



Orla Ryan

From: Michael Hanrahan
Sent: 20 June 2012 14:20
To: Orla Ryan
Subject: FW: Earthquake recorded off coast of Mayo
Importance: High
Attachments: mayo_earthquake_geology_noblock.jpg

From: Michael Hanrahan
Sent: 06 June 2012 10:27
To: Noel Murphy
Subject: Earthquake recorded off coast of Mayo
Importance: High

Noel

I just received a call from Gerry Stanley (GSI) to say that he has received a query from Midwest Radio regarding an earthquake that was recorded off the Mayo coast. According to the BGS http://www.earthquakes.bgs.ac.uk/earthquakes/recent_uk_events.html, a magnitude 4 earthquake was recorded to have occurred at 07:58 this morning at a depth of 15km at the following location 54.169 deg N, 10.920deg west (approx 55km west of Belmullet) – see attached map that I have asked Oonagh to prepare. Given its depth, this is a natural event and would not be related to any onshore Corrib works (currently hydro testing pipeline) or offshore activities (seismic survey). Interestingly, its location is coincident with Slyne Basin bounding fault.

Nonetheless, we can expect to receive queries about any relation to Corrib activities.
Mick

Orla Ryan

From: Michael Hanrahan
Sent: 20 June 2012 14:14
To: Orla Ryan
Subject: FW: Please see below from Press office - no doubt either Ciaran or Jim will be on to you

From: Gerry Stanley
Sent: 06 June 2012 11:08
To: Michael Hanrahan
Subject: Please see below from Press office - no doubt either Ciaran or Jim will be on to you

Hi Gerry/Koen/Ciaran/Jim,

Following on from our discussion this morning with GSI regarding a query from The Ray Darcy Show re news of a possible earthquake off the West Coast, we have now received an urgent query from [REDACTED]. She is looking for a comment re (1) the location of the earthquake (2) whether it is indeed an earthquake or (3) an earthquake caused by the 3D Seismic activity at Corrib. We would be grateful for a response as a matter of urgency.

Mid West Radio (Paula Donnellan) has also phoned requesting information.

Thanks,

Gerry Stanley PGeo
Head, Minerals Programme
Geological Survey of Ireland
Beggars Bush
Haddington Road
Ballsbridge
Dublin 4
Tel. + 353 1 678 2863
Fax + 353 1 678 2589
e-mail. gerry.stanley@gsi.ie

Please see the latest GSI newsletter

<http://www.gsi.ie/Newsletters/Introduction.htm>

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Orla Ryan

From: Jim Whelan
Sent: 06 June 2012 11:11
To: Orla Ryan
Subject: FW: URGENT - Earthquake off West Coast - Irish Times looking for comment

Jim Whelan
Petroleum Affairs Division
01 6782691

-----Original Message-----

From: Koen Verbruggen
Sent: 06 June 2012 11:05
To: Press Office DCENR; Gerry Stanley; Ciarán Ó hÓbáin; Jim Whelan
Cc: Mary Carter; Simon Nugent; Fergus O'Dowd; Aine McHugh; Ray Scanlon
Subject: RE: URGENT - Earthquake off West Coast - Irish Times looking for comment

Clodagh

BGS website indicates , time location, depth in kilometres below surface, and strength (4.0) as follows

07:58:13.9 54.151 -10.904 3 4.0 3 WEST COAST OF IRELAND

See http://www.earthquakes.bgs.ac.uk/earthquakes/recent_uk_events.html

A quake of this magnitude at this depth is not very unusual although not common but definitely natural

Regards

Koen

-----Original Message-----

From: Press Office DCENR
Sent: Wed 06/06/2012 11:02
To: Gerry Stanley; Koen Verbruggen; Ciarán Ó hÓbáin; Jim Whelan
Cc: Mary Carter; Simon Nugent; Fergus O'Dowd; Aine McHugh
Subject: URGENT - Earthquake off West Coast - Irish Times looking for comment

Hi Gerry/Koen/Ciaran/Jim,

Following on from our discussion this morning with GSI regarding a query from [REDACTED] re news of a possible earthquake off the West Coast, we have now received an urgent query from [REDACTED]. She is looking for a comment re (1) the location of the earthquake (2) whether it is indeed an earthquake or (3) an earthquake caused by the 3D Seismic activity at Corrib. We would be grateful for a response as a matter of urgency.

[REDACTED] has also phoned requesting information.

Thanks,

Clodagh O'Connor

Press Office

Department of Communications, Energy and Natural Resources

29-31 Adelaide Road

Dublin 2

+3531 6782418

press.office@dcenr.gov.ie

www.dcenr.gov.ie <<http://www.dcenr.gov.ie/>>

(4)

Orla Ryan

From: Jim Whelan
Sent: 06 June 2012 12:02
To: Orla Ryan
Subject: FW: Earthquake off the west coast

Jim Whelan
Petroleum Affairs Division
01 6782691

From: Michael Manley
Sent: 06 June 2012 11:57
To: Koen Verbruggen; Taly Hunter Williams; Ciarán Ó hÓbáin; Jim Whelan; Noel Murphy
Subject: Fw: Earthquake off the west coast

See message following - any update from SEPIL or anyone else on Corrib

From: Gerry Stanley
To: Michael Manley
Sent: Wed Jun 06 11:52:52 2012
Subject: RE: Earthquake off the west coast

Michael,

It was a relatively high magnitude earthquake for Ireland. There are unconfirmed reports of damage to some buildings in the west – apparently a school has a cack in one of its walls. The quake was felt in Mayo, Sligo and Galway (so far). My phone hasn't stopped ringing this morning. [REDACTED] have been on several times looking for an interview. I have been in touch with the Press Office, PAD [REDACTED] as been on asking about a Corrib link – apparently there was a seismic survey taking place somewhere in the vicinity last week.

The tsunami risk has past (if there ever was one).

Shall I give interviews to the radio stations?

Sorry to be so short.

Regards,

Gerry

From: Michael Manley
Sent: 06 June 2012 11:32
To: Gerry Stanley
Subject: Re: Earthquake off the west coast

Can't open link - is it bad? Does it raise any issue for Corrib

From: Gerry Stanley
To: Michael Manley; Everyone in GSI; Eibhlin Doyle; Wayne Cox; Brian Loughlin
Sent: Wed Jun 06 11:19:51 2012
Subject: Earthquake off the west coast

Please see the summary information form the BGS website for the earthquake this morning off the west coast.

Gerry

Summary

DATE	06/06/2012
ORIGIN TIME	07:58:13.9 UTC
LOCATION	54.151 -10.904
DEPTH	3 km
MAGNITUDE	4.0
LOCALITY	WEST COAST OF IRELAND
OFF W COAST OF IRELAND	

Location is approximately 60km west of Belmullet, County Mayo. Felt in the Counties of Mayo, Sligo and Galway.

Gerry Stanley PGeo
Head, Minerals Programme
Geological Survey of Ireland
Beggars Bush
Haddington Road
Ballsbridge
Dublin 4
Tel. + 353 1 678 2863
Fax + 353 1 678 2589
e-mail. gerry.stanley@gsi.ie

Please see the latest GSI newsletter

<http://www.gsi.ie/Newsletters/Introduction.htm>

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Orla Ryan

From: Michael Manley
Sent: 06 June 2012 12:09
To: Orla Ryan
Subject: Re: Corrib
Text

From: Orla Ryan
To: Michael Manley
Sent: Wed Jun 06 12:07:20 2012
Subject: RE: Corrib

Michael – on phone with Agnes – will call you in a minute.

Orla

From: Michael Manley
Sent: 06 June 2012 12:05
To: Orla Ryan
Subject: Re: Corrib

Can't contact you, but is there any update from Corrib in light of earthquake this morning + have only been able to send messages to Ciaran and Jim

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Orla Ryan

From: Jim Whelan
Sent: 06 June 2012 12:15
To: Orla Ryan
Subject: FW: URGENT - Earthquake off West Coast - Irish Times looking for comment

Jim Whelan
Petroleum Affairs Division
01 6782691

-----Original Message-----

From: Press Office DCENR
Sent: 06 June 2012 12:06
To: Koen Verbruggen; Ciarán Ó hÓbáin; Jim Whelan; Gerry Stanley
Cc: Mary Carter; Simon Nugent; Fergus O'Dowd; Aine McHugh; Ray Scanlon; Press Office DCENR
Subject: RE: URGENT - Earthquake off West Coast - [REDACTED] looking for comment

Koen / Ciaran

[REDACTED] has come back with a follow on question -

Could you confirm the location of the seismic work being undertaken by SEPIL and whether this was connected to the earthquake...?

If you could assist please, thanks!

Regards
Jade

-----Original Message-----

From: Koen Verbruggen
Sent: 06 June 2012 11:05
To: Press Office DCENR; Gerry Stanley; Ciarán Ó hÓbáin; Jim Whelan
Cc: Mary Carter; Simon Nugent; Fergus O'Dowd; Aine McHugh; Ray Scanlon
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Clodagh

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A quake of this magnitude at this depth is not very unusual although not common but definitely natural

Regards

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Sent: Wed 06/06/2012 11:02
To: Gerry Stanley; Koen Verbruggen; Ciarán Ó hÓbáin; Jim Whelan
Cc: Mary Carter; Simon Nugent; Fergus O'Dowd; Aine McHugh
Subject: URGENT - Earthquake off West Coast - Irish Times looking for comment

Hi Gerry/Koen/Ciaran/Jim,

Following on from our discussion this morning with GSI regarding a query from The Ray Darcy Show re news of a possible earthquake off the West Coast, we have now received an urgent query from Lorna Siggins, Irish Times. She is looking for a comment re (1) the location of the earthquake (2) whether it is indeed an earthquake or (3) an earthquake caused by the 3D Seismic activity at Corrib. We would be grateful for a response as a matter of urgency.

Mid West Radio [REDACTED] has also phoned requesting information.

Thanks,

Clodagh O'Connor

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Orla Ryan

From: Michael Manley
Sent: 22 June 2012 13:55
To: Orla Ryan
Subject: FW: URGENT - Earthquake off West Coast - Irish Times looking for comment

-----Original Message-----

From: Koen Verbruggen
Sent: 06 June 2012 12:19
To: Michael Manley
Subject: Fw: URGENT - Earthquake off West Coast - Irish Times looking for comment

That puts that to bed!

