3rd 3rd party appeal

PL16.207212

APPEAL BY

BRIAN COYLE

FURTHER APPEAL FORM

SECTION 26	SECTION 37

Appeal No: PL 207212

Lodged: 24/5/04 **Case Type:** 03

O.H. Request Date: 24/5/04 **P.A. Decision Date:** _____

Appellant: Brian Coyle

Adress/~~Agent~~: Block 1, 2nd floor, GFSC,
Moneenageisha Road, Galway

Mr Cranwell

1. **Acknowledge with:** BP01HM

Merge:

(1) psplit ☐ (4) omitdoc ☐

(2) msplit ☐ (5) overpay ☐

(3) revplan ☐ (6) xmas ☐

2. Issue appeal to:

(a) P.A: _____

(b) Applicant: _____

(c) Other: _____

_____

_____

3. Return appeal with: _____

4. Return to prepare exp.ltr: _____

Comments:

Please insert date of cross circulation on control sheet

_____

_____

_____

_____

EO: K Doherty **AA:** Ron Cranwell

Date: 26/5/04 **Date:** 3/6/04

J:abp\forms

Brian Coyle
Block 1, 2nd floor,
GFSC,
Moneenageisha Road
Galway.
TEL: 091 752000
FAX: 091 753000

20th May, 2004

Our Ref 04-025-040520-01L

An Bord Pleanála
64 Marlborough Street
Dublin 1

Re: 3rd Party Grounds of Appeal - Pl Ref No. P03/3343

To Whom it May Concern,

Please see attached 3rd Party Grounds of Appeal on behalf of Brian Coyle, in relation to a decision by Mayo County Council to grant permission on an application by Shell E&P Irl, C/o Tom R. Phillips & Associates, 8-11 Lower Baggot Street, Dublin 2 for the proposed gas terminal development for the Corrib gas field at Bellanaboy Bridge, Bellanagelly South, Co. Mayo and for a peat deposition site at Srahmore and Attavally, Bangor, Co. Mayo. (i.e. Pl Ref No. P03/3343).

Also attached is a cheque for the requested fee of €200.00 for the Grounds of Appeal and a further €90.00 for an Oral Hearing, which is requested in the report of the attached Grounds of Appeal. We understand that the fee is non-refundable should the Board decide not to grant the Oral Hearing.

We thank you for your consideration of this appeal. Please acknowledge with receipt for same.

Yours sincerely,

Signed: _____
Brian Coyle BE CEng MIEI MIStructE

Encl. Grounds of Appeal
Cheque for €290.00

Mayo County Council
Aras An Chontae
Castlebar

Ref No.: P03/3343

27/01/2004

Mr Brian Coyle
Coyle Kennedy Engineers
GFSC Moneengeisha Road
Galway

A Chara

I wish to acknowledge receipt of submission received from you on 26/01/2004 in connection with planning application by **SHELL E & P IRELAND LIMITED for CONSTRUCT GAS TERMINAL FOR THE RECEPTION AND SERAPATION OF GAS FROM THE CORRIB GAS FIELD, AND FOR A PEAT DEPOSITION SITE, RESPECTIVELY. THE DEVELOPMENT WILL CONSIST OF THE CONCURRENT DEVELOPMENT OF TWO SITES LOCATED 11 KILOMETRES APART, APPROXIMATELY, AND IDENTIFIED AS THE SITE OF THE GAS TERMINAL FOR THE RECEPTION AND SEPARATION OF GAS FROM THE CORRIB GAS FIELD IN THE TOWNLAND OF BELLAGELLY SOUTH AND THE SITE OF THE PEAT DEPOSITION SITE IN THE TOWNLANDS OF SRAHMORE AND ATTAVALLY, BANGOR ERRIS. THE DEVELOPMENT AT THE BELLAGELLY SOUTH SITE WILL CONSIST OF: A GAS TERMINAL FOR THE RECEPTION AND SEPARATION OF GAS INCLUDING PLANT AND EQUIPMENT; PROVISION OF 4,935 SQ M (GROSS FLOOR AREA), APPROXIMATELY, OF BUILDINGS; ACCESS ROADS; 40 NO. CAR PARKING SPACES; AND ANCILLARY DEVELOPMENTS, OF WHICH 13 HA, APPROX, WILL BE DEVELOPED INRESPECT OF THE GAS TERMINAL'S FOOTPRINT. THE PROPOSED DEV. WILL OF THE BELLAGELLY SOUTH SITE WILL ALSO CONSIST OF; THE EXCAVATION AND REMOVAL OF 450,000 CUBIC M at BELLAGELLY SOUTH SRAHMORE ATTAVALLY.**

The matters referred to by you will be taken into consideration by the Council before a decision is made on the application. Notice of the Council's decision on the

application will be given in accordance with the requirements of the Planning and Development Regulations, 2001. This may be in the form of:

(a) posting the notice directly to you; or

(b) publishing the notice in a newspaper circulating in the area where the proposed development is situated.

Please note that in the event of an appeal being lodged by you, An Bord Pleanala will require a copy of this letter of acknowledgement.

Mise, le meas

pp

RUNAI CHONDAE

AN BORD PLEANÁLA
TIME _____ BY _____
24 MAY 2004
LTR-DATED _____ FROM _____
PL _____

PLANNING DEPARTMENT
MAYO COUNTY COUNCIL
ARAS AN CHONTAE
CASTLEBAR
CO. MAYO
094-24444

26-01-2004 12:28:48

Receipt No. : PLAN/0/8378

BRIAN COYLE
COYLE KENNEDY ENGS
GFSC MONEENGEISHA RD
GALWAY

MISC RECEIPTS - PLANNING 40001
OBJ P03/3343

Total 20.00 EUR
15.75 IEP

Tendered:
Cash 20.00

Issued By : Johanna Bourke
From: PLANNING SECTION

AN BORD PLEANÁLA
TIME _____ BY _____
24 MAY 2004
LTR-DATED _____ FROM _____
PL _____

THE BRIAN COYLE APPEAL

20th May 2004

TO THE DECISION MADE BY MAYO COUNTY COUNCIL FOR THE DEVELOPMENT OF A PROPOSED GAS TERMINAL AT BELLANABOY BRIDGE AND A PEAT DEPOSITION SITE AT SRAHMORE CO. MAYO

BASED ON ITS WORLD RECORDS

Should we allow the Corrib Gas Field to be Connected:

- ❑ To an Inland Terminal

And

- ❑ Becomes the only Inland Terminal In the WORLD? OF ITS KIND
- ❑ Surrounded in BLANKET BOG that can become unstable at an angle of 2degrees or more
- ❑ Connected from a Landfall at the Base of a Hill that is Unstable
- ❑ Residents as close as 60m to the High Pressure Untreated Pipeline
- ❑ Residents within the Explosion/Gas Vapour Exclusion Zone from the Terminal and High Pressure Pipeline
- ❑ Streams and Rivers within an exclusion zone feeding into a major drinking water supply
- ❑ The only World Wide Deposition of 450,000m3 of Acidic Blanket Bog
- ❑ Causing in excess of 100,000 CONSTRUCTION traffic turning movements during its development
- ❑ Resulting in the removal and discharge of at least 400,000,000 litres (Four hundred million) litres of acidic base water to the North and South of Carrowmore Lake, the only drinking water supply for the entire region
- ❑ In an Area of Natural Ground Instability

Why should we?
- when all the other World Wide Authorities have done different

Is it the lack of experience in our Representatives and Authorities that they do not know the difference between right and wrong?

We do not want an Erris EU Directive to be written similar to the Seveso II directive that was written following the disaster and the ultimate consequence to people in the small town called Seveso in Italy.

The Content of this report is written without prejudice and is for information purposes only

By Brian Coyle,
BE, CEng, MIEI, MIStructE

Chartered Consulting
Civil & Structural Engineer
Director of COYLE KENNEDY LTD
Consulting Engineers

Index

See Next page for Appendices

Appendices

Appendix 1

Mayo County Councils (MCC) Confirmation Of Receipt Of Observation and Objection Reports

Appendix 2

The Brian Coyle Observation and Objection Report Based on Applicant Submission and Research carried out at that time

Appendix 3

The Brian Coyle Observation and Objection Report Based on Applicants response to Further Information Request

Appendix 4
Correspondence BetweenBrian Coyle Mayo County Council And Health and Safety Authority

Appendix 5
Extract from SI 476/2000

Appendix 6
Extract from HSA report

Appendix 7
Rivers Fields Sour Gas Field Located in The Irish Sea

Appendix 8
Sour Gas Field Location in the Irish Sea Shown on a 3D Image of the Continental Shelf That is shared between European Countries

Appendix 9
New Mexico Gas Pipeline Explosion Detailed Report

Appendix 10
List of Explosions & Fires 1992-2002 at Shell Group Companies

Appendix 11
Copy of Letter to Ms. Mary Harney TD regarding discrepancy in the application of SI 476/2000 Regulations and Council Directive 96/82/EC

Appendix 12
Larger Scale Pictures of major accident events

Appeal

Introduction

This appeal against Mayo County Councils decision to grant permission to

CONSTRUCT GAS TERMINAL FOR THE RECEPTION AND SERAPATION OF GAS FROM THE CORRIB GAS FIELD, AND FOR A PEAT DEPOSITION SITE, RESPECTIVELY. THE DEVELOPMENT WILL CONSIST OF THE CONCURRENT DEVELOPMENT OF TWO SITES LOCATED 11 KILOMETRES APART, APPROXIMATELY, AND IDENTIFIED AS THE SITE OF THE GAS TERMINAL FOR THE RECEPTION AND SEPARATION OF GAS FROM THE CORRIB GAS FIELD IN THE TOWNLAND OF BELLAGELLY SOUTH AND THE SITE OF THE PEAT DEPOSITION SITE IN THE TOWNLANDS OF SRAHMORE AND ATTAVALLY, BANGOR ERRIS. THE DEVELOPMENT AT THE BELLAGELLY SOUTH SITE WILL CONSIST OF: A GAS TERMINAL FOR THE RECEPTION AND SEPARATION OF GAS INCLUDING PLANT AND EQUIPMENT; PROVISION OF 4,935 SQ M (GROSS FLOOR AREA), APPROXIMATELY, OF BUILDINGS; ACCESS ROADS; 40 NO. CAR PARKING SPACES; AND ANCILLARY DEVELOPMENTS, OF WHICH 13 HA, APPROX, WILL BE DEVELOPED INRESPECT OF THE GAS TERMINAL'S FOOTPRINT. THE PROPOSED DEV. WILL OF THE BELLAGELLY SOUTH SITE WILL ALSO CONSIST OF; THE EXCAVATION AND REMOVAL OF 450,000 CUBIC M

is compiled and written by Brian Coyle BE, CEng, MIEI, MIStructE Chartered Consulting Engineer and director of Coyle Kennedy Ltd (Consulting Engineers).

I am a practicing consulting engineer in Galway and involved in civil and structural engineering projects throughout the country. I am a native of the North Mayo area where most of my family and friends live. I welcome infrastructure development and acknowledge our National and Local policies.

Reasons for my Observations, Objections and This Appeal

During the previous applications submitted, I assumed (and took verbal advice from people that really did not know the full facts) that the proposed development at Bellanaboy was no different than any other gas terminal development built throughout the world. I did not examine or submit an observation/ objection to any of the applicants' previous submissions because previously I was not familiar with the applicants' proposals.

I initially became concerned when I heard that the applicant was re-applying on the same site for a gas terminal following the devastating landslides of September 2003. How could the applicants design team, local authorities and government officials be encouraging such a development following these natural events?

Part of Dooncartoon Hill Landslide (East Face) September 2003. The force of the failure ripped through woodland, local cemetery walls, bridges, headstones etc. and covered its path with blankets of bog and mineral soil. It completely blocked the main public road.

I became more concerned to hear that two of the three routes proposed for the high-pressure pipeline from the gas well to the terminal were up and along the Dooncartoon hill. This was an indication of the lack of research and investigation into the proposals put forward by the applicant and their design team for this gas terminal development. Based on the natural occurring landslide events of 1983 and 2003 these alternative routes should have never been proposed. This triggered my interest in the recent proposed gas terminal development and its related consequences.

The force of the landslide ripped through existing streams and formed large dikes. The applicant was identifying two possible high-pressure pipeline routes along and up the Dooncartoon Hill. This creator was formed from a small stream. One of the alternative pipeline routes would have been through this stream. Undoubtedly the force of the flow and dislodged boulders, etc would have resulted in pipeline failure.

Part of the Dooncartoon Hill Landslide (North Face)

The proposed current location for this high-pressure pipeline is another overwhelming mistake and is an indication of organisational shortcomings into investigating alternative more realistic proposals. Shortcomings are still apparent in the recent application and technical submissions and will be highlighted later. The proposed development and pipeline route has the potential to create a major accident as the proposed gas terminal and its installations are surrounded in blanket bog that can fail at slopes of 2-degrees and above as stated by the applicant.

Local residents have continued to highlight this possibility and further possible occurrences. It is now obvious, that the 'domino effect' of a potential major accident was prevented by the persistence of a small group of local residents. The current proposal put forward by the applicant is another overwhelming mistake and is the recipe for a major accident.

The preamble of the Seveso II directive states:

*Whereas analysis of the major accidents reported in the Community indicates that the majority of them are the result of **managerial and/or organisational shortcomings;***

Following my close examination of the applicants proposals, coupled with research into major accident events, changing regulations and directives it is now apparent to me that this is the wrong site for this proposed development. I welcome this development on an alternative site that limits the consequences of a major accident domino effect. This site contains all the characteristics of a 'major accident 'domino effect'. The Bellanaboy site characteristics and its surroundings (Blanket Bog, Streams, Rivers, Bog Heather, Forestry, Carrowmore Lake, natural ground instability etc.) concerns me as they can all lead to a major accident domino effect during the operational phase or in the event of a fire /explosion either at the terminal or along the pipeline.

The persistence of the applicant, local authorities and government officials and the lack of research and thorough investigation into alternative sites are very evident. How many more events are necessary/required to occur and possible lives lost before the applicant, local authority and government officials realise that this is the wrong site for a gas terminal development. It doesn't take an expert to arrive at this conclusion. We do not want to be implementing the regulations for the Erris EU Directive on major accidents similar to those implemented for the Seveso disaster in 1976.

WE ARE RELYING TOO MUCH ON THE ADVICE FROM AN INDUSTRY THAT WE SHOULD BE ADEQUATELY REGULATING.

Confirmation of Receipt of my Observations and Objection Documents by Mayo County Council

Appendix 1 of this report contains Mayo County Councils (MCC) confirmation of receipt of my observation and objection reports, including receipt of payment.

Copy of my Observation and Objection Reports

A copy of my submitted reports is included in Appendix 2 and Appendix 3. Appendix 2 contains my first report based on the applicants' planning application and it is titled 'The Brian Coyle Observation & Objection Report'

Appendix 3 contains my other report titled 'The Brian Coyle Observation & Objection Report To The Further Information Response' following examination of the applicants' response to MCC further information request.

Request for an Oral Hearing

Based on recent events;

- Gas explosions-reports of some events are included in this document.
- Dooncarton Hill Landslide
- The exploration and treatment of gas containing Hydrogen Sulphide in the Irish Sea that is fatal at very low concentrations,
- Terrorists Attack – The infrastructure is already in place to transport the Corrib Gas to Russia and South Africa, thus making it a potential terrorist target

I therefore request an oral hearing, as these items have not been adequately addressed.

Reasons for Refusal

Summary of Observation and Objection Report
Copy of Report- Included in Appendix 2

I Object to the Proposed Site for the Gas Terminal Industrial Process at Bellagelly South, located to the North of the Catchment area of Carrowmore Lake, and the Peat Deposition Site at Srahmore on the following basis.

- Health and Safety Risks that this development impacts to local residents. Engineering assessment on slope stability must adequately examine slope stability prior to, during and after an explosion and also take account of Natural and livelihood events that are outside the applicant's control. The applicant has identified these events as one of the reasons for peat/land slides on slopes as low as 2 degrees but has not provided an engineering assessment, or a method of control for such events.

- Health and Safety Risks that this development impacts to Carrowmore Lake and hence the Erris community during construction, following construction or after a major accident. The applicant fails to identify how they can limit the consequences of events identified by them and in the Seveso II directive. The applicant has no control on the land use or the surface water runoff to streams and rivers that feed into Carrowmore Lake. These streams and rivers are outside the control of the applicant and can become contaminated with toxic chemicals.

- I object to the risk that the terminal imposes on the stability of the surrounding landscape including Dooncartoon Hill. The risks associated with the Gas Industry process i.e. explosions etc. will cause ground vibrations and hence ground instability. Remember that the applicant has identified in their submission that peat can become unstable at an angle of 2degrees or above.

- I object that economic analysis based purely on the Corrib gas quantity has formed the immediate basis of their decision for building an inland/onshore gas terminal. Gas/oil Hydrocarbons have been found and exploited in the Celtic Sea, the Porcupine Trough and in the Corrib Basin. These areas are mainly located off the west coast of Mayo, Galway, Clare and Kerry.

- I object to the excavation and the deposition of 450,000m^3 of Acidic Peat to the South of Carrowmore Lake (the only drinking water supply for the entire Erris People).

- I object to the increase in traffic turning movements associated with this proposed development and the impact that this has on local residents, emergency vehicles etc.

- The previous application identified approximately 7,600 traffic-turning movements. The current application will introduce A MINIMUM OF 82,000 TRAFFIC TURNING MOVEMENTS just to remove the Acidic Peat. The overall traffic turning movements associated with the proposed development will exceed 100,000 movements i.e. a truck will enter or leave the site at least 100,000 times during construction.

- At least 90% of peat is water. There is 1000L of water in a meter cube (m^3). I object to the removal of such a large volume of acidic water contained in the Blanket Peat. This blanket peat is going to be disturbed/removed and disposed in an area to the North and South of Carrowmore Lake respectively.

  The amount of acidic water contained in the blanket bog is AT LEAST 405,000,000 LITRES (FOUR HUNDRED AND FIVE MILLION LITRES OF ACIDIC WATER).

- I object to the traffic hazard imposed on local roads arising from the construction of the terminal, the removal of 450,000m^3 of peat and 50,000m^3 of mineral soil. The c.11km route chosen to dispose this material is inadequate in formation, width and alignment. This road will be destroyed and congested with trucks during construction and will impose a high risk to those people travelling to Castlebar General Hospital in the event of an emergency. This route is the shortest route available to Castlebar/Mayo General Hospital for all residents in the North Erris area. Therefore, people's lives are at risk even during construction stage.

- I object to the location of the Gas Pipeline, Discharge Pipeline and Umbilical Line as identified under the

Foreshore Licence. I also object to the Link between this infrastructure and the Gas Terminal on foot of the recent landslide of Dooncartoon Hill. The pipeline is also been laid on Blanket Bog which the Applicant has identified can slide at an angle of 2degrees or more. How do they intend to control Natural or Local livelihood events that have been identified (by the applicant) as one of the main reasons for peat/land slides? These landslides will undoubtedly fracture, shear the pipeline and can impact on the terminal and cause a catastrophic disaster in an area currently stamped with natural ground instability. In light of this new information the Minister for the Marine has power under the Foreshore Act to withdraw the Foreshore licence on the basis of non-observance by the licensee of all these events at the time the licence was issued.

- I object to the fact that insufficient Health and Safety assessment has not been provided for all the possible events and their ultimate consequences. All Health and Safety aspects should be assessed at this stage. How do we intend to control and limit the consequences of these events if people involved cannot even provide a solution at this stage? It is unacceptable to conceal facts and realistic concerns associated with the proposed development.

Summary of my Report to the Response to FI Request

Copy of that report -Included in Appendix 3

- The applicants own recommendations are not been meet along the entire stretch of the public haul road even after upgrading works.
- The proposed road width of 5.5m is not verified in accordance with NRA standards or any other published documents and therefore it effectiveness and safety cannot be addressed for such large volumes of heavy traffic.
- Emergencies and contingencies have not been fully considered, addressed or resolved by this recent submission.
- The applicant has identified that the haul route is supported on 2-3m of peat
- The overall impact of the road improvement works on existing land, embankments, slope stability, drainage and private property is not fully assessed.
- Published documents state that there is a statutory requirement to provide for the health, safety and welfare of all employees and members of the public in connection with the design, construction operation and maintenance of pipelines
- Published documents state that it is desirable to avoid a route where the pipeline might be subject to heavy external stresses or where the consequences of a leak, if one did occur, might be particularly serious. In practice, all cross-country pipelines and some local pipelines will have to be subjected to a detailed safety evaluation as part of its consideration.
- The highly flammable liquid transported in the pipeline under pressure creates forces at bends, junctions, valves and all restrictions to, and changes in, direction of flow.
- Additional transient forces may be generated by pump starts or stops, valve closures etc. The vector analysis arising from high-pressure fluid in the pipeline must be resolved and hence the pipeline effectively supported or else it will fail.
- Section 2.2 in the EIS report states that the terminal is designed to throughput of 10 million cubic meters per day (350 million standard cubic feet per day).
- Taking account of the 10 million cubic meters per day and on the basis that 'volume in' equates to 'volume out' then the speed of flow through a 508mm diameter pipeline with a 25.4mm wall thickness will be a whooping c. 2,500km/hr (two thousand five hundred kilometres per hour).
- The applicant has stated the orthophosphate impact to surface watercourses from phosphate-impacted soils is widely recognised as being a major concern in certain parts of Ireland, because it can lead to eutrophication of lakes and rivers. The orthophosphate concentrations

recorded by the applicant in the blanket bog is approximately 250-10,000 times greater than the allowable concentration in lake waters.

- The milling of peat commonly associated with the work that Bord Na Mona does is better compared to harvesting crops than removing saturated blanket bog. This statement is supported with picture evidence in the Bord Na Mona Website.

- The proposed construction work (grouting) resulting in the injection of chemicals into the ground where surface water run-off will flow into rivers and streams and then into a major drinking water supply for the entire region should undoubtedly be avoided. Published documents states that this process should be independently investigated.

- The applicant has now identified that the proposed process of removing the peat is weather dependent. Waterproofing sheeting will have to be placed over the peat every time it rains. Can you imagine acres of peat to be covered with sheets ever time it rains. Therefore, it could take many months and even years to remove the saturated blanket bog in order to meet the criteria put forward by the applicant.

Summary of Appeal Report

- Difficulties encountered during the Planning Process and the withholding of an observation / submission (HSA report) by Mayo County Council until a decision was made is contrary to the Planning and Development Act.

- The HSA advice is limited and only considers that area of land inside the Gas Terminal Security Fence

- The HSA has refused to consider or provide advice on the Health and Safety of the Local People at Work

- The HSA has refused to consider or provide advice on the safety of the public from the upstream (Import) pipeline under their remit (land use planning)

- Pipeline Standards only Consider the Safety of the Pipeline from the public (3rd Party Activity) and not the Safety of the Public from the pipeline. There The safety of the public from the high-pressure upstream pipeline in blanket bog has yet to adequately verified

- The HSA has admitted and stated that they do not have the expertise in-house to examine all of the necessary land-use planning criteria e.g. slope stability and in that instance they have omitted this major accident hazard event from there examination and have not provided advice for this event in their land-use planning advice HSA report.

- Site Specific Technical Advice is omitted in the assessment and advice given to the Local Authority, by the HSA as they have stated that they do not have in-house expertise

- The conclusions of the HSA report dated 8th April 2004 under land use planning are typical 'template' statements and do not address site-specific issues

- The HSA or local Authority has not considered all toxic substances that can be present in untreated gas and therefore excluding the assessment and advice in relation to the presence of Anticipated Substances

- The alternatives sites would still fulfil the National Policy to develop the Corrib Gas Field and would limit the consequence of a major accident domino effect arising from the Bellanaboy site characteristics

- Convenient Visits to other Gas Terminal Sites arranged by the Applicant are misleading and form no site-specific comparison to the proposed gas terminal site at Bellanaboy

- Independent Consultants Fehily Timoney & Company is only providing notes and commentary to Mayo County Council. They are not providing independent, verified factual conclusions and recommendations. This is evident in the Introduction content of their report

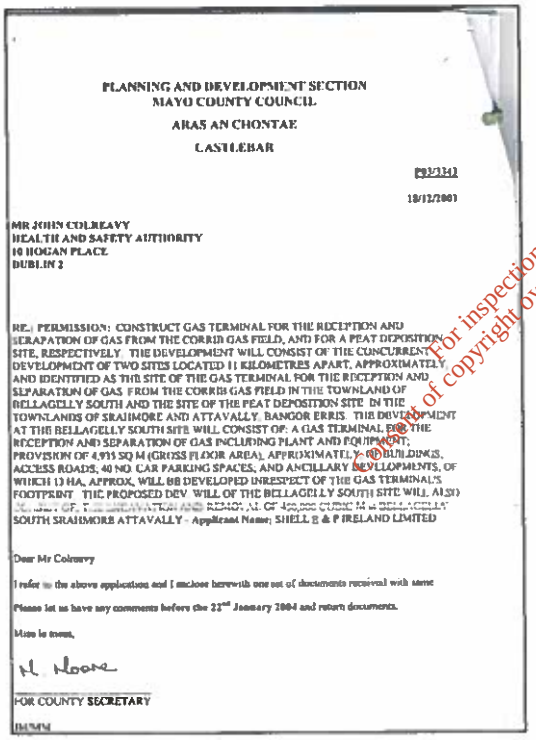
LET US BE AN EFFECTIVE AND RESPONSIBLE NATION FOR ALL OUR ACTIONS.

Difficulties Encountered during the Planning Process and the withholding of relevant information by Mayo County Council

Mayo County Council Withheld The HSA report from the Public

Public investigations and observations have been hampered as Mayo County Council and the Health and Safety Authority would not provide a copy of the HSA report prior to a decision by Mayo County Council.

A letter from Mayo County Council to Mr. John Colreavy (representative from the Process Industry Unit of the Health and Safety Authority hereafter referred to as the HSA) does not suggest that the HSA report would become an internal document and it does not suggest that it would not be available to the public until a decision was made.



PLANNING AND DEVELOPMENT SECTION
MAYO COUNTY COUNCIL
ÁRAS AN CHONTAE
CASTLEBAR

P03/3343

19/12/2003

MR JOHN COLREAVY
HEALTH AND SAFETY AUTHORITY
10 HOGAN PLACE
DUBLIN 2

RE: PERMISSION: CONSTRUCT GAS TERMINAL FOR THE RECEPTION AND SEPARATION OF GAS FROM THE CORRIB GAS FIELD, AND FOR A PEAT DEPOSITION SITE, RESPECTIVELY. THE DEVELOPMENT WILL CONSIST OF THE CONCURRENT DEVELOPMENT OF TWO SITES LOCATED 11 KILOMETRES APART, APPROXIMATELY, AND IDENTIFIED AS THE SITE OF THE GAS TERMINAL FOR THE RECEPTION AND SEPARATION OF GAS FROM THE CORRIB GAS FIELD IN THE TOWNLAND OF BELLAGELLY SOUTH AND THE SITE OF THE PEAT DEPOSITION SITE IN THE TOWNLANDS OF SRAHMORE AND ATTAVALLY, BANGOR ERRIS. THE DEVELOPMENT AT THE BELLAGELLY SOUTH SITE WILL CONSIST OF: A GAS TERMINAL FOR THE RECEPTION AND SEPARATION OF GAS INCLUDING PLANT AND EQUIPMENT; PROVISION OF 4,935 SQ M (GROSS FLOOR AREA), APPROXIMATELY, OF BUILDINGS, ACCESS ROADS, 40 NO. CAR PARKING SPACES, AND ANCILLARY DEVELOPMENTS, OF WHICH 13 HA, APPROX, WILL BE DEVELOPED IN RESPECT OF THE GAS TERMINAL'S FOOTPRINT. THE PROPOSED DEV. WILL OF THE BELLAGELLY SOUTH SITE WILL ALSO [illegible] SOUTH SRAHMORE ATTAVALLY - Applicant Name: SHELL E & P IRELAND LIMITED

Dear Mr Colreavy

I refer to the above application and I enclose herewith one set of documents received with same

Please let us have any comments before the 22nd January 2004 and return documents.

Mise le meas,

H. Moore

FOR COUNTY SECRETARY

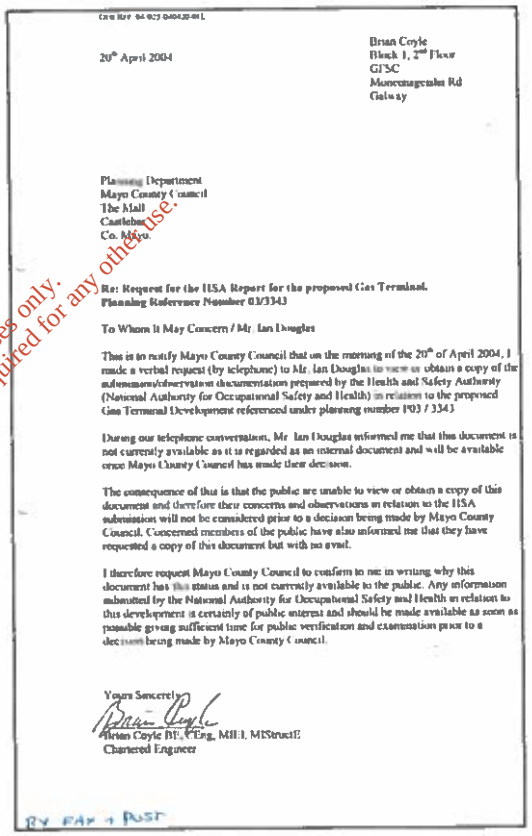
I believe that the HSA report is a submission or observation in relation to the planning application, and should have been made available for inspection and/or purchase to members of the public prior to MCC making a decision.

Mayo County Council received many phone calls from the public requesting a copy of the HSA report. I was not informed by Mayo County Council when they received the HSA report.

Mayo County Council did not indicate to me at any time that the report would be withheld from the public prior to a decision being made.

Mayo County Council received the health and safety authority report for land use planning advice on the 13th of April 2004, 27 days before the decision to grant permission.

On the 20th of April 2004, I wrote to Mayo County Council, (following a telephone conversation with Mr. Iain Douglas Senior Planner) asking them to confirm to me in writing why the HSA report was not available to the public prior to a decision being made and why it had achieved such a status i.e. internal document (copy below).



Our Ref: 04-023-040420-001

20th April 2004

Brian Coyle
Block 1, 2nd Floor
GTSC
Monivaggenlan Rd
Galway

Planning Department
Mayo County Council
The Mall
Castlebar
Co. Mayo

Re: Request for the HSA Report for the proposed Gas Terminal.
Planning Reference Number 03/3343

To Whom It May Concern / Mr. Ian Douglas

This is to notify Mayo County Council that on the morning of the 20th of April 2004, I made a verbal request (by telephone) to Mr. Ian Douglas to view or obtain a copy of the submission/observation documentation prepared by the Health and Safety Authority (National Authority for Occupational Safety and Health) in relation to the proposed Gas Terminal Development referenced under planning number P03 / 3343

During our telephone conversation, Mr. Ian Douglas informed me that this document is not currently available as it is regarded as an internal document and will be available once Mayo County Council has made their decision.

The consequence of this is that the public are unable to view or obtain a copy of this document and therefore their concerns and observations in relation to the HSA submission will not be considered prior to a decision being made by Mayo County Council. Concerned members of the public have also informed me that they have requested a copy of this document but with no avail.

I therefore request Mayo County Council to confirm to me in writing why this document has this status and is not currently available to the public. Any information submitted by the National Authority for Occupational Safety and Health in relation to this development is certainly of public interest and should be made available as soon as possible giving sufficient time for public verification and examination prior to a decision being made by Mayo County Council.

Yours Sincerely,

Brian Coyle BE, CEng, MIEI, MStructE
Chartered Engineer

BY FAX + POST

On the 27th of April 2004, I received a written reply to my letter (copy below).

COMHAIRLE CHONTAE MHAIGH EO

Áras an Chontae, Caisleán a' Bharraigh, Contae Mhaigh Eo.
Teileafón (094) 24444 Fax (094) 25917

Your Ref Our Ref

27th April, 2004

Mr. Brian Coyle,
Chartered Engineer,
Block 1, 2nd Floor,
GTSC,
Monumentgreahn Road,
Galway.

RE: HAS Report for the proposed Gas Terminal.

Dear Mr. Coyle,

This letter is to confirm our telephone conversation as requested in your letter dated 20th April, 2004. I will consider same will be given the concerns you have expressed.

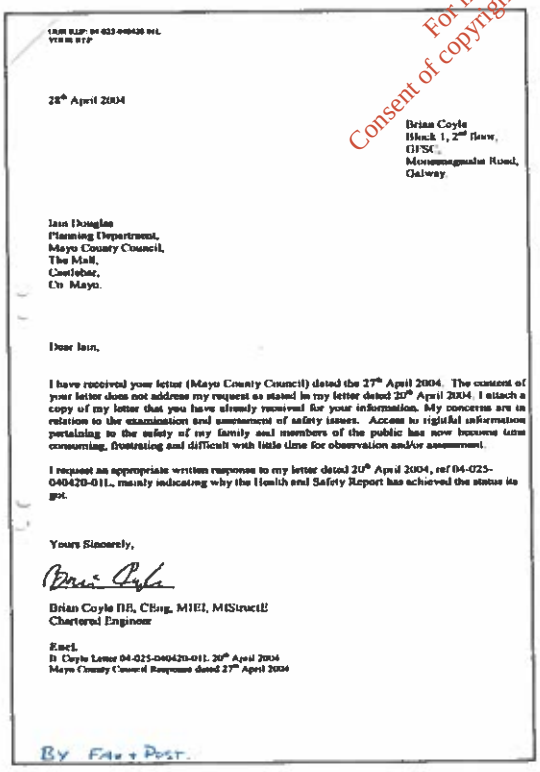
Yours sincerely,

Iain Douglas
Senior Planner.

MAYO COUNTY COUNCIL, Áras an Chontae, Castlebar, Co. Mayo. Tel: (094) 24444

A larger scale copy of this reply letter from Mayo County Council is included in Appendix 4. The response did not address my request and only confirmed our telephone conversation.

On the 28th of April, I wrote to Mr. Iain Douglas again to inform him that the content of his letter does not address my request and again, I requested an appropriate written response.



28th April 2004

Brian Coyle
Block 1, 2nd floor,
GTSC,
Monumentgreahn Road,
Galway.

Iain Douglas
Planning Department,
Mayo County Council,
The Mall,
Castlebar,
Co Mayo.

Dear Iain,

I have received your letter (Mayo County Council) dated the 27th April 2004. The content of your letter does not address my request as stated in my letter dated 20th April 2004. I attach a copy of my letter that you have already received for your information. My concerns are in relation to the examination and assessment of safety issues. Access to rigidal information pertaining to the safety of my family and members of the public has now become time consuming, frustrating and difficult with little time for observation and/or assessment.

I request an appropriate written response to my letter dated 20th April 2004, ref 04-025-040420-01L, mainly indicating why the Health and Safety Report has achieved the status to get.

Yours Sincerely,

Brian Coyle BE, CEng, MIEI, MIStructE
Chartered Engineer

Encl.
B Coyle Letter 04-025-040420-01L 20th April 2004
Mayo County Council Response dated 27th April 2004

BY Fax + Post.

To date, I have not received an appropriate written response/explanation from Mayo County Council.

A larger scale copy of these letters is included in Appendix 4.

Why was the HSA report withheld from the public before a decision was made?

Members of the public should be entitled to view or copy a document that should identify the risks and safety implications of the proposed development prior to a decision being made.

Planning and Development Act, 2000 Section 38 states that;

(1) Where a planning authority gives its decision in respect of a planning application the following documents shall be made available within 3 working days for inspection and purchase by members of the public during office hours at the offices of the authority:

(a) a copy of the planning application..... obtained from the applicant in accordance with regulations under this act.

(b) a copy any submission or observation in relation to the planning application which have been received by the authority;

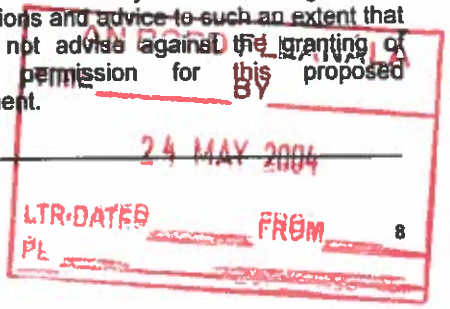
(3) Any documents referred to in paragraphs (a) and (b) of subsection (1) which is received or obtained by a planning authority shall be made available for inspection and purchase by members of the public at the office hours of the authority from as soon as may be after receipt of the document until a decision is made on the application

I believe that the actions of Mayo County Council in frustrating and withholding information from members of the public are a serious breach of the relevant Planning Acts and Regulations.

I request the Board to seriously consider and examine these series of events and state if the application is in compliance with relevant Acts and Regulations.

Prior to my request for the HSA report, I informed the HSA that I was prepared to have the HSA report independently verified and examined by an international safety consultant or other competent authority.

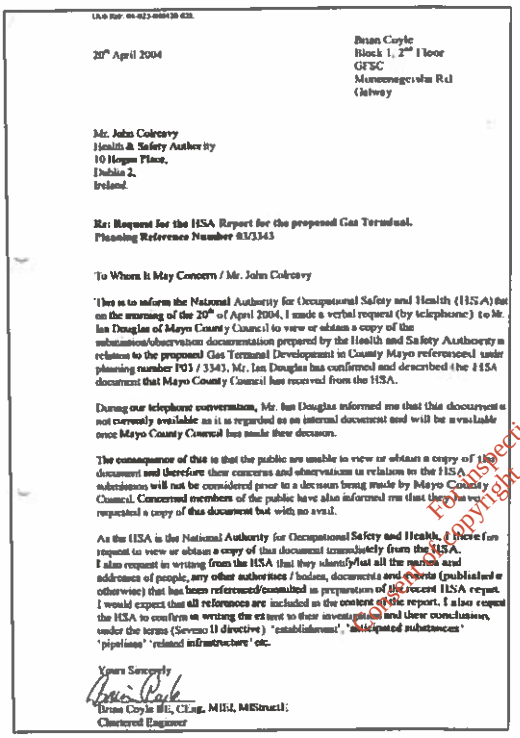
The attitude of Mr. Colreavy (Safety Representative from the Process Industry Unit, of the HSA) was, that the HSA is the competent authority and no matter what the HSA advice would be accepted and adopted. This 'competent authority' is limiting their investigations and advice to such an extent that they will not advise against the granting of planning permission for this proposed development.



Correspondence between Brian Coyle (author of this report) and Mr. John Colreavy representative from the Process Industry Unit (PIU) of the Health and Safety Authority during the planning process

Following the failure of Mayo County Council to provide me with a copy of the HSA report, I then tried to view or obtain a copy of the HSA report from Mr. John Colreavy.

On the 20th of April 2004, I wrote to Mr. Colreavy requesting to view or obtain a copy of the HSA report.



Brian Coyle
Block 1, 2nd Floor
GFSC
Moneenageesha Rd
Galway

20th April 2004

Mr. John Colreavy
Health & Safety Authority
10 Hogan Place,
Dublin 2,
Ireland.

Re: Request for the HSA Report for the proposed Gas Terminal.
Planning Reference Number 03/3343

To Whom It May Concern / Mr. John Colreavy

This is to inform the National Authority for Occupational Safety and Health (HSA) that on the morning of the 20th of April 2004, I made a verbal request (by telephone) to Mr. Ian Douglas of Mayo County Council to view or obtain a copy of the submission/observation documentation prepared by the Health and Safety Authority in relation to the proposed Gas Terminal Development in County Mayo referenced under planning number P03 / 3343. Mr. Ian Douglas has confirmed and described the HSA document that Mayo County Council has received from the HSA.

During our telephone conversation, Mr. Ian Douglas informed me that this document is not currently available as it is regarded as an internal document and will be available once Mayo County Council has made their decision.

The consequence of this is that the public are unable to view or obtain a copy of the document and therefore their concerns and observations in relation to the HSA submissions will not be considered prior to a decision being made by Mayo County Council. Concerned members of the public have also informed me that they have requested a copy of this document but with no avail.

As the HSA is the National Authority for Occupational Safety and Health, I therefore request to view or obtain a copy of this document immediately from the HSA. I also request in writing from the HSA that they identify/list all the names and addresses of people, any other authorities / bodies, documents and reports (published or otherwise) that has been referenced/consulted in preparation of the recent HSA report. I would expect that all references are included in the content of the report. I also request the HSA to confirm in writing the extent to their investigation and their conclusions, under the terms (Seveso II directive) 'establishment', 'anticipated substances' 'pipelines' 'related infrastructure' etc.

Yours Sincerely

Brian Coyle BE, CEng. MIEI, MIStructE
Chartered Engineer

I was amazed at the verbal and written response from a representative from the National Authority for Occupational Safety and Health.

HEALTH AND SAFETY AUTHORITY

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

21st April 2004,

Dear Mr Coyle,

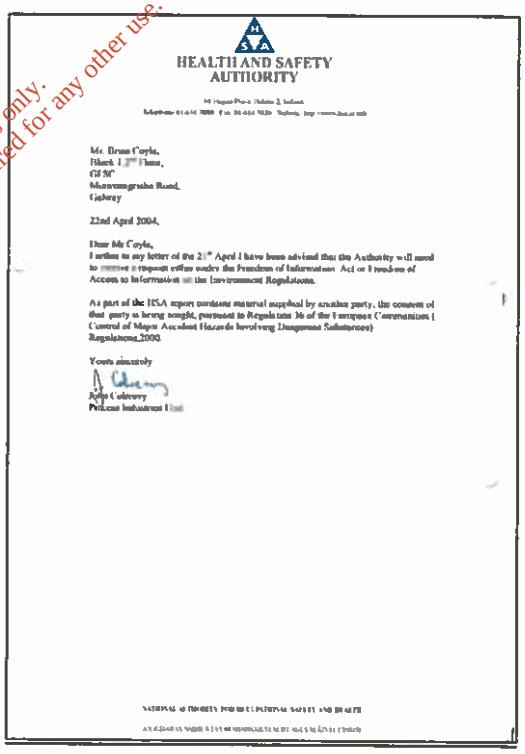
I acknowledge receipt of your " Observations and Objection Report " and your letter of the 20th April 2004

I was not aware that the HSA report was not available from Mayo Co Co and I have spoken to the Department of the Environment, Heritage and Local Government concerning this issue.

Your request for a copy of the report is under consideration.

Yours sincerely

John Colreavy
Process Industries Unit



HEALTH AND SAFETY AUTHORITY

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

22nd April 2004,

Dear Mr Coyle,

Further to my letter of the 21st April I have been advised that the Authority will need to receive a request either under the Freedom of Information Act or Freedom of Access to Information on the Environment Regulations.

As part of the HSA report contains material supplied by another party, the consent of that party is being sought, pursuant to Regulation 36 of the European Communities (Control of Major Accident Hazards Involving Dangerous Substances) Regulations 2000.

Yours sincerely

John Colreavy
Process Industries Unit

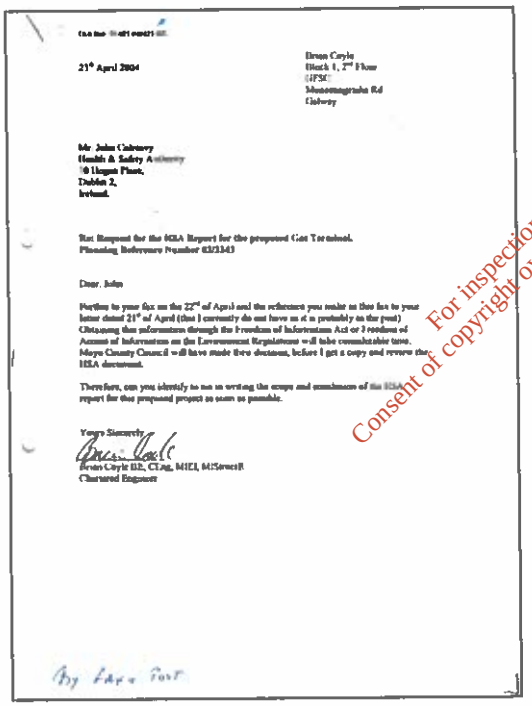
The content of Mr. Colreavy's letter is self-explanatory but quite frustrating for anyone that is trying to view or obtain a copy of the HSA report for their own personal benefit. In summary, like Mayo County Council, the HSA were also obstructing and delaying me from viewing or obtaining a copy of the HSA report. Any reference or input from any technical bodies/persons who was consulted or otherwise in preparation of the report should have realised or be made aware that this

document would be eventually viewed/obtained by the members of the public.

The HSA advice is limited and only considers the area of land inside the Gas Terminal Security Fence

Following receipt of the HSA letters dated 22nd of April; I had a telephone conversation with Mr. John Colreavy. He confirmed to me that the HSA advice is limited to an area within the security fence and that they were not considering or providing advice on the entire area under the control of the operator or advice on the risks arising from the existing site characteristics and its possible 'domino effects' when major accident occurs.

On a final attempt, I wrote to Mr. Colreavy asking him to provide me with the scope and conclusion of the HSA report. A copy of my letter is included below and is available in a larger size in Appendix 4.



21st April 2004

Brian Coyle
Block 1, 2nd Floor
OFSC
Mountmagratha Rd
Galway

Mr. John Colreavy
Health & Safety Authority
10 Hogan Place,
Dublin 2,
Ireland.

Re: Request for the HSA Report for the proposed Gas Terminal.
Planning Reference Number 03/3343

Dear. John

Further to your fax on the 22nd of April and the reluctance you make at this fax to your letter dated 21st of April (that I currently do not have as it is probably in the post) Obtaining that information through the Freedom of Information Act or Freedom of Access of Information on the Environment Regulations will take considerable time. Mayo County Council will have made their decision, before I get a copy and review the HSA document.

Therefore, can you identify to me in writing the scope and conclusion of the HSA report for the proposed project as soon as possible.

Yours Sincerely,

Brian Coyle BE, CEng, MIEI, MIStructE
Chartered Engineer

By Fax + Post

I concluded from this conversation that;

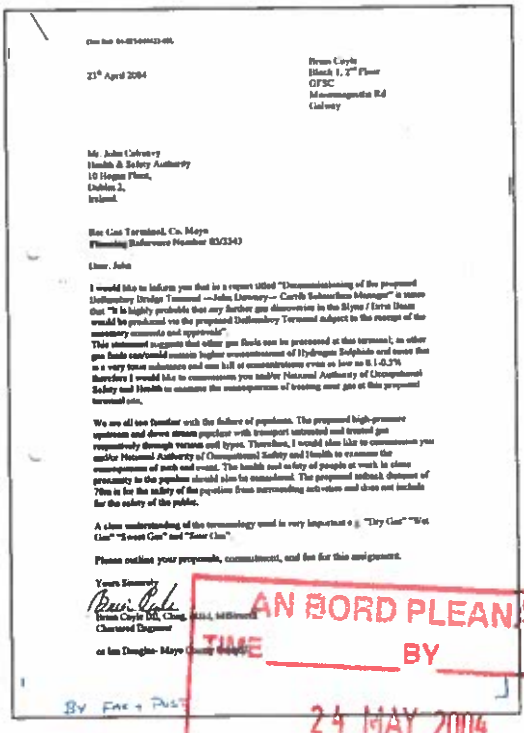
- The HSA had redefined the term 'establishment' which they are not allowed to do, as there is a legal definition of this term in SI 476/2000 regulations. Basically, they have limited their investigation and therefore advice under Land-use Planning
- The HSA did not consider all the substances present or treated in the gas processing industry.
- The HSA advice did not include global slope stability or structural stability of the pipeline.

