affected due to overburden pressure, digging, trapped water, reduced water table etc. Natural Blanket Bog permeability affected due to overburden pressure and consolidation and therefore hydrostatic pressure build up within peat mass	Impact to Lake, streams, rivers, construction workers, terminal staff and public.	4	5	20			5	> = 15	The published document 'Managing Geotechnical Risk' (Clayton) has quoted on page 33 that Designers should recognise the limited accuracy of many geotechnical design calculations. Due to the unpredictable nature of peat and the lack of confident information relating to the properties of stabilised peat the probability of peat slope failure is 'Likely' regardless of Control measures. Secondary settlement of stabilised peat requires further testing Such a large volume of saturated blanket bog has never been excavated and removed and then deposited successfully on a cut-away bog. It is recognised that mans interference has contributed to many peat slope failures. Such are the reasons for many sections of the Dooncartoon Landslide. This project can definitely lend itself to mans interference with blanket bog. On the Southern portion of Dooncartoon Hill i.e. (Cornhill side) The mechanism of peat slope failure has resulted from mans interference and not the mechanism identified by the applicant. The impact of such a Hazard certainly becomes greater when the highly explosive gas is processed on site. The heavy mass of stabilised peat, with its varying permeability will affect the natural flow of water through the peat. The surface water drainage network and its design have no direct link with peat slope failure. Varying hydrostatic pressure within the peat mass has. This is obvious as picture evidence of a peat slope failure at the top of a crest have been included in this report where surface water would not possibly collect and pond. There is no definite way to ensure that the site will continue to maintain its current permeability or its natural formation. Surface water drainage channels will effectively collect surface water runoff and slow water seepage through the peat above the drainage bed. Increased Hydrostatic pressure within the peat can still occur from trapped water because of the varied permeability regardless of

											drainage network resulting from mans interference. (Soil Stabilisation, Stockpiling of Materials, Construction Traffic, Consolidation etc.)