Koen Verbruggen,
Geological Survey of Ireland
Mobile email

----- Original Message -----

From: Jim Whelan
To: Press Office DCENR; Koen Verbruggen; Ciarán Ó hÓbáin; Gerry Stanley
Cc: Mary Carter; Simon Nugent; Fergus O'Dowd; Aine McHugh; Ray Scanlon
Sent: Wed Jun 06 12:17:49 2012
Subject: RE: URGENT - Earthquake off West Coast - Irish Times looking for comment

Jade,

The seismic survey, which is due to take place over the Corrib gas field, has not yet commenced.

Jim
Jim Whelan
Petroleum Affairs Division
01 6782691

-----Original Message-----

From: Press Office DCENR
Sent: 06 June 2012 12:06
To: Koen Verbruggen; Ciarán Ó hÓbáin; Jim Whelan; Gerry Stanley
Cc: Mary Carter; Simon Nugent; Fergus O'Dowd; Aine McHugh; Ray Scanlon; Press Office DCENR
Subject: RE: URGENT - Earthquake off West Coast - Irish Times looking for comment

Koen / Ciaran

[REDACTED] s come back with a follow on question -

Could you confirm the location of the seismic work being undertaken by SEPIL and whether this was connected to the earthquake..?

If you could assist please, thanks!

Regards
Jade

-----Original Message-----

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Sent: 06 June 2012 11:05
To: Press Office DCENR; Gerry Stanley; Ciarán Ó hÓbáin; Jim Whelan
Cc: Mary Carter; Simon Nugent; Fergus O'Dowd; Aine McHugh; Ray Scanlon
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Clodagh

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See http://www.earthquakes.bgs.ac.uk/earthquakes/recent_uk_events.html

A quake of this magnitude at this depth is not very unusual although not common but definitely natural

Regards

Koen

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Sent: Wed 06/06/2012 11:02

To: Gerry Stanley; Koen Verbruggen; Ciarán Ó hÓbáin; Jim Whelan

Cc: Mary Carter; Simon Nugent; Fergus O'Dowd; Aine McHugh

Subject: URGENT - Earthquake off West Coast - Irish Times looking for comment

Hi Gerry/Koen/Ciaran/Jim,

Following on from our discussion this morning with GSI regarding a query from [REDACTED] re news of a possible earthquake off the West Coast, we have now received an urgent query from [REDACTED] Irish Times. She is looking for a comment re (1) the location of the earthquake (2) whether it is indeed an earthquake or (3) an earthquake caused by the 3D Seismic activity at Corrib. We would be grateful for a response as a matter of urgency.

Mid West Radio (Paula Donnellan) has also phoned requesting information.

Thanks,

Clodagh O'Connor

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Orla Ryan

From: Michael Hanrahan
Sent: 20 June 2012 14:16
To: Orla Ryan
Subject: FW: Earthquake off the west coast

From: Noel Murphy
Sent: 06 June 2012 14:24
To: Michael Hanrahan
Subject: FW: Earthquake off the west coast

fyi.

From: Gerry Stanley
Sent: 06 June 2012 12:25
To: Michael Manley; Brian McConnell; Koen Verbruggen; Ciarán Ó hÓbáin; Noel Murphy
Subject: RE: Earthquake off the west coast

Michael,

Fine, I will forward them onto Brian. I only took the call as I was the only person contactable at the time.

Regards,

Gerry

From: Michael Manley
Sent: 06 June 2012 12:19
To: Brian McConnell; Gerry Stanley; Koen Verbruggen; Ciarán Ó hÓbáin; Noel Murphy
Subject: Re: Earthquake off the west coast

Thanks for various messages - gather you're fielding media queries. I think this is Brian's area, but can you coordinate with PAD and Press Office in anything that is to be said

From: Brian McConnell
To: Gerry Stanley; Michael Manley; Everyone in GSI; Eibhlin Doyle; Wayne Cox; Brian Loughlin
Sent: Wed Jun 06 12:02:10 2012
Subject: RE: Earthquake off the west coast

Just to alert people, I've had questions, from local radio and others, on whether this could have anything to do with Corrib drilling (which it couldn't). The epicentre is located on the fault system that drops the Slyne-Rockall basins down to the west off the Irish shelf (Corrib is ~20km away to NW into the basin).

*Dr Brian McConnell
Geological Survey of Ireland
Beggars Bush
Dublin 4
brian.mcconnell@gsi.ie
+353-1-6782850
www.gsi.ie*

From: Gerry Stanley
Sent: 06 June 2012 11:20
To: Michael Manley; Everyone in GSI; Eibhlin Doyle; Wayne Cox; Brian Loughlin
Subject: Earthquake off the west coast

Please see the summary information from the BGS website for the earthquake this morning off the west coast.

Gerry

Summary

DATE	06/06/2012
ORIGIN TIME	07:58:13.9 UTC
LOCATION	54.151 -10.904
DEPTH	3 km
MAGNITUDE	4.0
LOCALITY	WEST COAST OF IRELAND
OFF W COAST OF IRELAND	

Location is approximately 60km west of Belmullet, County Mayo. Felt in the Counties of Mayo, Sligo and Galway.

Gerry Stanley PGeo
Head, Minerals Programme
Geological Survey of Ireland
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e-mail. gerry.stanley@gsi.ie

Please see the latest GSI newsletter

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Orla Ryan

From: Michael Hanrahan
Sent: 20 June 2012 14:16
To: Orla Ryan
Subject: FW: URGENT - Earthquake off West Coast - Irish Times looking for comment

-----Original Message-----

From: Noel Murphy
Sent: 06 June 2012 14:25
To: Michael Hanrahan
Subject: FW: URGENT - Earthquake off West Coast - [REDACTED] looking for comment

Fyi, the last email...

-----Original Message-----

From: Ciarán Ó hÓbáin
Sent: 06 June 2012 13:21
To: Michael Manley; Simon Nugent
Cc: Koen Verbruggen; Noel Murphy; Jim Whelan; Orla Ryan
Subject: RE: URGENT - Earthquake off West Coast - Irish Times looking for comment

Michael\Simon

I spoke with Koen and agreed that as is already happening Brian McConnell of the GSI would provide information in relation to this seismic event. I understand that Brian has already provided some factual information and done a few interviews.

In relation to the specific follow on query below from the Times (good example of investigative journalism or paranoia?) I propose that the Department simply confirm the fact that this survey has not as yet commenced.

Ciarán

-----Original Message-----

From: Press Office DCENR
Sent: 06 June 2012 12:06
To: Koen Verbruggen; Ciarán Ó hÓbáin; Jim Whelan; Gerry Stanley
Cc: Mary Carter; Simon Nugent; Fergus O'Dowd; Aine McHugh; Ray Scanlon; Press Office DCENR
Subject: RE: URGENT - Earthquake off West Coast - Irish Times looking for comment

Koen / Ciaran

Lorna has come back with a follow on question -

Could you confirm the location of the seismic work being undertaken by SEPIL and whether this was connected to the earthquake...?

If you could assist please, thanks!

Regards
Jade

-----Original Message-----

From: Koen Verbruggen
Sent: 06 June 2012 11:05
To: Press Office DCENR; Gerry Stanley; Ciarán Ó hÓbáin; Jim Whelan
Cc: Mary Carter; Simon Nugent; Fergus O'Dowd; Aine McHugh; Ray Scanlon
Subject: RE: URGENT - Earthquake off West Coast - Irish Times looking for comment

Clodagh

BGS website indicates , time location, depth in kilometres below surface, and strength

(4.0) as follows

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See http://www.earthquakes.bgs.ac.uk/earthquakes/recent_uk_events.html

A quake of this magnitude at this depth is not very unusual although not common but definitely natural

Regards

Koen

-----Original Message-----

From: Press Office DCENR

Sent: Wed 06/06/2012 11:02

To: Gerry Stanley; Koen Verbruggen; Ciarán Ó hÓbáin; Jim Whelan

Cc: Mary Carter; Simon Nugent; Fergus O'Dowd; Aine McHugh

Subject: URGENT - Earthquake off West Coast - Irish Times looking for comment

Hi Gerry/Koen/Ciaran/Jim,

Following on from our discussion this morning with GSI regarding a query from The Ray Darcy Show re news of a possible earthquake off the West Coast, we have now received an urgent query from [REDACTED] Irish Times. She is looking for a comment re (1) the location of the earthquake (2) whether it is indeed an earthquake or (3) an earthquake caused by the 3D Seismic activity at Corrib. We would be grateful for a response as a matter of urgency.

Mid West Radio ([REDACTED]) has also phoned requesting information.

Thanks,

Clodagh O'Connor

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18

Orla Ryan

From: Jim Whelan
Sent: 06 June 2012 17:27
To: Orla Ryan
Subject: FW: URGENT - Earthquake off West Coast - Irish Times looking for comment

Jim Whelan
Petroleum Affairs Division
01 6782691

-----Original Message-----

From: Ray Scanlon
Sent: 06 June 2012 12:13
To: Press Office DCENR; Koen Verbruggen; Ciarán Ó hÓbáin; Jim Whelan; Gerry Stanley; Brian McConnell
Cc: Mary Carter; Simon Nugent; Fergus O'Dowd; Aine McHugh
Subject: RE: URGENT - Earthquake off West Coast - Irish Times looking for comment

Hi,

Apparently the earthquake happened on about 20km away from the centre of the Corrib basin, and was associated with the fault which defines the edge of the basin. It happened at depth and could not have been associated with any seismic surveying.

For info Brian McConnell has recorded a piece for Mid West radio which is due to go out on their lunchtime show.

Ray Scanlon
Acting Principal Geologist
& GSI Tellus Manager
GSI
Geological Survey of Ireland,
Beggars Bush,
Haddington Road,
Dublin 4,
Ireland
tel. +353 (0)1 678 2740
mob. +353 (0)87 2100448
fax. +353 (0)1 668 1782
ray.scanlon@gsi.ie
www.gsi.ie
www.tellusborder.eu
See our latest newsletter www.gsi.ie/Newsletters/ View and download GSI maps and data at www.gsi.ie/mapping

-----Original Message-----

From: Press Office DCENR
Sent: 06 June 2012 12:06
To: Koen Verbruggen; Ciarán Ó hÓbáin; Jim Whelan; Gerry Stanley
Cc: Mary Carter; Simon Nugent; Fergus O'Dowd; Aine McHugh; Ray Scanlon; Press Office DCENR
Subject: RE: URGENT - Earthquake off West Coast - Irish Times looking for comment

Koen / Ciaran

[REDACTED] has come back with a follow on question -

Could you confirm the location of the seismic work being undertaken by SEPIL and whether this was connected to the earthquake..?