I was amazed, saddened and very concerned at such an attitude and response from a 'competent authority'.

During a telephone conversation with Mr. John Colreavy, he informed me that they did not advise on the treatment of gas containing Hydrogen Sulphide and didn't expect that gas containing hydrogen sulphide could be treated at the Terminal and confirmed that it was not part of their remit.

On the 23rd of April I wrote to Mr. Colreavy outlining my concerns, that H2S is as likely to be present as not, in untreated gas and that it was the intention of the applicant to treat any future gas finds in this terminal. In my letter, I also informed him/HSA that I was personally prepared to commission him/HSA to examine and give advice on the following issues

- Upstream pipeline failure
- Treatment of gas containing hydrogen sulphide,
- Health and safety of the local people when working close to is pipeline.



21st April 2004

Brian Coyle
Block 1, 2nd Floor
OFSC
Mountmagratha Rd
Galway

Mr. John Colreavy
Health & Safety Authority
10 Hogan Place,
Dublin 2,
Ireland.

Re: Gas Terminal, Co. Mayo
Planning Reference Number 03/3343

Dear. John

I would like to inform you that in a report titled "Decommissioning of the proposed Ballinaboy Bridge Terminal —John Mowney— Corrib Submarine Manager" it states that "It is highly probable that any further gas discoveries in the Slyne / Erris Basin would be produced via the proposed Ballinaboy Terminal subject to the receipt of the necessary consents and approvals"
This statement suggests that other gas finds can be processed at this terminal; as other gas finds can/could contain higher concentrations of Hydrogen Sulphide and more than as a very toxic substance and one half of concentrations even as low as 0.1-0.5% therefore I would like to commission you and/or National Authority of Occupational Safety and Health to examine the consequences of leaking sour gas at this proposed terminal site.

We are all too familiar with the failure of pipelines. The proposed high-pressure upstream and down stream pipeline with transport untreated and treated gas respectively through various soil types. Therefore, I would also like to commission you and/or National Authority of Occupational Safety and Health to examine the consequences of such and event. The health and safety of people at work in close proximity to the pipeline should also be considered. The proposed setback distance of 70m is for the safety of the pipeline from surrounding activities and does not include for the safety of the public.

A clear understanding of the terminology used is very important e.g. "Dry Gas" "Wet Gas" "Sweet Gas" and "Sour Gas".

Please outline your proposals, commitment, and fee for this assignment.

Yours Sincerely,

Brian Coyle BE, CEng, MIEI, MIStructE
Chartered Engineer

cc Ian Douglas- Mayo County Council

By Fax + Post

To date the HSA has not responded to my assignment or my intentions outlined in my letter dated 23rd of April 2004 (2nd Letter). I personally feel that this investigation should be

part of their advice under the Land-Use Planning assessment. I feel so strong about this that I was, and still am, prepared to commission them to examine and advice the public on these risks and consequences.
Flare towers are associated with the removal of H2S from untreated gas.

The preamble of the Seveso II directive states:

*Whereas analysis of the major accidents reported in the Community indicates that the majority of them are the result of **managerial and/or organisational shortcomings;***

The Authorities of this country are relying too much on the advice from an Industry that we should be regulating. I plead and ask the question why is the HSA limiting their investigation and therefore their advice.
What are they afraid about? Is it that, if they do examine all the possible risks and possible events they will not be able to justify the safety of the environment and members of the public?

The HSA has refused to consider or provide advice on the Health and Safety of the Local People at Work

I informed Mr. John Colreavy that it is their function and role;

- *To promote, encourage and foster the prevention of accidents*
- *To encourage and foster measures directed towards the promotion of health and safety of persons at work*
- *And to make arrangements for enforcement of relevant legislation*

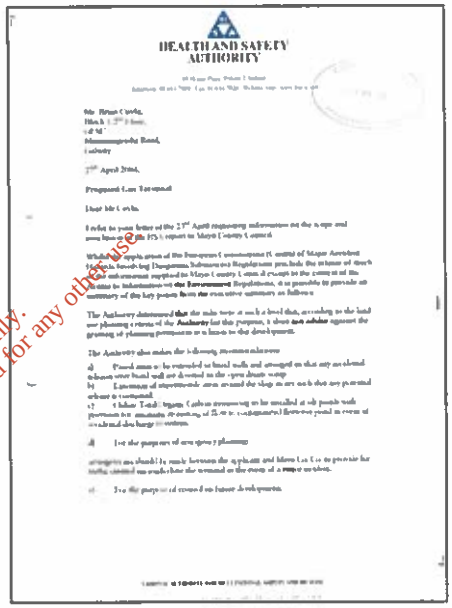
I asked Mr. Colreavy when was the HSA going to examine the safety of the local people working on the land where the upstream high-pressure (import) pipeline was laid and the people working at home, at school etc. adjacent to the pipeline route under the Health and Safety at Work Act.

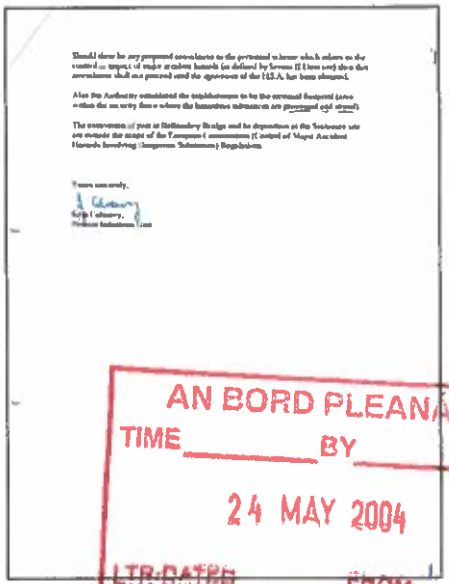
Mr. Colreavy has not responded to this request either. I am not aware of any public safety assessment (for the benefit of the people) or advice given for the upstream (import) pipeline or that section of high-pressure upstream import pipeline that travels under the site boundary in deep blanket bog to the gas terminal.

In relation to safety and health of workers at work the scope of the Seveso II directive state;
The provisions of this Directive shall apply without prejudice to Community provisions concerning the working environment, and, in particular, without prejudice to Council Directive 89/391/EEC of 12 June 1989 on the introduction of measures to encourage improvements in the safety and health of workers at work

On the 29th April 2004, (one day before the decision to grant permission for the development) I received a letter from the HSA outlining their advice and conclusions. The letter is dated 27th of April and is included below. A larger scale copy of this letter is included in Appendix 4.

The content of this letter from a 'competent authority' and the Health and Safety conditions attached to the permission is nothing more than an insult to members of the public.


HEALTH AND SAFETY AUTHORITY


AN BORD PLEANÁLA
TIME _____ BY _____
24 MAY 2004
LTR-DATED _____ FROM _____
PL

The HSA has refused to consider or provide advice on the safety of the public from the upstream (Import) pipeline under their remit (land use planning)

Mr. Colreavy, informed me that the HSA would not consider the safety of the public from the upstream (import) pipeline routed through deep blanket bog. Mr. Colreavy stated that the HSA would only consider the safety aspect of the pipeline during the installation and maintenance periods under the Health and Safety at Work Act.

Pipeline Standards only Considers information regarding the Safety of the Pipeline from the public (3rd Party Activity) and not the Safety of the Public from the pipeline

The pipeline regulations and standards set aside specified distances that only take account of the safety of the pipeline from the public and **NOT** the safety of the public from the pipeline. Mr. Colreavy refused to examine the safety of the public from the upstream (import) pipeline and said it was not part of the HSA remit.

This upstream (import) pipeline route is 8km long, is on land adjacent to residential dwellings, sited in a work place as defined under the Health and Safety at Work Act and pass through an abundance of saturated blanket bog that can fail at 2-degrees thus likely to impose excessive load, deformation and dramatic failure.

The Health and Safety at Work Act defines the term '*place of work*' and it includes

'*any place, land or other location at, in, upon or near which, work is carried on whether occasionally or otherwise..*'

Q. Who is responsible for the safety assessment of the public from these pipelines?

I wrote to the Mr Colreavy (HSA) and informed them that I was personally prepared to commission him and/or the HSA to examine the consequences and advise the applicant, local authority and local people of an upstream pipeline failure making it part of the HSA remit.

Mr. Colreavy has not responded to my assignment or request and a copy of my letter to Mr. Colreavy is included in Appendix 4.

This information is necessary and must be made public in preparation of an adequate Safety Report under the Seveso II directive and SI 476/2000 regulations.

The fact is that Local residents residing along the 8km route are not at a safe distance from this proposed development (pipeline route) and will die in the possible event of a major accident and domino effect arising.

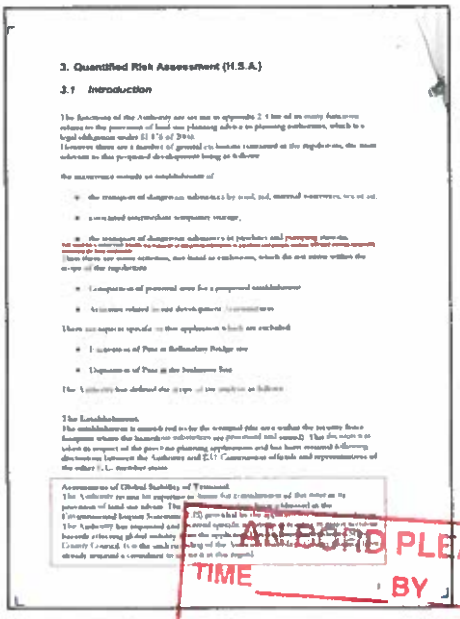
A report prepared following a gas pipeline explosion (45 bar) states that people residing hundreds of meters away were killed in seconds. A copy of this in-depth report is included in Appendix 9.

People are residing as close as 60m to the proposed high-pressure (c.150bar) upstream (import) pipeline and will be working directly beside it.
If the HSA could justify the safety of the public from the pipeline (not the pipeline safety) then they would undoubtedly put peoples mind at ease and state and support that fact.

The HSA confirmed receipt of a copy of my observation and objection reports

The HSA has admitted and stated that they do not have the expertise in-house to examine all of the necessary land-use planning criteria e.g. slope stability and in that instance they have omitted this major accident hazard event from their examination and have not provided advice or taking account of this event in their land-use planning advice HSA report.

This remarkable fact is an indication of the limited investigations and advice provided by the HSA. This fact is stated on the last paragraph on page 5 of the HSA Report dated 8th April 2004 'Quantified Risk Assessment (HSA).
A copy of the relevant page is included below and is at a larger scale in Appendix 6


3. Quantified Risk Assessment (H.S.A.)

3.1 Introduction

The attitude of the HSA in this instance is not acceptable and does not constitute good advice from an authority regarded as the 'central competent authority'.

The HSA has requested and received specific documentation relating to major accident hazards affecting global stability from the applicant. The HSA has **not** sought independent technical conclusive advice in relation to slope stability but nevertheless has identified that it can relate to a major accident hazard.

The HSA have omitted site-specific information relating to major accident hazards affecting global stability from their report dated 8th April 2004. They have indicated that they don't even know the status of the document prepared by the consultant employed by Mayo County Council.

It is inadequate for the HSA to request and make reference to a document that relates to major accident hazards and omit the independent conclusive advice relating to this possible major accident event from their land-use planning advice report.

Independent Consultants Fehily Timoney & Company is only providing notes and commentary to Mayo County Council. They are not providing independent, verified factual conclusions and recommendations. This is evident in the Introduction content of their report

Q. If the HSA had the expertise in-house would this mean they would consider major accident hazards affecting global slope stability, and many more possible events that can lead to a major accident?

It is therefore obvious, that the HSA has limited their investigation into possible major accident events because they do not have the expertise in-house to examine them.
Since this independent risk assessment is not independently verified it is therefore incorrect for the HSA Authority to provide advice on land use planning with limited information.

Site Specific Technical Advice is omitted in the assessment and advice given to the Local Authority by the HSA as they have stated that they do not have in-house expertise

The HSA has admitted that they do not have the in-house expertise to examine slope stability.

In their advice on 'land use planning' the HSA have ignored the consequences of the Natural Landslide disasters that they have identified can cause a major accident hazard. The Seveo II directive and/or SI 476/2000 regulation do not allow this approach to be taken- it is therefore illegal to do.

In summary Mr. Colreavy / HSA have provide advice under 'land use planning' requirement without obtaining independent technical support and conclusive advice on any of the following site specific characteristics;

(presumably because they do not have the expertise in-house)

- Consequences of natural landslides slope stability disasters,
- Blanket Bog
- Water pollution
- Forestry (effects and consequences)
- Fire Control
- Control of Major Accident Events that can spread beyond site boundaries and can contaminate lakes and rivers.
- Upstream (import) or Downstream (export) pipeline failure in deep blanket bog
- The consequences and risks associated with removing the peat
- Underlying or Overlaid Peat Slope failure during or after Construction

The consequences and domino effects that can arise from these site-specific characteristics must be examined now and cannot be delayed any further. The Seveso II directive and SI 476/2000 Regulations on the control of major accidents does not state/indicate that the investigations into the causes of major accidents can be delayed until some future date.

Q. Which Competent Authority / Independent company is examining and providing advise to the HSA, Local Authority and/or members of the public on these very likely major accident events?

Here again we are experiencing organisational shortcomings and this time it's from the authority that should be regulating the applicant, the HSA.

I therefore advise the Board to request the HSA to commission recognised authorities and/or independent technical experts recognised under the Seveo II directive and SI 476 regulations to examine and advise on all possible events that would give rise to a major accident. It is then, and only then, that proper sound advice can be given on land-use planning. It is no wonder that the *analysis of*

*the major accidents reported indicates that the majority of them are the result of **managerial and/or organisational shortcomings** – extract from* Seveso II directive.

From my examination of a copy of the HSA report on land-use planning dated 8th April 2004, (that I only received 24hrs ago), I can conclude that the advice given in the report does not take account of or include any site-specific issues i.e. as written the text, conclusions and advice of the HSA report can be applied to any gas terminal site any where in the country without changing its conclusion or advice. The report content is more like a 'template' than a site-specific report.

The conclusions of the HSA report dated 8th April 2004 under land use planning are typical 'template' statements and do not address site-specific issues

THE HSA REPORT CONCLUSIONS AND ADVICE DOES NOT ACCOUNT FOR ANY SITE SPECIFIC CHARACTERISTICS

It wouldn't make a bit of difference or change the text or advice contained in the HSA report (conclusion) if the proposed Gas terminal site was been built in a swamp, at the bottom of a hill that is about to collapse, in the middle of a forestry, or adjacent to a major drinking water supply.

If the HSA is not going to consider site specific issues that can lead to major accident events then recognised authorities/technical experts should be providing technical conclusive advice to the HSA and then, and only then, should the HSA give advice on 'land use planning' criteria.

I request the Board to seriously consider these shortcomings and refuse permission for this proposed development.

Q. What is the HSA considering under land-use planning criteria? Their conclusion and advice does not relate to any site-specific issues.

Q. I would advise the Board, when reading the HSA report to identify what conclusion or advice item would change if it was proposed to build the gas terminal at the edge of Carrowmore lake, in a swamp, or at the bottom of Dooncartoon Hill, would it change the content of the HSA report?

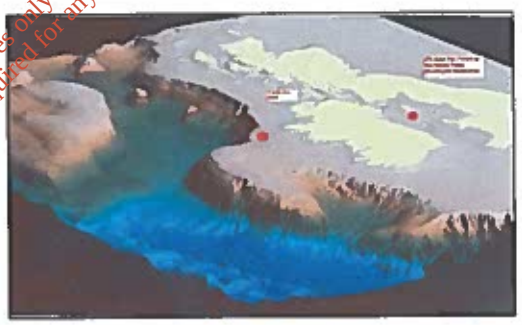
The HSA or local Authority has not considered all toxic substances that can be present in untreated gas and are therefore excluding the assessment and advice in relation to the presence of Anticipated Substances

Sour gas in the petroleum industry is often defined, as gas containing >=1% hydrogen sulphide otherwise the gas is regarded as sweet. However, persons exposed to 0.2-0.5% hydrogen sulphide will die i.e. sweet gas can contain enough hydrogen sulphide to kill.

Approximately 40% of untreated gas in Canada is Sour.

Q. Could the gas finds off the Coast of Ireland contain Hydrogen Sulphide?
A. Yes, it can. Hydrogen Sulphide is a bio-gas and is as likely to be present than absent from untreated gas.

Burlington Resources (Most Likely Competitors of the Applicant-Shell) has stated that they have discovered 3% sour gas adjacent to their sweet gas well in the Irish Sea south of the Isle of Man in the Rivers Fields gas wells.



The above picture is extracted from a hand out document given to the public by representatives of the Applicant. Note the outline of Ireland and England. It indicates a 3D view of the Continental Shelf that Ireland and England both share. Superimposed on it, I have indicated the location of the Corrib Gas Well and the Rivers Fields **Sour Gas well in the Irish Sea.**
A larger scale image of this picture is included in Appendix 8.

The consequences of treating Sour gas should therefore be assessed and advice given thereafter.

Information on the Rivers Fields sour gas wells in relation to the Rivers Fields is included in Appendix 7.

I asked Mr. Colleavy was he going to consider the treatment of gas containing hydrogen sulphide (sour gas). His comment was that the

applicant has identified to him that from preliminary investigations the gas at the Corrib gas well does not contain hydrogen sulphide.

Once again the HSA are limiting their investigations and advice, as they have not considered the presence and treatment of Gas containing hydrogen sulphide. They believe that, at present the terminal is not capable of treating such type of gas and they are accepting the applicants advice that no hydrogen sulphide is present.
Flare Stacks are associated with the elimination and treatment of Hydrogen Sulphide.

ONCE AGAIN WE ARE RELYING TOO MUCH ON THE ADVICE FROM AN INDUSTRY THAT WE SHOULD BE ADEQUATELY REGULATING.

The scope of the Seveso II directive and SI 476/2000 regulations does not state that it is appropriate to delay investigations and assessments of presence of anticipated substances. Therefore, as they are substances that can cause a major accident, they must be examined now. The applicant has identified that any future gas finds will be processed and treated at this proposed gas terminal.

Reports following the gas well blowout in China (December 2003) states that it affected 25sq miles. The area was regarded as a death zone. Untreated gas poisoning and hydrogen sulphide poisoning was most likely the main contributing factors to the high fatalities.

The death toll from a natural gas well blowout in south-west China has climbed to 233 as rescue workers began cleaning up a vast ***"death zone"****, the official Xinhua news agency said.*

The cloud of gas swept across a ***25 square kilometre*** *area on Tuesday,* ***devastating villages and poisoning farms.*** *More bodies were found in mountain villages on Sunday,.. pushing the death toll up by 35. About 1,000 workers were clearing away almost 4,000 animals, including cattle, pigs, rabbits, ducks, chickens and dogs, killed by the gas well burst*

Medical workers were disinfecting eight villages, testing drinking water and poisoned crops near the site of the leak, a gas field in Chongqing municipality, Zhang Mingkui, director of the Kaixian County Bureau of Environmental Protection, said.

It is a legal obligation under SI 476/2000 regulations to consider all the anticipated substances present in an Industry.

Seveso II Article 2 Scope Par 2 states

For the purposes of this Directive, the 'presence of dangerous substances' shall mean the actual or ***anticipated*** *presence of such substances in the establishment*

SI 476/2000 Regulation (a legal obligation) defines the presence of dangerous substances as;

' those substances present as a raw material, product, by-product, residue or intermediate and ***the anticipated presence of such substances*** *and the presence of those which it is reasonable to believe may be generated during the loss of control of an industrial chemical process and the word 'present' shall be construed accordingly'*

It is obvious once again that the Authorities are limiting their investigations and therefore their advice and recommendations as they are relying on the applicants' advice and actions when in fact they should be adequately regulating them.

Why are the HSA/Local Authorities/other government bodies limiting their questions and investigations in relation to the gas processing industry? Is it to ensure that the project goes ahead on this site irrespective of public safety?

Are they afraid to ask for information in case they cannot justify it?

The HSA is an authority defined in SI 476/2000 regulations as the competent authority who is responsible for '*ensuring compliance with these Regulations and shall fulfil the functions assigned to it by these Regulations' as stated in regulation 5 of SI 476/2000.* Irrespectively of their legal obligations and even when possible major accident events are pointed out to them, the Authorities including the HSA still try to swindle their way out by relying on historic views approaches, definitions, actions and attitudes of the past when the facts are that new directives, regulations and guidelines are written to acknowledge past events and to change such historic actions and attitudes.

Regulation 8 SI 476/2000 'Demonstration of safe operation'

(1) This Regulation and Regulations 9 to 11 shall apply to all establishments.

(2) In respect of an establishment to which this Regulation applies, the operator shall,

whenever requested by the Central Competent Authority or by an inspector of that Authority, provide or cause to be provided to the Authority or to that person such evidence (including documents) to prove that he has—

(a) identified the major accident hazards, and

(b) taken all necessary measures to comply with these Regulations

SI 476/2000 Regulation 28 Part 2 States that; (Legal obligation)

*(2) The Competent Authority shall, using the information received from an operator in a notification sent by virtue of Regulation 11 or a safety report, **identify establishments** or groups of establishments where the likelihood and the possibility or consequences of a major accident **may be increased because of the location** and proximity of such establishments, and their inventories of dangerous substances and on such identification shall inform each operator in writing for the purpose of Regulation 9(3).*

The applicant has identified alternative sites in their submission, has the HSA assessed these sites? If not, why not.

Under regulation 8 of SI 476/2000 (apply to all establishments) the authority can request this information and under regulation 28 they must identify establishments where the likelihood and the possibility or consequences of a major accident may be increased.

The proposed Bellanaboy gas terminal site is certainly a site that should be identified by the Authority as being a site where the likelihood and the possibility or consequences of a major accident is increased due to its location and characteristics. In that regard planning should be refused.

Appendix 2 of the HSA report Section 2 Seveso II Legal Context states;

*'The authority advice **does not** deal with site selection or the suitability of one site over another'*

The authority is therefore not complying with regulation 28 of SI 476/2000.

The Authority has not identified establishments where the possibility or consequences of a major accident is increased because of its location. The authorities have let the applicant rule out all other alternatives based on the applicants' own assessment. Once again the authorities are relying on applicants advice when they should be regulating it.

The Proposed and Alternative Site Location Characteristics

It is obvious from the pictures below that a vast amount of alternative sites and area of land is available away from existing natural environmental and public sensitive areas that can have the consequences of a major accident domino effect.

All land and sea west of the red line are alternative locations that should be reviewed for the proposed development.

The proposed site is surrounded with Blanket Bog that can fail at 2-degrees and above as identified by the applicants design team. This can further impact the events of a major accident.

The site is adjacent to Streams and Rivers that can become contaminated in the event of a major accident that can further enhance the consequences and events of a major accident.

The site is adjacent to Carrowmore Lake the only drinking water supply for the entire North Mayo area that can become contaminated in the event of a major accident. The HSA report has identified that risk contour events extend outside the boundaries of the applicants site. This can further enhance the consequences of a major accident.

The proposed gas terminal site is adjacent to Forestry that can ignit and therefore further enhances the consequences of a major accident (visa-versa).

The proposed gas terminal site is in an area of natural ground instability. This area has experienced landslides in 1983 and 2003.

There are alternative sites available that do no pose such risks.

- The alternative sites are not beside a major drinking water supply
- The alternative sites are not surrounded in blanket bog
- The alternative sites are not in an area of natural ground instability
- The alternative sites are not adjacent to forestry
- The alternative sites does not require the excavation and removal of 450,000m3 of peat containing approximately 405,000,000 (405million) litres of acidic water to enable its construction
- The alternative sites does not require a peat deposition site
- The alternative sites does not require a haul route for peat deposition
- The alternative site does not require permanent retaining structures to retain peat that can become unstable in the event of a major accident
- The alternative sites does not require an 8km upstream high-pressure pipeline
- The alternative sites does not require a upstream pipeline through an abundance of blanket bog
- The alternative site does not require an upstream pipe route to pass through the work place of many
- The alternative sites are closer to the gas well than the proposed site
- The alternative sites are much safer and do not pose such overwhelming risks and consequences to the public and the environment.

I request the Minister for communications, Marine and Natural Resources to influence the applicant that alternative sites are more readily available that do not pose such overwhelming environmental, traffic, slope stability, and water contamination risks.

I therefore request the Board to refuse planning for the proposed development at the Bellanaboy and Srahmore site, as there are alternative sites more readily available that dramatically reduce the consequences of a major accident.

Q. What information did the applicant/operator provide that identifies the major accident hazards to the HSA?

Q. What are these hazards and consequential risks?

Q. What questions did the HSA request from the operator?

Q. Has the applicant/operator identified all the possible effected **areas** arising from a major accident?

Q. What measures are proposed by the Authorities to minimise major accident events and limit their consequence? This is the Aim of the Seveso II Directive. Where are the regulating measures in the planning conditions?

It appears that the risk contours identified do not identify the entire effected areas arising from a major accident. The area affected arising from a major accident can undoubtedly go beyond the site boundaries and therefore outside the *control* of the operator.

The risk contours identified in the HSA report appear to be quite circular in nature, which would suggest that a low wind speed was chosen in their assessment.

What wind speed was used in the risk assessment?
A gas cloud can be carried in the wind before it ignites, what time was chosen prior to the gas cloud igniting and exploding?

In the HSA assessment How far had the gas cloud travelled before igniting?

Evidence and reports from Medium pressure Pipeline failures (45 Bar) affected **areas** up to 3 square miles following their failure and explosion. The volume of substance that affected these areas is small compared to the volume of substance to be stored and treated at the Bellanaboy gas terminal.

Fire from the gas pipeline explosion (photo by Duane Macsymach, Brandon, MB)

BROOKDALE, MANITOBA Natural Gas pipeline explosion. 14th of April 2002. Reported that vibrations arising from the explosion was felt six miles away. Note the spread of fire on the ground to the left of the picture. The following day the Authorities were keeping people back 3km from where the explosion occurred.

If this occurred at the terminal site in Bellanaboy;

Q. What would happen to the surrounding blanket bog would the vibrations cause a domino effect? The factor of safety of 1.23 provided by the applicant's consultant would certainly NOT be enough. It means that in an explosion event a 1m width of gabions would not be able to support a 1.3m width of peat. Adjacent gabions can be dislodged in the event of an explosion and no one can guarantee the stability of gabion retaining structure against that type of failure.

Q. What would happen to the substances stored at the terminal site?

Q. What would happen to the forestry, this would surely ignite?

Q. What would happen to Carrowmore Lake, would it become contaminated?

Q. What would happen if the explosion severed the control umbilical line to the wellhead?

The pipeline that failed in the picture above was probably installed to the best standards and regulations available and was supposed to the maintained and upgraded when necessary.

How come this major accident happened?

I'm sure the authorities and operators also thought they had everything covered and that it was unlikely that a major accident like this was going to happen. They probably produced pages and pages of risk contours and safety reports to justify that it was 'probably safe and an unlikely event' or may be they didn't bother assessing it at all, just like what the HSA and the applicant is doing now in their submissions.

In section 3.4.4 of the HSA report the applicant states *that the worst possible consequence would be caused by a full-bore rupture at the high-pressure import gas pipeline*. It is obvious that this event would kill and have a major effect on the surrounding environment including the stability of Dooncarton Hill.

New Mexico Gas Pipeline Explosion, caused by a heat source approximately 200m away from the pipeline killed everyone that was residing in the nearby campsite that was between 100-200m away. The effects of the pipeline explosion was equivalent to placing 5.7 tonnes of TNT in the ground

A Gas Pipeline rupture and explosion occurred in New Mexico on the 19th August 2000. A detailed report of the incident is included in Appendix 9 and its content is frightening. Seismic signals from the pipeline incident were recorded as far as 136km from the explosion. Large sections of the pipeline were found 87m from the blow-out. It would have taken 5.7 tonnes of TNT buried at a depth of 4m to create a crater and have similar effects. A heat source approximately 200m away was the likely cause of the explosion.

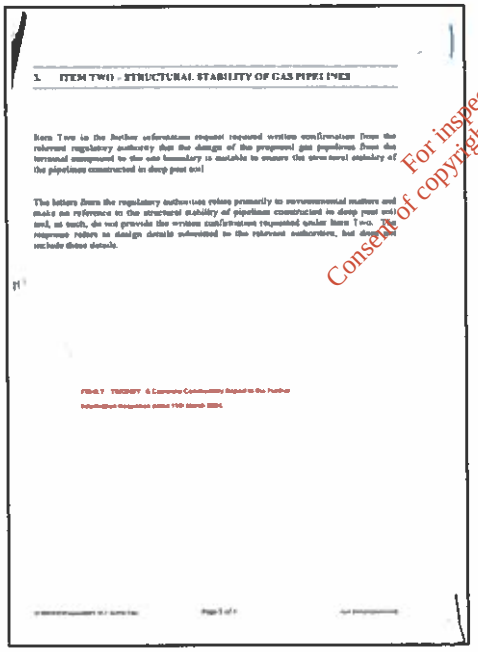
Note the size of the people standing around the crater. This is only a 45 bar pressure pipeline explosion the proposed pipeline pressure is three times that. If this happened at Bellanaboy undoubtedly the stability of Dooncarton Hill would be affected and many people would loose their lives. The permanent retaining wall would be completely dislodged and blown away.

In this regard the risks associated with this development on the proposed site surrounded in blanket bog, in an area of natural ground instability, adjacent to forestry and streams and Carrowmore Lake is all a recipe for a major domino effect disaster.

I identified to the local authority that the structural stability and performance of the upstream (import) pipeline to the Corrib gas terminal in deep blanket bog should be identified and assessed, as the risks of pipeline failure is inevitable. Mayo County Councils further information request, Item No. 2 request this information from the applicant. The applicant has not justified the structural stability and long term performance of the pipeline in deep blanket bog. I made this known to Mayo County Council in my second report (refer to Appendix 3.

In this regard, what qualification or assessment has the HSA used that allows them to state that this an upstream pipeline explosion is *'an unlikely event'*? The Seveso II directive and SI 476/2000 regulations requires them to identify all risks and events and to limit their consequences on the public and the environment. It does not allow the HSA/Operator/Local Authority to attach the *'unlikely event scenario'* in any circumstance or risk assessment.

Fehily Timoney & Company employed by Mayo County Council also state that the structural stability of the pipeline in deep peat has **NOT** been adequately addressed.



1. ITEM TWO - STRUCTURAL STABILITY OF GAS PIPELINES

Item Two in the further information request required written confirmation from the relevant regulatory authority that the design of the proposed gas pipelines from the terminal compound to the site boundary is suitable to ensure the structural stability of the pipelines constructed in deep peat soil

The letters from the regulatory authorities relate primarily to environmental matters and make no reference to the structural stability of pipelines constructed in deep peat soil and, as such, do not provide the written confirmation requested under Item Two. The response refers to design details submitted to the relevant authorities, but does not include these details.

Since this has been identified as one of the worst possible consequences of a major accident, should it not be the advice of the HSA to the applicant, that they should limit the length of the upstream (import) pipeline that can ultimately cause the *'worst possible consequence arising from a major accident'* Alternatives are available that limits the length of the upstream (import) pipeline.

A conclusion of this kind put forward by the HSA is extremely worrying and begs the question, is the HSA fulfilling their role and function?

Letter to Ms. Mary Harney TD outlining the Discrepancy in the application of SI 476/2000 Regulations and Council Directive 96/82/EC on the Control of Major Accident Hazards

This discrepancy has resulted in an unauthorised EU Directive relaxation in the application of the SI 476/2000 Regulations compared to the Seveso II directive. It further enables/allows the HSA to limit their investigation and advice on Land-use planning.

A copy of my letter to Ms. Mary Harney T.D. is included in Appendix 11. Now we are experiencing shortcomings in the role of our government ministers when implementing EU Directives.

A conclusion to a 'Land-use planning assessment' and a relaxation of EU Directive recommendations supports the statement made in the Seveso II directive when it states;

*Whereas analysis of the major accidents reported in the Community indicates that the majority of them are the result of **managerial and/or organisational shortcomings;***

Picture 3 Gas pipeline explosion.

Note the affected grey/black surface area to the North of the river. This is the area of ground affected from a relatively low-pressure gas pipeline explosion. Imagine what the outcome would be if this happened at the Bellanaboy Gas Terminal Site, or along the upstream (import) pipeline, the contamination of Carrowmore lake etc.

Picture 4 (local area within the affected zone)
Picture 4 shows a larger scale picture of the affected area shown outlined in a red box in picture 3 above.

Based on pipeline failure accidents that are happening throughout the world and noting that the HSA stated that this event would result in the worst possible consequence, then I can only conclude that pipelines placed in blanket bog, that can become unstable at angles of 2 degrees and above, so close to dwellings and the already unstable Dooncartoon hill would constitute an unacceptable risk to the health and safety of the local community and people residing in the North Mayo area. The proposed development at this particular site would, therefore, be contrary to the proper planning and development of the area.

The events that have occurred since the last submission mainly recent pipeline explosions throughout the world and Dooncarton Hill Landslide, including 911, reinforce the Boards previous decision to refuse permission for gas terminal development on this site.

Refer to appendix 10 for explosions and Fires associated with Shell Group Companies that have occurred between 1992-2002. It is frightening to believe that so many events are occurring.

Alternatives are available for the development of the Corrib Gas Field. These alternatives would still fulfil the National Policy to develop the Corrib Gas Field and would limit the consequence of a major accident

At the very least, if an onshore site is required then it should be:

- Outside the catchment of a major drinking water supply thus reducing the consequences of a Seveso II event.
- In an area with surrounding ground stability, where such large quantities of Peat should not have to be retained and removed thus reducing a traffic hazard, acidic peat removal and 400 million litres of acidic water.
- Where most of the raw materials can be quarried on site for hardcore fill and concrete etc.
- In situations like this, the Health and Safety of livelihoods should take precedence over areas of special conservation and areas of scenic amenity. There are many other sites available in Erris and indeed in Mayo, where the high risk events and the potential consequences of a gas terminal is dramatically reduced.

Identification of Major Accident Events and Domino Effect arising from the proposed development

The Preamble of the Seveso II directive states:

Whereas major accidents can have consequences beyond frontiers; whereas the ecological and economic cost of an accident is borne not only by the establishment affected but also by the Member States concerned; whereas it is therefore necessary to take measures ensuring a high level of protection throughout the Community;

SI 476/2000 Regulation 28 Part 2 States that;

(2) The Competent Authority shall, using the information received from an operator in a notification sent by virtue of Regulation 11 or a safety report, **identify establishments** or groups of establishments where the likelihood and the possibility or consequences of a major accident **may be increased because of the location** and proximity of such establishments, and their inventories of dangerous substances and on such identification shall inform each operator in writing for the purpose of Regulation 9(3) (which applies to all establishments).

Major Accident Domino Effect 1
Industrial Accident at Terminal ->Water contamination (Runoff, streams, rivers) -> Forestry Fires -> Carrowmore Lake contaminated ->Personal Health affected 25miles arising from contaminated drinking water from Carrowmore lake.

Major Accident Domino Effect 2
High Pressure Gas Pipeline Leak close to Site Boundary -> Explosion -> Permanent Retaining Structures dislodged and moved->Vibrations cause peat slope failures-> impact to gas terminal, fire water storage ponds, storage structures (explosion again), rivers streams, forestry, Carrowmore Lake contaminated.

Blanket Bog impacting the pipeline or the blanket bog not capable of supporting the high-pressure pipeline high forces causes excessive local deformation in the pipeline and the pipeline fails.

Major Accident Domino Effect 3
Gas Leak ->Wind ->Gas Cloud Carried in the Wind-> Gas Cloud Ignited-> Explosion->Active Pressure on Retaining Structures->Blanket Bog Failure-> Heather and Internal Forestry Fires-> ->Streams and Rivers contaminated- Carrowmore Lake Contaminated etc

Major Accident Domino Effect 4
Natural ground movement-> pipeline leak -> chemical contamination of surface water runoff -> Carrowmore lake contaminated- Public Health affected c.25miles beyond the location of the accident.

This can occur in Upstream and/or Downstream pipelines outside site boundary. This is outside the control of the operator. This scenario is greatly increased in the presence of Blanket Bog and the failure possibility identified by the applicant that peat can fail at an angle of 2-degrees and above. Coupled with this is the location of Carrowmore Lake.

Major Accident Domino Effect 5
Upstream pipeline damaged due to third party activity and/or due to subsidence/movement of the supporting blanket bog-> High pressure flammable substance escape including gas cloud-> Residents in the vicinity of the pipeline killed-> Vibrations arising from explosion further destabilise the already unstable Dooncarton Hill-> Landslide->etc.

The Health and Safety recommendations/conclusions in the planning conditions are an insult to the local residents and concerned members of the public.

In summary they are;

- PC 33 -Adequate water supply
- PC 34& 35-Placing a few more paving slabs --oh and extend that permeable area
- PC 36- Monitor organic carbon

What about the controls that should be put in place for the limitation of a major accident and the consequences thereafter?

What about regulating the operator ensuring that they adhere to specific directives, regulations and guidelines?

What penalties will be imposed if the operator do not implement or adhere to regulations and standards?

If the HSA report were judged in a court of law, I would predict that it would be found that it contains little or no substance and offers extremely limited protection to the environment and members of the public in the North Mayo Area. It is more in favour of the applicant than the concerned members of the public.
As stated previously the HSA conclusions and advice is 'template-like and typical of any gas terminal regardless of where the site is'. Their conclusion does not contain site-specific references.

Q. Did the applicant write the HSA report?

If this is the only conclusion that the HSA can come to after referring to the Seveso II directive and reference to major accident events and their supposed to be regulating SI 476/2000 regulations then there as well not to have an input at all.

There would be more stringent Environmental, Health and Safety planning conditions for a farmer's slatted house than this proposed development. This is ridiculous, but typical! It is obvious from the recommendations made by the HSA that its has not considered all potential major accident events arising from this proposed development.

Appendix 3 of the HSA report states;

'In practice, the establishment is considered to be the area within the security fence footprint where the hazardous substances are processed and stored. This area comes under the remit of the regulations. This approach has historically being taken and has been retained following discussions between the Authority and E.U. Commission Officials and representatives of the other E.U. member states.'

The term establishment is legally defined in SI 476/2000 regulations as;

*'the **whole area** under the control of the operator where dangerous substances are **present** in one or more installations, including common or related infrastructures or activities and includes new, existing and other establishments'*

Regulation SI 476/2000 clearly defines what the definition of 'establishment' is and **does not allow** the HSA to use the terms or references like

'In practice'
'Is considered'
'Security Fence'
'This approach has historically been taken…'
in order to define what 'establishment' means.

The definition given in SI 476/2000 is clear, unambiguous legal and binding and does not require/allow the HSA to redefine it. The HSA should be examining the whole area under the control of the operator where dangerous substances are **present**.

The statement from the HSA '*This approach has historically been taken..*' is extremely worrying and concerns me with regard to fulfilling the aims of the Seveso II directive and associated regulations.

EU Directives, Regulations and Guidelines are continuously been written, implemented, and revised to remove **historic interpretations and approaches** in order to prevent past events from reoccurring.
Here we have an Authority that wants to keep implementing historic approaches even after the implementation of legal regulations that requires their removal.

The preamble of the Seveso II directive states;

Whereas use of a list specifying certain installations while excluding others with identical hazards is not an appropriate practice, and may allow potential sources of major accidents to escape regulation;

I therefore request the Board to refuse permission for this development.

Convenient Visits to other Gas Terminal Sites arranged by the Applicant are misleading and form no site-specific comparison to the proposed gas terminal at Bellanaboy

The applicant conveniently arranged a visit for government and local authority officials to visit the Anjum gas terminal in the Netherlands.

The need for the local authority and government officials to visit gas terminal sites is an indication that people have not carried out adequate research and are not familiar with the gas industry process and its associated risks. It is also an indication that they are not familiar with the additional domino major accident effects characteristics that come attached to the proposed gas terminal site at Bellanaboy, (Surrounded in Blanket Bog, Adjacent to Streams, Rivers and Lake The only main water supply for the entire North Mayo Area).

It is obvious, that there is no other gas terminal site in the world that is similar in characteristics to the Bellanaboy site.

It is therefore no wonder that the only comparison that Mr. Iain Douglas (Senior Planner with Local Authority, Mayo County Council) has made is that the gas terminal *'is similar in size (output) to that proposed in Bellanaboy'.*

Most people are familiar with the risks posed by the superstructure elements of a gas terminal above ground. Our concerns and queries should be how stable are the substructure elements below ground (items that we cannot see by a brief visit) and what will happen if a major accident occurs that cannot be controlled before it causes a domino effect.

A. The Anjum Terminal did not have and upstream (import) pipeline travelling 8km on land. The planners report suggests that this pipeline was within the site boundaries and therefore secure from third party activities.

Q. Was the Anjum Terminal surrounded with Blanket Bog?

Q. Was the Anjum Terminal adjacent to a major drinking water supply?

Q. Was the Anjum Terminal adjacent to Forestry?

Q. Did the applicant invite of arrange a visit for government and local authority officials to visit a site where a major accident occurred?
Refer to Appendix 10 for an in-depth list of accidents that has occurred between 1992-2002 at Shell Group Companies.

Q. Has any member of the Local Authority, HSA or Government Officials visited a site where a Major Accident occurred? My concerns relate to operational and natural occurring risks and the consequences of those risks to cause a major accident domino effect.

This proposed terminal at the Bellanaboy Site should not be compared to the Gas terminal in Anjum, Netherlands or any other gas terminal. The proposed Bellanaboy gas terminal and its surroundings is the only gas terminal site of its kind, and that's a fact.

Independent Consultants Fehily Timoney & Company is <u>only</u> providing <u>notes</u> and <u>commentary</u> to Mayo County Council. They are not providing independent, verified factual conclusions and recommendations. This is evident in the Introduction content of their report

The introduction of the Fehily Timoney & Company report dated 24th February 2004 states that;

*'this geotechnical **NOTE** has been prepared by Fehily Timoney & Company (FTC) further to a request from Mayo County Council (MCC) to provide and independent **COMMENTARY** on geo-technical aspects ....'*

The terms 'NOTE' and 'COMMENTARY' indicates that these reports do not provide independent, verified factual conclusions and recommendations. Therefore the report prepared by Fehily Timoney & Company should not be considered as a means of providing 'technical advice' to the Local Authority.

Consequences of Peat (Blanket Bog) Removal

This recent application has dramatically increased the consequences and potential impacts of the proposed gas terminal development compared to the previous application. It is misleading for anyone to suggest that the potential consequences of this development is less and that the 'peat issue has been resolved'.

The problem previously encountered with the peat has only been transferred from one site to another and thus increasing the impact and consequence of the proposed development.

How come Board Na Mona was not capable of providing an adequate solution for the last application that was refused by the Board?

Now, the applicant has admitted in Section 8 Soils, Geology and Hydology Subsection 8.4 Potential Impacts that:

*" its not unusual for **Bog failures** with man interference have occurred on slopes as shallow **as 2 degrees**. Both **natural** and **man-made** drainage measures have also often been identified as a contributory cause of some failures. The use of **trackways** across peat land can also impose additional loads, which could contribute to slope failures."*

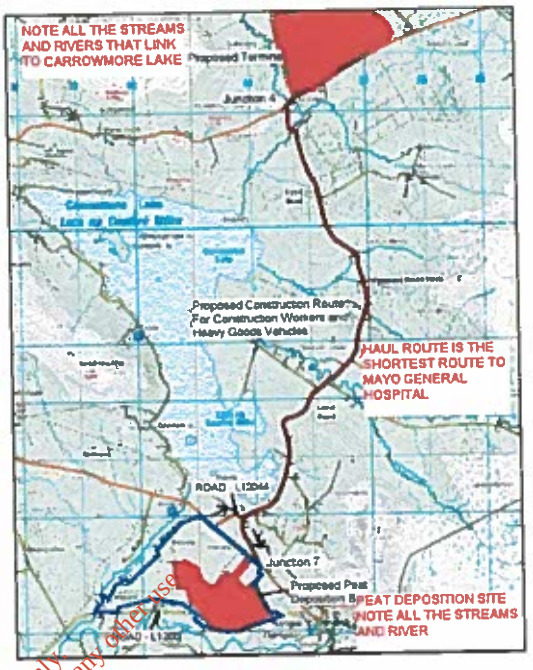
In its bulk virgin undisturbed state, peat failures have occurred on slopes as shallow as 2-degrees. According to the planners report the peat deposition site at Srahmore is 1.8 degrees what a coincidence!

However, based on past possible events there is only 2/1.8 = 1.11 factor of safety against the sliding of peat in its natural in-situ state in an area where the peat has formed over thousands of years and the fibre material has embedded/drown across all surfaces of the peat.

Considering that the proposed peat excavation technique will be saturated, disturbed and [*loaded-transported-unloaded*] three times before final placing, and that the saturated blanket bog will be placed on a site that has a bare cutaway surface '*devoid of vegetation*'.

Evidence from natural occurring events of peat slope failures is certainly more realistic and more reliable than laboratory tests and examinations of relatively small samples.

Therefore, It is reasonable to suggest that the calculated factor of safety against sliding of (1.11) based on the applicant's advice, which is based on natural occurring events, is not adequate as the peat is placed on cutaway bog, devoid of vegetation, disturbed and most likely very wet. The peat will also become saturated again over periods of prolonged rainfall on the Srahmore site.



This proposed development affects two very sensitive sites both North and South of the Carrowmore Lake (the only major clean water supply for the entire North Mayo Area).

At the hearing arising from the previous application it was determined, with some difficulty that there would be 7,600 truck movements arising from the development. This was false and misleading information. Truck turning movements arising from this recent application will now exceed 100,000 movements. The haul route is the shortest route available to Mayo (Castlebar) General Hospital. This road will be heavily congested with trucks travelling in both directions during the peat excavation stage and construction stage. It will hinder and delay any emergency from getting to Mayo General Hospital.

Consider a pregnant woman about to give birth to a child or a person expressing chest pains prior to a heart attack travelling in a family saloon, on a slippery surface, congested with trucks and it being extremely difficult to overtake as trucks are travelling in both directions, trying to get to Mayo General Hospital as quickly as possible. In this instance time is everything!

This proposal is placing people's lives at risk during all stages of the proposed development.

It is proposed to remove 450,000m^3 of Peat off-site. This is saturated blanket bog with approx. 90% moisture content. It has been determined that approximately 405,000,000 (405 million) litres of acidic water is contained within 450,000 cubic meters of blanket bog that is proposed to be removed. This cannot be compared to volumes of **dried** powder such as peat commonly transported by Board Na Mona.