If you could assist please, thanks!

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Jade

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Subject: RE: URGENT - Earthquake off West Coast - Irish Times looking for comment

Clodagh

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Regards

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(14)

Orla Ryan

From: Ciarán Ó hÓbáin
Sent: 22 June 2012 10:57
To: Orla Ryan
Subject: FW: URGENT - Earthquake off West Coast - Irish Times looking for comment

-----Original Message-----

From: Michael Manley
Sent: 06 June 2012 12:15
To: Koen Verbruggen; Simon Nugent; Ciarán Ó hÓbáin
Cc: Press Office DCENR
Subject: Re: URGENT - Earthquake off West Coast - Irish Times looking for comment

Ministers before JOC right now - wonder if they should make some comment on this.
Likely to reach NR issues in next 10 minutes

----- Original Message -----

From: Koen Verbruggen
To: Simon Nugent
Cc: Press Office DCENR; Michael Manley
Sent: Wed Jun 06 12:03:35 2012
Subject: RE: URGENT - Earthquake off West Coast - Irish Times looking for comment

Simon

May not be up to us to comment on another company's activities but all the evidence to date points to this being a naturally occurring earthquake along a known geological structure and while slightly larger than usual, such events are not uncommon as historic map of events shows on the BGS website.

See http://www.earthquakes.bgs.ac.uk/earthquakes/recent_events/west_coast_ireland_06_jun_2012_seis.jpg

-----Original Message-----

From: Simon Nugent
Sent: Wed 06/06/2012 11:58
To: Koen Verbruggen
Cc: Press Office DCENR
Subject: Re: URGENT - Earthquake off West Coast - Irish Times looking for comment

Hi Koen

So press office could give categorical confirmation this is completely unrelated to shell 3d seismic survey currently in train... ?

Thanks

S

Simon Nugent

Sent from my mobile phone

On 6 Jun 2012, at 11:07, "Koen Verbruggen" <Koen.Verbruggen@gsi.ie> wrote:

Clodagh

BGS website indicates , time location, depth in kilometres below surface, and strength (4.0) as follows

07:58:13.9
IRELAND

54.151 -10.904

3

4.0

3

WEST COAST OF

See http://www.earthquakes.bgs.ac.uk/earthquakes/recent_uk_events.html

A quake of this magnitude at this depth is not very unusual although not common but definitely natural

Regards

Koen

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Sent: Wed 06/06/2012 11:02

To: Gerry Stanley; Koen Verbruggen; Ciarán Ó hÓbáin; Jim Whelan

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Hi Gerry/Koen/Ciaran/Jim,

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(12)

Orla Ryan

From: Press Office DCENR
Sent: 06 June 2012 14:24
To: Brian McConnell; Gerry Stanley; Koen Verbruggen; Michael Manley; Simon Nugent; Fergus O'Dowd; Aine McHugh; Michael Hanrahan; Ciarán Ó hÓbáin; Jim Whelan; Orla Ryan; Ray Scanlon
Cc: Press Office DCENR
Subject: Irish Times on Earthquake

Earthquake strikes off Co Mayo

AOIFE CARR and GENEVIEVE CARBERY

A magnitude 4.0 earthquake has been recorded off the coast of Co Mayo this morning, close to the Corrib gas field.

A spokesman for the British Geological Survey, which monitors seismic activity in the UK and Ireland, said the quake happened just before 9am, 60km west of Aughlea near Belmullet. It was at a relatively shallow depth of 3km.

He said it was very unusual to have an earthquake of such magnitude in the area as it had never happened before.

Tremors were felt in counties Mayo, Sligo and Galway with some local radio stations receiving calls from listeners who described houses shaking.

Minister for Energy and Natural Resources Pat Rabbitte said all evidence so far pointed to this being a "naturally occurring earthquake". The epicentre was on a known fault line west of the Irish shelf, and was slightly larger than usual, he said.

Mr Rabbitte said there was "no link" to the Corrib gas field in Co Mayo, which was not in production.

Press Officer,
Department of Communications, Energy & Natural Resources,
29-31 Adelaide Rd,
Dublin 2.
+353 1 6782441
Press.office@dcenr.gov.ie
www.dcenr.gov.ie

(13)

Orla Ryan

From: Michael Hanrahan
Sent: 20 June 2012 14:26
To: Orla Ryan
Subject: FW: Corrib OBC latest timing

From: Mick Hanrahan [mailto:mickee.hanrahan@gmail.com]
Sent: 07 June 2012 12:36
To: Michael Hanrahan
Subject: Fwd: Corrib OBC latest timing

Sent from my iPhone

Begin forwarded message:

From: "Noel Murphy" <Noel.Murphy@dcenr.gov.ie>
Date: 6 June 2012 15:44:44 GMT+01:00
To: "Mick Hanrahan" <mickkee.hanrahan@gmail.com>
Cc: "Oonagh O'Loughlin" <Oonagh.O'Loughlin@dcenr.gov.ie>, Ciarán Ó hÓbáin
 <Ciaran.OhObain@dcenr.gov.ie>, "Michael Manley"
 <Michael.Manley@dcenr.gov.ie>
Subject: FW: Corrib OBC latest timing

Mick

Thanks. John Conroy also called earlier to confirm that the Marlene Osterwald was still in port, so there can be no possible or imaginable link !!!

Noel

From: [REDACTED] [mailto:colm.gormley@shell.com]
Sent: 06 June 2012 15:12
To: Michael Hanrahan
Subject: RE: Call

Mick,


Sorry I missed your call...just tried ringing you now.
 I was in meetings all day and I gather from John that you have received calls regarding an earthquake off Mayo!
 I wasn't aware of that but just to be clear, the survey has not started yet.
 Brief outlook below....

Outlook

- The Ocean Pearl continues troubleshooting the first cable before moving towards deployment of the second cable.
- The Malene Ostervold is finalizing gun wiring in port. They will remain in port until sometime tomorrow.
- The Deilginis is at prospect with the Ocean Pearl
- Weather forecast OK, bit more swell coming up.

Best regards,

Colm


Shell E&P Ireland Limited
Registered Office
Corrib House
52 Lower Leeson Street
Dublin 2
Ireland

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Deimhnítear leis seo freisin nár aimsíodh víreas sa phost seo tar éis a scanadh.



Orla Ryan

From: Press Office DCENR
Sent: 06 June 2012 17:04
To: Michael Manley; Ciarán Ó hÓbáin; Orla Ryan
Cc: Press Office DCENR; Simon Nugent
Subject: Corrib - MoS took call from Radio na Gaeltachta

Hi All,

I've spoken to the MoS who has taken a call from RnaG . They quoted a statement that has been issued by a [REDACTED] Gaelge speaker and ex teacher from Drogheda, which questions if the EIA carried out on Corrib could possibly have taken account of earthquakes in the order of force 4.....and hence can only assume the pipeline is now a hazard.

As you know, R na G have followed up with us for a comment even after issuing them the briefing note. I'm guessing this query may morph throughout tomorrow so the line you're working up for R na G will be helpful.

Ta
Enda

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(15)

Orla Ryan

From: Michael Manley
Sent: 22 June 2012 13:57
To: Orla Ryan
Subject: FW: Press Office query re co-ordinates for the Corrib GAS Field.

From: Enda Gallagher
Sent: 06 June 2012 17:46
To: Ciarán Ó hÓbáin; Clodagh.O'Connor; Press Office DCENR
Cc: Michael Manley; Jim Whelan; Orla Ryan; Simon Nugent; Aine McHugh
Subject: RE: Press Office query re co-ordinates for the Corrib GAS Field.

Perfect Ciaran, ta.
Enda

Press Officer,
Department of Communications, Energy & Natural Resources,
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From: Ciarán Ó hÓbáin
Sent: 06 June 2012 17:45
To: Clodagh.O'Connor; Press Office DCENR
Cc: Michael Manley; Jim Whelan; Orla Ryan; Simon Nugent; Aine McHugh
Subject: FW: Press Office query re co-ordinates for the Corrib GAS Field.

Clodagh\Enda

RnaG looked for the coordinates for Corrib, please see suggested response below not just giving coordinates but reasserting that this was a naturally occurring event.

The Co-ordinates for the point at the centre of Corrib Lease area are as follows:
Lat: 54.33179 Long: -11.05162

As confirmed today by the Geological Survey of Ireland, while the location and magnitude of this event are unusual, smaller earthquakes are quite common around Ireland, although they generally cluster in northern Donegal and in the Irish Sea between Wexford and North Wales. As with today's event, which occurred in excess of 20 km from the Corrib Gas Field, these clusters are related to small movements on long-lived geological faults.

Will have a response in the morning on the query re EIA process.

Regards

Ciarán

From: Orla Ryan
Sent: 06 June 2012 17:31
To: Ciarán Ó hÓbáin
Subject: Press Office query re co-ordinates for the Corrib GAS Field.

Ciarán,

See below suggested response to the Press Office Query.

Orla

The Co-ordinates for the point at the centre of Corrib Lease area are as follows:
Lat: 54.33179 Long: -11.05162

As confirmed today by the Geological Survey of Ireland, while the location and magnitude of this event are unusual, smaller earthquakes are quite common around Ireland, although they generally cluster in northern Donegal and in the Irish Sea between Wexford and North Wales. As with today's event, which occurred in excess of 20 km from the Corrib Gas Field, these clusters are related to small movements on long-lived geological faults.

*Orla Ryan
Petroleum Affairs Division
Department of Communications, Energy & Natural Resources
29-31 Adelaide Road
Dublin 2*

*Tel: +353 1 678 2135
Fax: +353 1 678 2619
Email: Orla.Ryan@dcenr.gov.ie*

Orla Ryan

From: [REDACTED]
Sent: 07 June 2012 07:56
To: Orla Ryan
Cc: Jon Hancox
Subject: RE: Corrib - Earthquake off Belmullet

Orla

I was intrigued so I did a quick search. The expected frequency of earthquakes of this magnitude in Belmullet is 1 in 50 years.

<http://www.chinci.com/travel/pax/q/2966208/Belmullet/IE/Ireland/0#>

Earthquakes are generally caused by movement of the earth's crust either side of a fault line. If we are certain that there are no fault lines crossing the pipeline route then there is no concern. Even if there are fault lines in the area the pipeline would be able to with stand considerable movement. There are many pipelines in areas prone to regular earthquakes of greater magnitude in places such as California, North Africa and Turkey.

Perhaps if more technical detail is required then Jon could find a geologist able to comment on likely maximum movement and we could calculate any impact on the tunnel or pipeline?

Regards

Peter Waite

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www.astriduk.co.uk

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----- Original Message -----

Subject: Corrib - Earthquake off Belmullet
From: "Orla Ryan" <Orla.Ryan@dce.nr.gov.ie>
Date: Wed, June 06, 2012 5:05 pm
To: [REDACTED]

Peter,

Could you give me a call please?

Thanks,

Oela

*Orla Ryan
Petroleum Affairs Division
Department of Communications, Energy & Natural Resources
29-31 Adelaide Road
Dublin 2*

Tel: +353 1 678 2135

Fax: +353 1 678 2619

Email: Orla.Ryan@dcenr.gov.ie

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Deimhnítear leis seo freisin nár aimsíodh víreas sa phost seo tar éis a scanadh.

Orla Ryan

From: Ciarán Ó hÓbáin
Sent: 22 June 2012 11:08
To: Orla Ryan
Subject: FW: Follow on Query from RnaG re Earthquake this morning off West Coast of Ireland

From: Ciarán Ó hÓbáin
Sent: 07 June 2012 10:15
To: Press Office DCENR; Jim Whelan; Orla Ryan
Cc: Michael Manley; Aine McHugh; Fergus O'Dowd
Subject: RE: Follow on Query from RnaG re Earthquake this morning off West Coast of Ireland

Clodagh

The Department gave approval for the survey on 20 April. The survey has not yet commenced.

When approving seismic surveys the Department does not stipulate a commencement date as this date will be determined by a range of factors including in particular the weather along with vessel movements\availability.

Regards

Ciarán

From: Press Office DCENR
Sent: 07 June 2012 10:08
To: Ciarán Ó hÓbáin; Jim Whelan; Orla Ryan
Cc: Michael Manley; Aine McHugh; Fergus O'Dowd; Press Office DCENR
Subject: Follow on Query from RnaG re Earthquake this morning off West Coast of Ireland
Importance: High

Hi Ciaran/ Jim/ Orla,

Please see attached follow on query from [REDACTED] Radio Na Gaeltachta, regarding the 3D Seismic Survey over the Corrib Gas Field. We would be grateful for your assistance in responding to this query.

Thanks,

Clodagh
 Press Office

From: [REDACTED]
Sent: 07 June 2012 08:43
To: Press Office DCENR
Subject: RE: Briefing Note re Earthquake this morning off West Coast of Ireland

Thank you Clodagh,
 I have a few more queries:

On what date did the department sanction a commencement notice to Shell E&P Ireland in relation to the 3D Ocean Bottom Cables Seismic Survey over the Corrib Gas Field?

What information has been given to the department in relation to this work to date?

Mise le meas,
Eibhlín Ní Chonghaile.

From: Press Office DCENR [Press.Office@dcenr.gov.ie]
Sent: 06 June 2012 17:49
To: Irisaniar
Cc: Press Office DCENR
Subject: RE: Briefing Note re Earthquake this morning off West Coast of Ireland

[REDACTED] chara,

We are happy to provide the following information regarding your query.

The Co-ordinates for the point at the centre of Corrib Lease area are as follows:
 Lat: 54.33179 Long: -11.05162

As confirmed today by the Geological Survey of Ireland, while the location and magnitude of this event are unusual, smaller earthquakes are quite common around Ireland, although they generally cluster in northern Donegal and in the Irish Sea between Wexford and North Wales. As with today's event, which occurred in excess of 20 km from the Corrib Gas Field, these clusters are related to small movements on long-lived geological faults.

Summary of today's earthquake – source British Geological Survey

DATE	06/06/2012
ORIGIN TIME	07:58:13.9 UTC
LOCATION	54.151 -10.904
DEPTH	3 km
MAGNITUDE	4.0
LOCALITY	WEST COAST OF IRELAND
OFF W COAST OF IRELAND	

Location is approximately 60km west of Belmullet, County Mayo. Felt in the Counties of Mayo, Sligo and Galway.

All the best
 Enda Gallagher
 Press Officer,
 Department of Communications, Energy & Natural Resources,
 29-31 Adelaide Rd,
 Dublin 2.
 +353 1 6782441
Press.office@dcenr.gov.ie
www.dcenr.gov.ie

From: [REDACTED]
Sent: 06 June 2012 17:04
To: Press Office DCENR

Subject: RE: Briefing Note re Earthquake this morning off West Coast of Ireland

Clodagh a chara,

What are the coordinates of the epicentre of the earthquake which struck off the coast of Mayo this morning?
What are the coordinates of the Corrib Gas field?

Mise le meas,
Eibhlín Ní Chonghaile.
086 1743946.

From: Press Office DCENR [Press.Office@dcenr.gov.ie]

Sent: 06 June 2012 16:31

To: [REDACTED]

Cc: Press Office DCENR

Subject: Briefing Note re Earthquake this morning off West Coast of Ireland

Hi [REDACTED]

I refer to your telephone call of today requesting information regarding the earthquake this morning off the West Coast of Ireland. The following is a briefing note from the Department re same:-

Briefing earthquake Mayo 6/6/12, 07:58UTC

An earthquake of magnitude 4.0 struck 60km off the Mayo coast at a depth of 3km shortly before 9 o'clock this morning. The epicentre was located on a fault system that drops the Slyne-Rockall basins down to the west off the Irish shelf. These faults have had a long geological history and are related to the continuing opening of the Atlantic ocean. Seismicity of this magnitude has not been recorded previously along the fault system in this area but it is now clear that it is still geologically active. It may be anticipated that small aftershocks will follow, but there will be no long-term environmental effects to the seabed or onshore from the event.

While the location and magnitude of this event are unusual, smaller earthquakes are quite common around Ireland, although they generally cluster in northern Donegal and in the Irish Sea between Wexford and North Wales. As with today's event, these clusters are related to small movements on long-lived geological faults.

The Irish National Seismic Network is managed by the Geophysics section of the School of Cosmic Physics, Dublin Institute for Advanced Studies.

6/6/12

Kind Regards,

Clodagh O'Connor

Press Office

Department of Communications, Energy and Natural Resources

29-31 Adelaide Road

Dublin 2

+3531 6782418

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(18)

Orla Ryan

From: Ciarán Ó hÓbáin
Sent: 22 June 2012 11:00
To: Orla Ryan
Subject: FW: Broadcast Alert - Earthquake - SF calls for Min Rabbitte to comment

From: Ciarán Ó hÓbáin
Sent: 07 June 2012 17:22
To: Enda Gallagher; Orla Ryan; Jim Whelan
Cc: Simon Nugent; Michael Manley; Press Office DCENR; Aine McHugh
Subject: RE: Broadcast Alert - Earthquake - SF calls for Min Rabbitte to comment

Enda

I would suggest a general response along the following lines in relation to the Corrib queries:

"The regulatory framework that applies in the case of the Corrib Gas project provides that in addition to the developer ensuring that the various elements of the related infrastructure are constructed as proposed, that a number of statutory bodies must also consent to the commissioning and operation of the infrastructure before gas could be produced. A safety permit from the Commission for Energy Regulation would be amongst the consents required. Such consents could only be granted where the relevant statutory authorities are satisfied with the integrity of the infrastructure."

While I would have thought it would be unnecessary to do so, perhaps just in case it is not understood, it should be pointed out to the Times and RnaG that there is no gas in the offshore pipeline.

As regards the Times's follow on query in relation to the distance from the epicentre of the earthquake to some other "prospects" in an area covered by a licensing option awarded to Providence Resources last year, I am totally at a loss as to what the interest could possibly be. In any event as the Times has also asked Providence for this information and as there really is a limit to how much time can justifiably be spent by the Department dealing with such "information queries" I think that it would not be unreasonable to leave this matter for Providence to respond to the journalist.

Regards

Ciarán

From: Enda Gallagher
Sent: 07 June 2012 16:55
To: Ciarán Ó hÓbáin; Orla Ryan; Jim Whelan
Cc: Simon Nugent; Michael Manley; Press Office DCENR; Fergus O'Dowd; Aine McHugh
Subject: Broadcast Alert - Earthquake - SF calls for Min Rabbitte to comment

For info.

In addition, RnaG rang back again to say that Shell has announced that they will carry out a "scoping exercise" next week to ascertain if any damage has been done.

Ta

Enda

Programme: Northwest Today
Station: Ocean FM
Presenter: Niall Delaney
Broadcast Date: 07/06/2012

Broadcast Time: 09:00:00
Duration: 8:00
Subject: Earthquake

SF Councillor [REDACTED] discusses concern for the recent earthquake and a possible link to Shell testing in the Corrib gas field area. She says we need a comment from Minister Pat Rabbitte to soothe concern. [10:13]

To order a transcript, mp3, mp4, DVD or CD of this item, please email your request to broadcast@mediahub.ie or contact our Broadcast Department at (01) 661 8625.

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All other queries, please email: info@mediahub.ie

(19)

Orla Ryan

From: Orla Ryan
Sent: 08 June 2012 08:01
To: 'Jonathan Hancox'; 'MILES HITCHCOCK'
Subject: FW: Corrib - Earthquake off Belmullet
Jon. Miles.

Please see suggestion below from Peter Waite – if possible this might be helpful.

Thanks,

Orla

From: [REDACTED]
Sent: 07 June 2012 07:56
To: Orla Ryan
Cc: Jon Hancox
Subject: RE: Corrib - Earthquake off Belmullet

Orla

I was intrigued so I did a quick search. The expected frequency of earthquakes of this magnitude in Belmullet is 1 in 50 years.

<http://www.chinci.com/travel/pax/q/2966208/Belmullet/IE/Ireland/0#>

Earthquakes are generally caused by movement of the earth's crust either side of a fault line. If we are certain that there are no fault lines crossing the pipeline route then there is no concern. Even if there are fault lines in the area the pipeline would be able to withstand considerable movement. There are many pipelines in areas prone to regular earthquakes of greater magnitude in places such as California, North Africa and Turkey.

Perhaps if more technical detail is required then Jon could find a geologist able to comment on likely maximum movement and we could calculate any impact on the tunnel or pipeline?

Regards

Peter Waite

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----- Original Message -----

Subject: Corrib - Earthquake off Belmullet
 From: "Orla Ryan" <Orla.Ryan@dcenr.gov.ie>
 Date: Wed, June 06, 2012 5:05 pm
 To: [REDACTED]

Peter,

Could you give me a call please?