Board Na Móna involvement with peat through the years is dealing with milled peat i.e. they effectively scrape the top 10-15mm from the surface and put it into windrows.

Source Board Na Móna Website www.bnm.ie

Source Board Na Móna Website www.bnm.ie

Source Board Na Móna Website www.bnm.ie

Work commonly carried out by Board Na Mona is better compared to harvesting crops that moving, treating and placing saturated blanket bog.

The HSA has stated that activities relating to site development/construction do not come within the scope of the regulations. The HSA also confirmed that their remit for land-use planning under the regulations excludes the assessment and safety advice associated with the excavation of Peat at Bellanaboy site and the deposition of the Peat at the Srahmore site.

At this stage, this is not surprising; as the HSA have excluded almost everything else from their remit in determine their advice on land-use planning.

In response to the Further Information request the applicant has identified that the proposed process of removing the peat is now weather dependent. Waterproofing sheeting will have to be placed over the peat every time it rains. Can you imagine acres of peat to be covered with sheets ever time it rains. Therefore, it could take many months and even years to remove the saturated blanket bog in order to meet the criteria put forward by the applicant.

The applicant has stated the orthophosphate impact to surface watercourses from phosphate-impacted soils is widely recognised as being a major concern in certain parts of Ireland, because it can lead to eutrophication of lakes and rivers. The orthophosphate concentrations recorded by the applicant in the blanket bog is approximately 250-10,000 times greater than the allowable concentration in lake waters.

The applicant has been working and experimenting on the proposed gas terminal site since the first application was submitted and even more extensively over the past few months. It was noted when local residents visited the site on the 26th of March 2004; they witnessed extensive work had/was being carried out without any obvious protection to prevent water pollution. This has been noted on page 10 Par 1 of my second report. A copy of that report is included in Appendix 3. During the visit, this was highlighted to representatives of the applicant but they could not provide evidence of adequate water treatment.
The peat contains phosphorus concentrations between 250-10,000 times greater than what is currently allowed in streams and rivers. It has now been reported that Algal Bloom have occurred in the lake.

Q. Which authority is responsible for the safety implications of these activities and the potential consequences of there effects?

I request the Board to identify from their examinations who is to be held responsible if accidents occur. (Slope Failure, Water Contamination, Traffic Accident arising from the development)

I advise the Board that some authority MUST be held accountable for the proposed works and the potential consequences of this proposed development.

It is my suggestion that the Applicant / or their partners in business will not be held accountable for all possible consequences that has the potential to occur.

I request the Board to refuse permission based on the risks of peat excavation, removal, retention and deposition.

Conclusion

I conclude that the proposed development would constitute an unacceptable risk to the health and safety of the local community and of the general public residing in the vicinity of the site and the upstream (import) pipeline and on the public road.

This recent submission in comparison to the last submission (moving of peat off-site) would constitute a greater and unacceptable risk of pollution to sources of potable waters of Carrowmore Lake and Gleanmoy River.

It would further constitute an unacceptable risk of pollution of salmonid waters in Glenamoy River, Sruwaddacon Bay and Carrowmore Lake. It would also seriously injure the amenities and values of properties adjacent to the proposed gas terminal and its related infrastructures.

The proposed development would further constitute an unacceptable risk to members of the public especially local residents in the vicinity of the terminal site.

That in the event of a accident occurring, the proposed type of development would present such 'domino effects' that under the present facilities and infrastructures development of the area would further constitute and unacceptable risk to the environment, local community and members of the public.

That in the event of a major accident occurring, the proposed development type would constitute and unacceptable risk to the dislodging and removal of permanent retaining structures that are required to provide global stability to the peat surrounding the terminal.

It is also reasonable to consider that the peat deposited at the Srahmore site has a high probability of failure and the proposed development would constitute an unacceptable risk to the public road, and the salmoid rivers adjacent to the Srahmore site.

It is also reasonable to consider that in the absence of accountable independent verification of the structural stability of the upstream pipeline surrounded in blanket bog and based on recent pipeline failures and local landslides and the overwhelming destruction and loss of life that there is a high probability of failure and therefore the proposed development would constitute an unacceptable risk to the public road, local residents, stability of the already unstable Dooncartoon hill and permanent retaining structures required for the global stability of the peat surrounding the site.

I THEREFORE CONCLUDE THAT PERMISSION SHOULD BE <u>REFUSED</u>

Site(s) Location


Pipeline Failure


Pipeline Failure


Dooncarton Hill Landslid

Appendix 1

Mayo County Councils (MCC)

Confirmation

Of

Receipt

Of

Observation and Objection Reports

Mayo County Council
Aras An Chontae
Castlebar

Ref No.: P03/3343

27/01/2004

Mr Brian Coyle
Coyle Kennedy Engineers
GFSC Moneengeisha Road
Galway

A Chara

I wish to acknowledge receipt of submission received from you on 26/01/2004 in connection with planning application by **SHELL E & P IRELAND LIMITED for CONSTRUCT GAS TERMINAL FOR THE RECEPTION AND SERAPATION OF GAS FROM THE CORRIB GAS FIELD, AND FOR A PEAT DEPOSITION SITE, RESPECTIVELY. THE DEVELOPMENT WILL CONSIST OF THE CONCURRENT DEVELOPMENT OF TWO SITES LOCATED 11 KILOMETRES APART APPROXIMATELY, AND IDENTIFIED AS THE SITE OF THE GAS TERMINAL FOR THE RECEPTION AND SEPARATION OF GAS FROM THE CORRIB GAS FIELD IN THE TOWNLAND OF BELLAGELLY SOUTH AND THE SITE OF THE PEAT DEPOSITION SITE IN THE TOWNLANDS OF SRAHMORE AND ATTAVALLY, BANGOR ERRIS. THE DEVELOPMENT AT THE BELLAGELLY SOUTH SITE WILL CONSIST OF: A GAS TERMINAL FOR THE RECEPTION AND SEPARATION OF GAS INCLUDING PLANT AND EQUIPMENT; PROVISION OF 4,935 SQ M (GROSS FLOOR AREA), APPROXIMATELY, OF BUILDINGS; ACCESS ROADS; 40 NO. CAR PARKING SPACES; AND ANCILLARY DEVELOPMENTS, OF WHICH 13 HA, APPROX, WILL BE DEVELOPED INRESPECT OF THE GAS TERMINAL'S FOOTPRINT. THE PROPOSED DEV. WILL OF THE BELLAGELLY SOUTH SITE WILL ALSO CONSIST OF; THE EXCAVATION AND REMOVAL OF 450,000 CUBIC M at BELLAGELLY SOUTH SRAHMORE ATTAVALLY.**

The matters referred to by you will be taken into consideration by the Council before a decision is made on the application. Notice of the Council's decision on the

application will be given in accordance with the requirements of the Planning and Development Regulations, 2001. This may be in the form of:

(a) posting the notice directly to you; or

(b) publishing the notice in a newspaper circulating in the area where the proposed development is situated.

Please note that in the event of an appeal being lodged by you, An Bord Pleanala will require a copy of this letter of acknowledgement.

Mise, le meas

pp

RUNAI CHONDAE

PLANNING DEPARTMENT
MAYO COUNTY COUNCIL
ARAS AN CHONTAE
CASTLEBAR
CO MAYO
094-24444

26-01-2004 12:28:49

Receipt No PLAN/0/0378

BRIAN COYLE
COYLE KENNEDY ENGS
GFSC MONEENGEISHA RD
GALWAY

MISC RECEIPTS - PLANNING 40001
OBJ P03/3343

Total 20.00 EUR
15.75 IEP

Tendered
Cash 20.00

Issued By Johanna Bourke
From PLANNING SECTION

AN BORD PLEANÁLA
TIME _____ BY _____
24 MAY 2004
LTR-DATED _____ FROM _____
PL _____

Appendix 2

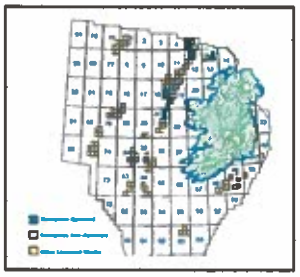
The Brian Coyle Observation and Objection Report

Based on

Applicant Submission

And

Research carried out at that time



By Brian Coyle,
BE, CEng, MIEI, MIStructE

Chartered Consulting
Civil & Structural Engineer

Director of
COYLE KENNEDY LTD
Consulting Engineers

TO THE SITE CHOSEN FOR CORRIB GAS TERMINAL
THE PROPOSED CONSTRUCTION TECHNIQUES & ROUTES
THE PEAT DEPOSITION SITE AT SRAHMORE
THE UPSTREAM HIGH PRESSURE PIPELINE ROUTE

BASED ON ITS WORLD RECORDS

Should we allow the Corrib Gas Field to be Connected:

- To an Inland Terminal

And

- Becomes the only Inland Terminal In the WORLD?
- Surrounded in BLANKET BOG that can become unstable at an angle of 2degrees or more
- Connected from a Landfall at the Base of a Hill that is Unstable
- Residents as close as 60m to the High Pressure Untreated Pipeline
- Residents within the Explosion/Gas Vapour Exclusion Zone from the Terminal and High Pressure Pipeline
- Streams and Rivers within an exclusion zone feeding into a major drinking water supply
- The only World Wide Deposition of 450,000m3 of Acidic Blanket Bog
- Causing in excess of 100,000 traffic turning movements during its development
- Resulting in the removal and discharge of at least 400,000,000 litres (Four hundred million) litres of acidic base water to the North and South of Carrowmore Lake, the only drinking water supply for the entire region
- In an Area of Natural Ground Instability

Why should we?
- when all the other World Wide Authorities have done different

As We Are Lead To believe by the Applicant That There Are No Other Alternatives! When in fact there are!

Is it the lack of experience in our Representatives and Authorities that they do not know the difference between right and wrong?

We do not want an Erris EU Directive to be written similar to the Seveso II directive that was written following the disaster and the ultimate consequence to people in the small town called Seveso in Italy.

The Content of this report is written without prejudice

Index

Page

See Next page for Appendices

Appendices

Appendix A

Appendix B

Appendix C

Appendix D

Observer and Objector

The observations and objections contained in this document are compiled and written by Brian Coyle BE, CEng, MIEI, MIStructE Chartered Consulting Engineer and are the observations and objections of many of my immediate family and friends that reside throughout the Erris community. These observations and objections are contained within the full text of this document and are supported with references from the applicant's application.

Proposed Development Planning Text

Bellagelly South & Srahmore Attavally Proposed Development.

PLANNING REFERENCE NO. 033343

LOCATION BELLAGELLY SOUTH
SRAHMORE ATTAVALLY

PERMISSION SOUGHT FOR
CONSTRUCT GAS TERMINAL FOR THE RECEPTION AND SERAPATION OF GAS FROM THE CORRIB GAS FIELD, AND FOR A PEAT DEPOSITION SITE, RESPECTIVELY. THE DEVELOPMENT WILL CONSIST OF THE CONCURRENT DEVELOPMENT OF TWO SITES LOCATED 11 KILOMETRES APART, APPROXIMATELY, AND IDENTIFIED AS THE SITE OF THE GAS TERMINAL FOR THE RECEPTION AND SEPARATION OF GAS FROM THE CORRIB GAS FIELD IN THE TOWNLAND OF BELLAGELLY SOUTH AND THE SITE OF THE PEAT DEPOSITION SITE IN THE TOWNLANDS OF SRAHMORE AND ATTAVALLY, BANGOR ERRIS. THE DEVELOPMENT AT THE BELLAGELLY SOUTH SITE WILL CONSIST OF: A GAS TERMINAL FOR THE RECEPTION AND SEPARATION OF GAS INCLUDING PLANT AND EQUIPMENT; PROVISION OF 4,935 SQ M (GROSS FLOOR AREA), APPROXIMATELY, OF BUILDINGS; ACCESS ROADS; 40 NO. CAR PARKING SPACES; AND ANCILLARY DEVELOPMENTS, OF WHICH 13 HA, APPROX, WILL BE DEVELOPED INRESPECT OF THE GAS TERMINAL'S FOOTPRINT. THE PROPOSED DEV. WILL OF THE BELLAGELLY SOUTH SITE WILL ALSO CONSIST OF; THE EXCAVATION AND REMOVAL OF 450,000 CUBIC M

Summary of Observations and Objections

I Object to the Proposed Site for the Gas Terminal Industrial Process at Bellagelly South, located to the North of the Catchment area of Carrowmore Lake, on the following basis.

- Health and Safety Risks that this development impacts to local residents. Engineering assessment on slope stability must examine slope stability prior to, during and after an explosion and also take account of Natural and livelihood events that are outside the applicant's control. The applicant has identified these events as one of the reasons for peat/land slides on slopes as low as 2 degrees but has not provided an engineering assessment, or a method of control for such events.

- Health and Safety Risks that this development impacts to Carrowmore Lake and hence the Erris community during construction, following construction or after an explosion. The applicant fails to identify how they can limit the consequences of events identified by them and in the Seveso II directive. The applicant has no control on the land use or the surface water runoff to streams and rivers that feed into Carrowmore Lake. These streams and rivers are outside the control of the applicant and can become contaminated with toxic chemicals.

- I object to the risk that the terminal imposes on the stability of the surrounding landscape including Dooncartoon Hill. The risks associated with the Gas Industry process i.e. explosions etc. will cause ground vibrations and hence ground instability. Remember that the applicant has identified in their submission that peat can become unstable at an angle of 2degrees or above.

- I object that economic analysis based purely on the Corrib gas quantity has formed the immediate basis of their decision for building an inland/onshore gas terminal. Gas/oil Hydrocarbons have been found and exploited in the Celtic Sea, the Porcupine Trough and in the Corrib Basin. These areas are mainly located off the west coast of Mayo, Galway, Clare and Kerry.

- I object to the excavation and the deposition of 450,000m^3 of Acidic Peat to the South of Carrowmore Lake (the only drinking water supply for the entire Erris People).

- I object to the increase in traffic turning movements associated with this proposed development and the impact that this has on local residents, emergency vehicles etc.

- The previous application identified approximately 7,600 traffic-turning movements. The current application will introduce A MINIMUM OF 82,000 TRAFFIC TURNING MOVEMENTS just to remove the Acidic Peat. The overall traffic turning movements associated with the proposed development will exceed 100,000 movements i.e. a truck will enter or

leave the site at least 100,000 times during construction.

- At least 90% of peat is water. There is 1000L of water in a meter cube (m^3). I object to the removal of such a large volume of acidic water contained in the Blanket Peat. This blanket peat is going to be disturbed/removed and disposed in an area to the North and South of Carrowmore Lake respectively.

  The amount of acidic water contained in the blanket bog is AT LEAST 405,000,000 LITRES (FOUR HUNDRED AND FIVE MILLION LITRES OF ACIDIC WATER).

- I object to the traffic hazard imposed on local roads arising from the construction of the terminal, the removal of 450,000m^3 of peat and 50,000m^3 of mineral soil. The c.11km route chosen to dispose this material is inadequate in formation, width and alignment. This road will be destroyed and congested with trucks during construction and will impose a high risk to those people travelling to Castlebar General Hospital in the event of an emergency. This route is the shortest route available to Castlebar General Hospital for all residents in the North Erris area. Therefore, people's lives are at risk even during construction stage.

- I object to the location of the Gas Pipeline, Discharge Pipeline and Umbilical Line as identified under the Foreshore Licence. I also object to the Link between this infrastructure and the Gas Terminal on foot of the recent landslide of Dooncartoon Hill. The pipeline is also been laid on Blanket Bog which the Applicant has identified can slide at an angle of 2degrees or more. How do they intend to control Natural or Local livelihood events that have been identified (by the applicant) as one of the main reasons for peat/land slides? These landslides will undoubtedly fracture, shear the pipeline and can impact on the terminal and cause a catastrophic disaster in an area currently stamped with natural ground instability. In light of this new information the Minister for the Marine has power under the Foreshore Act to withdraw the Foreshore licence on the basis of non-observance by the licensee of all these events at the time the licence was issued.

- I object to the fact that insufficient Health and Safety assessment has not been provided for all the above events and their ultimate consequences. All Health and Safety aspects should be assessed at this stage. How do we intend to control and limit the consequences of these events if people involved cannot even provide a solution at this stage? It is unacceptable to conceal facts and realistic concerns associated with the proposed development.

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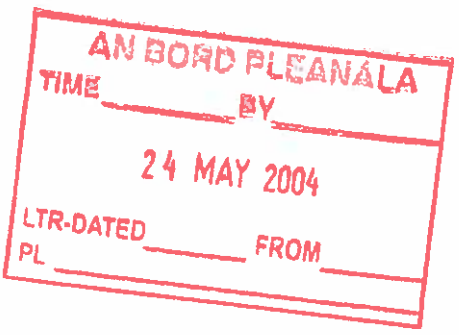
At the very least, if an onshore site is required then it should be:

- Outside the catchment of a major drinking water supply thus reducing the consequences of a Seveso II event.
- In an area with surrounding ground stability, where such large quantities of Peat should not have to be removed thus reducing a traffic hazard, acidic peat removal and 400 million litres of acidic water.
- Where most of the raw materials can be quarried on site for hardcore fill and concrete etc.
- In situations like this, the Health and Safety of livelihoods should take precedence over areas of special conservation and areas of scenic amenity. There are many other sites available in Erris and indeed in Mayo, where the high risk events and the potential consequences of a gas terminal is dramatically reduced.



Introduction

Ireland has one of the largest Offshore Oil and Gas exploration areas in Europe. Hydrocarbons have been found and exploited in the Celtic Sea, the Porcupine Trough and in the Corrib Basin. Refer to Appendix A for location of these areas. They are predominantly off the coasts of Counties Donegal, Sligo, Mayo, Galway, Clare and Kerry.

Elsewhere throughout the world Gas processing is carried out either at newly constructed Gas terminals or connected into existing gas infrastructure. The existing European Gas network infrastructure currently available is capable of delivering the Corrib gas to Africa and Russia.
Refer to Appendix "A" for the existing European Gas Network layout infrastructure.

The basis of my objection is outlined below and is supported with extracts and statements from the applicant's submission.

Facts and Figures

Gas is been extracted in water depths greater than 1000m. The Corrib gas water depth is approx. 200m
e.g. NANSEN BOOMVANG GAS FIELD is extracted from waters greater than 1000m deep.

Existing techniques exist for the transportation of untreated Gas from a well to a terminal either offshore or onshore for up to distances of 140m. This transportation distance is currently been quoted for SNØHVIT GAS FIELD, BARENTS SEA, NORWAY where a much more harsh marine environment exists than that in the Corrib field. Therefore, onshore sites can be considered in Counties Sligo, Mayo, Galway and Clare for an onshore/coastal terminal for the Corrib Gas Field.

Of all the gas terminals in the world none of them are inland.

At the hearing arising from the previous application it was determined with some difficulty that there would be 7,600 truck movements arising from the development. Truck turning movements arising from this recent application will now exceed 100,000 movements.

It is proposed to remove 450,000m^3 of Peat off-site. This is saturated blanket bog with approx. 90% moisture content. This cannot be compared to volumes of dried powder such as peat commonly transported by Bord Na Mona.

There is no evidence available to suggest that such a large volume of blanket bog has ever been satisfactorily excavated and/or satisfactorily deposited so close to a major drinking water supply without contaminating it.

At least four hundred and five million litres of acidic water (405,000,000L) is contained within this peat and has the potential to seriously pollute the only water supply for the entire region.

Gas and Oil pipelines fracture and burst throughout the world on a daily basis.

The safety aspect of the high pressure pipeline has not been properly reviewed.

Economic analysis based purely on the Corrib gas quantity is misleading.

Corrib gas quantity should not form the immediate basis of the applicant's decision to choose an inland terminal.

I object to the fact that economic analysis based purely on the Corrib gas quantity has formed the immediate basis of the decision for building an inland/onshore gas terminal. Inland and Onshore gas terminal will allow the applicant to expand for their own benefit.

The applicant has failed to provide in-depth site-specific information for the alternative sites investigated. The applicant has ruled against these sites on their own merits. A proper and site-specific documented list as previously requested by Bord Pleanala should be provided and examined by the local Authority in conjunction with the HSA and made available to the public for comparison purposes.

Based on the unexplored but already licensed exploration blocks in the Atlantic Ocean it is only a matter of time until the applicant will offer, use or share this proposed development infrastructure to process and export future oil/gas findings. The exploration licensed block areas are clearly shown on maps included in Appendix A.

The applicant has previously identified that the terminal has been designed to be the control centre for all the offshore (subsea) facilities in the Corrib Field and beyond. Refer to Page 14 of 377; An Bord Pleanala Report under the heading 'Design Life' for the recorded information.

The Applicant States in Section 4 "Alternatives" Subsection 4.2.2 "Reasons why alternative concepts were eliminated:"

> *"Economic analyses determined that the very high capital and operating cost of each of the floating or fixed platform options, combined with the requirement for extensive gas transport infrastructure, could not be recovered due to the relatively moderate size of the predicted Corrib reserves and envisaged gas sale price."*

This statement and the applicants decisions based upon this statement are misleading and inaccurate for the following reasons:

- The applicant bases their economic decision purely on the quantities of the Corrib Gas field and for the applicant's own economic benefits.
- Under the current legislation, the HSA should also examine, qualify and prepare a HSA Zoning for each site and participate in choosing the appropriate site.
- Offshore and Coastal Platforms have previously been built for such quantities and recent exploration findings use the previously constructed offshore/coastal platforms for a terminal connection (e.g. Canyon Express).
- The areas explored off the West Coast of Ireland is very small and already gas/oil findings have been made. Economic analysis based purely on the Corrib gas quantity should not form the immediate basis of the decision to build an inland gas terminal. Refer to Appendix A for other Licensed Blocks areas.
- The quantities of gas/oil in Irish Waters off the west coast of Ireland are likely to be greater than Corrib gas find.
- It was previously identified that metocean conditions in the North Sea, where offshore platforms are common, greatly exceed the average metocean conditions for Corrib field. Metocean conditions at Corrib suit an Offshore Platform.
- Economics for the benefit of a Multinational company should not be the deciding factor.
- Previous submissions to An Bord Pleanala by one of the applicant's agents from Granherne stated at the hearing that it is technically feasible to develop Corrib in a different way.

Incorrect Assessment of Alternative Sites

The applicant has ruled against alternative sites on their own merits. It is obvious once again from reading the current application that Economic Analysis on the applicants' part seems to be the main deciding factor in choosing the proposed site which is the only inland gas terminal site in the world. Under the current Planning and Development Act, the local authority including the HSA should be determining the Land Use Policies for an area especially an Industrial Area.

Mr. Kevin Moore of An Bord Pleanala previously stated on Page 74 of his report dated April 2003:

"that the landfall options in the Killala area were dismissed because (a) the location considered

recorded by the applicant in the blanket bog is approximately 250-10,000 times greater than the allowable concentration in lake waters.

- The milling of peat commonly associated with the work that Bord Na Mona does is better compared to harvesting crops than removing saturated blanket bog. This statement is supported with picture evidence in the Bord Na Mona Website.

- The proposed construction work (grouting) resulting in the injection of chemicals into the ground where surface water run-off will flow into rivers and streams and then into a major drinking water supply for the entire region should undoubtedly be avoided. Published documents states that this process should be independently investigated.

- The applicant has now identified that the proposed process of removing the peat is weather dependent. Waterproofing sheeting will have to be placed over the peat every time it rains. Can you imagine acres of peat to be covered with sheets ever time it rains. Therefore, it could take many months and even years to remove the saturated blanket bog in order to meet the criteria put forward by the applicant.

Summary of Appeal Report

- Difficulties encountered during the Planning Process and the withholding of an observation / submission (HSA report) by Mayo County Council until a decision was made is contrary to the Planning and Development Act.

- The HSA advice is limited and only considers that area of land inside the Gas Terminal Security Fence

- The HSA has refused to consider or provide advice on the Health and Safety of the Local People at Work

- The HSA has refused to consider or provide advice on the safety of the public from the upstream (Import) pipeline under their remit (land use planning)

- Pipeline Standards only Consider the Safety of the Pipeline from the public (3rd Party Activity) and not the Safety of the Public from the pipeline. There The safety of the public from the high-pressure upstream pipeline in blanket bog has yet to adequately verified

- The HSA has admitted and stated that they do not have the expertise in-house to examine all of the necessary land-use planning criteria e.g. slope stability and in that instance they have omitted this major accident hazard event from there examination and have not provided advice for this event in their land-use planning advice HSA report.

- Site Specific Technical Advice is omitted in the assessment and advice given to the Local Authority, by the HSA as they have stated that they do not have in-house expertise

- The conclusions of the HSA report dated 8th April 2004 under land use planning are typical 'template' statements and do not address site-specific issues

- The HSA or local Authority has not considered all toxic substances that can be present in untreated gas and therefore excluding the assessment and advice in relation to the presence of Anticipated Substances

- The alternatives sites would still fulfil the National Policy to develop the Corrib Gas Field and would limit the consequence of a major accident domino effect arising from the Bellanaboy site characteristics

- Convenient Visits to other Gas Terminal Sites arranged by the Applicant are misleading and form no site-specific comparison to the proposed gas terminal site at Bellanaboy

- Independent Consultants Fehily Timoney & Company is only providing notes and commentary to Mayo County Council. They are not providing independent, verified factual conclusions and recommendations. This is evident in the Introduction content of their report

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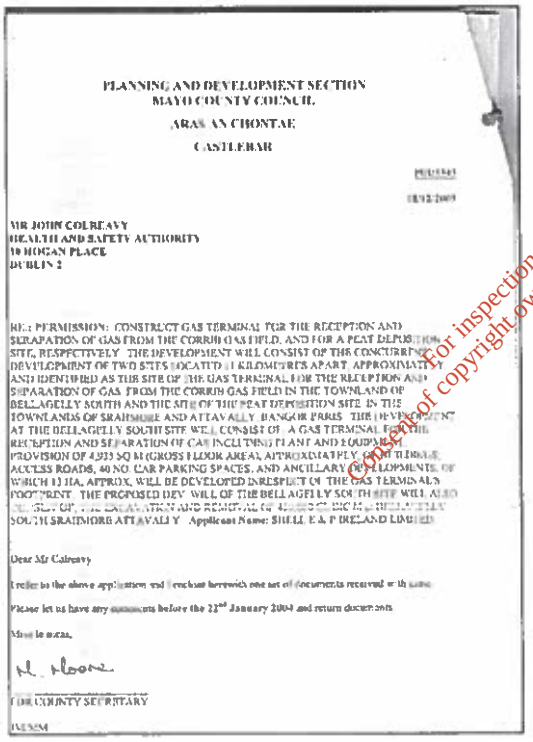
Difficulties Encountered during the Planning Process and the withholding of relevant information by Mayo County Council

Mayo County Council Withheld The HSA report from the Public

Public investigations and observations have been hampered as Mayo County Council and the Health and Safety Authority would not provide a copy of the HSA report prior to a decision by Mayo County Council.

A letter from Mayo County Council to Mr. John Colreavy (representative from the Process Industry Unit of the Health and Safety Authority hereafter referred to as the HSA) does not suggest that the HSA report would become an internal document and it does not suggest that it would not be available to the public until a decision was made.



PLANNING AND DEVELOPMENT SECTION
MAYO COUNTY COUNCIL
ÁRAS AN CHONTAE
CASTLEBAR

MR JOHN COLREAVY
HEALTH AND SAFETY AUTHORITY
10 HOGAN PLACE
DUBLIN 2

RE: PERMISSION: CONSTRUCT GAS TERMINAL FOR THE RECEPTION AND SEPARATION OF GAS FROM THE CORRIB GAS FIELD, AND FOR A PEAT DEPOSITION SITE, RESPECTIVELY. THE DEVELOPMENT WILL CONSIST OF THE CONCURRENT DEVELOPMENT OF TWO SITES LOCATED 11 KILOMETRES APART, APPROXIMATELY AND IDENTIFIED AS THE SITE OF THE GAS TERMINAL FOR THE RECEPTION AND SEPARATION OF GAS FROM THE CORRIB GAS FIELD IN THE TOWNLAND OF BELLAGELLY SOUTH AND THE SITE OF THE PEAT DEPOSITION SITE IN THE TOWNLANDS OF SRAHMORE AND ATTAVALLY, BANGOR ERRIS. THE DEVELOPMENT AT THE BELLAGELLY SOUTH SITE WILL CONSIST OF: A GAS TERMINAL FOR THE RECEPTION AND SEPARATION OF GAS INCLUDING PLANT AND EQUIPMENT, PROVISION OF 4,933 SQ M (GROSS FLOOR AREA) APPROXIMATELY IN TOTAL, ACCESS ROADS, 40 NO. CAR PARKING SPACES, AND ANCILLARY DEVELOPMENTS, OF WHICH 13 HA, APPROX, WILL BE DEVELOPED IN RESPECT OF THE GAS TERMINALS FOOTPRINT. THE PROPOSED DEV. WILL OF THE BELLAGELLY SOUTH SITE WILL ALSO [illegible] SOUTH SRAHMORE ATTAVALLY. Applicant Name: SHELL E & P IRELAND LIMITED

Dear Mr Colreavy

I refer to the above application and I enclose herewith one set of documents received with same.

Please let us have any comments before the 22nd January 2004 and return documents.

Yours sincerely,

M. Moore

FOR COUNTY SECRETARY

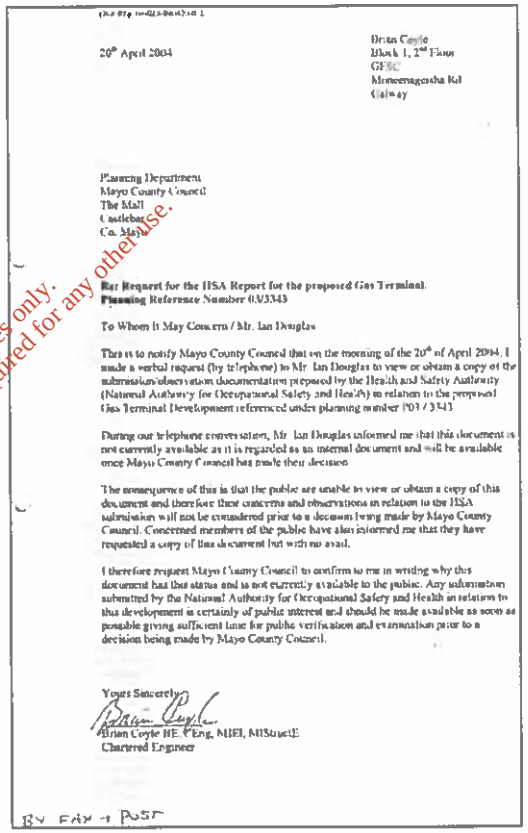
I believe that the HSA report is a submission or observation in relation to the planning application, and should have been made available for inspection and/or purchase to members of the public prior to MCC making a decision.

Mayo County Council received many phone calls from the public requesting a copy of the HSA report. I was not informed by Mayo County Council when they received the HSA report.

Mayo County Council did not indicate to me at any time that the report would be withheld from the public prior to a decision being made.

Mayo County Council received the health and safety authority report for land use planning advice on the 13th of April 2004, 27 days before the decision to grant permission.

On the 20th of April 2004, I wrote to Mayo County Council, (following a telephone conversation with Mr. Iain Douglas Senior Planner) asking them to confirm to me in writing why the HSA report was not available to the public prior to a decision being made and why it had achieved such a status i.e. internal document (copy below).



20th April 2004

Brian Coyle
Block 1, 2nd Floor
GFSC
Mervue Business Park
Galway

Planning Department
Mayo County Council
The Mall
Castlebar
Co. Mayo

Re: Request for the HSA Report for the proposed Gas Terminal.
Planning Reference Number 04/3343

To Whom It May Concern / Mr. Ian Douglas

This is to notify Mayo County Council that on the morning of the 20th of April 2004, I made a verbal request (by telephone) to Mr. Ian Douglas to view or obtain a copy of the submission/observation documentation prepared by the Health and Safety Authority (National Authority for Occupational Safety and Health) in relation to the proposed Gas Terminal Development referenced under planning number P04 / 3343.

During our telephone conversation, Mr. Ian Douglas informed me that this document is not currently available as it is regarded as an internal document and will be available once Mayo County Council has made their decision.

The consequence of this is that the public are unable to view or obtain a copy of this document and therefore their concerns and observations in relation to the HSA submission will not be considered prior to a decision being made by Mayo County Council. Concerned members of the public have also informed me that they have requested a copy of this document but with no avail.

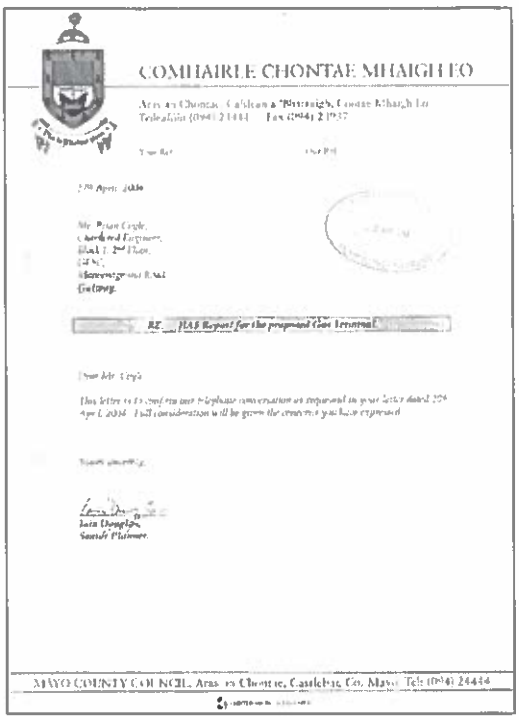
I therefore request Mayo County Council to confirm to me in writing why this document has this status and is not currently available to the public. Any submission submitted by the National Authority for Occupational Safety and Health in relation to this development is certainly of public interest and should be made available as soon as possible giving sufficient time for public verification and examination prior to a decision being made by Mayo County Council.

Yours Sincerely,

Brian Coyle BE, CEng, MIEI, MIStructE
Chartered Engineer

BY FAX + POST

On the 27th of April 2004, I received a written reply to my letter (copy below).



COMHAIRLE CHONTAE MHAIGH EO

Áras an Chontae, Caisleán a' Bhréanaigh, Contae Mhaigh Eo
Teileafón (094) 24444 Fax (094) 21937

[illegible] April 2004

Mr. Brian Coyle,
Chartered Engineer,
Block 1, 2nd Floor,
GPSC,
Monemagoisha Road,
Galway.

RE: HAS Report for the proposed Gas Terminal

Dear Mr. Coyle

This letter is to confirm our telephone conversation as requested in your letter dated 27th April 2004. Full consideration will be given the concerns you have expressed.

Yours sincerely,

Iain Douglas,
Senior Planner.

MAYO COUNTY COUNCIL Áras an Chontae, Castlebar, Co. Mayo Tel: (094) 24444

A larger scale copy of this reply letter from Mayo County Council is included in Appendix 4. The response did not address my request and only confirmed our telephone conversation.

On the 28th of April, I wrote to Mr. Iain Douglas again to inform him that the content of his letter does not address my request and again, I requested an appropriate written response.

28th April 2004

Brian Coyle
Block 1, 2nd Floor,
GPSC,
Monemagoisha Road,
Galway

Iain Douglas
Planning Department,
Mayo County Council,
The Mall,
Castlebar,
Co. Mayo.

Dear Iain,

I have received your letter (Mayo County Council) dated the 27th April 2004. The content of your letter does not address my request as stated in my letter dated 20th April 2004. I attach a copy of my letter that you have already received for your information. My concerns are in relation to the examination and assessment of safety issues. Access to rightful information pertaining to the safety of my family and members of the public has now become time consuming, frustrating and difficult with little time for observation and/or assessment.

I request an appropriate written response to my letter dated 20th April 2004, ref 04-025-040420-01L, mainly indicating why the Health and Safety Report has achieved the status as set.

Yours Sincerely,

Brian Coyle BE, CEng, MIEI, MIStructE
Chartered Engineer

Encl.
B. Coyle Letter 04-025-040420-01L 20th April 2004
Mayo County Council Response dated 27th April 2004

By Fax + Post.

To date, I have not received an appropriate written response/explanation from Mayo County Council.

A larger scale copy of these letters is included in Appendix 4.

Why was the HSA report withheld from the public before a decision was made?

Members of the public should be entitled to view or copy a document that should identify the risks and safety implications of the proposed development prior to a decision being made.

Planning and Development Act, 2000 Section 38 states that;

(1) Where a planning authority gives its decision in respect of a planning application the following documents shall be made available within 3 working days for inspection and purchase by members of the public during office hours at the offices of the authority:

(a) a copy of the planning application..... obtained from the applicant in accordance with regulations under this act.

(b) a copy any submission or observation in relation to the planning application which have been received by the authority;

(3) Any documents referred to in paragraphs (a) and (b) of subsection (1) which is received or obtained by a planning authority shall be made available for inspection and purchase by members of the public at the office hours of the authority from as soon as may be after receipt of the document <u>until a decision is made</u> on the application

I believe that the actions of Mayo County Council in frustrating and withholding information from members of the public are a serious breach of the relevant Planning Acts and Regulations.

I request the Board to seriously consider and examine these series of events and state if the application is in compliance with relevant Acts and Regulations.

Prior to my request for the HSA report, I informed the HSA that I was prepared to have the HSA report independently verified and examined by an international safety consultant or other competent authority.

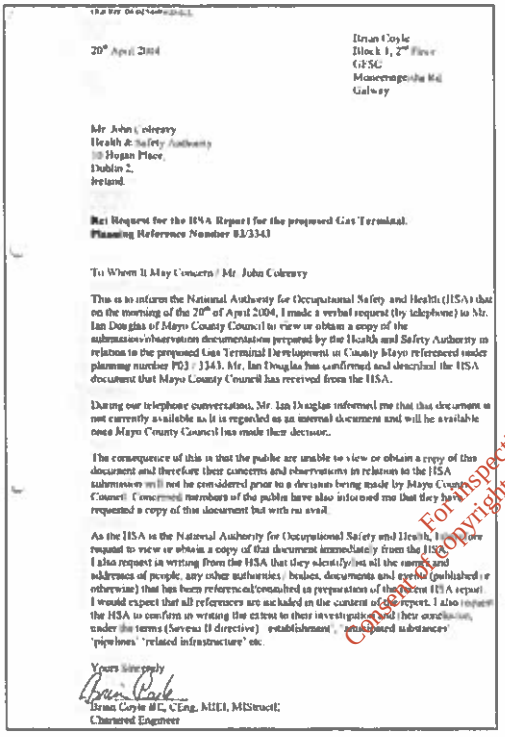
The attitude of Mr. Colreavy (Safety Representative from the Process Industry Unit, of the HSA) was, that the HSA is the competent authority and no matter what the HSA advice would be accepted and adopted. This 'competent authority' is limiting their investigations and advice to such an extent that they will not advise against the granting of planning permission for this proposed development.

Correspondence between Brian Coyle (author of this report) and Mr. John Colreavy representative from the Process Industry Unit (PIU) of the Health and Safety Authority during the planning process

.

Following the failure of Mayo County Council to provide me with a copy of the HSA report, I then tried to view or obtain a copy of the HSA report from Mr. John Colreavy.

On the 20th of April 2004, I wrote to Mr. Colreavy requesting to view or obtain a copy of the HSA report.



Brian Coyle
Block 1, 2nd Floor
GESC
Mascreaghadoo Rd
Galway

20th April 2004

Mr. John Colreavy
Health & Safety Authority
10 Hogan Place,
Dublin 2.
Ireland.

Re: Request for the HSA Report for the proposed Gas Terminal.
Planning Reference Number 03/3343

To Whom It May Concern / Mr. John Colreavy

This is to inform the National Authority for Occupational Safety and Health (HSA) that on the morning of the 20th of April 2004, I made a verbal request (by telephone) to Mr. Ian Douglas of Mayo County Council to view or obtain a copy of the submission/observation documentation prepared by the Health and Safety Authority in relation to the proposed Gas Terminal Development in County Mayo referenced under planning number P03 / 3343. Mr. Ian Douglas has confirmed and described the HSA document that Mayo County Council has received from the HSA.

During our telephone conversation, Mr. Ian Douglas informed me that this document is not currently available as it is regarded as an internal document and will be available once Mayo County Council has made their decision.

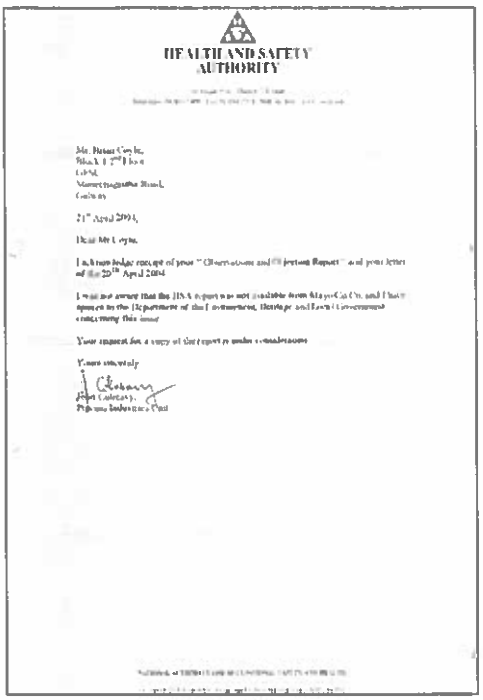
The consequence of this is that the public are unable to view or obtain a copy of this document and therefore their concerns and observations in relation to the HSA submission will not be considered prior to a decision being made by Mayo County Council. Concerned members of the public have also informed me that they have requested a copy of this document but with no avail.

As the HSA is the National Authority for Occupational Safety and Health, I therefore request to view or obtain a copy of this document immediately from the HSA. I also request in writing from the HSA that they identify/list all the names and addresses of people, any other authorities / bodies, documents and events (published or otherwise) that has been referenced/consulted in preparation of the above HSA report. I would expect that all references are included in the content of the report. I also request the HSA to confirm in writing the extent to their investigation and their conclusion, under the terms (Seveso II directive) 'establishment', 'designated substances' 'pipelines' 'related infrastructure' etc.

Yours sincerely

Brian Coyle BE, CEng, MIEI, MIStructE
Chartered Engineer

I was amazed at the verbal and written response from a representative from the National Authority for Occupational Safety and Health.



HEALTH AND SAFETY AUTHORITY

Mr. Brian Coyle,
Block 1, 2nd Floor,
GESC,
Mascreaghadoo Road,
Galway.

21st April 2004.

Dear Mr Coyle,

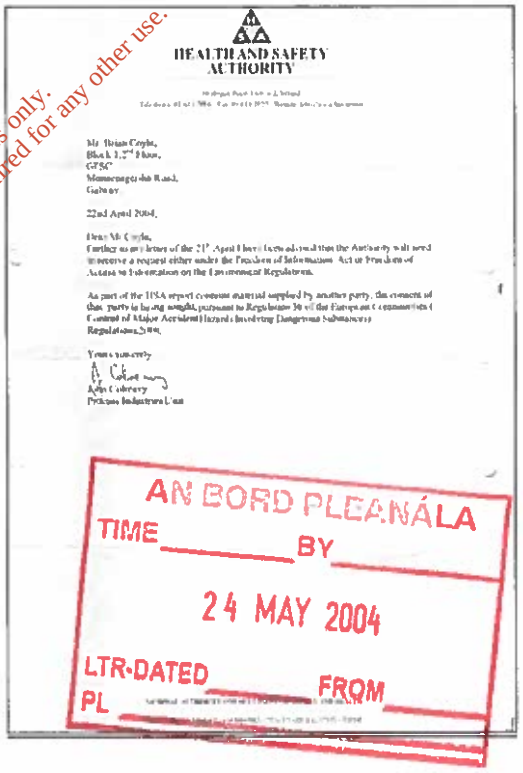
I acknowledge receipt of your "Observations and Comments Report" and your letter of the 20th April 2004.

I would be aware that the HSA report is not available from Mayo Co. Co. and I have spoken to the Department of the Environment, Heritage and Local Government concerning this issue.

Your request for a copy of the report is under consideration.

Yours sincerely

John Colreavy.
Process Industries Unit



HEALTH AND SAFETY AUTHORITY

Mr. Brian Coyle,
Block 1, 2nd Floor,
GESC
Mascreaghadoo Road,
Galway.

22nd April 2004.

Dear Mr Coyle,
Further to my letter of the 21st April I have been advised that the Authority will need to receive a request either under the Freedom of Information Act or Freedom of Access to Information on the Environment Regulations.

As part of the HSA report comments material supplied by another party, the consent of that party is being sought, pursuant to Regulation 30 of the European Communities (Control of Major Accident Hazard Involving Dangerous Substances) Regulations, 2000.

Yours sincerely

John Colreavy
Process Industries Unit

AN BORD PLEANÁLA
TIME _____ BY _____
24 MAY 2004
LTR-DATED _____ FROM _____
PL _____

The content of Mr. Colreavy's letter is self-explanatory but quite frustrating for anyone that is trying to view or obtain a copy of the HSA report for their own personal benefit. In summary, like Mayo County Council, the HSA were also obstructing and delaying me from viewing or obtaining a copy of the HSA report. Any reference or input from any technical bodies/persons who was consulted or otherwise in preparation of the report should have realised or be made aware that this

Health & Safety Implications Associated with the Proposed Development have not been fully addressed or controlled.

The Proposed Development Fails to Comply with Seveso II Directive [96/82/EC]

Current legislation requires that the planning process for new developments take into consideration the risk from industrial facilities that present a major accident hazard. Planning authorities are required to seek technical advice from the Health and Safety Authority (HSA) in relation to proposed and existing affected development.
The HSA must consider and advise on, the anticipated types and quantities of materials, the developing and changing processes associated with all industries.

Shortcomings in the applicant's submission into preventing, controlling and excluding personnel and the environment from High Risk Events are evident throughout the application.

The proposed Development is a Seveso II High Risk Event Industry with Local Residents residing within the Construction Sound buffer zone

The Environmental Risk Assessment of the Effects associated with the Key Hazard Scenarios are listed in Section 17 "Mitigation and Impacts Summary and Impact Interactions" in Table 17.5. The applicant has identified that the release of Flammable Liquid, Condensate, Product and Wet Methanol is possible.
The applicant has also stated in Section 4 "Alternatives" subsection 4.5.1 of the EIS report that fires are possible and hence explosions can occur when they state that one of the reasons for a flat site is " *to facilitate fire fighting around storage tanks*". They have also identified that when these materials are associated with a fire, that the Overall Risk Category is High.

Imprudently, the Applicant only provides information in relation to the "bunding / catchment" containment of such materials without the effects of fire, i.e. prior to explosion.

The quantity of explosive material on site indicates that this establishment is a "Seveso II High Risk Industry". Local Residents are so close to the proposed development that even the applicant has identified in Section 17 "Mitigation and Impacts Summary and Impact Interactions" in Page/Table 17-6) that they will be affected by the sound arising from construction works.

It is therefore, quite obvious that the residents are not far enough away from the development or the events and consequences that can arise in a Seveso II High Risk Event Industry.

The Applicant has failed to fulfill the Aims of the Seveso II Directive [96/82/EC]

Lets be clear, the aim of the Seveso II Directive is for 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.*"

The applicant has purposely ignored how to effectively control the consequences arising from a High Risk Category as the land associated with Vapour Exclusion Zone (Gas Cloud in atmosphere arising from a gas leak prior to explosion) or the Thermal Exclusion Zone (Heat given off from an explosion) are outside the site boundary and hence outside the applicant's control.

The proposed gas terminal development is sited on the catchment, streams and rivers carrying water supply to Carrowmore Lake and hence a High Risk Category event will have a consequential effect on these streams and rivers. Therefore man and the environment will be affected since Carrowmore Lake is a major water supply for the entire Erris Community.

Therefore, the aims of the Seveso II directive are not adhered too. The applicant fails to limit the consequences arising from a major accident and has not provided the high level of protection required under the aim Seveso II Directive.

The Anticipated Presence of Substances have not been verified or properly addressed as required under the Seveso II directive

The Applicant fails to include and identify all products/substances associated with the Gas Processing Industry and therefore the anticipated presence of dangerous substances cannot be properly addressed.

The applicant is requesting permission to:

"CONSTRUCT GAS TERMINAL FOR THE RECEPTION AND SEPERATION OF GAS FROM THE CORRIB GAS FIELD..."

The text of the applicant's application does not identify the **type** of gas to be received, separated or processed. There is no verified independent advice to identify that the Corrib Gas is a "Dry Gas". Depending on the source, the by-products of a natural gas processing plant vary and are more explosive than the process of "Dry" Gas.
The foreshore license has been awarded for a period of up to 99 years.

Future exploration and gas finds can be connected/linked to the Corrib gas zone and then brought ashore using this proposed development infrastructure without further planning implications, similar to other world wide gas terminal developments.

It is very unlikely (even after a HSA assessment) that a project worth a half a billion euro will be refused to process other types of gases! If the infrastructure is there then use it!

"Ireland has one of the largest offshore Oil and Gas exploration areas in Europe. Hydrocarbons have been found and exploited in the Celtic Sea, the Porcupine trough and in the Corrib Basin.Ramco, Enterprise Oil and Providence Resources have exploitable reserves".
Text taken from
http://www.tradepartners.gov.uk/oilandgas/ireland/profile/overview.shtml

Refer to Appendix A for the location of these areas.

With advances in mechanics, chemistry and technology any modifications necessary to treat "alternative gas types" can take place within the proposed building footprint or within some minor extension.

The Seveso II directive requires that;

*"the 'presence of dangerous substances' shall mean the actual or **anticipated** presence of such substances in the establishment, or the presence of those which it is believed may be generated during loss of control of an industrial chemical process, in quantities equal to or in excess of the thresholds"*

The anticipated presence of a substance within an establishment and the consequences of its effects must be assessed to comply with the Seveso II Directive. The anticipated presences of other dangerous substances associated with the Gas Industry cannot be ignored and must be addressed now **regardless if the presence** of this anticipated substance requires a future planning permission or not. Permission is currently being sought for a GAS TERMINAL.

The Seveso II directive **does not state nor does it allow** that the, "anticipated presence of a substance" can be dealt with at a later stage under a separate and/or future application. A more highly explosive substance with more highly explosive chemicals, than what is currently proposed can be brought ashore to produce natural gas e.g. the recent gas explosion in China affected a 25sq km area and was labeled a "Death Zone"

Therefore, in adherence and compliance with the Seveso II directive, the HSA zoning criteria for this proposed establishment must consider the anticipated presence and the processing of all types of gas (e.g. "Dry" and "Wet") and their products, as different gas types other than "Dry" can be brought ashore and processed.

The applicant must supply and include all the types and cumulative quantities of the anticipated products/byproducts used in the gas processing industry. These types and quantities should be independently verified. That is what the development is intended to be; an Industrial Gas Processing Plant. The HSA must consider the 'anticipated' presence of dangerous substances associated with all types of gas processing otherwise; the proposed development will not be in compliance with the Seveso II directive.

The Government, Local Authority and Applicant has failed to Comply with Article 8 (Domino Effect) and Article 12 (Land-Use Planning) of the Seveso II Directive

To further comply with the Seveso II directive under Articles 8 and 12

[Article 8: Domino Effect]

"Member States shall ensure that the competent authority, using the information received from the operators in compliance with Articles 6 and 9, identifies establishments or groups of establishments where the likelihood and the possibility or consequences of a major accident may be increased because of the location and the proximity of such establishments, and their inventories of dangerous substances."

The applicant fails to consider the "Domino Effect" arising from a leak/explosion that can occur at the terminal site and consequentially travel along the high-pressure pipeline. Therefore, I request that all authorities especially the HSA must assess this possible scenario and limit its consequence.

[Article 12: Land-Use Planning]

"Member States shall ensure that the objectives of preventing major accidents and

limiting the consequences of such accidents are taken into account in their land use policies and/or other relevant policies. They shall pursue those objectives through controls on :

a. *the siting of new establishments,*
b. *modifications to existing establishments covered by Article 10,*
c. *new developments such as transport links, locations frequented by the public and residential areas in the vicinity of existing establishments, where the siting or developments are such as to increase the risk or consequences of a major accident.*"

In considering the proposed terminal site:

The government shall ensure that the local Authority, using information received from the applicants, must identify sites or groups of sites that are possible candidates for the presence of dangerous substances in accordance and in adherence to the aims of the Seveso II directive.

Thereafter, the member state (Government) shall ensure that the objectives of preventing major accidents and limiting the consequences of such accidents (especially the consequences of community livelihoods and the environment) are taken into account in their land use policies.

In considering/granting this terminal site all relevant local and state authorities will fail to conform to the objectives of Seveso II Article 12 Land-Use Planning Policy as there are many more available sites in the Mayo area including Erris that are more appropriate under the directive than that of the proposed site. The development is taken place in close proximity and within the catchment of Carrowmore lake, where streams and rivers connecting to the lake will not be protected in the event of a major accident and hence pollution of the only water supply for the Erris Area.

HSA Zoning for Alternative Sites not Provide

HSA Must examine "Alternative Sites" and compare them to the Proposed Site in order to comply with Article 12[Land Use Planning] of Seveso II Directive

A site-specific analysis of all possible alternative industrial sites must be carried out by the HSA in order to advise the Local Authority on the best-suited sites for this industrial development in order to comply with Seveso II directive.

The HSA has not provided a compressive and comparative analysis of the alternative sites under the specific criteria of the Seveso II Directive, Pollution and Traffic Acts. The applicant has ruled against other establishments (sites for the terminal and pipeline) on their own merits, mainly on the basis of potential economic gain.

I request that alternative sites be examined which should be outside the catchment area of a major drinking water supply for the local community (in this case the entire Erris Area). This information should then be made available to the public for observation. In failing to do so Article 12 "Land Use Planning" has not been properly addressed by the HSA.

The Health, Safety and Welfare of a community (in this case the Erris Community) in close proximity to an Industry associated with the proposed Industical Gas processes, including the Storage and distribution of Explosive Substances should be accessed on the basis of the:

- Seveso II Directive
- Pollution and
- Traffic Safety

These criteria under the HSA heading should take precedence over Special Areas of Conservation or Areas of Scenic Amenity etc.

Thereafter, the basis of economic gain etc. should apply.

The Seveso II directive applies to all areas within an Establishment.

The term 'ESTABLISHMENT' under the Seveso II directive includes the Upstream High Pressure Landfall to Terminal Pipeline and therefore a HSA Zoning around the pipeline must be applied in order to provide the appropriate health and safety for local residents, which was also previously identified as a Health and Safety Hazard.

The term 'establishment' under the Seveso II directive includes the High Pressure Landfall to terminal pipeline that was previously ignored by the Applicant and the HSA.

Extracts from the directive

Article 1: The Aim of The Directive

This Directive is aimed 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.*

Article 2; Scope

*The Directive shall apply to **establishments** where dangerous substances are present in quantities equal to or in excess of the quantities listed in Annex I….*

*For the purposes of this Directive, the 'presence of dangerous substances' shall mean the **actual** or **anticipated** presence of such substances in the **establishment**, or the presence of those which it is believed may be generated during loss of control of an industrial chemical process…*

Article 3; Definitions

*'**establishment**' shall mean the **whole area** under the **control** of an operator where dangerous substances are present in one or more installations, including common or related infrastructures or activities*

- The directive applies to the whole area under the control of the applicant.
- The applicant is the only person who controls the flow in the pipeline and therefore the area of the pipeline.
- Under the foreshore license the applicant has the authority to enter, use and occupy the licensed area for the purpose of constructing, installing, locating, operating, maintaining, inspecting, testing, repairing any of the facilities. The applicant has principal control of the land when their activities are associated with the pipeline.
- The pipeline is also a common or related infrastructure.

It is therefore obvious that the pipeline from the Gas Field to the Terminal and especially that section of pipeline from the landfall to the terminal is **within** the "Establishment" as defined by the Seveso II directive.

Article 4; Exclusions
This Directive shall not apply to the following:

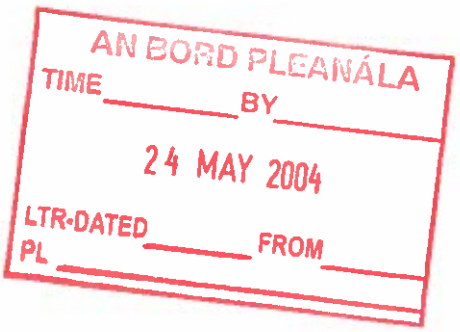
*d. the transport of dangerous substances in pipelines, including pumping stations, **outside establishments** covered by this Directive;*

THIS IMPLIES THAT PIPEWORK AND PUMPING STATIONS **WITHIN** ESTABLISHMENTS ARE UNDER THE SEVESO II DIRECTIVE

Therefore, the HSA must apply the Seveso II directive to the pipe work defined as 'Gas Pipeline, Control Umbilical and Discharge Pipeline under the foreshore license and determine an appropriate HSA Zone (separation distance) away from them.
Alternatively, they must assess the long-term health and safety aspects of the pipeline. If health and safety aspects cannot be addressed now, how can they be addressed in the event of a catastrophe? It is not acceptable to hide behind the risks and consequences of this terminal and pipeline in their proposed locations. People's lives are at risk.

A point of Information;
The separation distance from residential properties to a small-scale sewerage treatment plant to avoid odour and noise, in accordance with EPA Guidelines is a minimum of 50m.

The separation distance from residential properties to a high pressure untreated explosive gas pipeline like that coming from the landfall to the terminal should be at least a high multiple of 50m away. A more realistic figure of 500-1000m or greater should undoubtedly be provided. This is not the case and it was previously pointed out that some residents are less than 70m away from the pipeline.



Non-Performance or Non-Observance by the licensee implies that the Minister for the Marine can now withdraw Foreshore Licence

The Applicant has not identified/observed common risks associated with the proposed pipeline infrastructure route as shown on the Foreshore Licence.

Under the terms of the Foreshore Act 1933, Section 3 Par 5 the Minister has the power to '*terminate such licence on breach, non performance, or non-observance by the licensee*'. The following is a list of items that should have been considered/ observed during the application of the Foreshore Licence.

- The applicant has failed to investigate, observe or consider the stability of the surrounding landscape including Dooncartoon Hill either prior to, during or after an explosion event occurring at the terminal and/or anywhere along the Gas Line. Vibrations in the ground following an explosion can destabilise the already unstable high risk Dooncartoon hill (one of the highest hills in Erris). The applicant's submission now identifies these events as well.

- The Applicant fails to address how they intend to monitor, control and prevent landowners/trespassers from disturbing/digging the only inland high-pressure untreated gas line in the world, together with the *Discharge pipeline* and *Control Umbilical*.

- The applicant fails to identify how they intend to support the Gas Pipeline, Discharge Pipeline and Control Pipe (as defined in the Foreshore Licence) and prevent them from excessive deformation and hence failure especially when the pipeline infrastructure is supported on Peat.
  Does the applicant intend to remove all the peat under the pipeline?

- As previously discussed in this submission and as identified by the applicants design team, Peat has failed on slopes as low as 2 degrees. The pipeline route is through an abundance of peat. The applicant has failed to identify how they intend to protect this pipeline from such events.

- The applicant fails to address how they intend to prevent surcharge loadings on the ground arising from common general/agricultural use on the Gas Pipeline, Discharge Pipeline and Control Pipe (as defined in the Foreshore Licence) infrastructure servicing the gas terminal. The surcharges can either arise from heavy farm machinery or stock piling in a specific area. These effects can cause the pipelines to fail.

- The foreshore licence was granted without assessing the land policies in accordance with Article 12 of the Seveso II Directive. A site should have been chosen based on the *prevention of major accidents, limiting their consequences for man and the environment and ensuring high levels of protection throughout the community.* The proposed site does not meet the aims of the Seveso II directive. Therefore, the licence for the pipeline is not valid.

- Incorrectly, the previous Minister believed that this was the best site and issued a licence upon false and misleading information.

- The overwhelming impacts of the terminal on the landscape following High Risk Events arising at the terminal and/or along the pipeline as identified in the applications submission and collated in this report identifies that this IS the wrong site.

- The proposed development is;

  - Within the catchment area of Carrowmore Lake the only drinking water supply for the entire region.
  - The only inland terminal in the world.
  - In a landscape of natural ground instability.
  - Surrounded with Blanket Bog that can fail at 2 degrees, in an area of ground outside the applicant's control.

The Seveso II directive was written following the events and consequential affects thereafter, in the town of Seveso, Italy in 1976.
The local community do not want the Erris EU Directive for a similar future disaster. Major events will happen if this site is chosen for this development. There are better sites available in Erris and indeed in Mayo.

If the above events cannot even be addressed at this stage, how do we expect them to be addressed when they happen? It is no good hiding behind reality.

Therefore, I request that the Minister must enforce the powers he has from the Foreshore Act and terminate this licence as the applicant has failed to observe, identify and control the above events. Failure to address these events will undoubtedly have a major consequential impact on human beings and the environment.

Otherwise, I request that the Health and Safety Authority assess the location of the landfall and high-pressure pipe work that contains the untreated gas as the landfall and pipeline will cause a serious human and environmental risk in its proposed location.

Previous Reasons for Refusal still Valid

First Reason for Previous Refusal Still Valid

...The proposed gas processing terminal, forming part of a subsea tie-back development concept, would be sited in a remote, rural, unserviced, inland location some 8km from the landfall and away from centres of population in the region.

The siting of the proposed development, with its significant tie-back constraints, would be contrary to the strategic planning of infrastructural development for the Border Midlands West Region.

Furthermore, the proposed large industrial development would be located in an elevated and unspoilt rural setting in an area of scenic and ecological value lacking in public services and essential facilities. The policy of the planning authority, as set out in the current Mayo County Development Plan, is to protect the natural environment, to enhance the amenities of the county and to ensure that the availability of infrastructural facilities is not a limiting factor in the promotion of industrial development. In addition, it is an objective to strictly control development which might prove injurious to the amenity value of the Carrowmore Lake area of special scenic importance.

The proposed development would conflict with the policies of the planning authority by reason of:

(a) the imposition of a large industrial development in a remote inland rural location that is seriously deficient in public infrastructure to serve the development;

This statement is still true and valid and forms a basis of my objection.

(b) the visual obtrusiveness of the development when viewed from the west and the visual intrusiveness when viewed from the south, from local roads to the north-west and north-east, and from Carrowmore Lake by virtue of the siting of a large industrial complex on a prominent, open and exposed bogland hill, resulting in a significant deterioration of the landscape character of the area;

This statement is still true and valid and forms a basis of my objection.

(c) the irreversible alteration of this landscape arising from the site development works proposed;

This statement is still true and valid and forms a basis of my objection.

(d) the degradation of the fragile ecology of the area arising from the intensive industrial activities of the construction and operational phases of the development;

This statement is still true and valid and forms a basis of my objection.

(e) the environmental and public safety implications derived from the construction works; and

The applicant has increased the environmental and public safety risks with the recent application. The proposal of excavating and removing overwhelming quantities of acidic blanket bog North of Carrowmore Lake and transporting it by road to the water lodged deposition site at Srahmore, South of Carrowmore Lake.
This proposal has greater implications and the previous reason for refusal is now reinforced and is true and valid and forms a basis of my objection.

(f) the significant increase in traffic volumes and HGV movements at the construction stage onto a road network that is substandard in width, pavement and alignment.

Traffic volumes and HGV movements have dramatically increased compared to the previous proposal. There are eighty two thousand (82,000) more truck movements required to transport the peat to Srahmore.
This statement is still true and valid and forms a basis of my objection.

- The constraints of this site have not changed.
- The traffic movements arising from this recent application will dramatically increase (compared with the last application) arising from the Excavation and removal of at least 450m3 of Blanket Bog
- The Environmental and Public Health and Safety implications are more severe as the disturbance of acidic blanket bog South of the neutral water source of Carrowmore Lake, and the deposition of such large quatities of disturbed acidic blanket bog at a waterlogged site at Srahmore South of Carrowmore Lake. There is 405,000,000 litres of acidic water contained in the peat.

Second Reason for Previous Refusal

Having regard to the likely instability of the proposed containment bunds and the waste peat to be stored in the peat repositories arising from the failure to design an effective surface water drainage system to ensure the integrity and retention of waste materials stored in the permanent repository structures on a slope above Regional Road No. R314 and in close proximity to watercourses draining to the Glenamoy River and Sruwaddacon Bay, the consequent safety risk to the local community and the pollution risk arising therefrom, it is considered that the proposed development would endanger the health and safety of the general public in the vicinity of the site, would seriously injure the amenities of property in the vicinity, and would adversely affect the use of the regional road. The proposed development would, therefore, be contrary to the proper planning and sustainable development of the area.

The applicant is just transferring and adding to the problems encountered in the previous application to a waterlogged site at Srahmore. The volume of excavated material and the volume of traffic associated with the construction works have dramatically increased with this recent application.

An **additional 82,000 truck movements** are introduced to the public road by removing the peat to Srahmore some 11km from the development site. This route is the shortest route available for all residents in the North Erris area, travelling to Castlebar General Hospital in the event of an emergency. The route is inadequate in formation width and alignment for overtaking traffic movements.

The applicant has now spread the environmental impact by excavating and depositing huge quantities of acidic Peat containing at least **405,000,000 L i.e. four hundred and five million litres of acidic water** to a site at Srahmore close to a major source of drinking water supply for the entire region (Carrowmore Lake).

The context of the second reason for refusal is still valid but the environmental impact spread has increased. These works are now taking place to the North and South boundaries of Carrowmore Lake, the only public water supply for this region.
The recent application will now largely affect four areas - Bellinaboy, Srahmore, Mountain face quarry at Bangor Erris and the Mountain face Quarry at Glencastle.

If an onshore facility is ultimately required then, a coastal site should be chosen where, the ground is stable and where most of the raw materials can be processed on site (i.e. quarry the rock on site to produce the hardcore required for fill and to make concrete etc). This would dramatically reduce construction traffic on public roads and contain the development to one specific location. A site should be chosen outside the catchment of a major drinking water supply for a region. The health and welfare of individuals should take precedence over special areas of conservation and scenic amenity.

The second main reason for the previous refusal as identified above is enhanced based on the recent application and is a further reason for refusal.

Estimated Quantities:
As with the previous application, there are significant variations in the material quantities being estimated once again by the applicant. The application requires planning for the excavation and removal of 450,000m^3 of soil, however, Section 4 "Alternatives" subsection 4.5 of the Environmental Impact Statement states " 450,000 m^3 of Peat and 50,000 m^3 of mineral soils will be removed." Disposal of disturbed soil will also take up more volume than its current insitu volume.

Difficulties associated with Total Peat Removal (Previously Quoted by the Applicant):
Continuing inconsistency and contradictions in the applicant's submissions (previous and current) is a matter of great concern. In this recent planning application, the applicant has now concluded that the removal of all the peat is now the best and preferred option.

The applicant now states in Section 4 " Alternatives" subsection 4.5.7 of the EIS report that

> *"...total peat removal would present the best practical option for the terminal both for its construction and operation."*

I believe the above statement to be false and inaccurate for the reasons previously submitted by the applicant and stated on page 251 of An Bord Pleanala's report.

It is known that existing drainage from previous land use; either cut into, or installed below, the skin of the upper peat can affect the pore pressures in the main body of the peat. When drainage is taking place the pore pressures are reduced and this helps stabilise the peat, but when they are rapidly saturated and drainage is blocked, the build up in pore pressures can destabilise the peat. The site at Srahmore becomes water lodged in periods of prolonged rainfall.

The applicant previously ruled against the removal of the peat as there were many disadvantages associated with this work.

The disadvantages noted by the applicant include:

- *A large volume of peat would have to be removed thus increasing the quantity of peat to be stored.*
- *The removal of all peat would require trenches up to 4.5m in depth in peat, major temporary works would be required including use of heavy piling plant, and*

there would be additional safety risks for ground workers.

- *The excavation of trenches would pose a safety risk to the workforce.*
- *The excavations would fill with water and dewatering would be required and the water disposed of.*
- *There would be construction and safety difficulties in placing fill and working under water if dewatering was ineffective.*
- *Trafficking and disturbance of adjacent peat surfaces, possibly causing a reduction in strength, would result.*
- *A large volume of fill would have to be imported onto the site.*
  Mineral soil embankments may form a migration path for run-off into the underlying mineral soil and bedrock.

The above disadvantages previously submitted by the applicant still are relevant.

There is no known example of where successful large deposition of saturated blanket bog has taken place. I object to the removal of such large quantities of acidic peat and deposition of same close to a major neutral water supply for the Erris Area.
I also object to the 82,000 traffic movements this work will incur.

Third Reason for Previous Refusal Still Valid

Having regard to the provisions of Directive 96/82/EC ("Seveso II") in relation to land use planning (Article 12) and Circular Letter PD 6/99 from the Department of the Environment and Local Government and having regard, in particular, to the submissions from the National Authority for Occupational Safety and Health, the designated Central Competent Authority for the purposes of the Directive, the Board is not satisfied, on the basis of the submissions made in connection with the planning application and the appeal, that the proposed development could not, due to the risk of a major accident or if a major accident were to occur, lead to serious danger to human health or the environment. The proposed development would, therefore, give rise to an unacceptable risk to members of the public due to the proximity of the terminal site to residential properties and areas of public use to which the Directive applies and would, thus, be contrary to the proper planning and sustainable development of the area.

This statement is still valid and the events and consequences associated with this directive affect areas that are within the catchment of Carrowmore Lake on land that is outside the control of the Applicant.
Surface water, streams and rivers discharging to Carrowmore Lake can become contaminated with chemicals arising from events as identified by the applicant and in the Seveso II directive.

Therefore, the aim of the Seveso II directive is not fulfilled, as the consequences of an event cannot be controlled and limited.

Some Recent Explosions and Pipeline Burst Events

Explosions

Country	Date	Explosion	Area affected
Moomba	Jan 2004	Gas	6 sq miles (Plant)
China	Dec 2003	Gas	25 sq miles (Well)
Umtata	Sept 2003	Gas	12 sq miles
Ughelli	April 2001	Gas	Entire Community (Plant)
Illinois	Nov 1998	Gas	4 sq miles (Pipeline)
Lfd, Victoria	Sep 1998	Gas	Within the Plant
WILL, Ohio	July 2000	Gas	4 sq miles (Plant)

Pipeline Disasters

Note: Implying that pipelines do burst. This development is no different

Louisiana	Jan 21	Equilon **offshore** pipeline **spills 94,000 gallons of crude oil** off coast of Louisiana.
Winchester KY	Jan 27	Marathon Ashland pipeline near Winchester KY spills 900,000 gallons of gasoline, **almost reaching Kentucky River, major drinking water source.**
Knoxville TN	Feb 9	Colonial pipeline ruptures near Knoxville TN, spilling 53,550 gallons of diesel fuel **into Tennessee River.**
Greenville TX	March 9	**Explorer** pipeline at Greenville TX spills 564,000 gallons of gasoline into creek, **upstream from main drinking water supply of Dallas.**
Piney Point MD	April 7	Potomac Electric pipeline at Piney Point MD spills 140,400 gallons of fuel oil, **polluting creek and Patuxent River.**
Houston TX	May 20	Pipeline in Houston TX spills 84,000 gallons of gasoline, some into Hall's Bayou, tributary of Houston Ship Channel.
Blackman Township MI	June 7	Pipeline in Blackman Township MI spills 100,000 gallons of gasoline on ground and into Grand River.
Carlsbad NM	August 19	El Paso gas pipeline explodes in fireball near Carlsbad NM, **killing extended family of 12 people on camping trip**
Abilene TX	September 8	Propane pipeline near Abilene TX explodes in fireball, **killing motorist, injuring woman** who saved self by diving into a swimming pool.
Vaquillas TX	November 30	Natural gas pipeline explodes in Vaquillas TX, **killing backhoe operator, inuring another.**

Reproduced extracts from An Bord Pleanala

Dated April 2003
Prepared by Kevin Moore
Senior Planning Inspector

"I do not accept that offshore risks would be significantly high as the shallow water fixed steel jacket option would address the applicant's concerns relating to water depth, harsh environment at the field location and other geographical parameters."

I put forward the observation that pipelines constitute one of the least costly items identified in the applicant's schedules of costs.

the applicant's agent from Granherne stated at the hearing that it is technically feasible to develop Corrib in a different way.

While one of the main economic arguments for not developing an offshore platform is based around this lack of infrastructure, it is significant that this same issue on land is one of the main material matters that emphasises how remote the inland terminal site really is and places a material and significant planning constraint on the proposed development. Furthermore, regarding references to other proposed tie-backs, the siting of their terminals in coastal areas, whether close to urban areas, near shipping lanes, etc., makes these other tie-backs materially and significantly different proposals from that now before the Board. The proposed development would be a remote terminal in a rural area, some distance from the landfall, and not associated with the coastal area, shipping, or existing gas infrastructure.

The proposed subsea tie-back would be the second longest in the world. It will also be the only tie back that links the gas well to an inland terminal.

"The root cause of the problem is that the site chosen for the Gas Terminal is unsuitable."

It is evident that the significant environmental cost that would result from the development being sited in a location that comprises a vulnerable, remote, unserviced, rural landscape confirms it be the wrong site.

Page 222 of 377 of the Planners Report from An Bord Pleanala report stated that for the previous submission the "storage of methanol for the proposed development was considered excessive by the third parties and was offered as an indication that there are plans or intentions to greatly expand the terminal".
Reviews of other licienced gas/oil block areas off the west coast of Ireland certainly reinforce the above statement made previously by An Bord Pleanala. These blocks scatter and extend beyond Northern Ireland and to the South of Kerry and extend to an area approximately 200miles off the west Coast.

Also, and extremely significant, is that while a subsea pipeline to shore is common to all options, offshore processing would allow dry conditioned gas to be transported long distances (over hundreds of kilometres as described by the developer). This would be a significant advantage in considering alternative locations for landfall as it would eliminate the concerns of transporting gas that has not been conditioned over a lengthy distance of 92km to a terminal onshore. Furthermore, I note that a significant constraint factor influencing landfall selection, and thus influencing terminal site selection, is the need to minimise the length of the subsea umbilical in order to avoid, if possible, the need for subsea joints, which as the applicant has highlighted can be a source of failure. The development as proposed will have a joint at the landfall to keep the subsea continuous length of the umbilical to a minimum. It is admitted that the umbilical proposed for the Corrib Field would be one of the longest umbilicals in the world. The option of a shallow water fixed steel jacket would significantly reduce the length of this umbilical, thus reducing the need for subsea joints, thus limiting a source of failure.

The land at Asahi is zoned for industrial use.

No considerations in terms of cost, safety or the environment appear to be given in any detail to the cost of the risk environment that would be imposed on the local community.

The development of a gas processing terminal at Ballinaboy is not inherent in any local, regional or national policy

documents, inclusive of the National Spatial Strategy.

The proposed subsea tie-back would be the second longest in the world.

From the details provided by the applicant on existing subsea tie-backs around the world that are regarded as similar in principle to Corrib, all are tied back to offshore processing platforms, not land-based terminals. This is notwithstanding varying available reserves.

What is known of proposed subsea tiebacks, their proposed processing terminals on land would be sited in coastal areas and not inland in remote rural locations.

APPENDICES

The content contained in these appendices and throughout is taken from websites and is reproduced in this document without prejudice and for the benefit of those that do not have a readily available Internet connection.

Appendix A

THE EUROPEAN GAS NETWORK

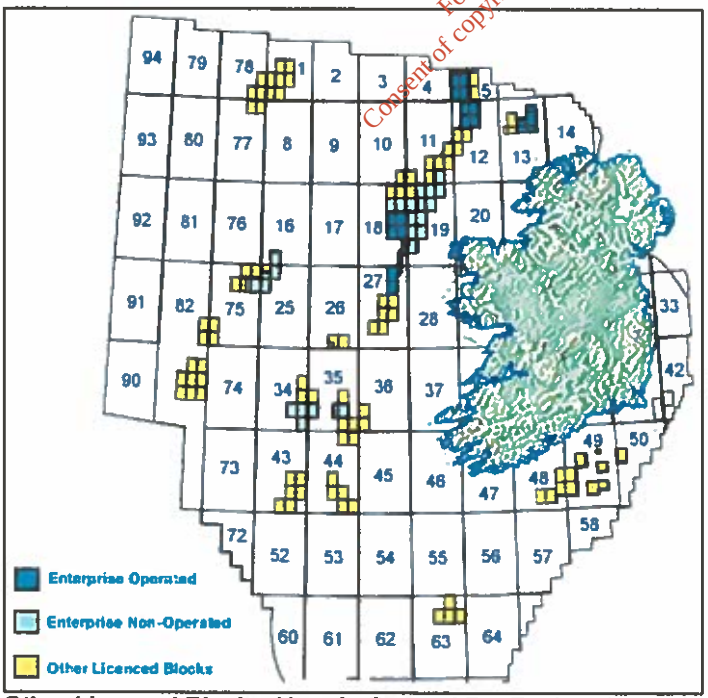
OTHER LICENSED BLOCKS GRANTED FOR EXPLORATION BEFORE 2003

IRISH WATER BLOCKS INCLUDING EXPLORATION BASINS

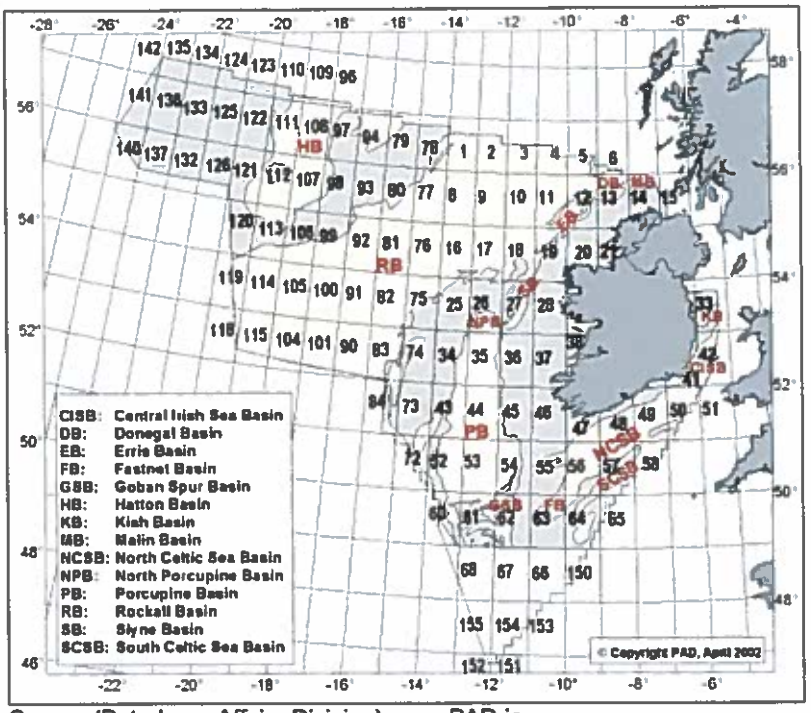
2003/2004 ADDITIONAL LICENSING INITIATIVES AT THE PORCUPINE BASIN

Source : Eurogas

The European Gas Network (Corrib Gas can be transported to Africa and Russia)

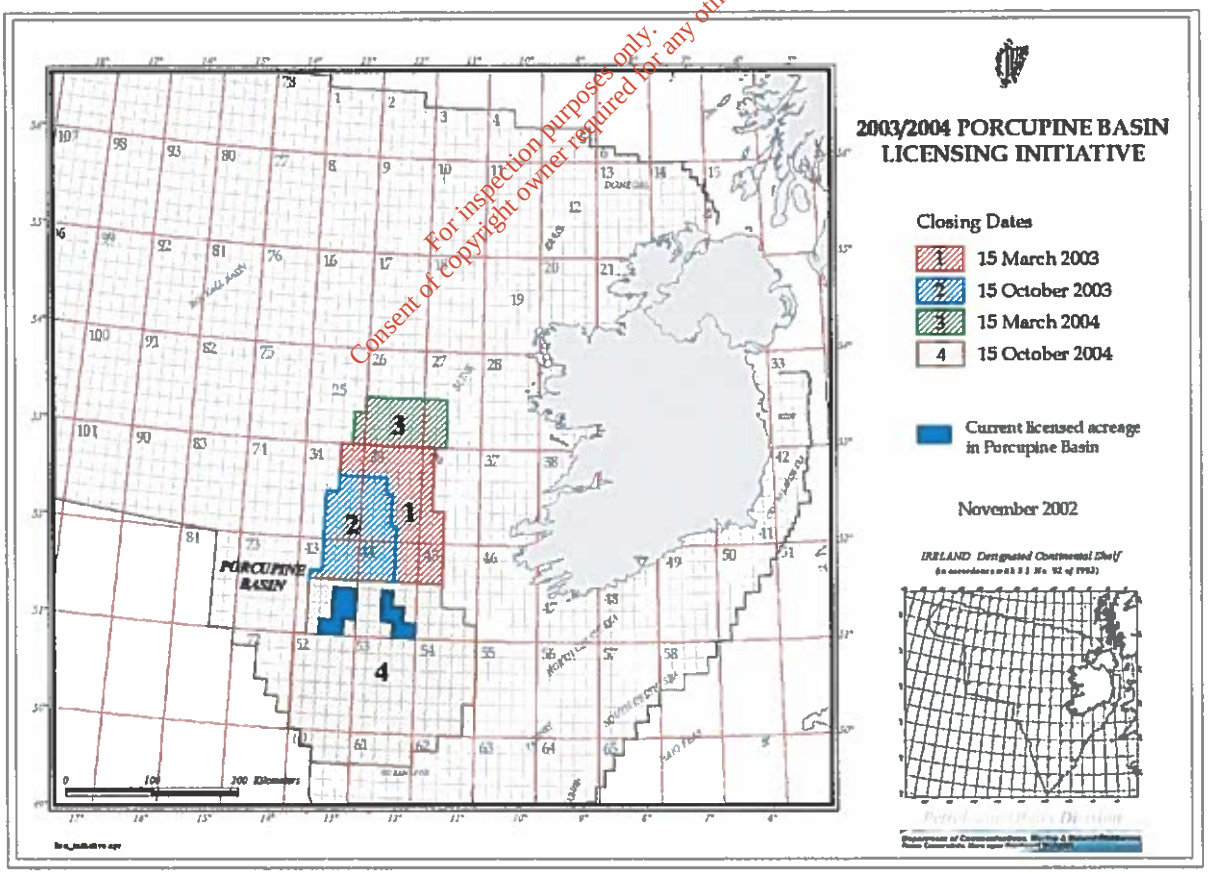


Other Licenced Blocks Already Granted For Exploration Before 2003



Source (Petroleum Affairs Division) www.PAD.ie

Irish Water Blocks including Exploration Basins



Source (Petroleum Affairs Division) www.PAD.ie

2003/2004 Additional Licensing Initiatives at The Porcupine Basin

Appendix B

EXTRACTS FROM THE

SEVESO II DIRECTIVE (96/82/EC)

EU GAS DIRECTIVE

Foreshore Act

Seveso II Directive [96/82/EC]

Article 1

Aim

This Directive is aimed 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.

Article 2

Scope

1. The Directive shall apply to establishments where dangerous substances are present in quantities equal to or in excess of the quantities listed in Annex I, Parts 1 and 2, column 2, with the exception of Articles 9, 11 and 13 which shall apply to any establishment where dangerous substances are present in quantities equal to or in excess of the quantities listed in Annex I, Parts 1 and 2, column 3.

For the purposes of this Directive, the 'presence of dangerous substances' shall mean the actual or anticipated presence of such substances in the establishment, or the presence of those which it is believed may be generated during loss of control of an industrial chemical process, in quantities equal to or in excess of the thresholds in Parts I and 2 of Annex I.

2. The provisions of this Directive shall apply without prejudice to Community provisions concerning the working environment, and, in particular, without prejudice to Council Directive 89/391/EEC of 12 June 1989 on the introduction of measures to encourage improvements in the safety and health of workers at work([1]).

Article 3

Definitions

For the purposes of this Directive:

1. 'establishment' shall mean the whole area under the control of an operator where dangerous substances are present in one or more installations, including common or related infrastructures or activities;
2. 'installation' shall mean a technical unit within an establishment in which dangerous substances are produced, used, handled or stored. It shall include all the equipment, structures, pipework, machinery, tools, private railway sidings, docks, unloading quays serving the installation, jetties, warehouses or similar structures, floating or otherwise, necessary for the operation of the installation;

3. 'operator' shall mean any individual or corporate body who operates or holds an establishment or installation or, if provided for by national legislation, has been given decisive economic power in the technical operation thereof;
4. 'dangerous substance' shall mean a substance, mixture or preparation listed in Annex 1, Part 1, or fulfilling the criteria laid down in Annex 1, Part 2, and present as a raw material, product, by-product, residue or intermediate, including those substances which it is reasonable to suppose may be generated in the event of accident;
5. 'major accident' shall mean an occurrence such as a major emission, fire, or explosion resulting from uncontrolled developments in the course of the operation of any establishment covered by this Directive, and leading to serious danger to human health and/or the environment, immediate or delayed, inside or outside the establishment, and involving one or more dangerous substances;
6. 'hazard' shall mean the intrinsic property of a dangerous substance or physical situation, with a potential for creating damage to human health and/or the environment;
7. 'risk' shall mean the likelihood of a specific effect occurring within a specified period or in specified circumstances;
8. 'storage' shall mean the presence of a quantity of dangerous substances for the purposes of warehousing, depositing in safe custody or keeping in stock.

Article 4

Exclusions

This Directive shall not apply to the following:

a. military establishments, installations or storage facilities;
b. hazards created by ionizing radiation;
c. the transport of dangerous substances and intermediate temporary storage by road, rail, internal waterways, sea or air, outside the establishments covered by this Directive, including loading and unloading and transport to and from another means of transport at docks, wharves or mashalling yards;
d. the transport of dangerous substances in pipelines, including pumping stations, outside establishments covered by this Directive;
e. the activities of the extractive industries concerned with exploration for, and the exploitation of, minerals in mines and quarries or by means of boreholes;
f. waste land-fill sites.

Article 12

Land-use planning

1. Member States shall ensure that the objectives of preventing major accidents and limiting the consequences of such accidents are taken into account in their land use policies and/or other relevant policies. They shall pursue those objectives through controls on :

a. the siting of new establishments,
b. modifications to existing establishments covered by Article 10,
c. new developments such as transport links, locations frequented by the public and residential areas in the vicinity of existing establishments, where the siting or developments are such as to increase the risk or consequences of a major accident.

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, areas of public use 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.

2. Member States shall ensure that all competent authorities and planning authorities responsible for decisions in this area set up appropriate consultation procedures to facilitate implementation of the policies established under paragraph 1. The procedures shall be designed to ensure that technical advice on the risks arising from the establishment is available, either on a case-by-case or on a generic basis, when decisions are taken.

EU Gas Directive 98/30/EC

SCOPE AND DEFINITIONS

Article 1

This Directive establishes common rules for the transmission, distribution, supply and storage of natural gas. It lays down the rules relating to the organisation and functioning of the natural gas sector, including liquefied natural gas (LNG), access to the market, the operation of systems, and the criteria and procedures applicable to the granting of authorisations for transmission, distribution, supply and storage of natural gas.

Article 2

For the purposes of this Directive:

1. 'natural gas undertaking' means any natural or legal person carrying out at least one of the following functions: production, transmission, distribution, supply, purchase or storage of natural gas, including LNG, which is responsible for the commercial, technical and/or maintenance tasks related to those functions, but shall not include final customers;

2. 'upstream pipeline network' means any pipeline or network of pipelines operated and/or constructed as part of an oil or gas production project, or used to convey natural gas from one or more such projects to a processing plant or terminal or **final coastal landing terminal**;

DISTRIBUTION AND SUPPLY

Article 9

1. Member States shall ensure that distribution undertakings act in accordance with Articles 10 and 11.

2. Member States may impose distribution undertakings **and/or supply undertakings, an obligation to deliver to customers located in a given area or of a certain class or both. The tariff for such deliveries may be regulated, for instance to ensure equal treatment of the customers concerned.**

Extracts from Foreshore Act 1933

Section 3

Power for Minister to grant licences of foreshore.

3.—(1) If, in the opinion of the Minister, it is in the public interest that a licence should be granted to any person in respect of any foreshore belonging to Saorstát Eireann authorising such person to place any material or to place or erect any articles, things, structures, or works in or on such foreshore, to remove any beach material from such foreshore, to get and take any minerals in such foreshore and not more than thirty feet below the surface thereof, or to use or occupy such foreshore for any purpose, the Minister may, subject to the provisions of this Act, grant by deed under his official seal such licence to such person for such term not exceeding ninety-nine years commencing at or before the date of such licence, as the Minister shall think proper.

(2) Every licence granted under this section shall (unless the Minister is of opinion that such licence should in the public interest be granted free of any payment) be granted subject to the payment to the Minister of such moneys, whether by way of fine or other preliminary payment or by way of rent or other periodical payment or by way of royalty on material removed or by all or any of such ways, as the Minister shall think proper and shall agree upon with the person to whom such licence is granted.

(3) Where, in the opinion of the Minister, a licence proposed to be granted under this section is, owing to its nature, duration, or otherwise, of a trivial character and should be granted without payment or subject to a nominal payment only, such licence may, notwithstanding anything contained in this section, be granted by way of permission in writing signed by the Minister or one of the principal officers of his Department.

(4) Notwithstanding anything contained in this section, no licence requiring payment by the licensee of a rent or other annual payment exceeding ten pounds a year shall be granted under this section without the sanction of the Minister for Finance.

(5) Every licence granted under this section shall contain a power to the Minister to terminate such licence on breach, non-performance, or non-observance by the licensee of any covenant on the licensee's part (including a covenant for payment of rent, royalty or other money), condition or agreement contained therein.

(6) No licence granted under this section shall contain any covenant or agreement for the renewal of such licence.

(7) Every licence granted under this section shall (subject to the provisions of this section) contain such covenants, conditions, and agreements as the Minister shall consider proper or desirable in the public interest and shall agree upon with the person to whom such licence is granted.

(8) No licence granted under this section shall extend to or authorise the removal of any minerals lying more than thirty feet below the surface of the foreshore to which such licence relates.

(9) Whenever an application is made to the Minister for the grant of a licence under this section, the Minister may, if he thinks fit, hold a public inquiry in regard to the granting of such licence.

Appendix C

News Extracts

Of

Recent

Gas Explosions.

Last Update: Monday, December 29, 2003. 8:24am (AEDT)

Death toll from China Gas Blast jumps to 233

The death toll from a natural gas well blowout in south-west China has climbed to 233 as rescue workers began cleaning up a vast "**death zone**", the official Xinhua news agency said.

Medical workers were disinfecting eight villages, testing drinking water and poisoned crops near the site of the leak, a gas field in Chongqing municipality, Zhang Mingkui, director of the Kaixian County Bureau of Environmental Protection, said.

About **42,000 people** were evacuated after the blow-out on Tuesday. Some began returning home over the weekend.

Newspapers and Internet portals showed pictures of villagers in trucks on their way home but locals, whose houses lie within five kilometres of the leak, were not allowed to return.

"I want to clean up my house and count my losses because we can't smell the fumes now," Xinhua quoted a farmer as saying.

The cloud of gas swept across a **25 square kilometre** area on Tuesday, **devastating villages and poisoning farms.** More bodies were found in mountain villages on Sunday, pushing the death toll up by 35. About 1,000 workers were clearing away almost 4,000 animals, including cattle, pigs, rabbits, ducks, chickens and dogs, killed by the gas well burst, Xinhua said.

The Ministry of Civil Affairs has sent 10,000 quilts and 300 tonnes of food and medicine to the victims. Workers poured hundreds of cubic metres of mud and cement into the 400-metre-deep well in Kaixian county on Saturday, plugging a mix of natural gas and sulphurated hydrogen that caused acid burns to the eyes, skin and lungs of victims.

A total of 10,175 people were either hospitalised or treated and discharged. Nearly 80 people were in serious condition.

State-run China National Petroleum Corp, which operates the gas field and parent of listed oil major Petrochina, will pay compensation to villagers, state television quoted company vice president Su Shulin as saying.

Xinhua did not say how the latest deaths occurred, but many of those injured reported suffered gas poisoning and skins burns from exposure to the fumes.

Jan 5 2004

The death toll from a gas-drilling accident that spewed toxic fumes over villages in south western China rose to 243 today, after 10 injured people died in hospital.

An additional 396 people were still being treated following the December 23 disaster north east of the city of Chongqing, the official Xinhua News Agency said. It said 27 of those were in a critical condition.

The government has blamed negligence among gas-drilling workers for the accident in which a well blew out and spewed a toxic mix of natural gas and hydrogen sulphide over the mountainous area.The well was sealed on December 27.

More than **9,000** people were treated for injuries and more than **60,000 evacuated** from the area.

SHELL GAS EXPLOSION

LANDS HUNDREDS OF COMMUNITY PEOPLE IN HOSPITALS/CLINICS: IWHREKAN, UGHELLI SOUTH LOCAL GOVERNMENT COUNCIL, DELTA STATE

April 26, 2001

HIGHLIGHTS

- Shell's Gas explosion threatens the peace of Iwhrekan community.- Local population lives in constant fear.- Shell engages in hide and seek game over explosion.- Gaseous fume may engender refugee crisis in Iwhrekan Community.

ABOUT IWHREKAN COMMUNITY AND PEOPLE

Iwhrekan is an Urhobo Community in the Ughelli South Local Government Area of Delta State. The Community houses UTOROGU GAS PLANT; it also has 29 oil wells and, produces 270,000 barrels of crude oil per day. Shell Petroleum Development Company (SPDC) is the sole operator of oil and gas facilities in the community.