Thanks,

Oela

*Orla Ryan
 Petroleum Affairs Division
 Department of Communications, Energy & Natural Resources
 29-31 Adelaide Road
 Dublin 2*

Tel: +353 1 678 2135

Fax: +353 1 678 2619

Email: Orla.Ryan@dcenr.gov.ie

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Deimhnítear leis seo freisin nár aimsíodh víreas sa phost seo tar éis a scanadh.

20

Orla Ryan

From: Orla Ryan
Sent: 08 June 2012 08:31
To: 'MILES HITCHCOCK'; 'Jonathan Hancox'
Subject: FW: CCMC

Attachments: MM to OhObain 7 June 2012 earthquake hydrotest.doc



MM to OhObain 7
June 2012 eart...

Miles, Jon,

Please see attached a copy of correspondence received from [REDACTED] with particular respect to her suggestion that an independent investigation of the Corrib Development be undertaken to ensure that "all potential impacts on Flora, Fauna, Health and Safety are posing no danger to human beings or to the environment" from the recent earthquake off Belmullet. As she is linking her comments to the Department's management of the EIS/EMP, I would appreciate Environ's comments with respect to any potential impact please.

Thanks and Regards,

Orla



DCENR
PAD
Principle Officer

Dublin

07/06/2012

Re: CCMC, earth quake, operation of gas pipeline hydro testing

Dear Ciaran,

The earthquake on 6 June 2012 recorded as approx 60km west of Belmullet, Co Mayo, at a depth of 3km, at 8.58am, registered a magnitude of four on the Richter scale. The location is about 23km south to southeast of the Corrib gas wells.

It was the largest local seismic event ever recorded, according to Tom Blake of the Irish National Seismic Network (INSN) and the Dublin Institute of Advanced Studies.

A leading seismologist has said yesterday's earthquake off the west coast was "unexpected" and poses "very interesting questions for geologists"

Shell E&P Ireland said "no reason to believe that this event has had any impact on the sub-sea infrastructure".

"However, as a precautionary measure, a visual inspection of the offshore infrastructure will be carried out in the coming days," it said.

While I approve of Shell E&P Ireland's inspection of the offshore infrastructure, the company is making comments of 'no reason' without any known reason or facts.

The Department is the responsible authority for the implementation of compliance conditions and submitted information by the developer including the Environmental Impact Statement and the Environmental Impact Assessment performed by the Minister to make sure that all potential impacts on Flora, Fauna, Health, Safety are posing no danger to human beings or the environment.

The Department would be acting negligently if it did not see that an investigation was carried out by an independent consultant for the very reason Minister Rabbitte stated:

"I believe Ireland's reputation as a lightly regulated economy is precisely what has got us into so much trouble in the first place. We need to repair the damage done by our "light touch" reputation. We need to be seen as having a regulatory environment that takes investigations seriously, proceeds with them expeditiously and punishes wrongdoing effectively."

If the investigation is left to the developer as a self-regulating exercise, it would be another case of light touch regulation, which has caused so much trouble in this jurisdiction.

On a separate issue, I raise the following:

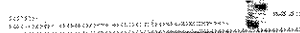
From: Press Office DCENR

To: Ciarán Ó hÓbáin; Jim Whelan; Orla Ryan; Noel Murphy; Clare Morgan

Cc: Aine McHugh; Fergus O'Dowd; Jonathan Harte; Simon Nugent; Press Office DCENR; Koen Verbruggen; Brian McConnell; Ray Scanlon

Subject: Irish Times - Survey shows tremor struck closer to Providence territory than Corrib

Survey shows tremor struck closer to Providence territory than Corrib



The epicentre for Wednesday's earthquake off Mayo was closer to an area licensed to Providence Resources than to the Corrib gas field. The latitude and longitude pinpointed by the British Geological Survey shows the magnitude-four quake, which occurred 60km west of Belmullet, was in the Slyne basin area, where Providence has two licences. However, the Department of Energy would not comment publicly yesterday, and Providence was unavailable for comment. Providence and British firm First Oil were granted the licences in prospects between 10km and 20km south of Corrib last year. The company has described the new acreage as having "exciting gas potential". Shell E&P Ireland has said it has "no reason to believe" the earthquake had "any impact" on it.



NUI Galway geologist Mike Williams said: "The gas field is a tiny part of the Slyne basin, but there's always a possibility that an event like this could liberate gas uncontrollably, at some cost to the developer. Magnitude four is not negligible."

LORNA SIGGINS

**Jade Fitzpatrick,
Press Office,
Department of Communications, Energy & Natural Resources,
29-31 Adelaide Rd,
Dublin 2.
+3531 6782442**

Press.office@dcenr.gov.ie
www.dcenr.gov.ie

22

Orla Ryan

From: MILES HITCHCOCK [REDACTED]
Sent: 08 June 2012 09:47
To: Orla Ryan; Jonathan Hancox
Subject: Re: CCMC

Orla / Jon,

A richter scale 4 earthquake will rattle a few cups on the shelf and not cause serious damage to any structure, so therefore the Shell approach of carrying out an inspection of their assets in the area as a precaution would normally be sufficient. However, in this instance given the situation I would recommend that Shell also confirm their design criteria for the pipeline demonstrating the magnitude events that it is designed for, the amount of tolerance to movement they have in the design and the material strengths / wall thicknesses selected. This can then be analysed by an 'independent expert' to demonstrate the suitability of their design.

Jon - perhaps the guy used for the Sakhalin work would be suitable?

Hope this helps,

Miles

Miles Hitchcock
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Mica Environmental Ltd.
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SY5 9DY
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fax +44 1743 885148
mob +44 7767 387303
www.micaenvt.co.uk

From: Orla Ryan <Orla.Ryan@dcenr.gov.ie>
To: MILES HITCHCOCK <[REDACTED]>
<JHancox@[REDACTED]>
Sent: Friday, 8 June 2012, 8:30
Subject: FW: CCMC

Miles, Jon,

Please see attached a copy of correspondence received from [REDACTED] with particular respect to her suggestion that an independent investigation of the Corrib Development be undertaken to ensure that "all potential impacts on Flora, Fauna, Health and Safety are posing no danger to human beings or to the environment" from the recent earthquake off Belmullet. As she is linking her comments to the Department's management of the EIS/EMP, I would appreciate Environ's comments with respect to any potential impact please.

Thanks and Regards,

Orla

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Deimhnítear leis seo freisin nar aimsíodh vireas sa phost seo tar eis a scanadh.

23

Orla Ryan

From: Orla Ryan
Sent: 08 June 2012 10:14
To: 'MILES HITCHCOCK'
Cc: 'Jonathan Hancox'; [REDACTED]
Subject: RE: CCMC

Thanks Miles,

Has Peter not considered this in the context of his technical safety assessment? If so he would be the appropriate independent person to provide a view to the Department with respect to the suitability of the design in these circumstances.

On the environmental side of things, is there any assessment necessary to ascertain that that there has been no environmental impact arising from any impact the earthquake could potentially have had on the Corrib Gas Field Development?

Thanks,

Orla

From: MILES HITCHCOCK [REDACTED]@btinternet.com]
Sent: 08 June 2012 09:47
To: Orla Ryan; Jonathan Hancox
Subject: Re: CCMC

Orla / Jon,

A richter scale 4 earthquake will rattle a few cups on the shelf and not cause serious damage to any structure, so therefore the Shell approach of carrying out an inspection of their assets in the area as a precaution would normally be sufficient. However, in this instance given the situation I would recommend that Shell also confirm their design criteria for the pipeline demonstrating the magnitude events that it is designed for, the amount of tolerance to movement they have in the design and the material strengths / wall thicknesses selected. This can then be analysed by an 'independent expert' to demonstrate the suitability of their design.

Jon - perhaps the guy used for the Sakhalin work would be suitable?

Hope this helps,

Miles

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fax +44 1743 885148
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www.micaenvt.co.uk

From: Orla Ryan <Orla.Ryan@dcenr.gov.ie>
To: MILES HITCHCOCK <miles.hitchcock@btinternet.com>; Jonathan Hancox <JHancox@environcorp.com>
Sent: Friday, 8 June 2012, 8:30
Subject: FW: CCMC

Miles, Jon,

Please see attached a copy of correspondence received from [REDACTED] with particular respect to her suggestion that an independent investigation of the Corrib Development be undertaken to ensure that "all potential impacts on Flora, Fauna, Health and Safety are posing no danger to human beings or to the environment" from the recent earthquake off Belmullet. As she is linking her comments to the Department's management of the EIS/EMP, I would appreciate Environ's comments with respect to any potential impact please.

Thanks and Regards,

Orla

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Deimhnítear leis seo freisin nar aimsíodh vireas sa phost seo tar eis a scanadh.

24

Orla Ryan

From: MILES HITCHCOCK [REDACTED]
Sent: 08 June 2012 10:29
To: Orla Ryan
Cc: Jonathan Hancox; [REDACTED]
Subject: Re: CCMC

Orla,

Peter would certainly be the most appropriate person to comment on the Safety aspects of the pipeline and the design suitability for this sort of event.

As regards the environmental impact I would suggest that the Department requests the post-event survey data from SEPIL as soon as it is available, ENVIRON can then review this and comment on any likely impact to flora, fauna and human health and safety on the basis of the findings.

Regards,

Miles

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 fax +44 1743 885148
 mob +44 7767 387303
 [REDACTED]

From: Orla Ryan <Orla.Ryan@dcenr.gov.ie>
To: MILES HITCHCOCK [REDACTED]
Cc: Jonathan Hancox <[REDACTED]>
Sent: Friday, 8 June 2012, 10:13
Subject: RE: CCMC

Thanks Miles,

Has Peter not considered this in the context of his technical safety assessment? If so he would be the appropriate independent person to provide a view to the Department with respect to the suitability of the design in these circumstances.

On the environmental side of things, is there any assessment necessary to ascertain that that there has been no environmental impact arising from any impact the earthquake could potentially have had on the Corrib Gas Field Development?

Thanks,

Orla

From: MILES HITCHCOCK [REDACTED]
Sent: 08 June 2012 09:47
To: Orla Ryan ; Jonathan Hancox
Subject: Re: CCMC

Orla / Jon,

A richter scale 4 earthquake will rattle a few cups on the shelf and not cause serious damage to any structure, so therefore the Shell approach of carrying out an inspection of their assets in the area as a precaution would normally be sufficient. However, in this instance given the situation I would recommend that Shell also confirm their design criteria for the pipeline demonstrating the magnitude events that it is designed for, the amount of tolerance to movement they have in the design and the material strengths / wall thicknesses selected. This can then be analysed by an 'independent expert' to demonstrate the suitability of their design.