"500 IN HOSPITAL OVER GAS LEAKAGE"

The above was the lead story of a local newspaper report over the Utorogu gas explosion (South - South, Thursday, April 26, 2001, page 1, volume 1. No. 239).

On April 19, 2001 at about 4.30 a.m., the community woke up that fateful morning and was threatened with a very loud noise which emanated from the Utorogu gas plant and subsequently, followed by gas rain. The incident lasted for about 2 weeks. The gas rain resulted into serious health impairment, which engendered an outbreak of epidemic in the area. Community activists told ERA that, over 500 persons are scattered in various hospitals/clinics outside the community receiving medical attention. The hospitals/clinics are the General Hospital and Shell Heath Center, all in Otujeremi in Ughelli South Local Government Area in Delta State. The following were reached on their sick beds during field trips:

Mr. Friday Ogbah Mr. Johnson Otaye Mrs. Esther Luwadure Mrs. Siaka Oghogho Mrs. Titi Onokere Miss Mercy Luwadare (2 yrs.) Old)

Top medical sources who pleaded anonymity and claimed to have treated some victims in an interview with ERA said the victims suffer from ailments such as sensation of the skull, vomiting, diarrhoea and peppery feelings in the eyes associated with contact with dangerous substance. Nearby farmlands and streams were whitened by the pollution.

"WE ARE NOT AWARE OF ANY GAS EXPLOSION; GOOD DAY AND BYE"

When ERA visited the gas plant for Shell's comment on the incident an official who spoke to ERA on phone banged the phone on us screaming, "we are not aware of any gas explosion; good day and bye."

Mr. Johnson Otaye, the General Secretary of the Iwhrekan Community told ERA from his sick bed that, after the explosion occurred Shell held a closed door meeting with journalists in Warri City, Delta State over the explosion to ensure the under-reporting of the incident. Some of the community people who spoke, expressed their willingness to be relocated from the community if the opportunity is given the real option, because, the gas plant is located right inside the community and the threat it poses is enormous.

SHELL PIPELINE EXPLOSION

A huge clean up operation is underway in the Nigerian Delta State following a pipeline explosion. It is understood a Shell pipeline exploded near the town of Ughelli spilling oil onto nearby farmland. Nobody was injured in the incident but reports claim up to 1 m barrels of oil were spilled in to the countryside. This has been vigorously denied by Shell. It says the trunk line was immediately shut down after the alarm was raised. A Shell spokesman said a Joint Reaction team of trained experts was at the scene but the cause of the blast and an entire picture of the damage done is not yet known.
Reports said there were 10 storage tanks each capable of holding 50 barrels of oil and two Shell security officials guarding the burst pipe which, was still pouring oil into a deep hole made by the initial explosion. This is the latest in a long series of pipeline explosions that have claimed the lives of hundreds of people in the last few years.

Shell's Leaking Pipes

ERA FIELD REPORT #53
Subject: Shell's Leaking Pipes
From: Patrick Naagbanton
Dispatchline: Gana, Ughelli-North L.G.A., Delta State
Date: **January 12, 2000**

HIGHLIGHTS
Gas fire outbreak in sight
Death toll rises, Children and women victims

> *When I die, know that Shell killed me....*
> Master Jerome Atariku, 7 years

> *I find it difficult to move and to breathe. Others have relocated leaving only me. I have no place to go. Tell them [shell] to come and stop this gas so that the cough and itching will stop..*
> Mrs. Omodovwe Adjohowo, 97 years.

> *Anytime I come to this spot [leaking pipeline] I have problems with my respiratory system and this is the only route to my work place.*
> Mr. Osikekpe Samson, 36 years

> *We have heard and read that shell.s staff are being held hostage by our people because of this explosion. You [ERA Monitor] have spent sometime here in our community and you have seen things for yourself. I appeal that you go to the world and say the truth, if you do that God will be with you. But .[striking his chest and weeping uncontrollably], Shell has sinned against God and our people, they have told lies against us. Are we violent as they say?*

> Gospel Emueheri, 30 years

BACKGROUND
Gana is an old rural settlement of Urhobo ethnic nationality in Ughelli-North Local Government Area of Delta State. The people are predominantly farmers because of the available fertile land in the area. The population of Gana is about 4,982 persons. Shell.s famous Eriemu oil field, 20 oil wells, network of facilities/ installations criss-cross the entire Gana community. Shell started operation in the place since 1958.

Gana community hosts the Gas project belonging to Nigerian National Petroleum Corporation (NNPC). All the above facilities are located inside the community.

GANA COMMUNITY, POLLUTED AND UNSAFE
On May 26, 1999, a major blowout occurred at Shell.s 16 inches truck line at Ikavwe bush and large quantity of crude oil spewed out. The affected area has vulnerable receptors like canals, swamps and open water bodies which aid the degrading effects of the spill. The following communities were heavily impacted.

1. Opherin community - Ughelli North LGA (Delta State) 2. Owevwe community . Ughelli North LGA (Delta State) 3. Onah community . Ughelli North LGA (Delta State) 4. Iyede community . Isoko North LGA (Delta State) 5. Emevor community . Isoko North LGA (Delta State)

The spill was not cleaned nor were compensation paid. Till the time of this report, the impact is still greatly felt in the affected areas.

On September 11, 1999, another major spill occurred at the Eriemu manifold situated in the community. The spill forced its way through a fragile valve (technical failure of Shell's equipment). The spill was not attributed to sabotage but the spill was abandoned.

DEATH TOLL RISES, GAS FIRE OUTBREAK IMMINENT

May 13, 1999

Mr. Shedrach Ohiyere, a 40 years old father of six children and Chairman of Gana community lamented to ERA that on May 13, 1999, a rupture occurred at the well 17 pipeline and spewed crude oil into the adjacent environment. The community said Shell only visited the community and did minor repairs on their aged pipeline leaving the environment devastated without any attention.

Consequently, another leakage occurred recently and spewed poisonous gas at the same well 17 pipeline that runs through Mrs. Omodovwe Adjohwo.s compound. ERA finding revealed that the leakage was caused by corrosion on the product pipeline.

The air in the community is charged with offensive odour and dangerous emissions from the affected site. This adverse atmospheric condition in the area has given rise to fears of impending epidemic in the area.

Unfortunately, the area has no health care facilities. The sanitary condition is very poor because of the polluted environment. The people are impoverished and suffer from poor nutrition. These factor are all conducive to disease vectors like cholera, dysentery, diarrhea and measles which has led to a high mortality rate in the community.

Late Mr. Joseph Evwietoma (a 48 years old man with two wives and 11 children) who was an asthmatic patient and the spokesman of the community slumped and died while inspecting the spill site with some government officials and some community members.

Medical sources who pleaded anonymity disclosed to ERA monitor at the Shell cottage hospital at Ireke in Ethiope East LGA, of Delta State, that the man died as a result of inhaling an excess of poisonous fumes. Another victim Master Godstime Obior, a 6 years old boy who was also asthmatic died in his residence close to the site of the explosion for the same reason. The corpses of the two deceased persons are still in the mortuary.

The following Gana community members are in critical conditions from the same problem situation. They are in Ughelli and Agbara main town:

1. Master Odiri Shedrach - 1 year
2. Miss Anthonia Etaka - 5 years old
3. Miss Gift Power - 1 year
4. Miss Vwareua - 8 years
5. Master Freeborn Oteri - 8 years
6. Master Matthew Mukoro - 6 years
7. Mr. Paul Etarhienyo - 27 years old

APPEAL FOR RELOCATION

Gana community hosts SPDC and NNPC facilities. There are good access roads to the manifold, oil field, flare points, plants etc but Gana lacks all these amenities. There is constant electricity supply at Eriemu oil field, but Gana community remains in darkness. As many of the community people desert the affected area, a grave refugee problem is in sight.

There is also the fear of a possible gas explosion. Community people in an interview with ERA indicated their interest to resettle elsewhere if government provides an alternative place.

ERA RECOMMENDATIONS

- Shell should stop their gas leakage and dispatch a team of medical experts to the community to save lives
- Shell should pay compensation to the Gana people
- Government should re-settle the Gana people or relocate their old and ageing facilities

Explosion at Moomba gas plant Jan 2004

About 50 South Australian businesses were asked to shut down in the wake of an explosion and fire at the Moomba natural gas plant.

The explosion caused a fire at the Santos plant in SA's far north-east which took emergency crews about seven hours to control.

Investigators were trying to determine the cause of the fire, which started about 3am CDT. There were no injuries.

The liquid recovery section of the plant was shut down, prompting the state government to ensure domestic gas supplies by asking major users to shut down.

A Santos spokesman said engineers had flown to the gas field to assess the damage.

LONGFORD GAS EXPLOSION SEPTEMBER 1998

By Vannessa Hearman

MELBOURNE -- At the end of April, final submissions were presented to the royal commission into the gas explosion and fire at Esso's Longford facility in the Latrobe Valley. The Victorian Trades Hall Council has called on the state government to toughen its stance on occupational health and safety in the light of the evidence presented to the commission.

On community radio 3CR's *Stick Together Show* broadcast on April 30, VTHC secretary Leigh Hubbard told Meredith Butler that Esso is guilty of a "gross negligence" in its operations, and in its health and safety and management culture: "For example, [Esso management] did not implement the emergency response agreement with the Country Fire Authority."

Hubbard also strongly criticised the state government's failure to implement a safety regime for major hazard facilities like the Esso gas plant. "Some of the problems should have been picked up. The valve that went seriously wrong -- everyone knew it was malfunctioning -- was not taken out of the system and overhauled. Instead, Esso said it would just look at it again in 2005."

Hubbard pointed out that if inspectors had visited the site regularly, instead of plant managers being relied on, the fact that staff were not being trained to deal with catastrophic events would have been quickly apparent.

Andrew Hopkins, who also conducted an in-depth study of the 1986 Moura mine disaster in Queensland, also gave evidence to the commission. Hubbard said Hopkins' evidence was important because "he talked about management culture ... at Esso Longford you see boards up stating how many days it has been since a `lost time injury' ... It is all focused on things that workers do, for example if they slip over, not on production-based major catastrophic events" which are the responsibility of management.

There were many similarities between the safety regimes at Moura and Longford, Hubbard noted. "It was eerie reading [Hopkins'] book on the Moura mine disaster because you could almost substitute the words `Esso Longford' for `BHP Moura'. The same string of system failures which happened there happened at Longford."

On the Victorian WorkCover Authority's plan to introduce in the next two years a new system to regulate major hazardous industries, Hubbard said that while VTHC is pleased that the government is finally implementing the national standard, "we have to wait to see the results because often the devil is in the detail. There are things we won't compromise on.

"First, an operator of a major hazard facility must lodge a safety case with the [government] regulator outlining how it will cope if something goes wrong. Second, the safety case must be approved by the regulator, not simply received."

Coroner blames Esso for Longford Gas Explosion September 1998

November 15 2002
By Liz Gooch

The State Coroner today blamed oil giant Esso for the 1998 Longford gas disaster which killed two workers and cut the state's gas supply for about two weeks.

Mr Wilson, a maintenance superintendent and Mr Lowery, a maintenance supervisor, died on September 25, 1998 when a gas explosion shook the Longford plant as equipment couldn't handle the unusually high gas flow.

For two weeks after the blast, Victorian businesses and households struggled to operate without gas in a crisis which was estimated to cost gas users about $1.3 billion.

Businesses were shut, workers were stood down without pay and emergency legislation was introduced to preserve the remaining gas.

In June 1999, a Royal Commission found that Esso's failure to adequately train workers in safety procedures caused the disaster and recommended that the company upgrade its training, safety monitoring and emergency procedures.

In July last year, Esso was fined a record $2 million in the Supreme Court after being found guilty of 11 charges under the Occupational Health and Safety Act.

After the verdict, 10,000 consumers and businesses who suffered financial loss during the gas shortage sued Esso in the Federal Court.

Eighteen Esso workers and their families also mounted a class action against the company in the Supreme Court. In a separate case, the Insurance Council of Australia sued Esso on behalf of 120 large businesses that lost production or had shut down during the gas crisis.

The World Today Archive - Thursday, 28 June , 2001 00:00:00

Reporter: Luisa Saccotelli

ELEANOR HALL: Well to a new development in the court case against the giant petroleum company, Esso.

The case was brought after the deadly explosion at Esso's Longford Plant in eastern Victoria nearly three years ago which killed two people.

Late this morning a jury in the Supreme Court in Melbourne found Esso guilty on 11 charges, as Luisa Saccotelli reports.

LUISA SACCOTELLI: The explosion at Esso's Longford Plant back in September 1998 cut gas supplies to more than a million homes and businesses for two weeks.

Two long-standing maintenance employees, Peter Wilson, and John Lowery were killed and eight others seriously injured. Piled on to that were business losses upwards of $1 billion.

Eyewitnesses painted a horrific picture of blazing fireballs and men walking around dazed and blackened after the blast.

A seven months royal commission savaged Esso for failing for properly train and supervise its workforce and for failing in its fundamental duty of care to provide a safe workplace.

The sequel to the royal commission has just been played out. A Supreme Court trail of Esso, prosecuted by the Victorian Workcover Authority for 11 safety breaches.

Gas Explosion Rocks Umtata

Posted Fri, 19 Sep 2003

A welding gas cylinder which exploded in Umtata on Thursday injured a child, demolished a house and four cars and also damaged at least 97 houses in a two-kilometre radius.

A Ngqeleni messenger of the court, Ndumiso Maqokolo, said that during the afternoon he was doing a welding job on one of the vehicles next to the main gate of his house.

A few hours later he left the area and walked towards his house when he heard a loud blast when only a **19kg** cylinder exploded.

Illinois Gas Plant Explosion Forces Area Evacuation

November 14, 1998
Web posted at: 3:32 p.m. EST (2032 GMT)

FISHER, Illinois (CNN) -- Officials say a fire at a natural gas plant in east-central Illinois is out after an explosion Saturday morning that required a nearby neighborhood to be evacuated.

Flames shot 400 feet in the air when a gas main exploded, said Steve Zehr of the Sangamon Valley Fire Protection District.

Fire officials say they had the blaze under control quickly.

But people who live within a one-mile radius of the People's Gas plant still have not been allowed to return to their homes. Zehr estimated about six homes were evacuated.

No injuries were reported. The explosion occurred in a gas storage well, Zehr said.

The plant is located near the town of Fisher, about 100 miles south of Chicago.

Appendix D

Examples of

Fixed Platforms

Floating Production Systems

And

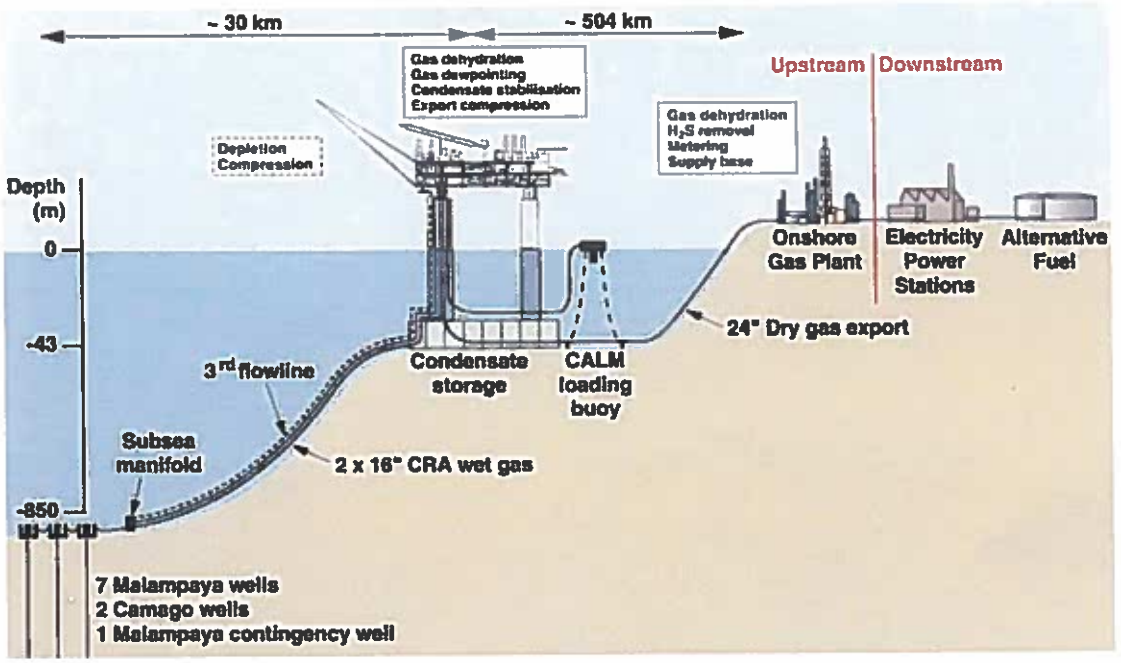
Subsea Tie-Backs

The content of this appendix is taken from offshore-technology com website. It is reproduced without prejudice and for benefit of those that do not have direct access to this website.

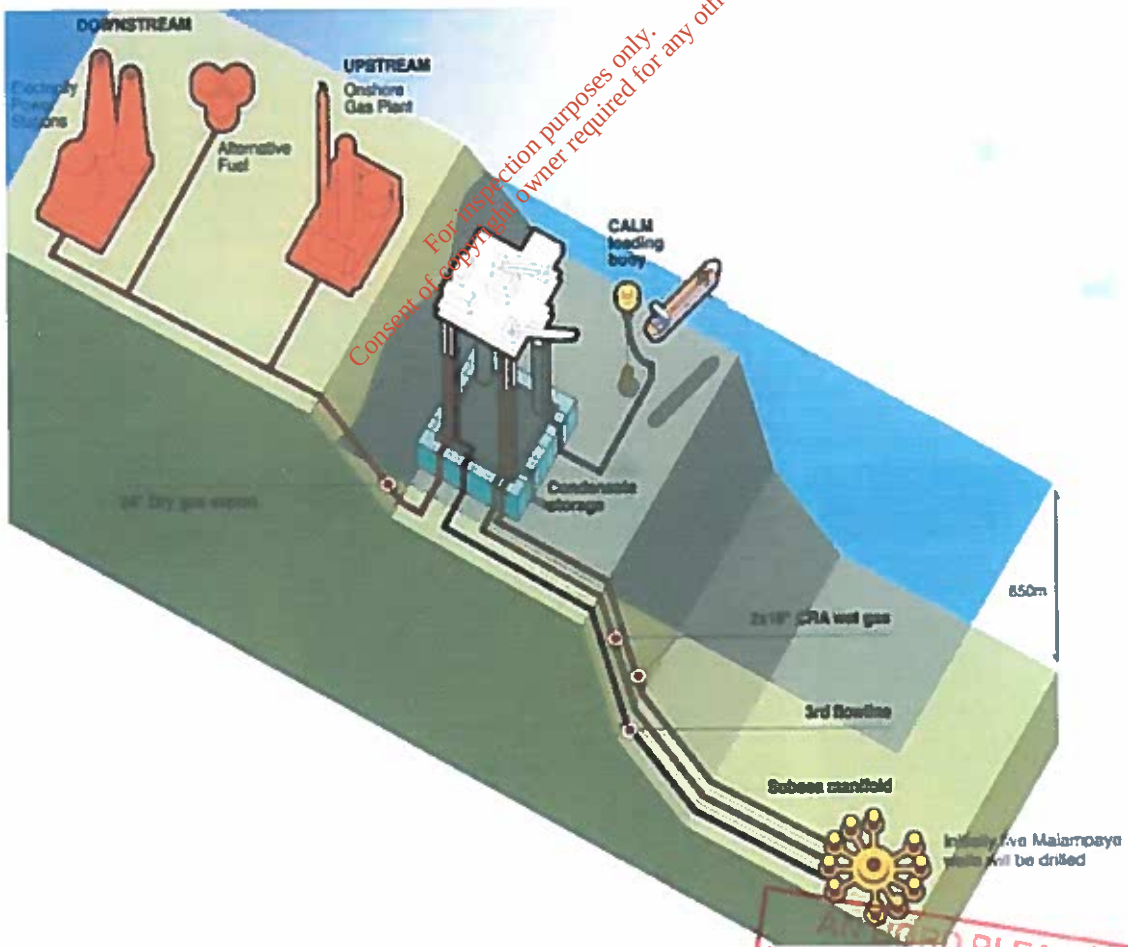
North America	North Sea
Baldpate Gulf of Mexico, USA	Alba Phase II North Sea Northern, UKingdom
Bombax Pipeline Development, Trinidad and Tobago	Åsgard North Sea Northern, Norway
Brutus Gulf of Mexico, USA	Balder North Sea Northern, Norway
Cantarell Oil Field, Mexico	Banff North Sea Central, United Kingdom
Canyon Express Gas Field, Mississippi Canyon, USA	Blake Flank, United Kingdom
Deep Panuke, Canada	Boulton North Sea Southern, United Kingdom
Devils Tower Gas Field, Gulf of Mexico, USA	Brigantine North Sea South, United Kingdom
Genesis Gulf of Mexico, USA	Britannia North Sea Central, United Kingdom
Gyrfalcon Gulf of Mexico, USA	Bruce Phase II North Sea Northern, U Kingdom
Hibernia Grand Banks, Canada	Caister Murdoch Phase 3, United Kingdom
Hickory Gulf of Mexico, USA	Captain North Sea Central, United Kingdom
Hoover Diana Gulf of Mexico, USA	Clair Field, Shetlands, United Kingdom
Horn Mountain Field, Gulf of Mexico, USA	Cook North Sea Central, United Kingdom
Magnolia Field, Gulf of Mexico, USA	Curlew North Sea Central, United Kingdom
Manatee Field, Gulf of Mexico, USA	Dunbar Phase II North Sea Central, UKingdom
Mardi Gras Oil and Gas Transportation System, USA	ECA North Sea Southern, United Kingdom
Mars Gulf of Mexico, USA	Ekofisk II North Sea Central, Norway
Matterhorn, Gulf of Mexico, USA	Elgin Franklin North Sea Central, U Kingdom
Mensa Gulf of Mexico, USA	Erskine North Sea Central, United Kingdom
Morpeth Gulf of Mexico, USA	ETAP North Sea Central, United Kingdom
Na Kika Oil and Gas Fields, Gulf of Mexico, USA	Gannet North Sea Central, United Kingdom
Nansen Boomvang Gas Field, Gulf of Mexico, USA	Glitne North Sea Northern, Norway
Neptune Gulf of Mexico, USA	Goldeneye Gas Platform, United Kingdom
Petronius Gulf of Mexico, USA	Gullfaks North Sea Northern, Norway
Ram Powell Gulf of Mexico, USA	Hanze F2A, Netherlands
Sable Island Scotia Shelf, Canada	Jade Oil and Gas Platform, United Kingdom
Serrano/Oregano Gulf of Mexico, USA	Janice North Sea Central, United Kingdom
Tahoe Gulf of Mexico, USA	Jotun North Sea Northern, Norway
Tanzanite Gulf of Mexico, USA	Kristin Deepwater Project, Norway
Terra Nova Grand Banks, Canada	Leadon North Sea Oil Field, U Kingdom
Thunder Horse Oil Field, Gulf of Mexico, USA	MacCulloch North Sea Central, U Kingdom
Troika Gulf of Mexico, USA	Magnus EOR, United Kingdom
Typhoon Gulf of Mexico, USA	Mikkel Deepwater Project, Norway
Ursa Gulf of Mexico, USA	Njord North Sea Northern, Norway
White Rose Oil and Gas Field, Canada	Norne North Sea Northern, Norway
	NUGGETS North Sea Northern, UK
	Ormen Lange North Sea Northern, Norway
	Oseberg Sør North Sea North, Norway
	Pierce North Sea Central, United Kingdom
	R Block Development North Sea, U K
	Ross North Sea Central, United Kingdom
	Shearwater North Sea Central, U Kingdom
	Sigyn Gas Field, Norw North Sea, Norway
	Siri North Sea Northern, Denmark
	Snøhvit Gas Field, Barents Sea, Norway
	Snorre North Sea Central, Norway
	South Arne North Sea Danish, Denmark
	Triton North Sea Central, United Kingdom
	Troll West North Sea Northern, Norway
	Valhall Flank Water Inj Platform, Norway
	Viking B North Sea Southern, UK
	Visund North Sea Northern, Norway
	Vixen North Sea South, United Kingdom

Africa & Middle East Abana Gulf of Guinea, Nigeria Agbami Discovery Well, Nigeria Bonga Deepwater Project, Niger Delta, Nigeria Ceiba Gulf of Guinea, Equatorial Guinea Ekpe Phase II Gulf of Guinea, Nigeria Espoir Field, Ivory Coast Girassol Luanda, Angola Kizomba Deepwater Project, Angola Mossel Bay Bredasdorp Basin, South Africa Scarab and Saffron, Egypt South Pars Field, Iran Yoho Oil Field, Nigeria Zafiro Gulf of Guinea, Equatorial Guinea	**Central Asia** Blue Stream Natural Gas Pipeline, Russia Kashagan Caspian Sea, Kazakhstan Sakhalin II Sea of Okhotsk, Russia Shah Deniz South Caspian Sea, Azerbaijan **North Atlantic** Corrib Gas Field, Ireland, Republic of Foinaven West of Shetlands, UK Liverpool Bay Liverpool Bay, UK Rivers Fields, East Irish Sea, UK Schiehallion West of Shetlands, UK **South America** Barracuda and Caratinga Fields, Brazil Bijupira and Salema Fields, Brazil Espadarte Campos Basin, Brazil Marlim Oil Field - Campos Basin, Brazil Marlim Sul Campos Basin, Brazil PROCAP 2000 Campos Basin, Brazil Roncador Campos Basin, Brazil
Asia and the Pacific Rim Bayu-Undan Timor Sea, Australia Buffalo Timor Sea, Australia Gorgon Northern Carnarvon Basin, Australia Laminaria Timor Sea, Australia Langsa Oil Pool, Straits of Malacca, Indonesia Liuhua 11-1 South China Sea, China Lufeng 22-1 South China Sea, China Malampaya South China Sea, Philippines Stag North West Shelf, Australia Wonnich Carnarvon Basin, Australia	

MALAMPAYA SOUTH CHINA SEA, PHILIPPINES



Sectional Drawing of Malampaya Gas Works (Note its 504km to OnShore Terminal)



3D View

Location
The Malampaya field is located 80km off the coast of Palawan Island, in the Republic of the Philippines. In August 1998, Shell Philippines Exploration BV awarded Brown & Root a US$432 million design, procurement, fabrication, installation and commissioning contract.

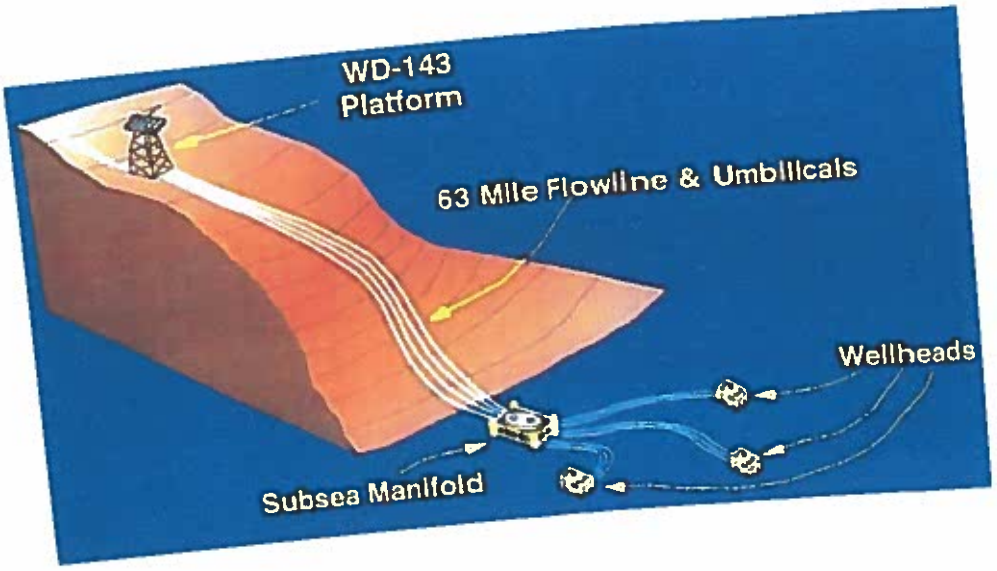
PLATFORM
The platform consists of a deck, supported by a concrete gravity sub-structure (CGS). The processed gas will be compressed and exported through a 504km pipeline to the Batangas onshore facility at Luzon Island, in the Philippines.

The condensate will be stabilised on the topsides, stored in the CGS and then exported to a shuttle tanker, through a catenary anchored leg mooring (CALM) system, located 3km from the platform. The design capacity of the integrated CGS and deck is 508 million ft3 gas and 32,800bbl of stabilised condensate per day.
The platform is located in water 43m deep and the deepwater subsea wells are at a depth of 850m.

TOPSIDES
The topsides were subcontracted to Sembawang Marine & Offshore Engineering (SMOE). This contract involved the fabrication, onshore commissioning and load-out of a three-level integrated deck, together with a living quarters module that can accommodate up to 44 people.
The topsides measure 40x90m in plan and reach 25m, from the base of the cellar deck to the helideck.
The lower (cellar) deck, contains the major pumps, heavy wall vessels and workshops.
The middle deck (or production deck) contains the separation equipment and the electrical-control module. The equipment on the top deck (or weather deck) includes two export gas compressors, three power-generation gas turbines and a crane.
The initial operating weight of the topside is 13,000t. This equates to a loadout weight - excluding the transportation frame - of 10,000t and, as such, this will be the heaviest topside ever constructed by SMOE.
Fabrication of the deck commenced at Sembawang's yard, located in the north of Singapore, in June 1999 and is scheduled for completion and onshore testing by February 2001.

In December 2001, an extended well test of the thin oil rim beneath the field initially yielded about 8,000 barrels of oil per day (bpd). The well test was performed by the Atwood Falcon drilling rig and Stena Natalita floating storage unit. It is also believed to be the deepest horizontal subsea well test undertaken in the world at a depth of about 850m.

MENSA GULF OF MEXICO, USA



Mensa is located 140 miles south-east of New Orleans and encompasses Mississippi Canyon blocks 686, 687, 730 and 731. The water is approximately 5,300ft deep.

DRILLING
The discovery well was drilled using Sonat's drillship, Discoverer Seven Seas. One delineation well has been drilled and two remaining production wells are also planned. They will be drilled by the Transocean semisubmersible, George Richardson.

RESERVES
The target reserves are in the Upper Miocene '1' sand, at a depth of approximately 15,500ft. The average net thickness is approximately 100ft. Ultimate recovery from the field is estimated at 720 billion ft3 of natural gas.
The first Mensa well produced approximately 108 million ft3 of gas per day. A peak production rate of 300 million ft3 of gas per day was achieved in the second quarter of 1998.

SUBSEA ARCHITECTURE
The subsea system consists of three wells, connected to a subsea manifold five miles away, which is in turn tied back via a 68-mile 12in flowline, to the shallow-water platform West Delta 143. This is the longest tieback in the world, beating the previous record of 30 miles, established by the Troll Oseberg Gas Injection Project, in the Norwegian sector of the North Sea.

SUBSEA MANIFOLD AND TEMPLATE BASE
The manifold/template base has four well-receiver slots and eight utility service slots, including hydraulic umbilicals, glycol injection and hydrate remediation.The template base is located on the seafloor. It is not connected by piling to the seafloor, but relies on its mass for stability. It has a diameter of 94ft, is 12.5ft tall and weighs about 200t.The manifold sits on the template base. This is a separate assembly, which can be recovered independently of the template. It has a diameter of 16ft, is 16ft tall and weighs about 50t.

ELECTRICAL DISTRIBUTION STRUCTURE (EDS)
The EDS is located near the subsea manifold. It takes electrical power and communications signals from the platform at West Delta 143, amplifies the signal (which decreases over the 63 miles from the platform to the EDS site), and distributes it to each of the subsea wells, five miles away.SUBSEA TREESThe three subsea trees provide the interface between the wellheads and the infield flowlines. The trees are of a 10,000psi composite block guidelineless design, with a vertical-flow piping connection mandrel for mating with the well jumper.

FLOWLINES
The flowlines transport the gas from the wells to the manifold, then on to the platform at West Delta 143. The three infield 6in flowlines are five miles long. They are made of carbon steel pipe and connected to the manifold with a stab and hingeover termination, and to the tree via a laydown sled and rigid

jumper.The 12in interfield flowline is 63 miles long, made of carbon steel pipe and is connected to the manifold via a sled and jumper. It is connected to the West Delta 143 platform via risers.

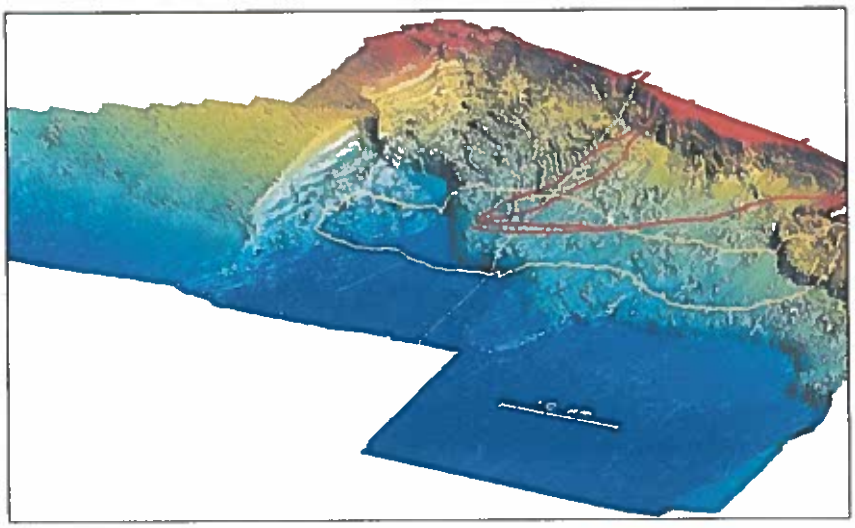
UMBILICALS

The hydraulic umbilicals are constructed of carbon steel, with zinc coating. They supply the hydraulic fluid and chemical injection (glycol).There are three seven-line, five-mile infield hydraulic umbilicals and one three-line, 63-mile interfield hydraulic umbilical.The electrical umbilicals are double-armoured cable and transmit electrical power and signals between the master control station on the West Delta 143 platform and the electrical distribution structure. There are three five-mile, infield electrical umbilicals and one 63-mile interfield electrical umbilical.The 3in glycol supply line supplies glycol to the subsea manifold, where it is distributed to the various wells.

MASTER CONTROL STATION

Located on West Delta 143, this computer-based system monitors operational status of wells and other subsea equipment and has the capability to open and close the wells.

ORMEN LANGE NORTH SEA NORTHERN, NORWAY



3D View (Note Vertical Cliff as the Line Approach the Shore Edge)

Ormen Lange is located in the Norwegian Sea, approximately 140km west of Kristiansund. The discovery lies across blocks 6305/4, 6305/5, 6305/6 and 6305/8. Preliminary estimates show that Ormen Lange is the second-largest gas discovery on the Norwegian shelf. The discovery well 6305/5-1 was drilled in 1997 and production is most likely to start in 2006.

DISCOVERY

Hydro and Shell Norway signed an agreement for sharing responsibilities for the field. Norsk Hydro will be responsible for the development phase, while Shell will be responsible for developing the transport of the gas and all the commercial relationships.

Norske Shell	16 per cent (production operator)
Norsk Hydro Produksjon	14.78 per cent (drilling operator)
Statoil	8.87 per cent
State's Direct Financial Interest (SDFI)	45 per cent
BP Amoco Norge	9.44 per cent
Esso Norge	5.91 per cent

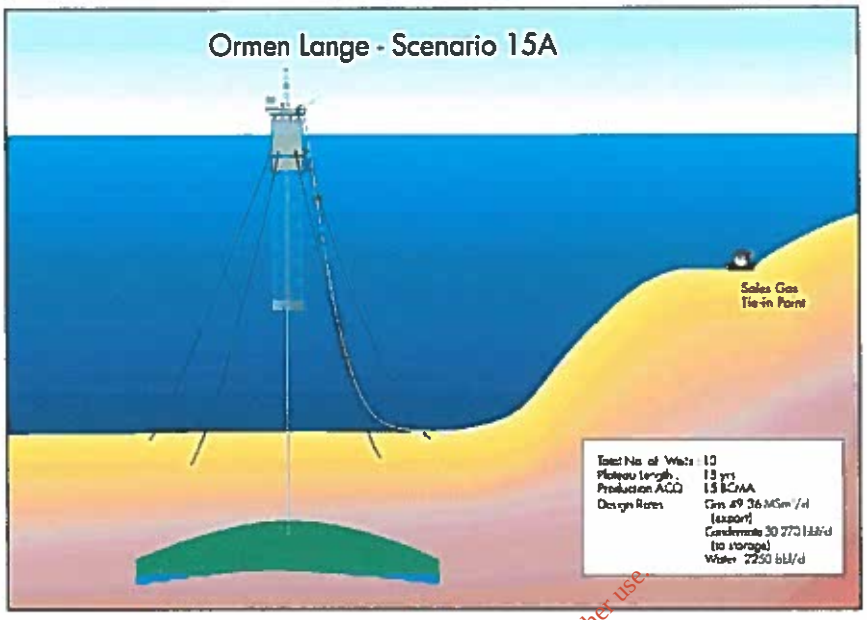
The main gas reserves lie in a reservoir in the Vale formation. Drilling has confirmed the original estimated resources of 315 billion m3 of natural gas.The difficulty in developing the field is due to the water depth and subsea topography. **The field lies in a depth of 800-1200m**, close to the steep back wall left by the Storegga submarine slide, which occurred 7,000-8,000 years ago.

The Storegga slide was probably triggered by a major earthquake caused as the land masses rose at the end of the Ice Age, combined with weak sedimentary layers.Norsk Hydro has carried out a programme of high-resolution seismic surveys, seabed mapping, shallow coring and deep geotechnical drilling. This programme is also used to: evaluate large-scale margin stability, identify slide release mechanisms, evaluate the risk of new large and small slides, assess the consequences of possible reservoir subsidence as a result of production, evaluate possible measures to reduce risk in the event of a development, as well as map the seabed to identify good pipeline routes out of the slide area.

DEVELOPMENT SCENARIOS

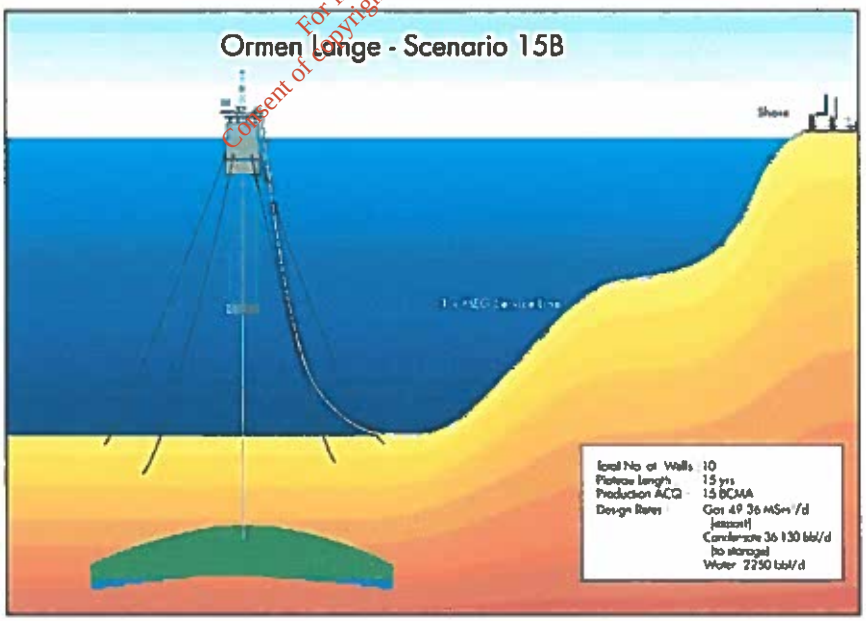
There are four potential development solutions, and a range of transport alternatives:

SCENARIO 15A



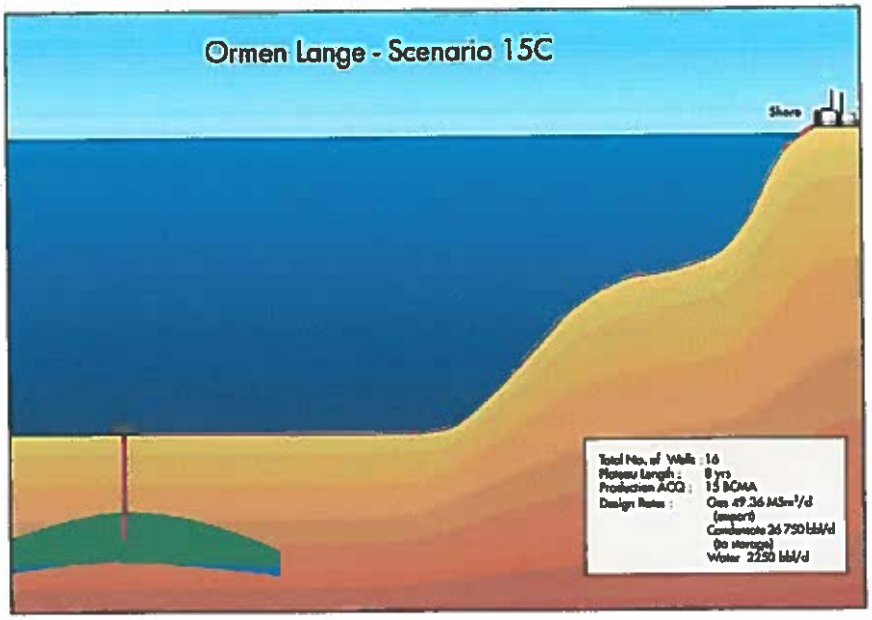
Scenario 15a consists of a spar moored to the seabed. Ten wells feed into the platform and the hydrocarbons are exported through a pipeline running to a subsea sales gas tie-in point. The design specifies exporting gas at a rate of 49.36M m3/day and storing up to 30,270b/d of condensate. The facilities can also process 2,250b/d of water.

SCENARIO 15B



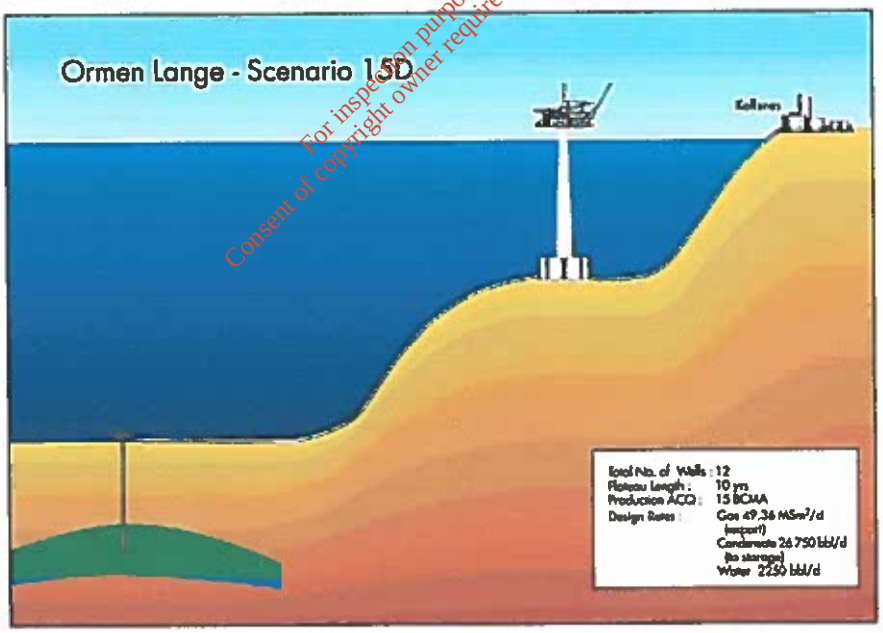
Scenario 15b is broadly similar to 15a, except that it will be developed using ten wells tied into a subsea template, then piped directly to the shore. The plateau production will be 15 years. The maximum gas- and water-production rates are the same as with 15a, but the storage specified is 36,130b/d.

DEVELOPMENT SCENARIOS (cont.)
SCENARIO 15C



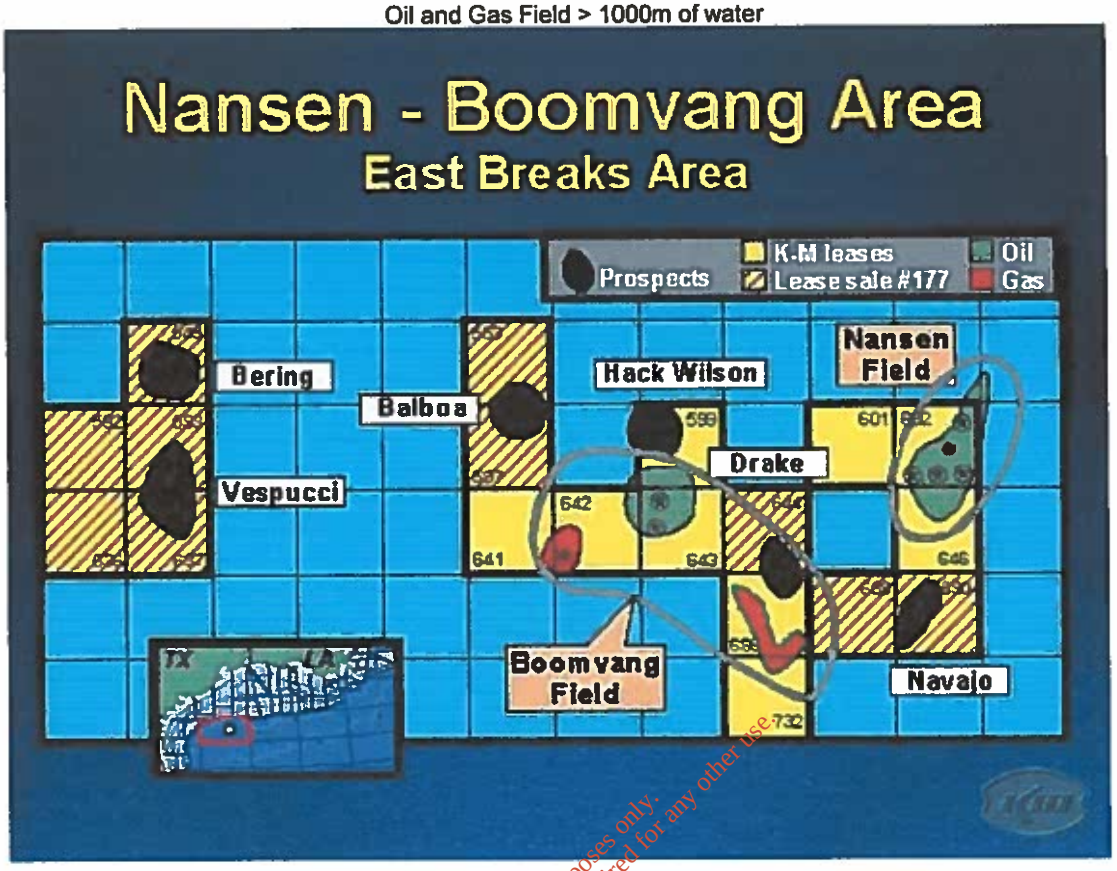
This scenario produces Ormen Lange as a subsea completion, tied back to the shore. It would be developed using 16 wells and stay on plateau production for eight years. The gas export and water production would remain at 49.36M m3/day and 2,250b/d, respectively, but 26,750b/d of condensate would be sent for storage.