Jon - perhaps the guy used for the Sakhalin work would be suitable?

Hope this helps,

Miles

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tel +44 1743 884746
fax +44 1743 885148
mob +44 7767 387303
[REDACTED]

From: Orla Ryan <Orla.Ryan@dcenr.gov.ie>
To: MILES HITCHCOCK <miles.hitchcock@btinternet.com>; Jonathan Hancox <JHancox@environcorp.com>
Sent: Friday, 8 June 2012, 8:30
Subject: FW: CCMC

Miles, Jon,

Please see attached a copy of correspondence received from Ms. Monica Muller with particular respect to her suggestion that an independent investigation of the Corrib Development be undertaken to ensure that "all potential impacts on Flora, Fauna, Health and Safety are posing no danger to human beings or to the environment" from the recent earthquake off Belmullet. As she is linking her comments to the Department's management of the EIS/EMP, I would appreciate Environ's comments with respect to any potential impact please.

Thanks and Regards,

Orla

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Deimhnítear leis seo freisin nar aimsíodh vireas sa phost seo tar eis a scanadh.

25

Orla Ryan**From:** Jonathan Hancox [REDACTED]**Sent:** 08 June 2012 17:15**To:** Orla Ryan**Subject:** Re: Urgent PQ

Orla

I'm afraid that this is a design and safety aspect and so outside of my area. Peter is best placed to comment this in terms of what was assessed as part of the previous Entec assessment.

Regards

Jon

From: Orla Ryan [mailto:Orla.Ryan@dcecr.gov.ie]**Sent:** Friday, June 08, 2012 04:00 PM**To:** Jonathan Hancox**Subject:** Urgent PQ

Jon,

I'm really sorry to disturb you but a Parliamentary Question has been put down for answer by our Minister as follows

"To ask the Minister for Communications, Energy and Natural Resources his position with regard to assessment of prospective loss, damage or injury arising from earthquake or tsunami on the Corrib gas pipeline, however unlikely such occurrences may be;; and if he will make a statement on the matter.□

We need to be able to say what levels of movement etc the Corrib design allows for and what level of earthquake it could reasonably be expected to withstand. Peter Waite is also on leave this week. Can you help?

Orla

*Orla Ryan**Petroleum Affairs Division**Department of Communications, Energy & Natural Resources**29-31 Adelaide Road**Dublin 2**Tel: +353 1 678 2135**Fax: +353 1 678 2619**Email: Orla.Ryan@dcecr.gov.ie*

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Deimhnítear leis seo freisin nár aimsíodh víreas sa phost seo tar éis a scanadh..

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Orla Ryan

From: Orla Ryan
Sent: 08 June 2012 17:27
To: [REDACTED]
Subject: RE: Corrib - Earthquake off Belmullet

Thanks for this Peter.

On a slightly separate note, the following Parliamentary Question has been put to our Minister

"To ask the Minister for Communications, Energy and Natural Resources his position with regard to assessment of prospective loss, damage or injury arising from earthquake or tsunami on the Corrib gas pipeline, however unlikely such occurrences may be;; and if he will make a statement on the matter."

We need to be able to say what levels of movement etc the Corrib design allows for and what level of earthquake it could reasonably be expected to withstand. I wonder if it would be possible to give me some material for response based on your assessment of the pipeline on Monday please?

Thanks and apologies for disturbing you break!

Orla

From: peter@astriduk.co.uk [REDACTED]
Sent: 07 June 2012 07:56
To: Orla Ryan
Cc: Jon Hancox
Subject: RE: Corrib - Earthquake off Belmullet

Orla

I was intrigued so I did a quick search. The expected frequency of earthquakes of this magnitude in Belmullet is 1 in 50 years.

<http://www.chinci.com/travel/pax/q/2966208/Belmullet/IE/Ireland/0#>

Earthquakes are generally caused by movement of the earth's crust either side of a fault line. If we are certain that there are no fault lines crossing the pipeline route then there is no concern. Even if there are fault lines in the area the pipeline would be able to withstand considerable movement. There are many pipelines in areas prone to regular earthquakes of greater magnitude in places such as California, North Africa and Turkey.

Perhaps if more technical detail is required then Jon could find a geologist able to comment on likely maximum movement and we could calculate any impact on the tunnel or pipeline?

Regards

Peter Waite

MA(Oxon) MSc C Eng C Math FICHEM FIMA MIGEM
 Registered Safety & Environmental Professional IChemE
 ASTRID Consulting Limited,
 (Number 7395319)
 1 Chazey Road
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www.astriduk.co.uk

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----- Original Message -----

Subject: Corrib - Earthquake off Belmullet

From: "Orla Ryan" <Orla.Ryan@dcenr.gov.ie>

Date: Wed, June 06, 2012 5:05 pm

To: [REDACTED]

Peter,

Could you give me a call please?

Thanks,

Oela

*Orla Ryan**Petroleum Affairs Division**Department of Communications, Energy & Natural Resources**29-31 Adelaide Road**Dublin 2**Tel: +353 1 678 2135**Fax: +353 1 678 2619**Email: Orla.Ryan@dcenr.gov.ie*

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Deimhnítear leis seo freisin nár aimsíodh vireas sa phost seo tar éis a scanadh.

27
Orla Ryan

From: [REDACTED]
Sent: 08 June 2012 22:16
To: Orla Ryan; MILES HITCHCOCK
Cc: Jonathan Hancox
Subject: RE: CCMC

There should be a statement within the design basis about the magnitude of earthquakes to be taken into account. However it is unlikely that the loading from earthquakes would be the limiting factor in the pipeline design. As suggested SEPIL should be asked to confirm this and indicate where / how they have demonstrated this is the case - verification that there are no fault lines on the pipeline route and that the design magnitude earthquake is greater than that recently experienced.

Peter Waite

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 Registered Safety & Environmental Professional IChemE
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----- Original Message -----

Subject: RE: CCMC
From: "Orla Ryan" <Orla.Ryan@dcenr.gov.ie>
Date: Fri, June 08, 2012 10:13 am
To: "MILES HITCHCOCK" [REDACTED]
Cc: "Jonathan Hancox" [REDACTED]

Thanks Miles,

Has Peter not considered this in the context of his technical safety assessment? If so he would be the appropriate independent person to provide a view to the Department with respect to the suitability of the design in these circumstances.

On the environmental side of things, is there any assessment necessary to ascertain that that there has been no environmental impact arising from any impact the earthquake could potentially have had on the Corrib Gas Field Development?

Thanks,

Orla

From: MILES HITCHCOCK [REDACTED]
Sent: 08 June 2012 09:47
To: Orla Ryan; Jonathan Hancox
Subject: Re: CCMC

Orla / Jon,

A richter scale 4 earthquake will rattle a few cups on the shelf and not cause serious damage to any structure, so therefore the Shell approach of carrying out an inspection of their assets in the area as a precaution would normally be sufficient. However, in this instance given the situation I would recommend that Shell also confirm their design criteria for the pipeline demonstrating the magnitude events that it is designed for, the amount of tolerance to movement they have in the design and the material strengths / wall thicknesses selected. This can then be analysed by an 'independent expert' to demonstrate the suitability of their design.

Jon - perhaps the guy used for the Sakhalin work would be suitable?

Hope this helps,

Miles

Miles Hitchcock
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fax +44 1743 885148
mob +44 7767 387303
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From: Orla Ryan <Orla.Ryan@dcenr.gov.ie>
To: MILES HITCHCOCK [REDACTED]; Jonathan Hancox
Sent: Friday, 8 June 2012, 8:30
Subject: FW: CCMC

Miles, Jon,

Please see attached a copy of correspondence received from [REDACTED] with particular respect to her suggestion that an independent investigation of the Corrib Development be undertaken to ensure that "all potential impacts on Flora, Fauna, Health and Safety are posing no danger to human beings or to the environment" from the recent earthquake off Belmullet. As she is linking her comments to the Department's management of the EIS/EMP, I would appreciate Environ's comments with respect to any potential impact please.

Thanks and Regards,

Orla

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Deimhnítear leis seo freisin nar aimsíodh vireas sa phost seo tar eis a scanadh.

Orla Ryan

From: [REDACTED]
Sent: 10 June 2012 22:31
To: Orla Ryan
Subject: RE: Corrib - Earthquake off Belmullet

Orla

I need to check the statements made in the EIS - I doubt that a "design earthquake" would really feature as the critical load factor in the design. I also need to check any requirements for this assessment in the codes - would Tuesday be OK to do this?

Peter Waite

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----- Original Message -----

Subject: RE: Corrib - Earthquake off Belmullet
From: "Orla Ryan" <Orla.Ryan@dcenr.gov.ie>
Date: Fri, June 08, 2012 5:27 pm
To: [REDACTED]

Thanks for this Peter.

On a slightly separate note, the following Parliamentary Question has been put to our Minister

"To ask the Minister for Communications, Energy and Natural Resources his position with regard to assessment of prospective loss, damage or injury arising from earthquake or tsunami on the Corrib gas pipeline, however unlikely such occurrences may be;; and if he will make a statement on the matter."

We need to be able to say what levels of movement etc the Corrib design allows for and what level of earthquake it could reasonably be expected to withstand. I wonder if it would be possible to give me some material for response based on your assessment of the pipeline on Monday please?

Thanks and apologies for disturbing you break!

Orla

From: peter@astriduk.co.uk [mailto:peter@astriduk.co.uk]
Sent: 07 June 2012 07:56
To: Orla Ryan
Cc: Jon Hancox
Subject: RE: Corrib - Earthquake off Belmullet

Orla

I was intrigued so I did a quick search. The expected frequency of earthquakes of this magnitude in Belmullet is 1 in 50 years.

<http://www.chinci.com/travel/pax/q/2966208/Belmullet/IE/Ireland/0#>

Earthquakes are generally caused by movement of the earth's crust either side of a fault line. If we are certain that there are no fault lines crossing the pipeline route then there is no concern. Even if there are fault lines in the area the pipeline would be able to withstand considerable movement. There are many pipelines in areas prone to regular earthquakes of greater magnitude in places such as California, North Africa and Turkey.

Perhaps if more technical detail is required then Jon could find a geologist able to comment on likely maximum movement and we could calculate any impact on the tunnel or pipeline?