SCENARIO 15D



This envisages 12 wells being produced into a subsea template and piped to a concrete platform. Production would then be sent to the plant at Kollsnes. It would stay on plateau production for ten years. The gas export and water production would remain at 49.36M m3/day and 2,250b/d respectively, but 26,750b/d of condensate would be sent for storage. In August 2000, the extension well 6305/8-1 confirmed gas volumes and a thin layer of oil, measuring a maximum of three metres. Norsk Hydro drilled the well into a chalk formation to a total depth of 3,175m, using the rig Scarabeo 5.

NANSEN BOOMVANG GAS FIELD, GULF OF MEXICO, USA
Oil and Gas Field > 1000m of water



The Nansen and Boomvang fields lie in the East Breaks area of the Gulf of Mexico, approx. 150 miles south of Houston. Nansen lies in East Breaks block 602 and Boomvang lies in blocks 642, 643 and 683. Nansen lies in 3,678ft of water, while Boomvang lies in 3,453ft.

EQUITY
Kerr McGee operates the Boomvang field with a 30% working interest and the Nansen field with a 50% working interest. The other partners in Boomvang are Enterprise (now Shell - 50%) and Ocean Energy (20%). Ocean Energy holds the remaining 50% interest in the Nansen field.

DRILLING
Nansen was discovered in October 1999, in 3,680ft of water, approx. eight miles east of the previously announced North Boomvang discovery. Successful drilling of Nansen No 8 well, on East Breaks 602, extended the field to the south. At Boomvang, a second rig was secured to concurrently drill a total of up to seven wells at North and East Boomvang.

DEVELOPMENT
In Early 2002, Nansen achieved first production from the first of three subsea wells. Daily production from the Nansen field ramped up to a peak rate of about 40,000 barrels of oil and 80 million cubic feet of gas by the fourth quarter of 2002, as completion activities at the remaining nine dry tree wells were completed. Both Nansen and Boomvang are being developed by the world's first truss spars. Spars International was contracted to design the almost identical systems. The truss design replaces the lower cylindrical hull in order to reduce weight and cost. The open truss structure also reduces movement and three heavy plates enhance stability. The Spars are 543ft in length and weigh 17,000t each. Air chambers in the upper hull provide buoyancy for the floating structures.Each spar has a production capacity of 40,000b/d and 200 million ft³/day of gas. The wells were completed beneath the spar and tied back through top-tensioned risers to dry wellheads and trees. Additional tie-ins are incorporated from subsea satellite wells. In total, there are nine top-tensioned production risers and associated equipment for Nansen and five for Boomvang.GAS

EXPORT
Williams constructed and operates the Seahawk Gathering System which moves all gas produced from Nansen and Boomvang. The Seahawk construction project includes 41 miles of 18in diameter line,

connecting the spar platforms to a new shallow-water facility on the shelf in GAA-244. From there, a 55-mile, 24in-diameter pipeline has been laid for exporting the gas to an interconnection on Williams' Central Texas Gathering System in BA538.

OIL EXPORT

Williams constructed and operates the Boomvang and Nansen Joint Oil (BANJO) System to move all the oil. BANJO is a 16in diameter, 41 mile-long oil-export pipeline that extends from the Spar platforms to the shallow-water facility in GAA-244. From there it interconnects with ExxonMobil's Hoover Offshore Oil Pipeline System. Both the Seahawk and BANJO Systems include deepwater subsea junction facilities for gathering oil and gas from future deepwater.

PIPELINE

The main pipeline was subcontracted by Williams to Coflexip Stena. The company used its CSO Deep Blue newbuild. Cal Dive International installed infield flowlines using its reeled pipelay system deployed from the Sea Sorceress. Workscope covered the installation of approximately 100,000ft of 6in-diameter pipelines, five flexible production risers and 86,000ft of associated umbilicals, plus the jumpers and flying leads necessary to tie-in three subsea trees.Wellstream designed and supplied the 5.625in, 6,000psi flexible pipe production risers and tie-in jumpers for the project. The risers were installed in a catenary configuration, enabling the spars to be offset for future on-site drilling. Bridon supplied HDPE sheathing on the wire spiral strand to be used for the spar moorings.

PROCAP 2000 CAMPOS BASIN, BRAZIL

To enable PETROBRAS to produce oil and gas from offshore fields situated in **ultra deep waters (of 1,000-3,000m)**, with the aim of incorporating the reserves located at these water depths, Petrobras set up the PROCAP 2000 project. This project targets the pilot trial of a subsea multiphase pumping system and a subsea multiphase metering system.

DRILLING AND COMPLETION TECHNIQUES

The two main topics were concerned with underbalanced drilling and high-pressure jet drilling.

SUBSEA SEPARATION SYSTEMS

The objective was to decrease the well-head backpressure, by separating the gas and the liquid phases at the seabed, as near as possible to the production well. This project is based on a vertical annular separation and pumping system (VASPS) subsea separation system.

HIGHLY DEVIATED WELLS IN UNCONSOLIDATED LITHOLOGIES

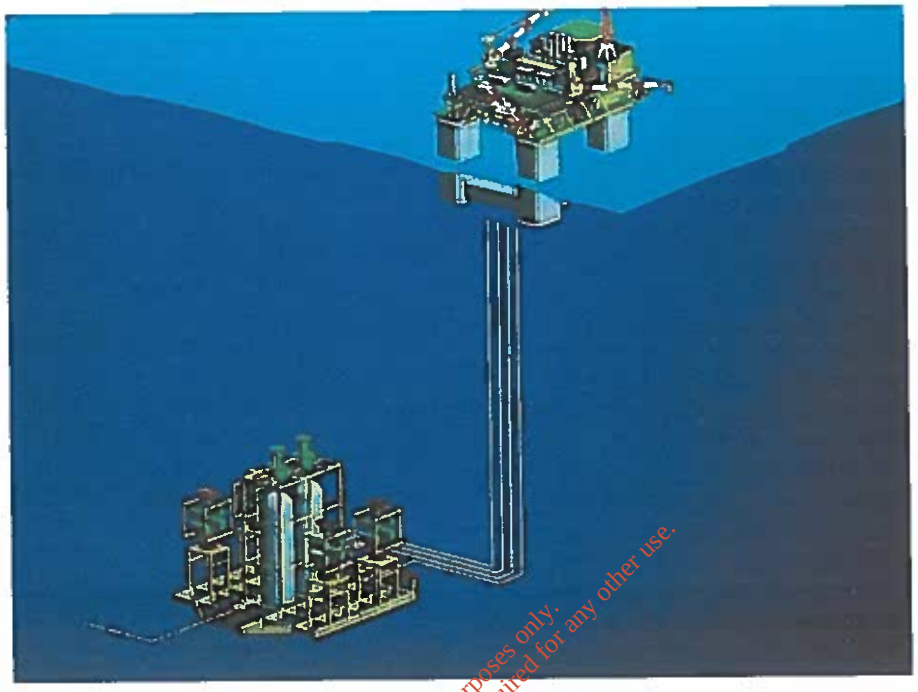
The aim of the project was to develop studies and tools for a better understanding of well instability, thus minimising its effect by guaranteeing cuttings removal. The problems relating to mechanical stability and cuttings removal are very well connected, as both are physically related. Due to the collapse of the formation, the cuttings fall into the well in great volumes.

STABILITY IN HORIZONTAL AND DEVIATED WELLS

The major concern has largely been restricted to poorly consolidated formations; perforated completions subjected to excessive drawdown; and wellbores intersecting tectonically active zones.

DEEPWATER SUBSEA EQUIPMENT

The main target is to promote the development of flexible pipes, accessories and installation procedures for water depths up to 3,000m, so as to evaluate and validate new flexible pipe design criteria and new material applicability. The sub-projects include horizontal christmas trees for water 2,500m deep; a drill pipe riser for ultra deep water; alternatives for drilling risers; slender wells for ultra-deep water; the shared actuator manifold - MacManifold; pig operation devices; and integrated system subsea equipment for the RJS396 area.



KICK AND BLOWOUT CONTROL IN DEEPWATER WELLS

The objectives are the development of theoretical and experimental studies, for helping in the definition of adequate well-control procedures, to minimise the possibility of blowouts. Considering the risks associated with gas influx control, early kick detection is a key factor.

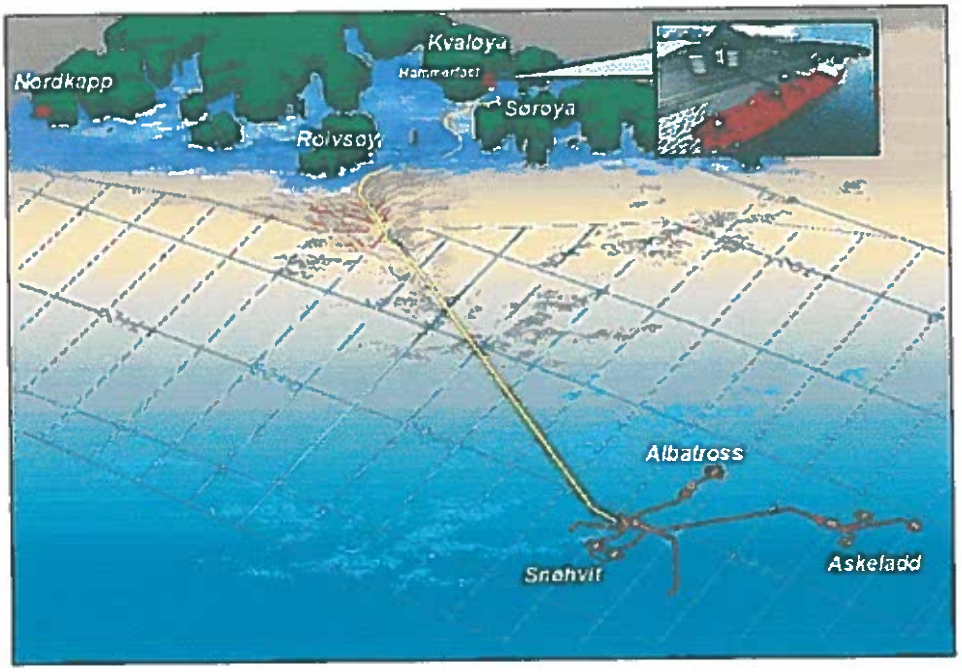
MOORING SYSTEM

The aim of this project is to develop technology to moor drilling, production and off-loading systems in water depths down to 3000m.

PRODUCTION UNITS WITH DRY COMPLETION

This will make available the Spar Buoy and TLP conceptual design for water depths from 1,000-3,000m, as well as evaluating the possibility of the SPAR to accommodate oil storage, identifying possible limitations.

SNØHVIT GAS FIELD, BARENTS SEA, NORWAY



The Snøhvit development comprises three fields - Snøhvit, Albatross and Askeladd. These lie in the Barents Sea, about **140km** north-west of Hammerfest in northern Norway. The fields were discovered in 1984 in **250-345m of water** and extend across seven production licences. It is operated by Statoil on behalf of Petoro, TotalFinaElf, Gaz de France, Norsk Hydro, Amerada Hess, RWE Dea and Svenska Petroleum Exploration. **All primarily contain natural gas** with small quantities of condensate. The accumulation exceeds 193 billion cubic metres of natural gas and 113 million barrels of condensate.

Snøhvit will be the first major development on the Norwegian continental shelf without a fixed or floating unit. Instead, a subsea production system on the seabed will feed a land-based plant on the north-western coast of Melkøya, at the entrance to the shipping channel into Hammerfest via a 68cm ID, 160km gas pipeline. In addition come two chemical lines, an umbilical and a separate pipeline for transporting carbon dioxide, which will be laid in the summer of 2005. Both the subsea production system located on the field and pipeline transport will be monitored and controlled from a control room at Melkøya, where operators will be able to open and close valves on the seabed 140km away with signals transmitted along fibre-optic cables, and with high-voltage electrical and hydraulic power lines.

The potential routes for the pipelines and cables have been mapped, as well as the areas where the subsea installations are to be sited in order to ensure the most favourable location for pipelines and equipment.

The work was carried out from the Normand Tonjer, which was followed by geotechnical surveys on the field and along the pipeline routes by the ship Bucentaur.

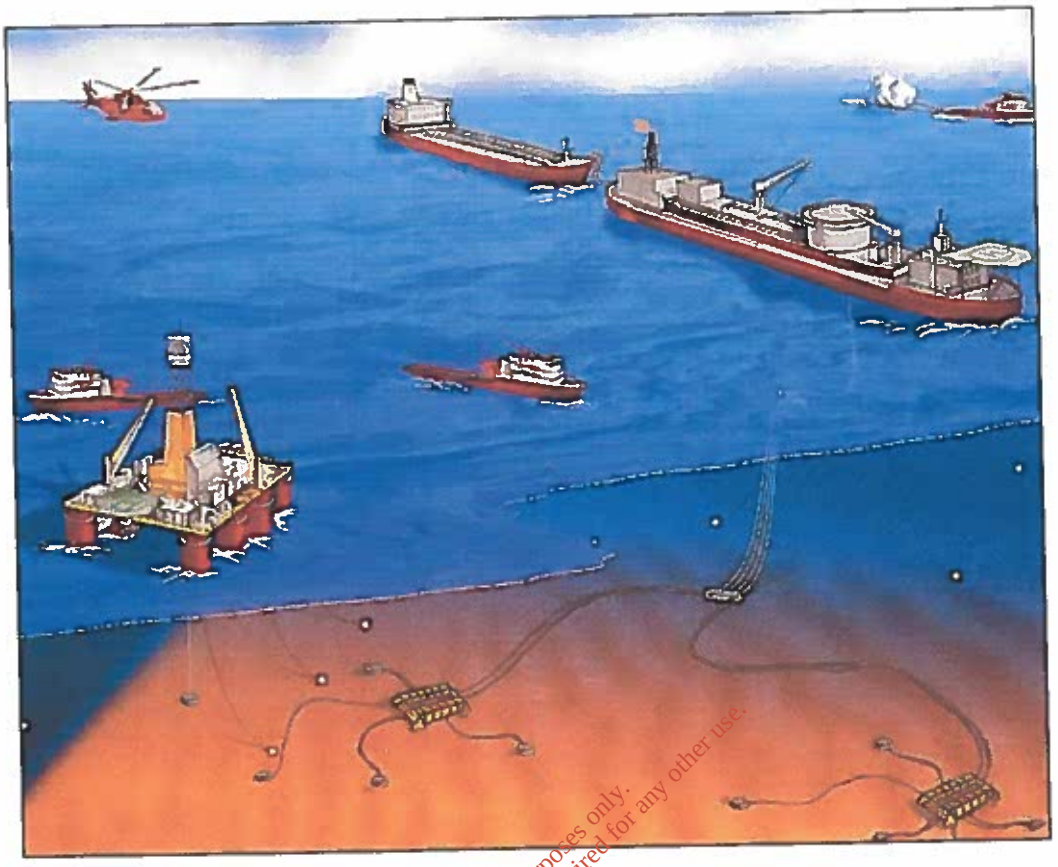
GAS LIQUEFACTION

The unprocessed wellstream arriving at Melkøya is separated and the gas cooled down to liquid form and exported. Gas from the Snøhvit area contains five-eight per cent carbon dioxide, which will be separated out at the land plant and returned in a separate line for storage underground beneath the seabed.A liquefaction plant will reduce its volume 600-fold by decreasing its temperature to -163°C. This will be carried out on a gas liquefaction barge, being built at the Spanish shipyard group Izar Construcciones Naval's yard in Ferrol in a contract worth about NOK 170 million. The barge will measure 9m high by 154m long and 54m wide.The chosen building approach greatly reduces the need for steelwork on Melkøya, and gives cost savings as well as higher productivity compared with constructing the plant on site.

Following completion, the barge will be towed to an outfitting yard where about 24,000t of process equipment for the gas liquefaction plant will be installed on its deck. From there, it will then be transported to Melkøya on a heavy-lift ship and installed in a dock blasted out in advance. About 70 cargos of LNG per year will be shipped out from Melkøya.

The annual exports are anticipated to be 5.75 billion cubic metres of LNG, 747,000t of condensate and 247,000t of liquefied petroleum gases (LPG). There are long-term contracts with Iberdrola in Spain and El Paso in the USA. The total investment will include NOK 34.2 billion for field development, pipeline and land plant and NOK 5.4 billion for ships. Snøhvit will start production in 2006.

TERRA NOVA GRAND BANKS, CANADA



Note
Same Process can now be done by producing Liquid Natural Gas (LNG) by GAS LIQUEFACTION similar to the SNØHVIT GAS FIELD in Norway

The Terra Nova field, located 350km ESE of St John's Newfoundland and 35km SE of Hibernia, was discovered in 1984 by Petro-Canada. Field reserves have been estimated at 406 million barrels (Mbbl).

ENVIRONMENT
Water depths are shallow - between 90m and 100m. The mean annual wind speed is 35kmph, with the strongest recorded wind speed being 145kmph and the largest recorded wave height being 25m.The area is characterised by the seasonal presence of floating sea ice, ranging in thickness from 0.5m to 1.5m, produced by the freezing of the ocean's surface layer and icebergs.

RESERVOIR
Terra Nova is subdivided into three major structural blocks: the Graben, the East Flank and the Far East. The field is estimated to contain over one billion barrels of oil in place, of which about 400Mbbl of oil are recoverable. (The Far East block, which is not yet drilled, is expected to add at least 100Mbbl of reserves to the 300Mbbl that have already been estimated within the Graben and East Flank). The estimated peak production rate is 125,000b/d from the Graben and East Flank portions alone. A total of 32 wells are planned for the Graben and East Flank blocks, including 20 production wells, ten water-injection wells and two gas injection wells. For the Far East, a total of 12 wells are planned, including six production wells and six injection wells. Field life is expected to be 18 years.

DEVELOPMENT
Petro-Canada selected the Grand Banks Alliance (SBR Offshore, Doris Conpro, PCL Industrial Constructors, Coflexip Stena, Halliburton Canada and FMC Canada) to carry out engineering, procurement, construction, installation, commissioning and possibly pre-development drilling activities up to the production of first oil. The project partners and Grand Banks Alliance consequently established a single alliance: the Terra Nova Alliance, with each company participating on a risk-and-reward basis.

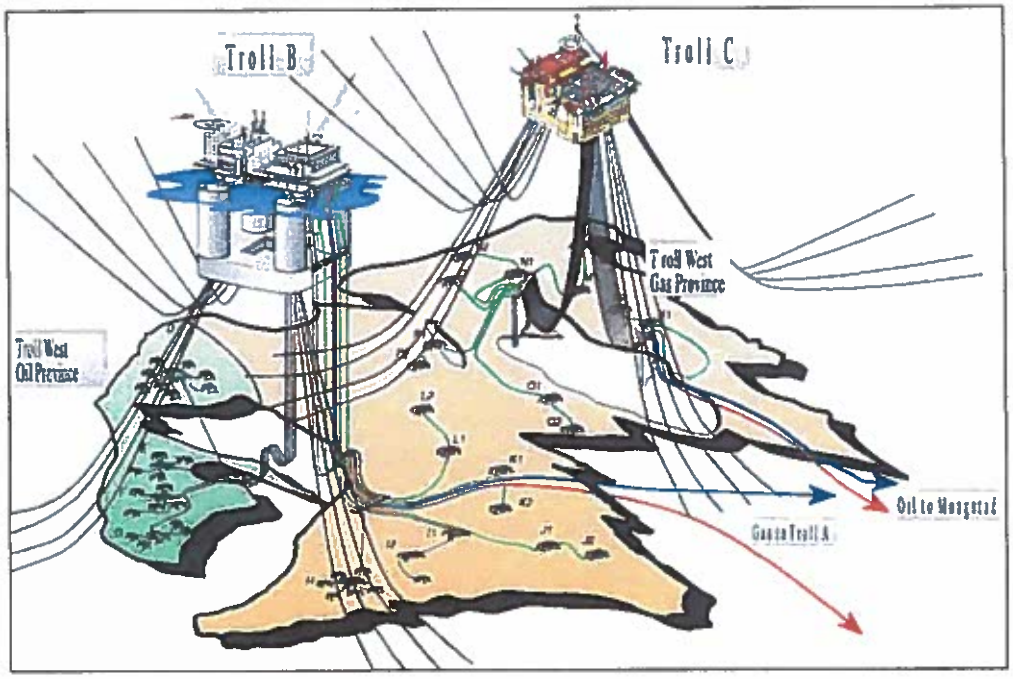
PRODUCTION
The subsea layout will consist of a production well feeding into a template, which, in turn, will be connected by flexible flowlines to a riser-base manifold (RBM). In order to protect the subsea wells from

iceberg scour, they will be set in glory holes - large holes drilled in the seabed in which equipment can be installed. Flexible risers will connect the RBM to an FPSO. The vessel will have a length of 280m and a width of 45m. The combination of low air and water temperatures with wind and wave action, makes superstructure icing a consideration during the winter months. This means that an allowance of several hundred tonnes of superstructure ice accumulation must be factored into weight and stability calculations. There must also be procedures for monitoring and mechanisms for controlling ice build-up on the structure and substructures of the offshore facilities.Low water temperatures require that fluids such as hydraulic control fluids be heated or treated to lower their freezing point. Similarly, low temperatures combined with the waxy nature of the crudes require that the flowlines and riser are insulated to reduce wax deposition. The FPSO is designed to operate in moderate sea ice, up to a limit of five-tenths coverage and to disconnect, as required, to avoid heavy pack ice and potential collisions with icebergs.The 9000t topsides facilities will be installed approximately 4.5m above the main deck. They will contain the necessary equipment to produce 150,000b/d oil, and inject 250,000bbl of seawater/day and 125 MMcf/d of gas. The FPSO hull will have an integrated storage capacity of 900,000bbl.

EXPORT

The export system will be a tandem offloading system for the transfer of crude oil from the storage tanks of the FPSO to ice-strengthened shuttle tankers, ranging in weight from 80,000t to 120,000t. The offloading system will be designed for connection to tankers in 5m significant-wave-height conditions.

TROLL WEST NORTH SEA NORTHERN, NORWAY



Although Troll is primarily a gas field, it also possesses significant quantities of oil, in thin zones under the gas cap, to the west of the field. West Troll can be divided into two major zones - the Troll West oil province and the Troll West gas province. Regular oil production from the 22- to 26m-thick reservoirs, in the Troll West oil province, began in late 1995. Now, the extensive use of advanced drilling technology and the experience of production and well management have allowed the development of the Troll West gas province to begin - where zones are only 12 to 14m thick.

TROLL WEST LOCATION

The field is located in blocks 31/2 and 31/5, within production licence 85. It lies approximately 75km from the shore and 32km from the Troll A platform. The water depth ranges from 315-345m.

DISCOVERY

Oil and gas were discovered by well 31/2-1 in 1979. This was followed by the drilling of 20 appraisal wells between 1980-93, all of which encountered quantities of oil and gas. In 1990, the horizontal test well 31/2-T1 was drilled in the oil province and this was followed, in 1991, by the horizontal test well 31/5-T 1 in the gas province.

DEVELOPMENT STRATEGY

The Troll West reservoirs are being drained by two platforms, Troll B and Troll C. These are both semisubmersible production units. Since it came on-stream, Troll B has been used to produce oil from the oil province and the southern part of the gas province. When it came on-stream in late 1999, Troll C started to deplete the Northern part of the gas province.

TROLL B - OIL PROVINCE

Production commenced on Troll B in September 1995, using eight predrilled wells in the oil province. Current production is 40,000-42,500m3/day, from 21 wells, in the four oil province well groups known as D, E, F and G. TROLL B –

GAS PROVINCE

The platform has also brought wells from the south part of the gas province on-stream. Altogether, there are 24 subsea satellite oil producers tied back to the Troll B platform - 12 wells are in the H-cluster and 12 in well group 1.

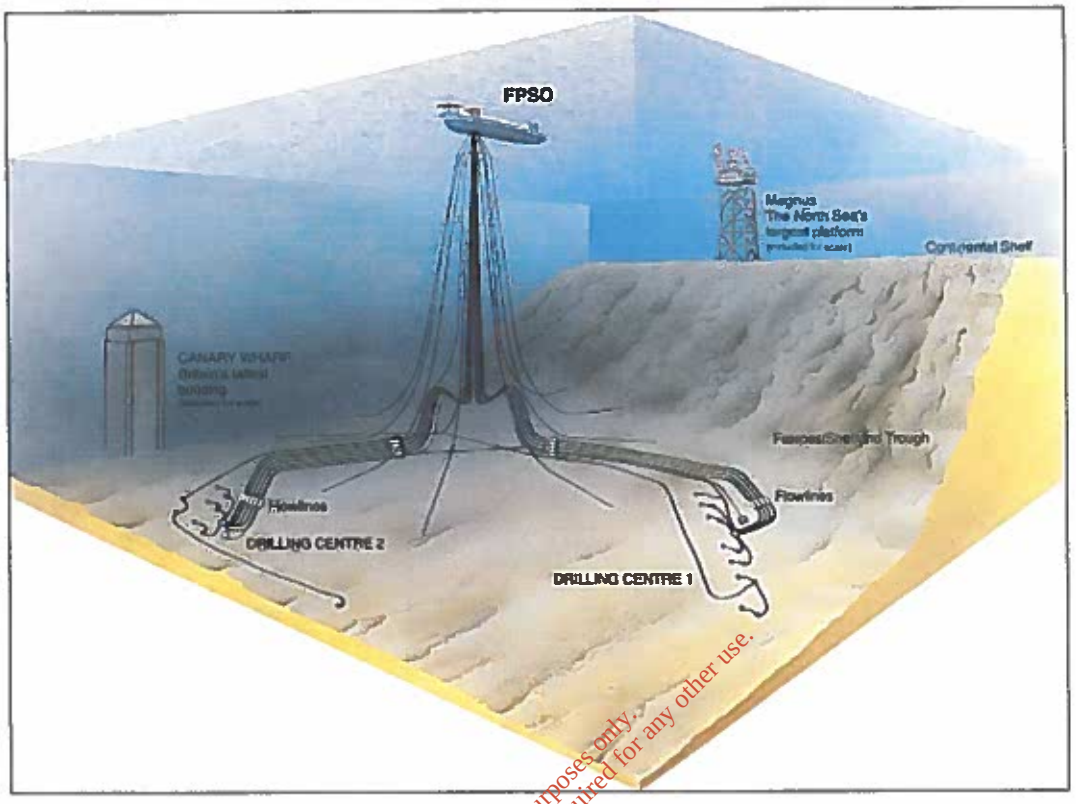
FUTURE PLANS

The remaining oil reserves of the gas province will be developed by 58 horizontal wells. Plans envisage that 14 of these will be drilled with two branches. These 58 wells will be arranged in ten well groups, each normally containing two templates. Between two and four wells will be drilled from each template. Three of these well groups - J, K and L, which will contain a total of 18 wells - will also be tied back to Troll B and use the spare tie-in capacity on the platform.

TROLL C

The remaining seven well groups will be routed to a new Troll C platform, which is located in the Northern part of the gas province. There will be no drilling facilities on Troll C. In early 1998, a second rig started pre-drilling wells in the gas province. Production from this part of the field commenced in late 1999. The drilling programme is planned for completion by the year 2002, but it may be extended, in order to find out the potential for improved oil recovery. Troll C has an oil-production capacity of 30,000m3/d, a water production capacity of 40,000m3/day, a liquid production capacity of 60,000m3/d and associated gas production capacity of 9 million m3/d. It has a total displacement of 52,750t and can accommodate 70 people.

FOINAVEN WEST OF SHETLANDS, UNITED KINGDOM



Note
Same Process can now be done by producing Liquid Natural Gas (LNG) by GAS LIQUEFACTION similar to the SNØHVIT GAS FIELD in Norway

Foinaven is located in blocks 204/19 and 204/24a, which are operated by BP Exploration. Shell UK Exploration and Production is the co-venturer. These blocks lie some **190km** west of the Shetland Islands, in a water depth of between **400 and 600m**.

Recoverable reserves are estimated to be in the region of 250 to 600 million barrels of oil. The project is being carried out as a phased development. The first of these is based on the recovery of 200 millions barrels within the Foinaven field.

These developments centre on subsea wells completed on the seabed. They produce oil, via a manifold, which passes through rigid flowlines and then flexible risers into a floating production, storage and offloading system (FPSO), which is permanently stationed in the field. Shuttle tankers then export the crude oil.

Appendix 3

The Brian Coyle Observation and Objection Report

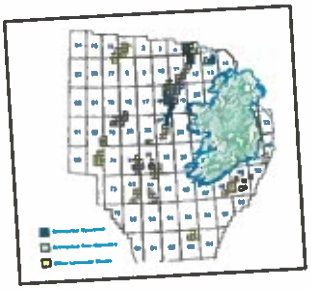
Based on

Applicants response

to

Further Information Request

THE BRIAN COYLE OBSERVATION & OBJECTION REPORT TO THE FURTHER INFORMATION RESPONSE



By Brian Coyle,
BE, CEng, MIEI, MIStructE

Chartered Consulting
Civil & Structural Engineer

Director of
COYLE KENNEDY LTD
Consulting Engineers

REFUSAL SHOULD BE GRANTED

TO THE SITE CHOSEN FOR CORRIB GAS TERMINAL

THE PROPOSED CONSTRUCTION TECHNIQUES & ROUTES

THE PEAT DEPOSITION SITE AT SRAHMORE

THE UPSTREAM HIGH PRESSURE PIPELINE ROUTE

BASED ON ITS WORLD RECORDS AND THE FURTHER INFORMATION RESPONSE

Should we allow the Corrib Gas Field to be Connected:

- ☐ To an Inland Terminal

And

- ☐ Becomes the only Inland Terminal in the WORLD?
  - ☐ Surrounded in BLANKET BOG that can become unstable at an angle of 2degrees or more
- ☐ Connected from a Landfall at the Base of a Hill that is Unstable
- ☐ Residents as close as 60m to the High Pressure Untreated Pipeline
- ☐ Residents within the Explosion/Gas Vapour Exclusion Zone from the Terminal and High Pressure Pipeline
- ☐ Streams and Rivers within an exclusion zone feeding into a major drinking water supply
- ☐ The only World Wide Deposition of 450,000m3 of Acidic Blanket Bog
- ☐ Causing in excess of 100,000 traffic turning movements during its development
- ☐ Resulting in the removal and discharge of at least 400,000,000 litres (Four hundred million) litres of acidic water to the North and South of Carrowmore Lake, the only drinking water supply for the entire region
- ☐ In an Area of Natural Ground Instability

Why should we?
- when all the other World Wide Authorities have done different

As We Are Lead To believe by the Applicant That There Are No Other Alternatives! When in fact there are!

Is it the lack of experience in our Representatives and Authorities that they do not know the difference between right and wrong?

We do not want an Enis EU Directive to be written similar to the Seveso II directive that was written following the disaster and the ultimate consequence to people in the small town called Seveso in Italy.

The Content of this report is written without prejudice and should be read in conjunction with the initial report.

Index

Observer and Objector

The observations and the reasons given for refusal contained in this document are compiled and written by Brian Coyle BE, CEng, MIEI, MIStructE Chartered Consulting Engineer and are the observations of many of my immediate family and friends that reside throughout the Erris community. These observations and objections are contained within the full text of this document and are supported with references from standards, publish documents and from the applicant's response to the further information request issued by the Planning Authority, dated 17th Feburary 2004.

Proposed Development Planning Text

Bellagelly South & Srahmore Attavally Proposed Development.

PLANNING REFERENCE NO 033343

LOCATION BELLAGELLY SOUTH
SRAHMORE ATTAVALLY

PERMISSION SOUGHT FOR
CONSTRUCT GAS TERMINAL FOR THE RECEPTION AND SERAPATION OF GAS FROM THE CORRIB GAS FIELD, AND FOR A PEAT DEPOSITION SITE, RESPECTIVELY. THE DEVELOPMENT WILL CONSIST OF THE CONCURRENT DEVELOPMENT OF TWO SITES LOCATED 11 KILOMETRES APART, APPROXIMATELY, AND IDENTIFIED AS THE SITE OF THE GAS TERMINAL FOR THE RECEPTION AND SEPARATION OF GAS FROM THE CORRIB GAS FIELD IN THE TOWNLAND OF BELLAGELLY SOUTH AND THE SITE OF THE PEAT DEPOSITION SITE IN THE TOWNLANDS OF SRAHMORE AND ATTAVALLY, BANGOR ERRIS. THE DEVELOPMENT AT THE BELLAGELLY SOUTH SITE WILL CONSIST OF: A GAS TERMINAL FOR THE RECEPTION AND SEPARATION OF GAS INCLUDING PLANT AND EQUIPMENT; PROVISION OF 4,935 SQ M (GROSS FLOOR AREA), APPROXIMATELY, OF BUILDINGS; ACCESS ROADS; 40 NO. CAR PARKING SPACES; AND ANCILLARY DEVELOPMENTS, OF WHICH 13 HA, APPROX, WILL BE DEVELOPED INRESPECT OF THE GAS TERMINAL'S FOOTPRINT. THE PROPOSED DEV. WILL OF THE BELLAGELLY SOUTH SITE WILL ALSO CONSIST OF; THE EXCAVATION AND REMOVAL OF 450,000 CUBIC M

Summary

- The applicants own recommendations are not been meet along the entire stretch of the public haul road even after upgrading works.
- The proposed road width of 5.5m is not verified in accordance with NRA standards or any other published documents and therefore it effectiveness and safety cannot be addressed for such large volumes of heavy traffic.
- Emergencies and contingencies have not been fully considered, addressed or resolved by this recent submission.
- The applicant has identified that the haul route is supported on 2-3m of peat
- The overall impact of the road improvement works on existing land, embankments, slope stability, drainage and private property is not fully assessed.
- Published documents state that there is a statutory requirement to provide for the health, safety and welfare of all employees and members of the public in connection with the design, construction operation and maintenance of pipelines
- Published documents state that it is desirable to avoid a route where the pipeline might be subject to heavy external stresses or where the consequences of a leak, if one did occur, might be particularly serious. In practice, all cross-country pipelines and some local pipelines will have to be subjected to a detailed safety evaluation as part of its consideration.
- The highly flammable liquid transported in the pipeline under pressure creates forces at bends, junctions, valves and all restrictions to, and changes in, direction of flow.
- Additional transient forces may be generated by pump starts or stops, valve closures etc. The vector analysis arising from high-pressure fluid in the pipeline must be resolved and hence the pipeline effectively supported or else it will fail.
- Section 2.2 in the EIS report states that the terminal is designed to throughput of 10 million cubic meters per day (350 million standard cubic feet per day).

- Taking account of the 10 million cubic meters per day and on the basis that 'volume in' equates to 'volume out' then the speed of flow through a 508mm diameter pipeline with a 25.4mm wall thickness will be a whooping c. 2,500km/hr (two thousand five hundred kilometres per hour).

- The applicant has stated the orthophosphate impact to surface watercourses from phosphate-impacted soils is widely recognised as being a major concern in certain parts of Ireland, because it can lead to eutrophication of lakes and rivers. The orthophosphate concentrations recorded by the applicant in the blanket bog is approximately 250-10,000 times greater than the allowable concentration in lake waters.

- The milling of peat commonly associated with the work that Bord Na Mona does is better compared to harvesting crops than removing saturated blanket bog. This statement is supported with picture evidence in the Bord Na Mona Website.

- The proposed construction work (grouting) resulting in the injection of chemicals into the ground where surface water run-off will flow into rivers and streams and then into a major drinking water supply for the entire region should undoubtedly be avoided. Published documents states that this process should be independently investigated.

- The applicant has now identified that the proposed process of removing the peat is weather dependent. Waterproofing sheeting will have to be placed over the peat every time it rains. Can you imagine acres of peat to be covered with sheets ever time it rains. Therefore, it could take many months and even years to remove the saturated blanket bog in order to meet the criteria put forward by the applicant.

Further Information Request Volume 1 No.1
Fully detailed traffic management plan.

Observation to Applicants Response

The applicants response to this request identifies that their own recommendations are not been meet along the entire stretch of road even after upgrading. The road geometry survey details submitted are extremely limited and do not convey the impacts of the road improvement works.

The proposed road width of 5.5m is not verified in accordance with NRA standards or any other published documents and therefore it effectiveness cannot be addressed. The applicant has raised their own concern in relation to the proposed road width when they suggest in Section 4.3 Par. 4.3.1

"where physically possible and where land between fences permits, a width greater than 5.5m is recommended."

It is physically possible and land does exist to meet this recommendation.

As previously identified the proposed haul route is the shortest route available to many people residing the North Erris area. The applicant has assumed that all emergences will be transported using an emergency vehicle.
This is seldom the case and often local residents transport their own medical emergences to Castlebar general hospital. Local residents have used this haul route to transport very sick people or a pregnant woman by private car to Castlebar general hospital. Once again peoples lives are at risk with this proposed development.

The time taken to travel along this section of road, with its envisaged poor quality, slippery surface, "*noticeable settlement*" surrounded with large vehicles carrying saturated and dusty material is a matter of great concern for the general public in this area. Trucks queuing at junctions to gain access onto major and minor roads will inevitably impede local traffic flow.
Therefore, emergencies and contingencies have not been fully considered, addressed or resolved by this recent submission.

There is insufficient information on the drawings submitted in addressing this request to determine the extent of the proposed road improvements.

It is obvious to anyone that drives along the proposed haul route that the existing pavement and road side embankments are not capable of supporting the local traffic that use this road. The applicant has identified that this road is supported on approx 2.0 -3.0m of Peat. Some roadside embankments are currently failing.

The drawings submitted to address this request (e.g. Drg. No. 2044-1010) contains limited information. The existing road geometry survey information included on the drawing is extremely limited and therefore the extent and impact that the upgrade works will have on adjoining land and existing land drains, water flow is not addressed effectively. The existing road is very narrow in some locations with steep unstable embankments, mainly consisting of peat. The survey information does not identify the gradient of this embankment or the location of existing land drains.
Therefore the overall impact of the road improvement works on existing land, embankments, slope stability, drainage and private property is not fully assessed.

Further Information Request Volume 1 No.2
Written confirmation from the relevant regulatory authority that the design of the proposed gas pipelines from the terminal compound to the site boundary is suitable to ensure the structural stability of the pipelines constructed in deep peat soil.

Observation to Applicants Response
The text of the applicant's response to Further Information Item No. 2 does not contain the necessary text to independently qualify the structural stability of the pipelines constructed in deep peat soil.

The applicant and/or regulatory authority has not justified or provided the qualitative assessment, analysis and design to justify that the pipeline is structurally adequate in poor ground conditions especially when it is surrounded in peat and/or mineral soil in an area of natural ground instability surrounded with heather and woodland that is susceptible to fires during prolonged periods of dry weather. We are all familiar with the intensive heat, rapid spread and uncontrollable damage caused by gorse fires. This risk exists and is more imminent as climate changes are expected to become more severe (Longer Dry Periods and Longer Wet Periods).

The pipeline route chosen should have been assessed based on its functionality, surrounding ground geology and its long-term performance in this environment. The structural stability of this pipeline and hence the Health and Safety aspects of this section of pipeline and indeed the entire pipeline must be considered.

Sections of the submitted documentation by the applicant from the Department of the Marine and Natural Resources dated 15th April 2002 is only a partial reproduction of some sections of text contained in the following British Standards.

BS 8010 Part 1: Pipelines on Land
BS 8010 Part 2: Pipelines on land; design, construction and installation
Section 2.8: 1992 Steel for oil and gas

A reproduction of part or any part of a standard is certainly not a means of justifying the structural stability of the pipeline. These standards are also referenced in Mr. Andrew Johnston report on the evaluation of Onshore Pipeline Design Codes dated 28th March 2002. Some of the design standards mentioned in Mr. Johnston report are now withdrawn or superseded. However, the safety aspects of the standards usually become more stringent as events and failures of pipelines occur.

Like most relevant standards or publish documents associated with the transportation of materials in pipelines, these documents contain specific references to safety requirements. Section 1.3 of BS 8010 Part 1 states that;

" There is a statutory requirement to provide for the health, safety and welfare of all employees and members of the public in connection with the design, construction operation and maintenance of pipelines"

The published document titled 'Guidance Notes for Applications and Notifications for Onshore Pipelines under the Pipelines Act 1962' published in 1993 also considers Pipeline Safety.

It states that

"it is desirable to avoid a route where the pipeline might be subject to heavy external stresses or where the consequences of a leak, if one did occur, might be particularly serious" "In practice, all cross-country pipelines and some local pipelines will have to be subjected to a detailed safety evaluation as part of its consideration. This is particularly the case for high pressure gas pipelines and a pipeline conveying toxic or highly volatile fluids, such as liquid petroleum gas (LPG), natural gas liquids (NGL) or ethylene."

The applicant and/or regulatory authority must consider and provide design details and calculations to justify the structural stability and hence the health and safety aspects of the pipeline including the surrounding landscape.

The section of pipelines queried in the further information request, and indeed any other section of pipeline should have been and must be assessed on the basis of structural stability, safety and integrity as there are various uses/work carried out on the surrounding landscape. The Health and Safety authority has a statutory obligation (under the health and safety at work act) to consider the health and safety of people at work. The long-term Health and Safety and people's livelihoods working at home and on the land (Agricultural use, building etc) prior to, during or after any possible failure/explosion event of the pipeline must be considered.

This information should be made available for independent verification. Design standards are often withdrawn or superseded by more stringent requirements. The current safety requirements in current standards will only become more stringent as more and more pipe failures occur. The statutory safety requirement will always be there and will be further enhanced as pipe failures keep occurring and environments and lives damaged and lost. Refer to 'Observation to Applicant's Response' Volume 1 No. 3 of this report for published documented facts.

The text contained in Section 8 of the Department of the Marine and Natural Resources letter dated 15th April 2002 acknowledge that upheaval buckling will occur when it states that

"the proposed measures for mitigating upheaval buckling of the flexible in-field flowlines should be subject to review."

Upheaval buckling is only part of the overall problem associated with this pipeline route. Surrounding ground settlement and movement in any direction mainly lateral and vertical around the pipeline will considerably increase the pipe loading and thus excessive stresses in the wall of the pipe will occur that can cause fractures and ultimate failure of the pipeline. This can occur in an area of natural ground instability close to a major drinking water supply for the entire region. The length of the pipeline that can become unsupported during differential ground movement can increase the shear, longitudinal and bending stresses in the pipeline. When a pipe passes through/supported on adverse ground conditions e.g. waterlogged ground, peat, and mineral soil the likelihood and consequences of differential ground movement and settlement is inevitable.

The applicant specifically states in Section 4.5.1 of the EIS report;

*"that **minimal** differential movement of the ground **is essential** because*

- *for **safety** and operability, particularly for equipment operating under high pressure, piping and equipment require very tight tolerances on differential settlement.*

- *Piperacks, **piping** and equipment design and installation would be very complex in a plant subject to differential settlement.*

- *excessive settlement would create operability difficulties for equipment such as pumps, turbines and compressors*

The highly compressible and variable characteristics of the surrounding landscape (peat, mineral soil) surrounded in an area of natural ground instability places this pipeline at great risk.

The highly flammable liquid transported in the pipeline under pressure creates forces at bends, junctions, valves and all restrictions to, and changes in, direction of flow.
Additional transient forces may be generated by pump starts or stops, valve closures etc. The vector analysis arising from high-pressure fluid in the pipeline must be resolved and hence the pipeline effectively supported.

BS 8010: Part 1 Section 1.4 'Insurance' states that;

"Promoters should ensure that there is adequate third party insurance in force during design, installation and subsequent operation of pipelines."

The published CIRIA Report 164 states that the *HSE data for the period 1980-1990 showed that of some 600 incidents world-wide there were 128 incidents in the UK involving gas, including both fuel gases such as LPG and chemical gases such as chlorine. The major incident in the UK was the Piper Alpha disaster in 1990 in which 167 people were killed as a result of an explosion of LPG. Incidents have occurred as a result of the transfer of gas in pipelines, the build up of gas in sewers and natural gas accumulation in buildings (e.g Abbeystead)*

I request that the applicant and/or regulatory authority submit/provide details and design calculations for the structural stability of the high pressure pipeline taking account that it is sited in an area of natural ground instability surrounded in blanket bog and its failure could destabilise the ground even more. Further more since this pipeline is within an establishment a proper HSA zoning should be applied to the pipeline, identifying safety and risks to each zone.

The applicant has submitted the design calculations for the site drainage but has not provided sufficient details to demonstrate how the pipeline will be adequately supported. How does the applicant intend to support and stabilise the foul and surface water pipe network and prevent from excessive settlement, back fall and ultimate failure? Is the pipe network going to be piled and supported on beams? Bearing in mind that both networks will contain harmful contaminated substances.

The structural design, installation, operation, performance and safety of all pipelines supported on and surrounded in an area of natural ground instability should be adequately indemnified and collateral warranties given from each relevant regulatory authority and project member. The pipelines and any other element should not fail for the life of the structure, as the consequences of such can be dramatic.

This information should be publicly available and independently verified. Otherwise the application should be refused.
The applicant and regulatory/local authorities must justify and be aware of the consequences of their intended objectives and decisions.

Section 2.2 in the EIS report states that the terminal is designed to throughput of 10 million cubic meters per day (350 million standard cubic feet per day).

Offshore Technology Website indicated that well tests have confirmed a flow rate of 60 million ft³/day. Six wells are intended to operate at first. This is comparable to the 350 million standard cubic feet per day quoted in the applicant's submission. Offshore Technology Website states that the reserves in the Corrib field are around One trillion ft³.

Taking account of the 10 million cubic meters per day and on the basis that 'volume in' equates to 'volume out' then the speed of flow through a 508mm diameter pipeline with a 25.4mm wall thickness will be a whooping
c. 2,500km/hr two thousand five hundred kilometres per hour.

We are all aware of how difficult it is to restrain and support a fire fighting hose, what will restrain this high-pressure pipeline? The blanket bog certainly will not.

Further Information Request Volume 1 No. 3
Proposals for system of collection and storage of any pumped water containing deleterious substances, including concrete, separate from

the surface drainage network and settlement ponds and to provide for its safe disposal.

Observation to Applicants Response
Grouting for Ground Engineering CIRIA C514. 2000 indicates and outlines the risk assessment and environmental impact assessment of grouting.

It states that

'it is an offence under the Water Resources Act, 1991 to cause or knowingly permit any poisonous, noxious or polluting matter or any solid waste matter to enter any controlled waters. Failure to comply with the above Act may lead to a criminal prosecution. Lacks of intent or negligence are no defence. In addition, expensive civil law suits may follow if harm is caused to someone else's person or property.
December 1997 the Environmental Agency had no defined policy on groundwater pollution caused by grouting in the ground.

It also states; *that any environmental impact assessment and especially the decision about admissible limits should be based on two largely independent investigations.'*

There should be an independent assessment made by an accredited body (with adequate PI insurance) as to the potential consequences arising from this method of construction. The EPA, WHO, Agrément Board bodies, should also confirm their acceptance.

This response should also deal with the safe collection and disposal of 'fire fighting' water. In the event of a fire, bunds around tanks can fill with fire fighting water and reach capacity prior to tank failure; the tank containing the dangerous substance can fail either during or after a fire thus there will be no containment volume for the dangerous substance. The applicant must identify a solution to this potential problem. Settlement ponds will not remove dissolved solids or chemicals in water. Containment bunds containing fire-fighting water will provide less storage volume for the dangerous substance.

The table below extracted from CIRIA Report 164 summarises the causes of loss of containment of liquids, which occurred at one large chemical complex in NW England. There were a 170 such incidents at the complex over a three-year period.

The cause of these incidents is listed below;

Transfer of materials through on-site pipework	37%
Failure of Storage Tanks	7%
Tankers (loading and off-loading)	7%
Compressor / oil bowsers	6%
Valves	5%
Pumps	2%
Other plant and Equipment	7%
Human Error	10%
Miscellaneous	19%

Note: the high percentage of pipe failures, storage tank failures and human errors. The risks of equipment failure alone associated with this development are very high and to further enhance these risks it is sited on poor ground, in natural ground instability, the only inland 8km upstream pipeline in the world, surrounded in blanket bog covered in heather, rush and forest that can quite easily ignite in the expected prolonged dry weather periods.

There are other onshore sites available that do not pose these risks.

The application should therefore be refused.

Further Information Request Volume 1 No. 5
Full details for the proposed sewage disposal system, including any water-table and percolation tests and the design of a suitably sized percolation area.

Observation to Applicants Response
The applicant response to this request states

"the site investigation indicated that there is a perched water table in the peat and that the peat is relatively impermeable"

This was also evident last Friday (26th March 2004) when local residents went to investigate and walk the land. The whole area was waterlogged and it was almost impossible to walk the site as people were sinking to there knees in the peat.

A soil percolation test at the location of the proposed puraflo modules / percolation area must be carried out as the effluent from the treatment system will only pond on the peat surface. This is not acceptable or adequate by any standard and the applicant's response to this request is inadequate. We are all aware how long it takes water to percolate through peat (weeks and even months).

Further Information Request Volume 1 No. 6
Submit a map outlining phosphate hot-spots, quantities of contaminated material, details of the analysis of the occasional occurrence of high levels of phosphorous detected in peat samples on the site and proposals to deal with the same including disposal. The format of the response shall include a comparison between

the total concentration (above background levels), that may theoretically, result from the development works and other land use activities that regularly occur in the area e.g. afforestation, clearfelling etc.

Observation to Applicants Response
The applicant indicates that numerous phosphorous soil sample points were located throughout the site. The maximum reported orthophosphate concentration was 219mg/l at a specific location but generally the concentrations were below 50mg/l in a zone close to the surface. They have stated that orthophosphate concentrations decrease significantly with depth and at greater depths (5.1m) decreased below 5mg/l.

The applicant has stated that the maximum limit for orthophosphate in river waters is 0.05-0.07mg/l and 0.02-0.05mg/l in lake waters. This implies that test results have indicated that orthophosphate concentrations in the blanket bog is approximately 250-10,000 times greater than the allowable concentration in lake waters.

It is imperative to realise that peat consists of approximately 90-95% moisture content (by weight) and now we are informed of its high phosphorus concentrations.

The applicant has stated on Volume 1 Item 6 Page 2 that

"Orthophosphate impact to surface watercourses from phosphate-impacted soils is widely recognised as being a major concern in certain parts of Ireland, because it can lead to eutrophication of lakes and rivers. The principal migration pathway via which orthophosphate typically impacts surface watercourses is via surface runoff."

The applicant once again ignores his own advice and proposes to perform work that will increase the risk of water contamination. The proposed works to the highly saturated and highly concentrated phosphorus blanket bog (containing 405million litres of acidic water) to place it in windrows and to deposit it at the Srahmore site following many mechanically loading, moving and unloading operations is dramatically increasing the surface area of the peat and thus allowing free water containing high concentrations of phosphorous to escape into the surface water streams, rivers, ponds and Carrowmore Lake via *surface runoff.*

The proposed blanket bog operations are;

excavating blanket bog to remove it from its current position at the terminal site,

loading to transport it to windrows at the terminal site,
transport it to the windrows at the terminal site
unloading to form windrows at the terminal site,
moved into windrows at the terminal site,

loaded again to be transported to Srahmore,
transported c. 11km to Srahmore
unloaded again at the Srahmore Site

loaded onto Bord Na Mona **Haku trailer**
transported to the final depositon site at Srahmore
unloaded at the final deposition site at Srahmore

and finally **compacted** at the deposition site at Srahmore. The compaction alone will cause water to escape.

The proposed [loading, transport, unloading] peat operations occurs at least three times, coupled with this is mechanically moving and compacting operations.

This sequence of operations is certainly not acceptable when one considers that there are alternatively sites available without any peat excavation or disposal requirements and outside the catchment area of a major drinking water supply for the entire Erris region. Water will continue to fall-on and escape from the peat when it is placed at the deposition site at Srahmore, (located to the south of Carrowmore Lake). The deposited peat will eventually absorb water thus reducing the shear strength and can ultimately cause peat failure. Remember the applicant has previously clamed that peat slopes can fail at angles of two degrees and above and their proposal have identified that water reduction is necessary for deposition of peat at the Srahmore site. Peatlands that have remained in place for thousands of years have failed, What make this site any different? Shear planes (2 degree and above) could occur within the main body of the peat.

Further Information Request Volume 1 No. 9 and Volume 2 No. 7
Information and proposals to address the possible impacts of free water from excavated peat on water quality, including PH and loading of humic and other acids.

An assessment of the impact of mineral soil being overlain on the existing peat soil.

Observation to Applicants Response
This observation also comments on information submitted by the applicant in relation to

Request for further information Volume 2; Items 7.

The content of the applicant's response to these items are misleading. On the afternoon of the 26th of March 2004 at approximately 5:00pm representatives from the Leenamore and Ballinaboy residents group and representatives from Shell walked the proposed gas terminal site. It was obvious to all that walked the site on that day that it was completely waterlogged and extremely soft sometimes people sinking to their knees in soft peat. It was reported that one of Shells representatives actually turned back as the conditions were so bad. Worked had commenced on site without providing any obvious protection/prevention of water pollution. It has been reported that, on site Shell's representative were informed of this and did not provide any evidence to demonstrate otherwise.

How then can the applicant suggest that the site is well drained? It may be well drained but the drains are not drying/draining the peat. The statement *'well-drained nature of the peat'* is misleading as this site visit suggested otherwise.

Bord Na Móna involvement with peat through the years is dealing with milled peat i.e. they effectively scrape the top 10-15mm from the surface and put it into windrows.

Source Bord Na Móna Website www.bnm.ie

Source Bord Na Móna Website www.bnm.ie

The dust like peat particles blow in the wind while this work is been carried out. This process or the works and any mitigation measures carried out during this process should not be compared with the removal of approx 450,000m3 of saturated blanket bog at Ballinaboy.

Source Bord Na Móna Website www.bnm.ie

This process and the main work carried out by Bord Na Móna is better compared to harvesting crops than removing saturated blanket bog. Comparing such process, works and mitigation measures is somewhat worrying and is an indication of the lack of knowledge in this area.

The applicant has already pointed out that water will escape from the blanket bog when it is excavated etc. Windrowing of the blanket bog will only affect the immediate surface of the windrowed peat. The impermeable nature of the blanket bog with its low voids ratio (unlike milled dust like peat) will not allow air to pass through the windrowed blanket bog and thus air drying is not effective. The blanket bog at low depth is inevitably in its virgin state. I welcome an on-site demonstration at Ballinaboy to prove different.

Bord Na Mona shows and states on their website that Peat cut with a hand held slane (winning) has a moisture content of 95%. This is after the bank of turf has been exposed to the elements for a full year. This is stated on http://www.ipcc.ie/cbwinning.html. How can they qualify then that windrows of blanket bog mainly in its virgin state will result in an effective reduction of the moisture content.

The Bord Na Móna submitted documentation contained in Volume 2 Item 7 is questionable for the following reasons.

- It is obvious from last Fridays site visit that the drainage system in place is not sufficient.
- Bord Na Mona has indicated that restoration of the drainage system is required implying that the existing drainage system is insufficient and hence the poor conditions experienced at last Fridays site visit.
- Blanket Bog below the invert levels of the drains should be considered to be in its virigin state and hence greater moisture content is expected.
- The water table was reported to be high

- They state that the free water in the peat drains away rapidly. Isn't the blanket bog very impermeable with very little voids?

- They have indicated that "depending on the prevailing weather condition such windrowing could lower the moisture content of the peat to approximately 80% over 8 days but would typically achieve 82-87%.

- The intended bulldozing and compaction of the peat will increase the risk of contaminated water escaping from peat and will increase the oxidation of the peat thus contradicting the statement made by the Applicant in Volume 2; Item 3 that "Nitrogen is reduced to Ammonia rather than oxidised to Nitrate" It is no wonder the second paragraph in Volume 2; Item 3 begins with the uncertainty statement that "It is not expected that the level of Ammoniacal Nitrogen will increase..". The submission requires more reassurance than that.

The industrial field trials should be observed and reported by an independent accredited body with adequate PI insurance, independent to companies involved with this application as the consequences of their report could have an overwhelming effect on the quality of water and surrounding environment. Evidence from the photographs (taken during this trial and submitted in the content of the applicants response) shows that this (one-off not independently verified test trial) was carried out in very good (sun shinning, blue sky) weather conditions.

The applicant states without technical support that

" the settlement ponds will provide a more than adequate buffer for any minor differences between the quality of the water released from the peat, and that present in the drains from other sources."

The quality of water in the drains at present is from surface water runoff and should not be compared to acidic water contained in the peat. Organic fibres arising from the disturbed peat may take many months to settle. Therefore, the capacity of the settlement ponds and the detention/attenuation time required is directly related to the suspended solid characteristics in the water and the rate at which they settle.
Settlement ponds will not remove any dissolved solids.

Sudden surges from heavy rainfall will also disturb the settled solids. How does the applicant intend to cater for these events?
In the interest of the health and safety and for the control and monitoring of water quality I request that water sampling and testing should be undertaken by an approved independent testing authority not linked to the applicant. This water sampling and testing should be carried over a period of months to obtain an effective baseline existing water quality in the drains etc.

There are other alternatives available to the applicant that does not unearth such vast quantities of saturated blanket bog, containing up to 10,000 times the allowable quantities of pollutants in lake waters, posing a high risk to the water quality and surrounding environment.

For this and many other reasons, I request that a refusal to this application be granted.

Further Information Request Volume 1 No. 11

Information on the possible impacts on water quality, aquatic ecology and surrounding peatlands arising from the use of the highly alkaline lime/cement binder to comparatively small parts of the site. The information should include technical information and assessments to support the use and appropriateness of this method of peat improvement in this location.

Observation to Applicants Response
Construction work resulting in the injection of chemicals into the ground where surface water run-off will flow into rivers and streams and then into a major drinking water supply for the entire region should undoubtedly be avoided.

In the interest of protecting a major drinking water supply for the entire region, there should be an independent certificate of approval to demonstrate (Agrement Cert or a Cert from the WHO or EPA) that the proposed method of construction including the cement binder to improve the load bearing capacity of the peat will not affect the quality of the water. If this is not forthcoming then this method of construction should be avoided.

It is noted in CIRIA C514. 2000 'Grouting for Ground Engineering' was not part of the applicant research references. This document indicates and outlines the risk assessment and environmental impact assessment of grouting.

It states that

'it is an offence under the Water Resources Act, 1991 to cause or knowingly permit any poisonous, noxious or polluting matter or any solid waste matter to enter any controlled waters. Failure to comply with the above Act may lead to a criminal prosecution. Lacks of

intent or negligence are no defence. In addition, expensive civil law suits may follow if harm is caused to someone else's person or property.
At December 1997 the Environmental Agency had no defined policy on groundwater pollution caused by grouting in the ground.

It also states *that*

'any environmental impact assessment and especially the decision about admissible limits should be based on two largely independent investigations.'

It is inconceivable to think that the applicants 'Mitigation Measures' to prevent the escape of a leachate is done by blocking drains. *Can you imagine on site someone saying, 'there goes the leachate lets block the drain!' Oh hang on, its about to rain!*

Without prejudice, RSK ENSR general notes states that where any data supplied by the client or from other sources have been used it has been assumed that this information is correct. Where field investigations have been carried out these have been restricted to a level of detail required to achieve the stated objectives of the work. There are too many assumptions and restrictions in order to achieve their client's objectives in their response.

I therefore request that the recommendations made in the CIRIA document be adhered too and that two independent investigations be carried out for the grouting proposal. This proposed method of construction should have an approved accredited status for this particular environment.
The attitude of the applicant to block drains is absolutely ridiculous. What happens in the event of heavy rainfall? What happens when grouting occurs below the invert level of the drain?

Based on the current submitted information and without independent verification of the impacts of this proposed method of construction, I request that this application be refused as there are other construction alternatives available including sites the will not require this construction technique.

Further Information Request Volume 1 No 13.
Investigation of the feasibility of only allowing surface water which is actively pumped from the site entering the settlement ponds and ensuring that site drainage during construction is a totally pro-active hydrometric process rather that a semi passive one. (Parameter would involve setting a maximum allowable output flow rate from the site and in the event that this flow rate is exceeded, flooding of the site is the end result, rather that dealing with the risk of overloading of the settlement ponds.)

Observation to Applicants Response
Certainly the surface water runoff to the settlement ponds should be limited to ensure that they perform their intended function. Turbulence in the settlement/silt ponds should be eliminated. A surcharge of water (high flow of water) entering the settlement/silt ponds will cause turbulence and an imbalance in the settlement pond and hence the solids will become suspended in the water.
Remember the applicant has submitted information to show that c. 2.25mm of rainfall caused an increase of flow from 25 l/s to 275 l/s within a couple of hours. This is a very low rainfall event and would occupy almost 1000m^3 in one hour.
An intense rainfall event could be 40-60mm of rainfall in one hour. The specific gravity of the suspended substances will vary and therefore the time taken for them to settle will vary. Any extreme event and its consequences should be accommodated and resolved within the site boundaries.

For this reason the response to this request is insufficient and therefore this application should be refused, as construction methods exist that will prevent this from occurring. Alternatively there are other sites available in less sensitive areas.

Further Information Request Volume 1 No 15.
A data history setting out the hydrological dynamics of the site to date. In particular the relationships between rainfall events, flows in perimeter drains and levels of phosphates and suspended solids.

Observation to Applicants Response
The applicant's response to item No. 15 states that phosphate levels have not been continuously measured even though it has been quoted by the applicant in FI Volume 1; Item 6 page 2 that

"Orthophosphate impact to surface watercourses from phosphate-impacted soils is widely recognised as being a major concern in certain parts of Ireland, because it can lead to eutrophication of lakes and rivers."

I am sure that this part of Ireland is no different!

Also, the applicant has not qualified the type of suspended solids, some solids will settle quicker than others and the settlement ponds must be designed to accommodate the settlement of all types of suspended solids not

just silt alone. Otherwise the chemically rich suspended solids will escape into the streams and rivers and hence into Carrowmore lake.

The complete excavation and operations carried out thereafter to unearth a huge volume of saturated blanket bog in a relatively deep and confined area cannot be compared to work already carried out by Bord na Mona. This work will unleash an abundance of organic material with high concentrations of containments into the water; some of it will remain in suspension for a long time while other materials (roots, timber, heather fibrous material etc.) will float on the surface of the water. Sudden surcharges of rainfall will also affect the settled solids.

The expected surcharge of water flow from only 2.25mm of rainfall is evident. FI request Volume 1: Item 15 Figure 1a shows that a c 2.25mm of rainfall caused a sudden surcharge flow of 275 l/s in drain 22 within a two hour period. This indicates a very quick high flow response arising from a rainfall event, which ultimately can disturb the settled solids.

Further Information Request Volume 1 No 16.
Proposals to deal with the storage of peat on site in the event of adverse weather conditions preventing sufficient de-watering of the peat to allow transportation to the deposition site.

Observation to Applicants Response
Dewatering of blanket bog covered with waterproofing sheeting cannot be compared to the dewatering process usually carried out by Bord Na Mona. The loose powder like material harvested by Bord Na Mona with a high degree of voids allows any moisture to percolate through the milled peat thus allowing it to dry shed water and hence effectively dry.
This will not happen with the windrowed insitu blanket bog, as there are little or not voids in peat hence its low permeability. Furthermore, any waterproofing sheeting will need to be anchored down tight to the peat surface further preventing water drying of the blanket bog.
It is insufficient and impractical to suggest that the windrowed blanket bog will be covered every time it rains. Is the peat going to be covered if a small shower of rain comes along? If its not going to be covered then the water content will increase etc etc. The covers on Bord Na Mona milled peat are usually on for months at a time.

The applicant has now identified that the proposed process of removing the peat is weather dependent.

Therefore, the applicant's response and proposal is insufficient, impractical as it could take many months and even years to remove this peat in order to meet the criteria put forward by the applicant.

It is imperative to remember that the peat will contain in excess of 405,000,000 litres (four hundred and five million litres) of acidic water with high concentrations of phosphorus.
This is not acceptable as the peat contains high levels of chemicals that will undoubtedly escape into the surface water streams and rivers and eventually into Carrowmore lake thus affecting water quality.

It is for these reasons also that I request that this application be refused. There are other sites available that do not require the excavation, removal and high risks that are associated with such large volumes of peat removal.

THIS IS SIMPLY THE WRONG SITE FOR THIS PROJECT.

Appendix 4

Correspondence

Between

Brian Coyle

Mayo County Council

And

Health and Safety Authority

Appendix 4A

Includes correspondence between Brian Coyle and Mayo County Council

Appendix 4B

Includes correspondence between Brian Coyle and Health and Safety Authority

Appendix 4A

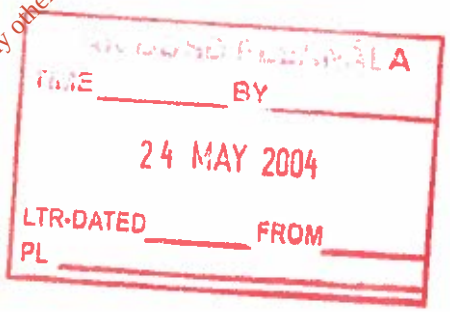
Correspondence

Between

Brian Coyle

And

Mayo County Council



OUR REF: 04-025-040420-01L

20th April 2004

Brian Coyle
Block 1, 2nd Floor
GFSC
Moneenageisha Rd
Galway

Planning Department
Mayo County Council
The Mall
Castlebar
Co. Mayo.

Re: Request for the HSA Report for the proposed Gas Terminal.
Planning Reference Number 03/3343

To Whom It May Concern / Mr. Ian Douglas

This is to notify Mayo County Council that on the morning of the 20th of April 2004, I made a verbal request (by telephone) to Mr. Ian Douglas to view or obtain a copy of the submission/observation documentation prepared by the Health and Safety Authority (National Authority for Occupational Safety and Health) in relation to the proposed Gas Terminal Development referenced under planning number P03 / 3343

During our telephone conversation, Mr. Ian Douglas informed me that this document is not currently available as it is regarded as an internal document and will be available once Mayo County Council has made their decision.

The consequence of this is that the public are unable to view or obtain a copy of this document and therefore their concerns and observations in relation to the HSA submission will not be considered prior to a decision being made by Mayo County Council. Concerned members of the public have also informed me that they have requested a copy of this document but with no avail.

I therefore request Mayo County Council to confirm to me in writing why this document has this status and is not currently available to the public. Any information submitted by the National Authority for Occupational Safety and Health in relation to this development is certainly of public interest and should be made available as soon as possible giving sufficient time for public verification and examination prior to a decision being made by Mayo County Council.

Yours Sincerely,

Brian Coyle BE, CEng, MIEI, MIStructE
Chartered Engineer

BY FAX + POST

COMHAIRLE CHONTAE MHAIGH EO

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

Your Ref. Our Ref.

27th April, 2004

COYLE KE... 26 APR 2004 CONSULTING ENGINEERS

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

RE: HAS Report for the proposed Gas Terminal.

Dear Mr. Coyle,

This letter is to confirm our telephone conversations as epuseld in your letter dated 20th April, 2004. Full consideration will be given the concerns you have expressed.

Yours sincerely,

Iain Douglas,
Senior Planner.

OUR REF: 04-025-040428-01L
YOUR REF:

28th April 2004

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

Iain Douglas
Planning Department,
Mayo County Council,
The Mall,
Castlebar,
Co. Mayo.

Dear Iain,

I have received your letter (Mayo County Council) dated the 27th April 2004. The content of your letter does not address my request as stated in my letter dated 20th April 2004. I attach a copy of my letter that you have already received for your information. My concerns are in relation to the examination and assessment of safety issues. Access to rightful information pertaining to the safety of my family and members of the public has now become time consuming, frustrating and difficult with little time for observation and/or assessment.

I request an appropriate written response to my letter dated 20th April 2004, ref 04-025-040420-01L, mainly indicating why the Health and Safety Report has achieved the status its got.

Yours Sincerely,

Brian Coyle BE, CEng, MIEI, MIStructE
Chartered Engineer

Encl.
B. Coyle Letter 04-025-040420-01L 20th April 2004
Mayo County Council Response dated 27th April 2004

By Fax + Post.

Appendix 4B

Includes correspondence

Between

Brian Coyle

And

Health and Safety Authority

during the

Planning Process

OUR REF: 04-025-040420-02L

20th April 2004

Brian Coyle
Block 1, 2nd Floor
GFSC
Moneenageisha Rd
Galway

Mr. John Colreavy
Health & Safety Authority
10 Hogan Place,
Dublin 2,
Ireland.

Re: Request for the HSA Report for the proposed Gas Terminal.
Planning Reference Number 03/3343

To Whom It May Concern / Mr. John Colreavy

This is to inform the National Authority for Occupational Safety and Health (HSA) that on the morning of the 20th of April 2004, I made a verbal request (by telephone) to Mr. Ian Douglas of Mayo County Council to view or obtain a copy of the submission/observation documentation prepared by the Health and Safety Authority in relation to the proposed Gas Terminal Development in County Mayo referenced under planning number P03 / 3343. Mr. Ian Douglas has confirmed and described the HSA document that Mayo County Council has received from the HSA.

During our telephone conversation, Mr. Ian Douglas informed me that this document is not currently available as it is regarded as an internal document and will be available once Mayo County Council has made their decision.

The consequence of this is that the public are unable to view or obtain a copy of this document and therefore their concerns and observations in relation to the HSA submission will not be considered prior to a decision being made by Mayo County Council. Concerned members of the public have also informed me that they have requested a copy of this document but with no avail.

As the HSA is the National Authority for Occupational Safety and Health, I therefore request to view or obtain a copy of this document immediately from the HSA.
I also request in writing from the HSA that they identify/list all the names and addresses of people, any other authorities / bodies, documents and events (published or otherwise) that has been referenced/consulted in preparation of the recent HSA report. I would expect that all references are included in the content of the report. I also request the HSA to confirm in writing the extent to their investigation and their conclusion, under the terms (Seveso II directive) 'establishment', 'anticipated substances' 'pipelines' 'related infrastructure' etc.

Yours Sincerely

Brian Coyle BE, CEng, MIEI, MIStructE
Chartered Engineer

HEALTH AND SAFETY AUTHORITY

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

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

21st April 2004,

Dear Mr Coyle,

I acknowledge receipt of your " Observations and Objection Report " and your letter of the 20TH April 2004.

I was not aware that the HSA report was not available from Mayo Co.Co. and I have spoken to the Department of the Environment, Heritage and Local Government concerning this issue.

Your request for a copy of the report is under consideration .

Yours sincerely

John Colreavy.
Process Industries Unit

NATIONAL AUTHORITY FOR OCCUPATIONAL SAFETY AND HEALTH
AN tÚDARÁS NÁISIÚNTA UM SHÁBHÁILTEACHT AGUS SLÁINTE CEIRDE

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.

22nd April 2004,

Dear Mr Coyle,
Further to my letter of the 21st April I have been advised that the Authority will need to receive a request either under the Freedom of Information Act or Freedom of Access to Information on the Environment Regulations.

As part of the HSA report contains material supplied by another party, the consent of that party is being sought, pursuant to Regulation 36 of the European Communities (Control of Major Accident Hazards Involving Dangerous Substances) Regulations,2000.

Yours sincerely

John Colreavy.
Process Industries Unit

OUR REF: 04-025-040423-021

23th April 2004

Brian Coyle
Block 1, 2nd Floor
GFSC
Moneenageisha Rd
Galway

Mr. John Colreavy
Health & Safety Authority
10 Hogan Place,
Dublin 2,
Ireland.

Re: Request for the HSA Report for the proposed Gas Terminal.
Planning Reference Number 03/3343

Dear. John

Further to your fax on the 22nd of April and the reference you make in this fax to your letter dated 21st of April (that I currently do not have as it is probably in the post). Obtaining this information through the Freedom of Information Act or Freedom of Access of Information on the Environment Regulations will take considerable time. Mayo County Council will have made their decision, before I get a copy and review the HSA document.

Therefore, can you identify to me in writing the scope and conclusion of the HSA report for this proposed project as soon as possible.

Yours Sincerely

Brian Coyle BE, CEng, MIEI, MIStructE
Chartered Engineer

By Fax + Post

OUR REF: 04-025-040423-02L

23th April 2004

Brian Coyle
Block 1, 2nd Floor
GFSC
Moneenageisha Rd
Galway

Mr. John Colreavy
Health & Safety Authority
10 Hogan Place,
Dublin 2,
Ireland.

Re: Gas Terminal, Co. Mayo
Planning Reference Number 03/3343

Dear. John

I would like to inform you that in a report titled "Decommissioning of the proposed Bellanaboy Bridge Terminal ---John Downey--- Corrib Subsurface Manager" it states that "it is highly probable that any further gas discoveries in the Slyne / Erris Basin would be produced via the proposed Bellanaboy Terminal subject to the receipt of the necessary consents and approvals".
This statement suggests that other gas finds can be processed at this terminal; as other gas finds can/could contain higher concentrations of Hydrogen Sulphide and since this is a very toxic substance and can kill at concentrations even as low as 0.1-0.5% therefore I would like to commission you and/or National Authority of Occupational Safety and Health to examine the consequences of treating sour gas at this proposed terminal site.

We are all too familiar with the failure of pipelines. The proposed high-pressure upstream and down stream pipeline with transport untreated and treated gas respectively through various soil types. Therefore, I would also like to commission you and/or National Authority of Occupational Safety and Health to examine the consequences of such and event. The health and safety of people at work in close proximity to the pipeline should also be considered. The proposed setback distance of 70m is for the safety of the pipeline from surrounding activities and does not include for the safety of the public.

A clear understanding of the terminology used is very important e.g. "Dry Gas" "Wet Gas" "Sweet Gas" and "Sour Gas".

Please outline your proposals, commitment, and fee for this assignment.

Yours Sincerely

Brian Coyle BE, CEng, MIEI, MIStructE
Chartered Engineer

cc Ian Douglas- Mayo County Council

BY FAX + POST

OUR REF 04-025-040428-02L

28th April 2004

Brian Coyle
Block 1, 2nd Floor
GFSC
Moneenageisha Rd
Galway

Mr. John Colreavy
Health & Safety Authority
10 Hogan Place,
Dublin 2,
Ireland.

Re: Gas Terminal, Co. Mayo
Planning Reference Number 03/3343

Dear. John

I await your written response to my letter dated 23rd of April 2004 ref 04-025-040423-02L. The content of this letter indicates that I am in a position to commission you and/or HSA to examine and report on the extremely likely event of upstream and downstream pipeline failure (associated with the proposed gas terminal) as it is passes through deep blanket bog in an area of natural ground instability that can fail at slopes of 2-degrees and above. I also would like you to examine the consequences and related events that can arise from the treatment of gas containing hydrogen sulphide.

Please respond in writing with your proposals, commitment, and fee for this assignment.

Yours Sincerely

Brian Coyle BE, CEng, MIEI, MIStructE
Chartered Engineer

BY FAX + POST

HEALTH AND SAFETY AUTHORITY

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

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

27th April 2004.

Proposed Gas Terminal

Dear Mr Coyle,

I refer to your letter of the 23rd April requesting information on the scope and conclusion of the HSA report to Mayo County Council.

Whilst the application of the European Communities (Control of Major Accident Hazards Involving Dangerous Substances) Regulations preclude the release of much of the information supplied to Mayo County Council except in the context of the Access to Information on the Environment Regulations, it is possible to provide an summary of the key points from the executive summary as follows:

The Authority determined that the risks were at such a level that, according to the land use planning criteria of the Authority for this purpose, it does not advise against the granting of planning permission in relation to this development.

The Authority also makes the following recommendations:

a) Paved areas to be extended to bund walls and arranged so that any accidental releases over bund wall are diverted to the open drains sump
b) Extension of impermeable areas around the slugcatcher such that any potential release is contained.
c) Online Total Organic Carbon monitoring to be installed at silt ponds with provision for automatic re-routing of flow to contaminated firewater pond in event of accidental discharge to system.

d) For the purposes of emergency planning:

arrangements should be made between the applicant and Mayo Co. Co. to provide for traffic control on roads close the terminal in the event of a major incident.

e) For the purpose of control on future development:

Should there be any proposed amendment to the permitted scheme which relates to the control or impact of major accident hazards (as defined by Seveso II Directive) then that amendment shall not proceed until the agreement of the H.S.A. has been obtained.

Also the Authority considered the establishment to be the terminal footprint (area within the security fence where the hazardous substances are processed and stored).

The excavation of peat at Bellanaboy Bridge and its deposition at the Srahmore site are outside the scope of the European Communities (Control of Major Accident Hazards Involving Dangerous Substances) Regulations.

Yours sincerely,

John Colreavy,
Process Industries Unit

Appendix 5

Extract from SI 476/2000

Extract from SI 476/2000

Demonstration of safe operation.

8. (1) This Regulation and Regulations 9 to 11 shall apply to all establishments.

(2) In respect of an establishment to which this Regulation applies, the operator shall, whenever requested by the Central Competent Authority or by an inspector of that Authority, provide or cause to be provided to the Authority or to that person such evidence (including documents) to prove that he has—

(*a*) identified the major accident hazards, and

(*b*) taken all necessary measures to comply with these Regulations.

General duties of operators.

9. (1) In respect of every establishment it shall be the duty of the operator concerned to take all necessary measures—

(*a*) to prevent major accidents occurring, and

(*b*) to limit the consequences of any such major accidents for man and the environment.

(2) Without prejudice to the generality of paragraph (1), the matters in respect of which the necessary measures are to be taken by the operator shall include—

(*a*) the identification of all major accident hazards in the establishment including an assessment of the extent and severity of the consequences of such accidents;

(*b*) the provision and maintenance of installations and systems of work and of the means of entry to and exit from the establishment or any part thereof that are, so far as is reasonably practicable, without risk for man and the environment;

(*c*) the making of arrangements to ensure that the use, handling, storage and transport of dangerous substances in the establishment are, so far as is reasonably practicable, without risk for man and the environment;

(*d*) the provision of such information, instruction, equipment, training and supervision as is necessary to ensure, so far as is reasonably practicable, the occupational safety and health of the persons working in the establishment;

(*e*) the use of the best practicable means—

(i) to prevent a major emission into the environment from any part of the establishment of dangerous substances resulting from uncontrolled developments in that establishment, and

(ii) for rendering harmless and inoffensive such substances as may be so emitted.

(3) An operator of an establishment on being notified in writing by the Central Competent Authority, that the establishment has been identified by the Authority as part of a group of establishments where the likelihood and the possibility or consequences of a major accident may be increased because of the location and the proximity of such establishments, and their inventories of dangerous substances, shall—

(*a*) provide suitable information in an appropriate manner about the establishment to each other establishment in the group to enable them to take account of the nature and extent of the overall hazard of a major accident in their major accident prevention policy documents, safety reports and internal emergency plans,

(*b*) take account in the manner as outlined in sub-paragraph (3)(*a*) of information provided to him by each establishment in the group, and

(*c*) co-operate with those establishments to enable them to carry out any obligations they have under Regulations 15(1), 17(3) and 19(1).

Major accident prevention policy.

10. (1) It shall be the duty of every operator to prepare, or cause to be prepared, a statement in writing which shall set out the manner in which major accidents are to be prevented, which statement shall be known and is herein-after referred to as a "major accident prevention

policy document".

(2) The major accident prevention policy document shall—

(*a*) be designed to guarantee a high level of protection for man and the environment by appropriate means, structures and management systems, and

(*b*) take account of the principles specified in Annex III to the Directive (which is set out in the Second Schedule).

(3) In the event of a modification of the establishment or any part thereof which shall include any modification to an installation, storage facility, process or nature or quantity of dangerous substances, which could have significant repercussions on major accident hazards, the operator shall review and, where necessary revise, the major accident prevention policy document pursuant to compliance with paragraph (2).

(4) An operator shall implement the policy set out in his major accident prevention policy document.

Notification of establishments.

11. (1) Save as otherwise provided in this Regulation, an operator shall at least 6 months, or such shorter period as the Central Competent Authority may agree in writing, before—

(*a*) the start of construction of an establishment,

(*b*) the start of operation of an establishment,

send to the Authority a notification containing the information specified in the Third Schedule.

(2) Notwithstanding paragraph (1) it shall be sufficient compliance with that paragraph if the operator of an existing or other establishment sends the notification required by paragraph (1) to the Central Competent Authority not later than 3 months after the coming into operation of these Regulations.

(3) Paragraph (1)(*b*) shall not require the notification to contain information already contained in the notification sent pursuant to paragraph (1)(*a*), if that information is still valid and accurate.

(4) An operator shall immediately inform the Central Competent Authority in writing in the event of—

(*a*) any significant increase in the quantity, or a significant change in the nature or physical form, of a dangerous substance present, as indicated in the notification provided pursuant to paragraphs (1) or (2), or any change in the processes employing it, or

(*b*) permanent closure of the installation.

(5) Paragraphs (1), (2) and (4) shall not require the notification of any information which has been included in a safety report already submitted to the Central Competent Authority.

(6) An operator shall as soon as practicable after the coming into operation of these Regulations, but in any event not later than 3 months after such date, submit in writing to the planning authority in whose functional area the establishment is situated and to any other planning authority whose functional area may be affected by a major accident at the establishment—

(*a*) confirmation that the establishment is subject to these Regulations, and

(*b*) the details outlined in paragraphs (*a*), (*d*), (*e*), (*g*) and (i) of the Third Schedule.

Appendix 6

Extract from HSA report

3. Quantified Risk Assessment (H.S.A.)

3.1 *Introduction*

The functions of the Authority are set out in appendix 2. One of its many functions relates to the provision of land use planning advice to planning authorities, which is a legal obligation under SI 476 of 2000.
However there are a number of general exclusions contained in the regulations, the most relevant to this proposed development being as follows:

the occurrence outside an establishment of -

- the transport of dangerous substances by road, rail, internal waterways, sea or air,
- associated intermediate temporary storage,
- the transport of dangerous substances in pipelines and pumping stations.

THE SEVESO II DIRECTIVE STATE: the transport of dangerous substances in pipelines and pumpin stations OUTSIDE ESTABLISHMENTS COVERED BY THIS DIRECTIVE

Then there are some activities, not listed as exclusions, which do not come within the scope of the regulations:

- Comparison of potential sites for a proposed establishment
- Activities related to site development /construction

There are aspects specific to this application which are excluded:

- Excavation of Peat at Bellanaboy Bridge site
- Deposition of Peat at the Srahmore Site

The Authority has defined the scope of the analysis as follows

The Establishment:
The establishment is considered to be the terminal (the area within the security fence footprint where the hazardous substances are processed and stored). This decision was taken in respect of the previous planning applications and has been retained following discussions between the Authority and E.U. Commission officials and representatives of the other E.U. member states.

Assessment of Global Stability of Terminal:
The Authority retains no expertise in-house for consideration of this issue in its provision of land-use advice. The stability issues have been addressed in the Environmental Impact Statement (EIS) provided by the applicant for normal conditions. The Authority has requested and received specific information relating to major accident hazards affecting global stability from the applicant. This has been forwarded to Mayo County Council. It is the understanding of the Authority that Mayo County Council have already retained a consultant to advise it in this regard.

Appendix 7

Rivers Fields Sour Gas Field

Located

in

The Irish Sea

East Irish Sea

Milestones

- **Major source of current natural gas production**
- **Millom and Dalton fields are fully developed**
- **Start-up of Rivers fields expected by early 2004**
- **Location offers excellent access to markets**
- **Plays to Burlington's technological expertise**

The East Irish Sea is a major source of current production for Burlington, as well as a source of near-term growth through development of new natural gas fields. Burlington entered the East Irish Sea in 1997 by acquiring 10 licenses covering 267,000 acres, and has 100 percent working interest in seven operated gas fields there. The company invested $128 million in capital here during 2002, primarily in the large Rivers Fields development program. Our East Irish Sea operations report to the International Division's London office.

High production from Millom and Dalton Fields

Burlington produces sweet natural gas from the Millom and Dalton fields from a combination of platform wells and subsea completions. The two fields are located about 25 miles west of Walney Island, Barrow, and are estimated to contain recoverable reserves of more than 300 Bcf. Production began in 1999, with an expected lifespan of 20 years. Net production from the fields doubled during 2001, peaking at 135 MMcfed with the addition of wells in the Millom Field. Those wells illustrate Burlington's advanced drilling technology, with two of them being "trilaterals," meaning that they incorporate three horizontally drilled lateral extensions that offer more thorough exploitation of the Ormskirk Reservoir. Net production from the fields was 97 MMcfed during 2002.

Production approaching from Rivers Fields

A $260-million project to develop natural gas production from the Rivers Fields, a complex of five sour gas fields in the East Irish Sea estimated to contain more than 250 Bcfe of resources, is nearing completion. Production is expected to begin by early 2004 at rates in excess of 100 MMcfed. The complex includes five fields - Calder, Darwen, Crossans, Hodder and Asland - that are all named after rivers. The fields are located between the British mainland and the Isle of Man. The development project includes the recent construction and installation of an unmanned production platform on the Calder Field, with the other fields scheduled for development during 2003 by sub-sea wells tied back to this facility. The gas will flow to a gas terminal currently under construction at Barrow-in-Furness in Cumbria. The facility will include a compressor station and sour gas treatment plant, and will be operated by Centrica plc.

Note reference to Five Sour gas fields.

Appendix 8

Sour Gas Field Location in the Irish Sea

Shown on a

3D Image of the Continental Shelf

That is shared between

European Countries

3D View of Continental Shelf. shared with Ireland and Britain. Note Location of Sour Gas Well in the Irish Sea

Appendix 9

New Mexico Gas Pipeline Explosion

Detailed Report

of the Seismological Society of America, Vol. 93 No. 4.

pp 1427-1432, August 2003

Bulletin of the Seismological Society of America, Vol. 93, No. 4, pp. 1427–1432, August 2003

Seismic Recordings of the Carlsbad, New Mexico, Pipeline Explosion of 19 August 2000

by Keith D. Koper, Terry C. Wallace, and Richard C. Aster

Abstract On 19 August 2000 two seismometer networks in southeastern New Mexico recorded signals from a natural gas pipeline explosion. Analysis of the particle motion, arrival times, and durations of the seismic signals indicates that three impulsive events occurred with origin times of 11:26:18.8 ± 1.9, 11:26:43.6 ± 2.1, and 11:27:01.7 ± 2.0 (UCT). The first event was caused by the explosive blowout of the buried, high-pressure pipeline, and the second event was caused by the ignition of the vented natural gas. The nature of the third event is unclear; however, it was likely created by a secondary ignition. There were also two extended seismic events that originated at the same time as the first two impulsive events. The first resulted from the preignition venting of the gas and lasted for about 24 sec, while the second resulted from the postignition roaring of the flames and lasted for about 1 hr. Many of the source constraints provided by the seismic data were not available from any other investigative technique and thus were valuable to a diverse range of parties including the New Mexico state police, law firms involved in litigation related to the accident, the National Transportation and Safety Board, and the general public.

Introduction

On 19 August 2000 a buried natural gas pipeline in southeastern New Mexico ruptured and exploded. The resulting fire burned for nearly an hour until maintenance workers were able to shut off the flow of gas. The incident was the deadliest pipeline accident in the United States in the last 25 years and resulted in the deaths of 12 nearby campers. Investigations of this tragedy have been performed by the New Mexico state police, the National Transportation Safety Board, and private experts contracted by lawyers representing the victims' estates in a lawsuit against the pipeline operator. The investigations have been significantly influenced by seismic data that were recorded by two nearby seismometer networks. Analysis of the seismic data has helped answer questions related to the fundamental nature of the accident and has affected the amount of legal damages that were awarded to the families of the victims. The seismic data constrain (1) the number of discrete sources, (2) the relative and absolute timing of the sources, and (3) the underlying cause of two of the sources. Some of the timing constraints are unique to the seismic data and are unavailable from other means of investigation, such as witness interviews, records of pipeline pressure from the gas company, observations of rescue personnel, or postaccident crater analysis. In this note we describe the seismic observations, present a basic source model, and comment on the importance of the seismic results in determining the details of the accident.

Specifics of the Pipeline Disaster

At approximately 5:30 a.m. local time on 19 August 2000, fire and rescue personnel from Carlsbad, New Mexico, and surrounding areas were alerted to an explosion near the Pecos River compressor station along the El Paso natural gas pipeline in southeastern New Mexico. The workers were initially able to venture only within about 1.2 km of the blowout because of the intense heat from the burning gas. Analysis of damage to two nearby concrete pads indicate that the temperature was as high as 1150°C. The flames reached a height of 150 m and were visible for tens of kilometers. Maintenance workers for El Paso Energy Corporation had arrived at nearly the same time as the rescue personnel and began shutting off the gas flow at valves upstream of the blowout. By about 6:30 a.m. the fire had died out and rescue workers were able to approach the accident site. It then became clear that an extended family group had been camping in the vicinity of the pipeline during the accident and needed medical attention. Ultimately all 12 of these individuals died from injuries sustained at the scene.

Summary of Seismic Observations

Two seismic networks were deployed in southern New Mexico at the time of the pipeline accident (Fig. 1). One network consisted of three-component, PASSCAL broadband

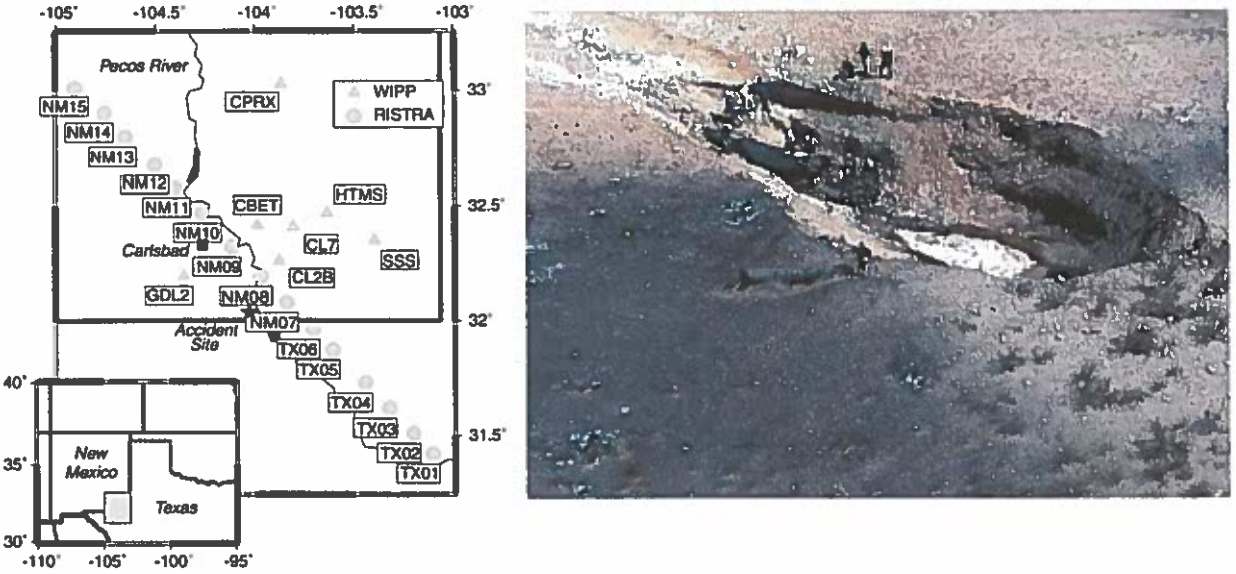


Figure 1. Station geometry for the two seismic networks deployed at the time of the pipeline accident. The WIPP stations, indicated by triangles, are short-period vertical component instruments, while the RISTRA stations, indicated by circles, are broadband, three-component instruments. Two of the stations shown, NM08 and TX04, were not operating properly at the time of the accident. The crater created by the pipeline blowout, shown on the right, was located at 104.0286° W, 32.0378° N.

seismometers that were temporarily deployed as part the Rio Grande Rift Seismic Transect (RISTRA) passive source experiment (Wilson *et al.*, 2002). The other network consists of permanently deployed, short-period, vertical component seismometers that monitor regional seismicity in support of the Waste Isolation Pilot Plant (WIPP) (Sanford *et al.*, 1980). Seismic signals from the pipeline accident were clearly visible at 17 of the sites shown in Figure 1 and were recorded as far away as NM15 (136 km). However, the propagation efficiency was strongly dependent on azimuth, and signals were observed only as far as TX05 (43 km) to the southeast.