Regards

Peter Waite

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 Registered Safety & Environmental Professional IChemE
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----- Original Message -----

Subject: Corrib - Earthquake off Belmullet
From: "Orla Ryan" <Orla.Ryan@dcenr.gov.ie>
Date: Wed, June 06, 2012 5:05 pm
To: <[REDACTED]>

Peter,

Could you give me a call please?

Thanks,

Oela

*Orla Ryan
Petroleum Affairs Division
Department of Communications, Energy & Natural Resources
29-31 Adelaide Road
Dublin 2*

Tel: +353 1 678 2135

Fax: +353 1 678 2619

Email: Orla.Ryan@dcenr.gov.ie

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Tá eolas sa teachtaireacht leictreonach seo (agus b'fhéidir sa chomhaid ceangailte leis) a d'fhéadfadh bheith príobháideach nó faoi rún. Is le h-aghaidh an duine/na ndaoine nó le h-aghaidh an aonáin atá ainmnithe thuas agus le haghaidh an duine/na ndaoine sin amháin atá an t-eolas. Murab ionann tusa agus an té a bhfuil an teachtaireacht ceaptha dó bíodh a fhios agat nach gceadaítear nochtadh, cóipeáil, scaipeadh nó úsáid an eolais agus/nó an chomhaid seo. Más trí earráid a fuair tú an teachtaireacht leictreonach seo cuir, más é do tholl é, an té ar sheol an teachtaireacht ar an eolas láithreach. Deimhnítear leis seo freisin nár aimsíodh víreas sa phost seo tar éis a scanadh.

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Deimhnítear leis seo freisin nár aimsíodh víreas sa phost seo tar éis a scanadh.

(29)

Orla Ryan

From: Ciarán Ó hÓbáin
Sent: 22 June 2012 16:11
To: Orla Ryan
Subject: FW: Earthquakes, Landslides, Subsidence; Shell to Sea calls for immediate halt to Corrib Project.

Importance: High

-----Original Message-----

From: Ciarán Ó hÓbáin
Sent: 11 June 2012 16:50
To: Simon Nugent
Cc: Michael Manley; Orla Ryan
Subject: FW: Earthquakes, Landslides, Subsidence; Shell to Sea calls for immediate halt to Corrib Project.
Importance: High

Simon

My suggestion would be to inform the journalist that the Department does not have a practice of responding to press releases by third parties.

Having regard to the final paragraph of the shell to sea press release, it would be an option if providing a "don't comment on third party press releases" type response to also reject the unfounded personal comments included in the shell to sea press release. On balance, however, offering any comment on the content of the press release might well be giving the press release more attention than it deserves.

Regards

Ciarán

-----Original Message-----

From: Press Office DCENR
Sent: 11 June 2012 15:45
To: Simon Nugent; Ciarán Ó hÓbáin
Cc: Press Office DCENR; Michael Manley; Jim Whelan; Orla Ryan
Subject: FW: Earthquakes, Landslides, Subsidence; Shell to Sea calls for immediate halt to Corrib Project.
Importance: High

Hi Simon/ Ciaran,

Please see attached query from [REDACTED] Irish Times asking if the Department is issuing a response to the Press Release from Shell to Sea and is there a follow-up in relation to the earthquake. We would appreciate your assistance in responding to the Irish Times.

Thanks,

Clodagh
Press Office


-----Original Message-----

From: [REDACTED]
Sent: 11 June 2012 15:32
To: Enda Gallagher
Cc: Press Office DCENR
Subject: Earthquakes, Landslides, Subsidence; Shell to Sea calls for immediate halt to Corrib Project.

Hi Enda/ John/Jade,

Is there any response to this...or is the Minister/ GSI doing some sort of follow-up in relation to the earthquake in any case?

Cheers


The Irish Times
087-2835909

----- Forwarded message -----

From: Shell to Sea <mayoshelltosea@gmail.com>
Date: Mon, 11 Jun 2012 11:27:49 +0100
Subject: News Release: Earthquakes, Landslides, Subsidence; Shell to Sea calls for immediate halt to Corrib Project.
To: "Shell to Sea ." <mayoshelltosea@gmail.com>

Press Release - Issued by Mayo Shell to Sea
June 11th, 2012 - For immediate release

Shell to Sea calls for an immediate cessation to the Corrib Project following the first major earthquake of the west coast.

Commenting in the wake of the earthquake close to the Corrib wellhead, Shell to Sea spokesperson Maura Harrington stated "Shell's proposed Corrib Project is made up as follows; the wellhead is in an earthquake zone; the landfall is in a landslide zone; the refinery is in a bog which may be subsiding".

She went on to state "This is a vindication of the many people who have been, and continue to be criminalised by the police and the courts through refusal to accept the concept of reasonable excuse which underpins the right to peaceful protest".

Spokesperson Terence Conway whose convictions at the Special Court sittings in Belmullet are currently under appeal stated "I do not believe that Pat Rabbitte, Minister for Communications and Natural Resources has the integrity or the courage to call Shell to account, so resistance to this treasonable and dangerous project will continue".

ENDS

*For more information contact: *

Terence Conway: 086 0866264
Maura Harrington: 087 9591474

<http://www.shelltosea.com>
<http://www.facebook.com/shelltosea>
http://twitter.com/#!/ShellToSea**

The Shell to Sea Campaign has three main aims:

1) That any exploitation of the Corrib gas field be done in a safe way that will not expose the local community in Erris to unnecessary health, safety and environmental risks.

2) To renegotiate the terms of the Great Oil and Gas Giveaway, which sees Ireland's 10 billion barrels of oil equivalent* off the West Coast go directly to the oil companies, with the Irish State retaining a 0% share, no energy security of supply and only 25% tax on profits against which all costs can be deducted.

3) To seek justice for the human rights abuses suffered by Shell to Sea campaigners due to their opposition to Shell's proposed inland refinery.

*This figure is based on the estimate, issued by the Department of Communications, Energy & Natural Resources (DCENR) in 2006, that the amount of recoverable oil and gas in the Rockall and Porcupine basins, off Ireland's west coast, is 10 BBOE (billion barrels of oil equivalent). Based on the average price of a barrel of oil for 2010 of \$79, this works out at \$790 billion, or €580 billion. This does not take account of further oil and gas reserves off Ireland's south & east coasts or inland. The total volume of oil and gas which rightfully belongs to Ireland could be

significantly higher. Also, as the global price of oil rises in the coming years, the value of these Irish natural resources will rise further.

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Orla Ryan

From: Michael Manley
Sent: 12 June 2012 09:44
To: Orla Ryan
Subject: FW: Earthquake corrib - urgent
Importance: High
Attachments: Briefing note earthquake 12 June.doc
Orla – should have copied you in on this.

ml

From: Michael Manley
Sent: 12 June 2012 09:34
To: Ciarán Ó hÓbáin; Koen Verbruggen; Brian McConnell; Noel Murphy
Subject: Earthquake corrib - urgent
Importance: High

Ciarán and colleagues,

The SG has asked that briefing points (essentially bullet speaking points) be put together for the Minister in case he wants to mention the earthquake at Cabinet this morning. The attached has been hurriedly put together from the available material (PQs) etc. and I would appreciate if you could urgently review and correct as necessary.

Michael

Earthquake west Coast of Ireland – 6 June, 2012

- An earthquake of magnitude 4 struck 60km off the Mayo coast at a depth of 3km shortly before 9 o'clock on Wednesday 6 June, 2012. Tremors were felt in counties Mayo, Sligo and Galway.
- The epicentre was located on a fault system that drops the Slyne-Rockall basins down to the west off the Irish shelf.
- These naturally occurring faults, formed millions of years ago, have had a long geological history and are related to the continuing opening of the Atlantic ocean. Seismicity of this magnitude has not been recorded along the fault system in this area since instrumental records began in 1970. While the location and magnitude of this event were unexpected, there is a clear geological reason for it.
- Future seismic activity along the fault system may be anticipated, but not of significantly larger magnitude. The magnitude was far below the threshold for generation of a seismogenic tsunami or indeed to cause significant structural damage.
- Ireland is situated on a tectonically benign part of the world, unlike for example Japan, California, New Zealand or parts of the Mediterranean and is therefore not at risk from high magnitude earthquakes.

Corrib

Interest/comment on the earthquake has focused on its proximity to the Corrib Gas field

- Shell (SEPIL) have an authorization to undertake a seismic survey over 120 Sq Kms (approx 6 miles by 6 miles). Questions were raised as to whether the survey could have lead to the earthquake
- While the survey was authorised to commence, mobilization of the boats involved had been delayed and the survey had not commenced at the time of the earthquake. Even had it commenced, a survey of the nature involved could not provide the energy required for anything like a magnitude 4 earthquake
- Separately, the safety of Corrib facilities has been raised (wellhead, pipeline, terminal)
 - There is no production at Corrib at present and there will not be for at least two years
 - Shell have indicated they will undertake a survey of its equipment in the coming weeks
 - Before the facility is brought into production, it will require an authorisation from the Commission for Energy Regulation (CER) – which will involve a complete safety assessment

Orla Ryan

From: [REDACTED]
Sent: 12 June 2012 09:53
To: Orla Ryan
Subject: RE: Draft

Orla,
 Yes I have asked to make sure that this gets done – only found out this morning that they were doing the slide pack.
 a

From: Orla Ryan [mailto:Orla.Ryan@dcenr.gov.ie]
Sent: Tuesday, June 12, 2012 9:52 AM
To: McLaverty, Agnes SEPIL-UIE/T/I
Subject: RE: Draft

Thanks Agnes. Can we be copied with whatever goes to Tec side please?

Thanks,

Orla

From: [REDACTED]
Sent: 12 June 2012 09:17
To: Orla Ryan
Subject: Draft

Orla,

SEPIL has prepared something for your tech side which they will forward to you via Gerry Co. In the meantime here is my take:

The Corrib facilities have been designed in accordance with best practice in the region (North Sea and N-E Atlantic). The Corrib wells and manifold were inspected by a subsea support vessel last week after the earthquake and confirmed that there has been no impact on the facilities. A report will follow to confirm this. The observations of the pipeline system during the week also confirm that there is no issue with the integrity of the pipeline. The Corrib pipeline is due to be inspected this summer, and survey reports will follow.

A slide pack to follow nearer lunchtime.

Agnes

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Deimhnítear leis seo freisin nar aimsíodh víreas sa phost seo tar éis a scanadh.