The seismograms from broadband station NM09 are presented in Figure 2. Six discrete arrivals are clearly visible, all of which have particle motion that is dominantly retrograde elliptical in the plane of propagation, implying that they are Rayleigh waves. These arrivals naturally break into two groups, consisting of the first and last three arrivals. The first group (A_1, A_2, A_3) has nearly equal amplitude on the radial and vertical components, while the second group (A_4, A_5, A_6) shows much higher amplitude on the vertical. However, the differential arrival times and relative durations among the arrivals in the first group match the corresponding values among the second group exceptionally well. For example, the differential time between the first and second arrivals (A_1 and A_2) is 24.1 sec, while the differential times between the fourth and fifth arrivals (A_4 and A_5) is 24.6 sec. The 0.5-sec difference can easily be accounted for by observational uncertainties in the arrival time picks. Therefore it appears that three discrete seismic sources occurred, each

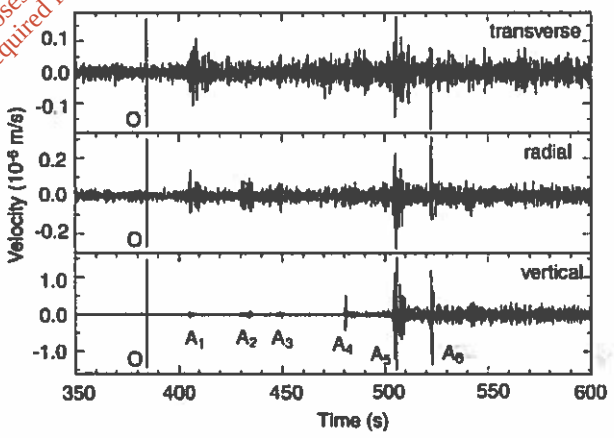


Figure 2. Seismograms of the pipeline accident at station NM09 (Fig. 1). The data have been bandpass filtered from 0.5 to 2.0 Hz using a Butterworth filter. Note that the vertical scales differ among the components. The six primary Rayleigh-wave arrivals are labeled A_1–A_6, and the origin time of the first of the three main sources is labeled with an *O*. This station is 31.4 km away from the accident site.

of which generated two Rayleigh waves propagating at different velocities.

This interpretation is further supported by a record section of the second group of arrivals (Fig. 3). These phases have much higher amplitude than those in the first group and

so are visible at the more distant stations. Precise arrival time picks show that the move-out of each arrival is linear and that the differential times among the arrivals are independent of distance. A linear fit to each set of arrival times gives estimates of the apparent velocity of each phase as well as the absolute origin time of each seismic source (Table 1). The apparent velocity of the phases, about 355 m/sec, is only slightly higher than the expected value for atmospheric wave speed at a temperature of 22°C (345 m/sec). Air-coupled Rayleigh waves are often generated by near-surface explosions and form when the shallow geologic structure has a surface wave phase velocity equivalent to the local atmospheric wave speed (Murphy, 1981; Kitov *et al.*, 1997). The exceptionally large amplitudes of the air-coupled Rayleigh waves are most likely related to a thermal inversion at the time of the accident. This weather condition is especially common in New Mexico valleys during the early morning hours. The relatively cool air near the surface creates a low-velocity zone, which acts as a wave guide for acoustic energy (e.g., Garces *et al.*, 1998). This also explains the azimuthal dependence of the amplitudes, since the Pecos River valley extends to the northwest from the explosion site but not to the southeast.

The first group of Rayleigh waves (A_1, A_2, A_3) is most clearly visible at stations CL2B, NM09, NM10, and CBET. At the closest station, NM07, the waves have not yet emerged as distinct phases and are obscured by diffuse high-frequency energy. At more distant stations, such as NM11 and SSS, the amplitudes have decayed below the ambient noise level. Combining the origin times derived from regressing the air-coupled Rayleigh waves with arrival time picks of the first group of Rayleigh waves gives apparent velocities of 1.7–1.9 km/sec. Solid-earth Rayleigh waves recorded at local distances (R_g) are often generated by explosions and shallow earthquakes with group velocities near 3.0 km/sec (Lay and Wallace, 1995); however, since these phases travel in the uppermost 2–3 km of the crust, they have large regional variations and R_g group velocities below 2.0 km/sec are common (e.g., Kocaoglu and Long, 1993; Goforth and Bonner, 1995; Mackenzie *et al.*, 2001). Hence, our group velocity estimates are consistent with previous R_g observations. Furthermore, the lack of R_g observations at the more distant stations is consistent with the strong attenuation of R_g (e.g., Myers *et al.*, 1999).

A remarkable feature of the seismic data is the extended codalike signal that begins with the second air-coupled Rayleigh wave and continues for approximately 1 hr (Fig. 4). Because of its high frequency content this signal is particularly clear on the unfiltered short-period instruments. On the three-component instruments the signal shows particle motion similar to that of the air-coupled Rayleigh waves but

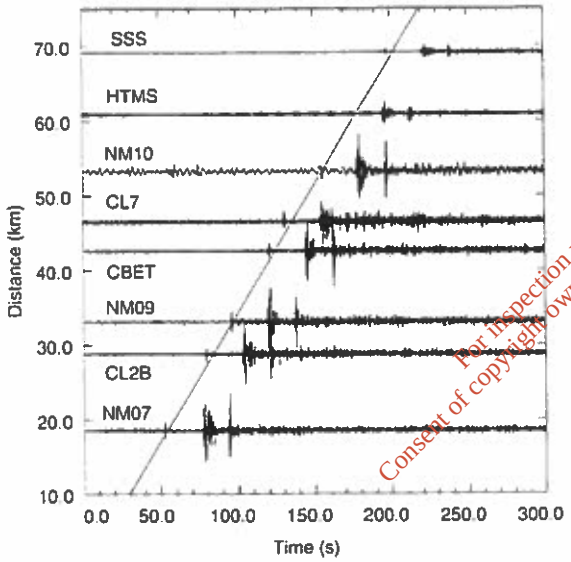


Figure 3. Record section of the seismic data associated with the pipeline accident. All the data have been bandpass filtered at 0.5–3.0 Hz. The zero time is the origin time of the first subevent. The sonic travel-time curve, shown as a solid line, has a velocity of 0.342 km/sec. The move-out and particle motion of the three large impulsive arrivals implies that they are air-coupled Rayleigh waves.

Table 1
Seismic Sources Related to the Pipeline Disaster

Source Number	Origin Time (UCT)	Approximate Duration	Cause
1	11:26:18.8 ± 1.9	1.0 sec	Pipeline blowout
2	11:26:43.6 ± 2.1	3.0 sec	Primary ignition
3	11:27:01.7 ± 2.0	1.0 sec	Secondary ignition (?)
4	Same as 1	24 sec	Venting of gas
5	Same as 2	1 hr	Roaring of flames

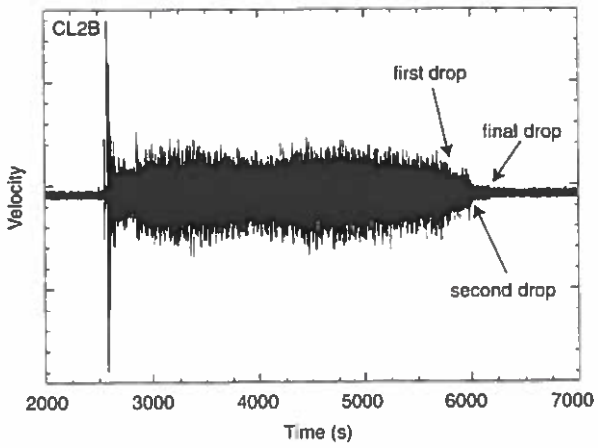


Figure 4. Unfiltered seismogram from the short-period station CL2B. The extended coda was created by the roaring of the flames at the accident site. The amplitude drops occurred as gas valves were successively shut down by maintenance workers.

with less coherence. The signal amplitude shows two distinct reductions after about 53 and 57 min and totally fades into the noise after about 60 min. These times are only accurate to within about 20 sec because of the gradual nature of the amplitude drops. There also appears to be a more subtle, higher-frequency coda between the first two air-coupled Rayleigh-wave arrivals (Fig. 5); however, this feature is visible only at the closer stations.

Nature of the Seismic Sources

The hour-long duration of the extended coda presented in Figure 4 implies that its source was the roaring flames at the accident site. At each station this coda begins at a time indistinguishable from the arrival time of the second air-coupled Rayleigh wave (A_5). Therefore the coda either consists of seismic waves driven by near-receiver loading of the surface by acoustic energy that has traveled through the atmosphere or is itself air-coupled Rayleigh-type energy. At most stations the ground motion after A_2 is similar to the motion between A_1 and A_2, and so the roaring of the flames appears to have generated little near-source seismic energy. The main exception to this comes from the seismogram of the closest broadband station (NM07), which shows diffuse high-frequency energy in the time window of expected R_g arrivals.

It follows that the source responsible for the second set of Rayleigh waves (A_2 and A_5) was the main ignition of the natural gas that had presumably been pooling in the area since the initial blowout of the pipeline. The blowout is likely responsible for the first set of Rayleigh waves (A_1 and A_4). The waveforms of the first set of Rayleigh waves are shorter and simpler than the second set, as is expected for the localized, impulsive blowout source compared to the diffuse, ignition source. The high-frequency coda visible at the closer stations between the first and second air-coupled Rayleigh arrivals would then represent the jetting of gas from the broken pipeline. The source of the third set of Rayleigh waves (A_3 and A_6) is unclear. One possibility is a secondary ignition of gas that remained intact after the primary ignition.

The relative times among the three main impulsive sources can be obtained with higher accuracy than the absolute origin times by averaging the differences in the Rayleigh-wave arrival times from all the stations. This gives 24.04 ± 0.66 sec between the blowout and primary ignition and 17.77 ± 0.68 sec between the primary ignition and the third impulsive source. The delay between blowout and ignition implies that the ignition was unrelated to the blowout process and so, for example, was not caused by the initial rending of the pipeline. The delay may be related to the time it took for the venting gas to reach an ignition source near the campsite.

A likely source for the primary ignition is the campers' vehicles, which were parked about 140 m downstream of the blowout site. If any of the vehicles were idling or if any of the electrical systems were in use, then the natural gas cloud could have ignited. This would imply a minimum velocity of 5–6 m/sec for the escaping gas. This is slightly faster than the nominal flow rate within the pipe of 3–4 m/sec; however, the gas velocity may be expected to increase when encountering the low-pressure atmosphere. A second possibility for the source of the primary ignition is the lanterns of the campers, which were located an additional 30–50 m away from the vehicles in the downstream direction. However, this site was on the banks of the Pecos River, with an elevation about 10 m lower than that near the blowout site, and since natural gas is lighter than air it is not clear that the gas could attain the minimum concentration for combustion (4%–5% by volume) near the lanterns.

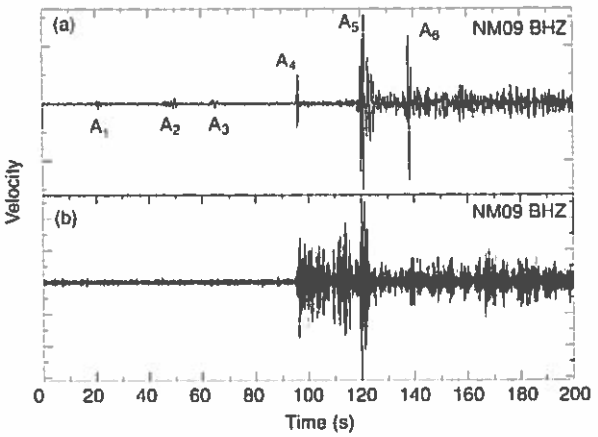


Figure 5. Vertical component seismogram from station NM09 shown (a) bandpass filtered at 0.5–3.0 Hz and (b) highpassed filtered at 3.0 Hz. The zero time is the origin time of the first subevent. The high-frequency coda between A_4 and A_5 is due to the venting of the natural gas.

Energy Release

The blowout of the pipeline was an exceptionally energetic event because of the high pressure (4.6×10^6 Pa) of the natural gas. Three sections of the 0.76-m-diameter pipe were ejected, the largest of which was 8 m long and landed 87 m from the blowout site. The resulting crater was elongated in the direction parallel to the pipeline and measured 34 m (length) by 15 m (width) by 6 m (depth); however, the width decreased with depth in an irregular manner, resulting in an estimated volume of 1180 m^3. Calculations made with a model based on previous chemical explosion data show that it would take approximately 5700 kg of TNT, buried at a depth of 4 m, to create a crater of similar volume in a similar medium (J. K. Ingram, personal comm., 2002). This implies that the energy released during the blowout was approximately 2.4×10^{10} J. However, it is unlikely that the entire crater volume was created during the blowout, and so

the value given above is probably a gross overestimate. We prefer to determine an upper bound based on the overpressure of the natural gas. We estimate a scale volume of 6.75 m^3 based on the fact that a total length of 15 m of pipeline was ejected. Combining this with an overpressure of 4.5×10^6 Pa yields a potential energy of 3.0×10^7 J, about 3 orders of magnitude smaller than the estimate based on crater volume.

An upper bound for the energy release of the primary ignition can be obtained by assuming that the entire volume of gas that had been vented up to that point exploded at one time. We further assume that the venting velocity is approximately equal to the transport velocity (4 m/sec) and that both ends of the pipeline were leaking gas after rupture. Using a cross-sectional area of 0.45 m^2, a time lapse of 24 sec between blowout and ignition, and an energy content of 3.9×10^7 J/m^3 for the natural gas gives an energy release of 3.4×10^9 J, or about 100 times larger than the energy release associated with the blowout.

It is difficult to estimate absolute seismic magnitudes for each event because solid-earth energy is only seen for a few close-in stations and the only distinguishable phase is R_g. A duration-based magnitude scale that has been developed for local events (Sanford *et al.*, 1998) is not appropriate for these data, and we are not aware of any calibrated M_l scale for the region. Nevertheless, if we assume that the peak amplitudes of the R_g waves (A_1 and A_2) can be used as proxies for the amount of energy radiated seismically, then it appears that the two sources were approximately equivalent in the release of seismic energy. This can be reconciled with the 2-orders-of-magnitude difference in total energy release between the two events by recognizing that the seismic efficiency of the buried, impulsive blowout source would be expected to be much larger than that the of diffuse, ignition source occurring in the atmosphere. It is also worthwhile to note that although the first and second R_g arrivals have similar amplitudes, the first air-coupled Rayleigh wave is substantially smaller than the second air-coupled Rayleigh wave. This is again consistent with the model of the first source being buried and the second occurring on the surface within the atmospheric wave guide.

Conclusions

The seismic recordings of the natural gas pipeline accident in southeastern New Mexico provide source constraints that are unavailable from traditional investigative techniques. The seismic analysis reveals that three discrete events occurred and constrains the absolute origin times of these events to within ±2.0 sec. More importantly, the seismic data constrain the first event to be the blowout of the pressurized pipeline and the second event to be the primary ignition of the vented gas and constrain the differential time between these two events be 24.04 ± 0.66 sec. Such a large time between the two events implies that the source of the ignition was not sparking or heat produced by the pipeline rupture but more likely a heat source at the victims' campsite 100–200 m away. This 24-sec time span also bears on the amount of punitive damages the pipeline operator is responsible for, since the victims were in a state of extreme distress during this time period. The seismic data also corroborate gas company records and witness interviews as to precisely when the gas company was able to shut off the flow of gas, thus extinguishing the fire and allowing rescue workers to approach the scene.

In many forensic seismology studies the seismic analysis gives results that are important, but mainly in a corroborative sense (e.g., Byerly, 1946; Holzer *et al.*, 1996; Ichinose *et al.*, 1999; Koper *et al.*, 1999; Kim *et al.*, 2001; Koper *et al.*, 2002). In other instances forensic seismology can provide constraints that are unique with respect to publicly available information and complementary with respect to classified information (e.g., Koper *et al.*, 2001; Gitterman, 2002). In contrast, in the case presented here the seismic constraints are unique with respect to all other sources of data and means of investigation.

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Appendix 10

Explosion & Fires : 1992-2002

Sampling and Incidents

At

Shell Group Companies & Joint Ventures

Explosions & Fires: 1992-2002

Sampling of Incidents at Shell Group Companies & Joint Ventures

21 Jun 92	*Choon Hong III* oil tanker explodes and burns while unloading xylene at the Port Klang, Malaysia oil depot, run by Tiram Kimia, a Shell joint venture. The fire spread onshore and engulfed three nearby storage tanks. Thirteen workers and crewmen were killed, and more than 200 families living in the port vicinity were evacuated. The ship later sank, spilling its cargo into the bay. A lawsuit was filed by the families of the 13 dead workers in October 1994 charging negligence and seeking $13 million in damages from Shell. (the final outcome of that case was unavailable at publication). Shell reported that recommendations from an unidentified investigation were adopted at the terminal, with subsequent activities restricted to non-flammable products and blending. Shell also reported that the depot ceased operations in 1997.[1]
29 Sep 92	fire at Shell's Deer Park, Texas refinery shuts down the plant's 160,000-barrels-a-day crude distillation unit.[2]
March 93	fire at Shell's Pernis, Netherlands refinery shuts down polypropylene plant until June.[3]
1 Apr 93	explosion of a sludge collection storage tank at Shell's Martinez, California refinery sends 8-by-10-foot tank lid into a power line, cutting the area's electricity supply, causing a blackout.[4]
26 Aug 93	fire at Shell's Martinez, California refinery damages a furnace that heats heavy crude oil.[5]
8 Oct 93	explosion and fire at a sulfuric acid storage tank at Shell's Martinez, California refinery sends a giant, red cloud of smoke into the area. No injuries or evacuations reported.[6]
20 Jan 94	fire at Shell's Pernis, Netherlands oil refinery.[7]
27 May 94	a fire at Shell Chemical's Belpre, Ohio plant spreads to a nearby chemical storage tank area, touching off an explosion and ferocious chemical fire, causing four of the big tanks to burn and lose millions of gallons of chemicals. Four workers are killed in the incident and 1,700 people evacuated. The fire burns for about nine hours, and chemical leakage from the site pollutes the Ohio River with a 22-mile plume of ethylene dibromide, killing fish and forcing downstream municipalities to seek alternative water supplies. Shell later agrees to pay OSHA a $3 million dollar fine for federal safety violations and also settles wrongful death lawsuits with the families of the dead workers, making payments in the range of $2.1 to $2.4 million per family.[8]
18 Aug 94	fire and explosion at Shell chemical plant at Norco, Louisiana. In February 1995, the US OSHA issues a $201,600 penalty to Shell in connection with the incident.[9]
13 Jan 95	fire at Shell's Geelong refinery in Australia forces closure of catalytic cracker. The fire broke out in a heat exchange unit.[10]
10 Jun 95	oil well blow-out & fire occur in the El Isba oil field at Shell Syria venture near the desert town of Deiral-Zur, Syria. Five workers are killed in the incident, with the fire continuing to burn for at least ten days. According to reports, the blow-out and fire resulted when oil and gas that had been seeping from fissures around the well since May 3rd – more than a month prior to the blow-out – ignited. A wrongful death suit has been filed by at least one of the families of the dead workers.[11]
1 Dec 95	explosion and fire at Shell Oil tank farm at McCamey, Texas kills two workers and injures three others. Two of the workers were airlifted to the burn unit of the University Medical

*__Note:__ This 1992-2002 listing breaks out separately "explosions & fires"from those covered under all incidents in Appendix A of *Riding the Dragon*, and also includes *additional incidents* not included in the book or its appendix..

Center in Lubbock, Texas — Liberato Martinez, 23, with third-degree burns over his entire body, and Jimmie Jimenez, 23, with second- and third-degree burns over 70 percent of his body. Martinez died that night. Two other injured men, with less severe burns, were taken to McCamey Hospital. Robert Leroy Muncy, 40, was killed at the scene. The workers were performing maintenance work at the time of the accident.[12]

3 Feb 96 explosion at hydrogen unit operated by contractor Air Products at Shell's Martinez, California refinery; workers evacuated, 2 injured, community rattled.

1 April 96 explosion and fire at Shell's Martinez, California refinery, damages two hydro treating units, shakes up local community, and later invokes two violation notices from regional air pollution officials.[13]

3 April 96 fire in the desulfurization unit of Shell's Pernis, Netherlands refinery.[14]

24 Feb 97 fire at the Pilipinas Shell storage depot at Pandacan, near Manila, in the Philippines occurs after a loading hose disconnects from a truck at the LPG bulk filling station, resulting in property damage and lost work days.[15]

22 Jun 97 explosion and fire occur at Shell's Deer Park, Texas chemical plant after a flammable gas leak; blast felt 25 miles away, fire burns for 10 hours. More than 200 emergency responders involved; several workers injured with about 30 receiving medical treatment. A mile-long smoke plume prompts warning to residents from local health officials to stay indoors. Damaged unit inside the plant out of service for more than six months. Nearby residential property also damaged . Joint EPA/OSHA accident investigation report suggests accident was preventable. Shell is subsequently fined by OSHA and EPA for violations and infractions related to the incident.[16]

24 June 97 Shell Offshore, Inc., fined $10,000 by the US Department of the Interior for operational and/or environmental violations. "The gas & fire detection systems were not tested within the required time frames." Fine paid, June 15, 1998.[17]

20 Jul 97 small fire erupts at Shell Oil's 150,000 barrel-a-day refinery in Martinez, California; fire occurs in the refinery's lubricant/asphalt plant.[18]

13 Aug 97 fire in distillation unit shuts down Shell 28,000 barrels-per-day refinery at Odessa, Texas for about one week.[19]

31 Oct 97 flash fire occurs in one of the loading bays at the main fuels terminal of the Pilipinas Shell storage depot at Pandacan, near Manila, in the Philippines – caused by a faulty grounding system.[20]

16 Dec 97 fire at Shell Chemical's Geismar, Louisiana plant disables one of plant's three alcohol units; Shell declares *force majeure* on all alcohols and derivatives; unit shut down for weeks.[21]

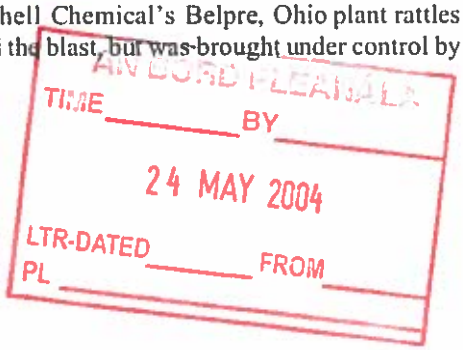
17 Dec 97 electrical fire in 625,000 mt/yr steam cracker unit at Shell Chemical plant at Moerdijk, Netherlands shuts down various petrochemical units at the complex for about a week.[22]

19 May 98 explosion and fire at SAPREF oil refinery in Durban, South Africa due to a failure at the alkylation unit. The explosion is heard several kilometers away and the fire is fought for more than six hours. No injuries were reported at the time, but an estimated five tons of hydrogen fluoride (HF), a highly dangerous substance, were released.[23]

2 Jun 98 storage tank explosion at Shell's Pernis, Netherlands refinery in Rotterdam kills one person, injures another.[24]

15 July 98 Shell Petroleum Development Company pays $258,000 to owners of farmland destroyed by fire caused by a leak in a gas pipeline in Rivers State, Nigeria.[25]

10 Aug 98 hydrogen explosion in a compressor unit at Shell Chemical's Belpre, Ohio plant rattles buildings up to five miles away. A fire followed the blast, but was brought under control by the plant's firefighters within 30 minutes.[26]



14 Aug 98 hydrocracking unit at Shell's Deer Park, Texas oil refinery, shut by a fire the week of August 3rd, is scheduled to be back on line.[27]

27 Aug 98 Environmental Rights Action (ERA) of Nigeria reports pipeline explosion at Well #13 at Shell's Awoba flow station, at Bille, Rivers State, Nigeria. A subsequent fire "set the facility ablaze and the adjacent mangrove forest was inflamed. Several fishing traps and nets around the affected area were burnt." Several people harvesting produce in a nearby mangrove forest were injured in a stampede during the incident.[28]

6 Oct 98 fire occurs at Shell's Berre-L'Etang, France refinery as it is being closed down for a turnaround. A gas oil line fails "due to accelerated naphthenic acid corrosion" and ignites. A kerosene air cooler also fails, adding additional fuel to the fire. A crude unit and a reformer are damaged. Losses are estimated at $22 million.[29]

25 Nov 98 six workers are killed at Equilon refinery near Seattle trying to remove residue from a coking unit; a flaming mass of hot liquid poured out of the unit setting off a huge explosion. State investigators later calculated it would have taken 236 days for the ambient air to cool the drum enough to allow the residue to be removed safely.[30]

25 Dec 98 explosion and fire at Shell's gas-to-liquids plant at Bintulu, Malaysia .[31]

2 Jan 99 US Minerals Management Service reports "small fire" at Shell Offshore, Inc. platform A in block 128 of Garden Banks area in the Gulf of Mexico. Equipment failure is cited as cause; "minor damage" to pipeline pump noted. "...The seals failed, allowing excessive temperature to build up... this ignited the remaining lubricating oil..."[32]

15 Jan 99 US Minerals Management Service reports "minor flash fire" at Shell Offshore, Inc. platform JC in block 176 of Eugene Island area in the Gulf of Mexico. Human error cited as cause. "...A welding operation to repair a hand railing on the top deck was in progress at the same time as a natural gas crane was in use. Slag sparks from the welding operation came into contact with the gas being exhausted from the crane. The crane was shut down and the fire was extinguished. No damage was reported."[33]

6 Feb 99 eight oil workers suffered severe burns after a Shell Oil pipeline explodes in southern Nigeria, state health authorities reported.[34]

7 Feb 99 US Minerals Management Service reports fire, platform damage, and worker injury at Shell Offshore, Inc. platform JA in block 40 of South Marsh Island area in the Gulf of Mexico. Equipment failure & human error cited as cause. Lone platform worker in living quarters is burned and injured after trying to stop liquid escaping from condensate pipe, which ignites, burning the worker and causing him to fall down a 15-foot stairway, sustaining injuries. Automatic emergency shutdown of the platform ensued, but fire continued to burn due to uncontrolled release of hydrocarbons. A pilot flying in the area reported the fire to a nearby Shell facility, and the operator was rescued. Ceramic plungers/pistons #2 and #3 in condensate pump were severely cracked. Condensate gas under 500 psi released uncontrolled to the atmosphere due to an apparent failure of the #1 ceramic plunger/piston in the pump.[35]

23 Feb 99 fire at Motiva refinery in Convent, Louisiana damages & shuts down part of the operation for several months, through May.[36]

4 Mar 99 a mid-afternoon explosion at the polymerization unit at Equilon's Puget Sound refinery in Anacortes, Washington injures five contract workers. Four of the workers were treated at local hospitals and released that evening. One 18-year-old worker was admitted to Island Hospital with head and neck injures and held for observation. "He mainly just remembers being blown through the air," said the mother of the man being held after visiting him in the hospital. "First I heard a boom, and then a big cloud of steam came out and a bunch of debris," recounted Mike Lee, another worker at the scene of the explosion. "Everyone hit

the ground." The polymerization unit was then down for maintenance, and no cause for the explosion was immediately apparent, although the state had begun an investigation.[37]

10 Jun 99 massive fireball and explosion of the Olympic Pipeline near Bellingham, Washington following a gasoline leak of 277,000 gallons kills two ten-year-old boys and another young man. The pipeline, jointly operated by Equilon, ARCO and GATX, was found to have anomalies in the section that ruptured, requiring certain actions that did not occur. In May 2002, EPA and the US Department of Justice filed a civil suit against Shell and Olympic, alleging gross negligence and seeking civil fines of $18.6 million against each company. The complaint charges that the pipeline rupture was caused by gross negligence in the operation and maintenance of the pipeline.[38]

12 Aug 99 fire reported at Motiva's refinery in Convent, Louisiana.[39]

24 Aug 99 small fire near the hydrogen unit at Equilon Enterprises' refinery in Bakersfield, California forces reduced runs to the hydrocracker.[40]

17 Sep 99 leaking oil from the Ugehelli-Rapele pipeline at Ekakpamre, Urhobo in Delta State, Nigeria, owned by the Shell Petroleum Development Company of Nigeria (SPDC), catches fire. The fire burns for a reported three days over several kilometers of farmland and wetlands, burning up boats, fishing nets, and forests according to some accounts. Among the communities affected are Ekakpamre, Ighwrekreka, Ughevwughe, Ekrejegbe, and Otor-Edo. Local officials from four of the villages later call the incident "one of the worst environmental disasters to happen in Urhobo country in 40 years of oil exploration." At an October 2, 1999 press conference these local officials reject claims that sabotage caused the spill and fire. They call for an independent inquiry and compensation to the affected communities.[41] According to SPDC, an immediate investigation of the incident by a joint team, including representatives of the affected communities, concluded that the pipeline had been blown up with explosives placed beneath it. SPDC says it has tried to clean up the site, but is being denied access.[42]

24 Mar 00 fire and two explosions at Shell's Godorf oil refinery in Cologne, Germany – the country's fourth-largest – causes more than $5 million in losses, cutting production by half. The fire started at one of two crude oil distillation stations where a heated oil product leaked, ignited, and set off a small explosion, then a second, larger explosion fed by several tons of oil. About 120 firemen fought the blaze for about three hours. A bilious cloud of smoke rose 1,000 feet into air at the scene, and over a nearby autobahn, which was closed for several hours. No injuries were reported. A small "controlled" fire was allowed to continue burning at the site to consume remaining oil that escaped during the incident. Some people at a nearby shopping center and residents close to the plant complained of irritated eyes and breathing difficulties, although state experts said no dangerous pollution occurred. Water used to fight the blaze was being contained and would be treated before it was released to the nearby Rhine River, according to refinery officials. Shell reported that removal of damaged parts of the crude distiller had begun in mid-April 2000, with new equipment slated to arrive through June, with the unit expected to be shut down for many weeks ahead.[43]

27 Apr 00 hundreds of residents living in a Brunei Shell company housing complex near the oilfield town of Seria, Brunei, are forced to abandon their homes following an explosion at one of the company's gas pipelines. The explosion destroys two homes and damages at least two others. "It was truly a miracle," reported one resident. "The occupants of the two affected houses were out at work when the blast occurred. Luckily, there were also no children playing near the area or vehicles passing by when the incident occurred. . . ." The cause of the explosion was later found to be a corroded pipeline.[44]

18 Aug 00 explosion at Motiva's Convent, Louisiana refinery injures nine workers; two treated at the scene with seven others taken to area hospitals, including one transported to the burn unit at Baton Rouge General Hospital. Some evacuation was also reported.[45]

26 Oct 00 fire starts in storage tank being demolished at Shell's Deer Park, Texas refinery. The burning tank – which held naphtha, a gasoline component – produced heavy black smoke in the area, prompting the temporary closure of the Harris County Toll road.[46]

January 01 the Shell/BP joint venture South Africa Petroleum Refinery (SAPREF) in Durban, South Africa has two refinery fires in January – one in early January in the refinery's bitumen blending area, and another on January 23rd at the refinery's No. 2 crude distillation unit.[47]

23 May 01 gas explosion at the partially Shell-owned (46%) Gorm oilfield in North Sea injures two workers. Rig is a Danish Underground Consortium facility operated by Danish oil and shipping group A.P. Moeller (39%), also partially owned by Texaco (15%). Oil and gas production at the 46,900 bpd operation was suspended following the accident, which occurred just prior to midnight. No oil pollution was reported.[48]

6 Jun 01 a Shell pipeline, which passes through the community of Baraale in Rivers State, Nigeria, spills crude oil into the community, forests, and on farmland. According to an Environmental Rights Action field report, local officials reported the leak to Shell and local police, but they were told the community should suffer because the lines were cut by saboteurs. Several months later, in October, the leaking oil caught fire. Again, local officials reported the fire to Shell officials, and they were again told they should pay the consequences of their actions. The fire continued to burn at least though January 2002. Burnt-over farmland is ruined, soot has contaminated drinking water, and some local residents fell ill from thick pall of smoke that hung over the area.[49]

17 July 01 a large aboveground storage tank holding spent sulfuric acid at Motiva's Delaware City, Delaware refinery explodes, killing one worker and injuring eight other workers. A fire followed. The tank, which had lifted off its foundation pad in the explosion, also collapsed, releasing more than 600,000 gallons of acid, some into a large bermed area which was later breached, with acid also reaching storm sewers polluting the nearby Delaware River, and killing thousands of fish and hundreds of crab. One week after the accident, Motiva admitted the collapsed tank had a history of leaks and corrosion and was overdue for an inspection. One plant worker had labeled the tank unsafe three weeks before the accident, and a company inspector had called for an immediate shutdown on June 26th. In January 2002, US OSHA recommended a $259,000 fine, citing Motiva for three "willful" and seven "serious" violations. In July 2002, the US EPA and the Delaware Department of Natural Resources and Environmental Control (DNREC), sued Motiva, accusing the company of gross negligence, seeking penalties that could exceed $50 million. In August 2002, the US Chemical Safety and Hazard Investigation Board (CSB) charged that the accident occurred because of neglected warnings, slipshod equipment changes, and chronic, unrepaired corrosion and leaks in the 415,000-gallon storage tank. "Had any one of these elements been handled more effectively," said CSB chairwoman, Carolyn W. Merritt, "this accident probably would not have occurred."[50]

7 Aug 01 well blow-out and fire occur at the Zauliyah-16 well in Oman, 120 km northwest of Haima. Well is operated by Petroleum Development Oman, a 34%-owned Shell company. Fire continued to burn for at least 12 days, through August 16th.[51]

23 Sept 01 fire at Shell's Pernis, Netherlands refinery shuts down two hydro desulfurization units curtailing production of low-sulfur diesel and gasoil at the refinery for at least two weeks.[52]

22 Jan 02 "contained explosion" and fire in sulfur removal unit at Motiva's Delaware City, Delaware refinery sends thick plume of black smoke into area. One worker reported scrambling away from flames on hands and knees to activate firefighting systems. Gas reportedly ignited in the heater structure of the unit, followed by a fire that burned for an hour and half, shutting down one part of the refinery. A state fire marshal ruled the fire accidental, but the Department of Natural Resources and Environmental Control was conducting a review of the incident.[53]

12 Feb 02 an explosion and flash fire at Shell Chemical Co.'s Geismar, Louisiana plant kills one worker and injures another during maintenance and cleaning. Gregory Gibson, 40, died of injuries at the Gonzales Hospital following the incident. He had worked at the plant for four years. At the time, Shell and the Louisiana State Police were investigating the incident.[54]

3 April 02 fire at Shell's Deer Park, Texas plant burns for five hours after an out-of-service crude oil storage tank being cleaned caught fire; no injuries reported.

13 May 02 fire at Shell's Deer Park, Texas chemical plant, in olefins-3 unit sends large plumes of smoke into area, forcing nearby roads, including Texas Highway 225, to be shut temporarily; residents of Pasadena and Deer Park ordered to shelter-in-place.[55]

24 July 02 fire at the hydrotreater unit of Motiva's Port Arthur, Texas refinery shuts unit down for a few days. In August, unit is taken down for early maintenance & repairs.[56]

18 Aug 02 storage tank containing 30,000 bbls of residual fuel oil explodes at Houston Fuel Oil Terminal Co., a 50%-owned Shell joint venture specializing in oil handling and storage in Houston, Texas. The explosion and fire produced a dark, billowing cloud of soot and smoke that rose more than a mile into the air. It took five hours and 20 fire and foam trucks to extinguish the blaze. About a dozen workers were evacuated from the site during the fire. Although the tank did not collapse, the roof caved in. "We were very fortunate there were no injuries to our people and that we were able to quickly isolate the fire to one tank," said Willis Rossler, CEO of the company. There were about 80 other tanks in the area, located along the Houston Ship Channel, which was shut down for a few hours during the blaze. The cause of the explosion was believed to be a failed joint on a pipe supplying the tank. Property damage was estimated in the "millions of dollars."[57]

1 Sept 02 explosion of storage tank – a sulfur pressure vessel – occurs at the Shell/BP South Africa Petroleum Refinery (SAPREF) in Durban, South Africa.[58]

Compiled by Jack Doyle for the Environmental Health Fund, November 2002. The incidents listed above are taken from the available public record, government reports, court records, company documents, and third-party reports. It is not a complete and comprehensive listing of all such incidents at Shell companies and joint ventures for the indicated period, or their resolution in every instance. Sources cited are believed to be reliable and accurate.

Endnotes - Addenda #1 - *Explosions & Fires*

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Appendix 11

Discrepancy

in the application of

SI 476/2000 Regulations

And

Council Directive 96/82/EC

on the

Control of Major Accident Hazards

Letter To Ms. Mary Harney TD

Our Ref : 04-025-040506-01L

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12th May 2004

Ms. Mary Harney T.D
Department for Enterprise Trade and Employment
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RE Discrepancy in the application of SI 476/2000 Regulations and Council Directive 96/82/EC on the Control of Major Accident Hazards.

Dear Mary,

I have noted a discrepancy in the application of both SI 476/2000 Regulations and Council Directive 96/82/EC and would like you or your department to confirm to me in writing which document is ultimately effective. You implemented regulation SI 476/2000 on the 21st of December 2000.

The discrepancy is noted in SI 476/2000 regulation 4 (2) (v)
It states that *These Regulations shall not apply to*— (v) *the transport of dangerous substances in pipelines and pumping stations,*

Council Directive 96/82/EC (Seveso II European Directive)
States in Article 4 'Exclusions' that the directive shall not apply to (d) the transport of dangerous substances in pipelines, including pumping stations, ***outside establishments covered by this Directive***

The statement 'outside establishments covered by this Directive' is omitted, in SI 476/2000. However, as stated in the explanatory notes at the end of SI 476/2000 the purpose of such document is to implement Council Directive 96/82/EC and therefore I conclude that it doesn't replace Council Directive 96/82/EC and that the content of Council Directive 96/82/EC is ultimately what should be referenced, used and applied.

Such an omission means, as a nation we are misinterpreting and therefore not correctly implementing Council Directive 96/82/EC. Therefore we are exposing the public and the environment to a far greater risk, than that currently recognised under the EU Directive. The transmission of dangerous substances through pipelines has a potential to produce major accidents.

The aim of the Seveso II directive (96/82/EC) is '*for the prevention of major accidents which involve dangerous substances, and the limitation of their consequences for man and the*

- The applicant has failed to identify how they intend to adequately support the pipelines in blanket bog that can fail at two-degrees and above. An independent engineering report commissioned by Mayo County Council (local planning authority) also notes this fact.

- The proposed site for this gas terminal is one of the worst sites in North Mayo for building on, due to the depth, volume and surrounding blanket bog.

- The development of this site will involve the removal of c.450,000 cubic meters of saturated blanket bog that will contain c 405,000,000 (405 million) litres of acidic water. This peat will be taken from a site located to the North of Carrowmore Lake and deposited at a site located to the South of Carrowmore Lake. Bord Na Mona has not provided any evidence where they have removed and deposited such a large volume of peat before so close to a major water supply. The milling and harvesting of peat usually carried out by Bord Na Mona involves the removal of the top 10-15mm (c. half an inch) of dust like particles this does not compare to the proposed works.

- The applicant, HSA or Mayo County Council has not provided any evidence or planning conditions as to how the operator must/should prevent the loss of life or ground water contamination in the event of a major accident, either at the terminal or along the pipeline or how it is intended to limit the domino effect arising from a major accident.

Coupled with all of the above, the Health and Safety Authority (Ireland) has refused to examine and report on possible events that can lead to major accidents e.g. pipeline failure, slope stability failure of blanket bog that can impact the terminal and pipeline, anticipated substances that can be present in untreated gas (e.g. Hydrogen Sulphide, etc.- this substance has be found in untreated gas in the Irish Sea. A gas well blowout containing this substance affected 25sq miles in China in December 2003- the area affected was reported as a death zone following the disaster)

The Health and Safety Authority considered the term 'establishment' to be the terminal footprint (area within the security fence where hazardous substances are processed and stored). The Seveso II directive defines establishment as '*the whole area under the control of an operator where dangerous substances are present in one or more installations, including common or related infrastructures or activities.*
It is clear from this that the HSA has determined their own definition for the term 'establishment', that has limited their assessment, analysis and advice. The Health and Safety Authority has refused to examine the consequences of a pipeline or slope stability failure.

The operator has been given specific control to an area of land in which the pipeline passes through and the operator also controls the flow in that pipeline. Irrespectively, the HSA will not consider the safety of the public from this pipeline. Design standards for pipelines quotes set-back distances from pipelines for the safety of the pipeline from third party activities and not for the safety of the public from that pipeline. Published documented reports of a pipeline explosion, operating at approximately one-third the pressure of this upstream pipeline, killed people that was as close as 200m from the pipeline explosion. The proposed route for the upstream pipeline for the Corrib gas field will be as close as 60m from existing dwellings.

I made an observation to Mayo County Council with regard to the stability of the pipeline in peat. Mayo Councy council identified this on their further information request to the applicant. The applicant has failed to provide details that will guarantee the stability and hence the safety of the pipeline in the surrounding landscape (blanket bog). The Health and Safety Authority have refused to examine the safety of the public from the pipeline.

environment, with a view to ensure high levels of protection throughout the community in a consistent and effective manner.'

Article 8 of the EU directive 'Domino Effect' states

Member states shall ensure that the competent authority, using the information received from the operators in compliance with article 6 and 9, identifies establishments or groups of establishments where the likelihood and the possibility or consequences of a major accident may be increased because of the location and the proximity of such establishment, and their inventories of dangerous substances'

Article 12 of the directive 'Land-use planning' states

'that 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, areas of public use and areas of particular natural sensitivity or interest...'

This leads me to the proposed site chosen for the Corrib Gas Terminal in North Mayo which has the potential to create a domino effect based on the site characterises and surroundings. The site chosen has not changed irrespective of the implementation of the EU directive in December 2000 and following the landslides that occurred in this area in 1983 and 2003.

- The site is surrounded in blanket bog in an area of natural ground instability. This can ultimately have an impact on the pipeline and terminal.
- The applicants design team has advised that peat slopes (blanket bog etc) can fail at angles of two-degrees and above.
- The site is surrounded with forestry and bog heather that can ignite in the expected periods of prolonged dry weather as climate changes are expected to become more severe. It is even proposed to plant more trees to minimise the visual impact of the terminal.
- The proposed site is located on the catchment area of a major drinking water supply (Carrowmore Lake) for the entire North Mayo area.
- Streams and rivers run adjacent to the site that discharge to Carrowmore Lake. If Carrowmore Lake become contaminated the impact to the public and environment will be widespread affecting communities 25-miles away from the terminal (Domino Effect).
- An existing established village is directly across the road from the proposed gas terminal development.
- The high-pressure upstream pipeline (c1500 tonnes/square meter pressure) travels approx. 8km inland through blanket bog along an established village and as close as 60m to dwellings. The Health and Safety Authority will not consider the safety of the people from this pipeline. They state its not part of their remit due to the interpretation of SI 476/2000 that implements Seveso II EU Directive. I have written to Mr. John Colreavy of the HSA and told him that I was personally prepared to commission the HSA to examine the effects and consequences of a pipeline failure. I did not receive any response or acknowledgement of my letter.

There are other alternative sites available in this locality that do not pose such a consequential risk, and therefore in the event of an accident these sites in comparison, limit the consequence to the public and the environment, such is the aim of the Seveso II directive. These sites do not require the removal of such large quantities of peat; they are not surrounded with trees, and are outside the catchment area of a major drinking water supply.

The safety of the public and protection of a major water supply in the event of a major accident should be of utmost important to us all. It is not comforting to think that our national authority responsible for the Health and Safety of the public will not consider the consequences of pipeline failure, peat slope failure and the transportation and treatment of gas containing hydrogen sulphide as they feel its not part of their remit.

An independent safety audit of the entire proposed gas terminal development (for the Corrib gas field) surrounded with blanket bog and trees, in an area of natural ground instability and within the catchment area of the only major water supply for the entire North Mayo area should now be carried out. Usually, the safety implications of documents become more rather than less stringent as more and more events occur.

I would be grateful if you or your department would clarify the discrepancy noted in this letter and identify the correct wording/document to reference, use and apply for the control of major accidents in Ireland. The implementation of the EU Directive 96/83/EC (Seveso II), in Ireland has resulted in the misinterpretation and incorrect application of a document that is intended to prevent and limit the consequences of a major accident. SI 476/2000 forms a relaxation rather than a more stringent safety requirement for such events.

Interpretations and applications of published documents responsible for the prevention and limitation of major accidents should be on the side of caution rather than relaxation.
Government policy to develop and extract our natural resources can still be achieved in an environment that will limit the consequence and domino effect of a major accident.

Yours Sincerely

Brian Coyle BE, CEng, MIEI, MIStructE
Chartered Engineer
cc Ms. Siobhan Duffy- European Commission Representation in Ireland

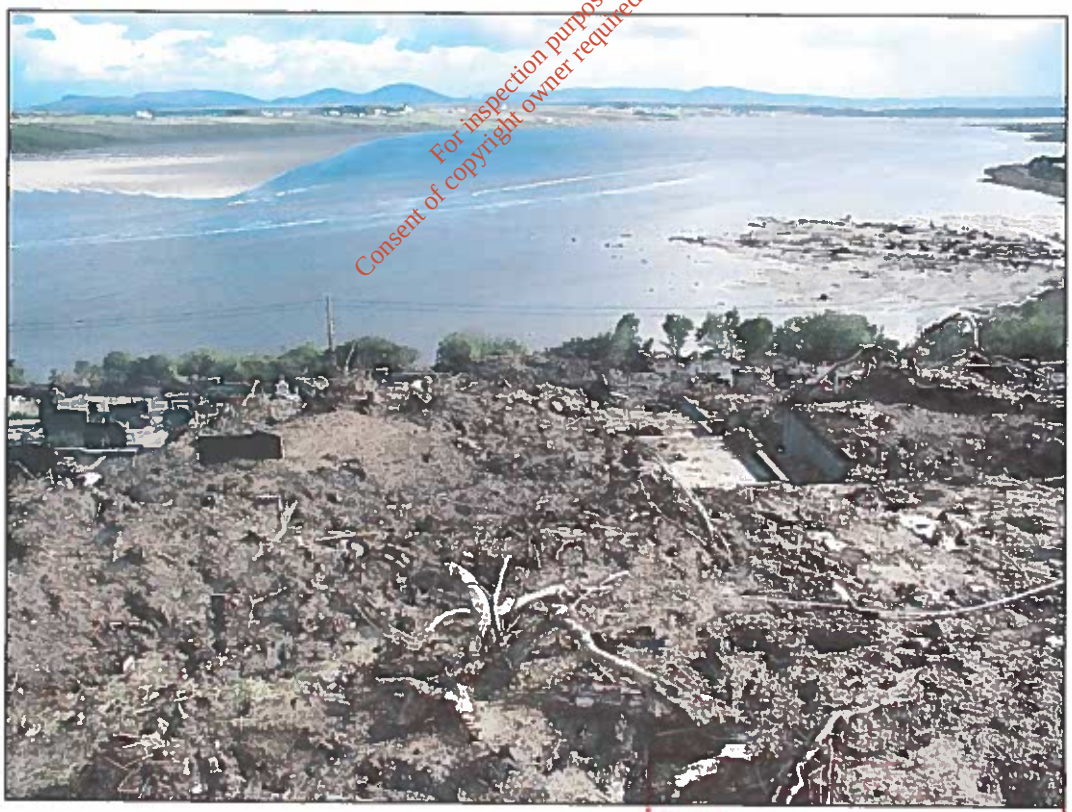
Appendix 12

Larger Scale Pictures Used in the Report

Picture of Landslide of Dooncarton Hill, Co. Mayo

Pictures of North Face of Dooncarton Hill Landslide, Co. Mayo Directly above the High pressure landfall for Corrib Gas Field

Note access road blocked in the event of a landslide.



Pictures of Dooncarton Hill Landslide

Recent Events of Pipeline Explosions

Pictures from theGas Pipeline Explosion in New Mexico. Note the size of the People Standing around the Crater