32
Orla Ryan

From: Ciarán Ó hÓbáin
Sent: 12 June 2012 10:03
To: Brian McConnell
Cc: Michael Manley; Koen Verbruggen; Noel Murphy; Orla Ryan
Subject: RE: Earthquake corrib - urgent
Brian

I was going to suggest including the following statement if you are happy with it

"A seismic survey could not provide the energy required to cause an earthquake." If accurate it would be more helpful to add "of any magnitude".

Would appreciate your advice.

Regards

Ciarán

From: Michael Manley
Sent: 12 June 2012 09:34
To: Ciarán Ó hÓbáin; Koen Verbruggen; Brian McConnell; Noel Murphy
Subject: Earthquake corrib - urgent
Importance: High

Ciarán and colleagues,

The SG has asked that briefing points (essentially bullet speaking points) be put together for the Minister in case he wants to mention the earthquake at Cabinet this morning. The attached has been hurriedly put together from the available material (PQs) etc. and I would appreciate if you could urgently review and correct as necessary.

Michael

Orla Ryan

From: [REDACTED]
Sent: 12 June 2012 10:13
To: Orla Ryan
Cc: Jon Hancox
Subject: RE: Corrib - Earthquake off Belmullet
Importance: High
 Orla

Pipelines are normally designed taking account of the largest loads they are likely to experience during their life including, transport, loading, installation and operation. Operational loads include those due to the pressure and flow of the fluid they contain and the externally imposed loads from the environment, both normal and accidental (such as earthquake loading). Normal practice is to design the pipeline to withstand the largest of these loads taking account of the likelihood of extreme events.

In the case of the Corrib pipeline the original design pressure (345 bar) and the forces imposed during laying of the offshore section will have determined the strength and therefore material and wall thickness of the pipe. In the North Sea and North Atlantic regions these loads dominate over the environmental or accidental loadings and provide a margin of safety for any loadings due to earthquakes experienced in the region. The risk of earthquakes of magnitude 5 or more is assessed by BGS as less than very low, the lowest risk assigned to any area. Earthquakes of magnitude less than 5 in these low risk areas will not give rise to forces on the pipeline greater than their design allows for.

Details of statements in the EIS and code requirements follow:

The EIS Volume 2 Book 6 of 6 Appendix Q6.4 Section 6.3.2.16 states that as the area is categorised as less than very low for earthquake risk. DNV state "Hence, in accordance with the codes, the pipeline design incorporates no specific provision for seismic activity".

Note that the BGS reference upon which they rely is only addressing Magnitude 5 and higher events (it does not define the scale). The recent Belmullet event was Magnitude 4 (i.e. ten times smaller).

The EIS Appendix Q6.3 has considered seismic events leading to a release from the sub sea equipment and onshore in the Qualitative Risk Assessment. However these were screened out of consideration for the Quantitative Risk Assessment by DNV see Appendix Q6.4 6.3.2 as being a non-credible cause for loss of containment.

The Corrib pipeline has been designed in conformance with the recognised codes as defined in the EIS and also confirmed with the NSAI. These codes require consideration of earthquake loads as accidental loads (see e.g. DNV-OS-F101 quoted below). The requirement is to consider earthquakes with a much longer return period (1 in 475 years) than that of the recent Belmullet earthquake (stated to be 1 in 50 years) and therefore the design should take into account a much more severe event, if necessary. The design has been independently verified by DNV as conforming with their code in its offshore section and the other relevant codes onshore.

Relevant Codes:

1. Offshore Standard DNV-OS-F101, October 2007

Sec. 4 Design - Loads

C 500 Earthquake

501 Load imposed by earth quake, either directly or indirectly (e.g. due to failure of pipeline gravel supports), shall be

classified into accidental or environmental loads, depending on the probability of earthquake occurrence in line with accidental loads in F.

Guidance note:

Earth quake with 475 years return period may be taken from International seismic zonation charts as in Eurocode 8. This can then be converted by importance factors to 100 years return period.

[F 100 General

101 Loads which are imposed on a pipeline system under abnormal and unplanned conditions and with an annual probability of occurrence less than 10^{-2} shall be classified as accidental loads.

102 Typical accidental loads can be caused by:

- extreme wave and current loads
- vessel impact or other drifting items (collision, grounding, sinking, iceberg)
- dropped objects
- seabed movement and/or mud slides
- explosion
- fire and heat flux
- operational malfunction
- dragging anchors.

103 Size and frequency of accidental loads, for a specific pipeline system, may be defined through risk analyses. Reference is also made to DNV-RP-F107 Risk Assessment of Pipeline Protection.

2. IS 328 2003

No mention of earthquake

3. BS 8010 Part 1

6.4.6 Fatigue

6.4.6.1 General

All cyclic stresses due to pressure, thermal, or external loading, occurring during the entire life of the pipeline, should be taken into account when establishing the predicted significance or effect of fatigue.

In the assessment of stress ranges, the effect of construction that can cause stress concentration should be taken into account.

All cyclic stresses between the threshold limit and the maximum allowable design stress should be addressed (see ASTM E1049).

NOTE 1 Typical sources of cyclic stresses include:

- transportation, installation and testing activities;
- dynamic stresses (wind, waves, currents, rivers, vortex shedding, road/rail and other traffic-induced stresses);
- pulsation-induced vibration (at or near stations, reciprocating pumps and compressors);
- vibrations caused by surge and product flow;
- full stress cycles (start-up to shutdown cycles);
- fluctuations in operational (pressure and thermal) cycles;
- external thermal stress cycles (above-ground pipelines);
- earthquakes and ground movements.

F.2.3 Terrain and subterranean conditions, including geotechnical and hydrographical conditions

The geography of the terrain traversed can be broadly separated into surface topography and subterranean

geology, and it is usually convenient to consider both natural and man-made geographical

features under
these two headings.

The potential impact to local water supplies and ground water regimes should be minimized.
The principal geographical features which are likely to be encountered and should be taken into account include:

a) land surface:

- 1) agricultural: crops, livestock, woodlands;
- 2) heritage: natural beauty, archaeological, ornamental;
- 3) natural barriers: rivers, mountains;
- 4) natural resources: water catchment areas, forestry;
- 5) occupation: population, communications, services;
- 6) physical: contouring, soil or rock type, water, soil corrosivity;
- 7) environmental: designated areas, protected habitats, flora and fauna;

b) subterranean:

- 1) geological features;
- 2) infill land and waste disposal sites, including those contaminated by disease, radioactivity or chemicals;
- 3) the proximity of past, present and future mineral extractions, including uncharted workings, pipelines and underground services;
- 4) areas of geological instability, including faults, fissuring and earthquake zones;
- 5) existing or potential areas of land slippage, subsidence and differential settlement;
- 6) tunnels;
- 7) ground water hydrology, including flood plains.

Adverse geotechnical and hydrographic conditions should be identified and mitigating measures defined.

In some instances, it can be necessary also to review meteorological conditions.

G.3 Environmental loads

G.3.1 Classification

Loads arising from the environment are classified as environmental, except where they need to be

considered as functional (see G.2) or, due to a low probability of occurrence, as accidental (see G.5).

Environmental loads can occur on above-ground pipework, buried pipelines and pipelines within water

crossings. Above-ground pipework is subject to wind, snow and ice.

Buried pipelines are affected by road and rail traffic but could also be subject to subsidence due to mining,

earthquake or other surface and sub-surface instability.

Loads from vibrations of equipment and displacements caused by structures on the ground are also

examples of environmental loads.

G.3.5 Earthquakes

Consideration should be given to pipelines located in regions of known earthquake activity.

The following effects should be taken into account when designing such pipelines: direction, magnitude and

acceleration of fault displacements. In particular, the following should be taken into account:

- a) flexibility of the pipeline to accommodate displacements for the design case;
- b) mechanical properties of the carrier pipe under pipeline operating pressure (conditions);
- c) design for mitigation of pipeline stresses during displacement caused by soil properties for buried

crossings and inertial effects for above-ground fault crossings;

d) induced effects (liquefaction, landslides);

e) mitigation of exposure to surrounding area by pipeline fluids;

f) engineered backfill that can flow around pipe and reduce twisting and sagging or hogging.

4. IGE/MD/1

Has similar requirements to BS8010- in particular section 6.7.10 of TD1 but is not available electronically

Finally the US Code (not used in the design of Corrib also has reference to earthquakes but is not as specific or as stringent as the DNV/BS/IGEM requirements:

5. U.S. Pipeline Safety Regulations (i.e. 49 CFR Parts 191, 192, 194 and 195)

TITLE 49--Transportation

Subtitle B--OTHER REGULATIONS RELATING TO TRANSPORTATION

CHAPTER I--PIPELINE AND HAZARDOUS MATERIALS SAFETY ADMINISTRATION, DEPARTMENT OF TRANSPORTATION

SUBCHAPTER D--PIPELINE SAFETY

PART 191--TRANSPORTATION OF NATURAL AND OTHER GAS BY PIPELINE; ANNUAL REPORTS, INCIDENT REPORTS, AND SAFETY-RELATED CONDITION REPORTS

Appendix C to Part 195-Guidance for Implementation of an Integrity Management Program

B. The rule requires an operator to include a process in its program for identifying which pipeline segments could affect a high consequence area and to take measures to prevent and mitigate the consequences of a pipeline failure that could affect a high consequence area. (See §§195.452 (f) and (i).) Thus, an operator will need to consider how each pipeline segment could affect a high consequence area. The primary source for the listed risk factors is a US DOT study on instrumented Internal Inspection devices (November 1992). Other sources include the National Transportation Safety Board, the Environmental Protection Agency and the Technical Hazardous Liquid Pipeline Safety Standards Committee. The following list provides guidance to an operator on both the mandatory and additional factors:

(12) Potential natural forces inherent in the area (flood zones, earthquakes, subsidence areas, etc.)

Peter Waite

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----- Original Message -----

Subject: RE: Corrib - Earthquake off Belmullet

From: "Orla Ryan" <Orla.Ryan@dcenr.gov.ie>

Date: Tue, June 12, 2012 7:59 am

To: [REDACTED]

Sorry for not responding yesterday Peter – I was out of the office unexpectedly. I would be very grateful if you could provide me with some text for response to the PQ as early as possible this morning, this question should have left me for upward clearance yesterday – it's for response tomorrow!

Thanks,

Orla

From: [REDACTED]
Sent: 10 June 2012 22:31
To: Orla Ryan
Subject: RE: Corrib - Earthquake off Belmullet

Orla

I need to check the statements made in the EIS - I doubt that a "design earthquake" would really feature as the critical load factor in the design. I also need to check any requirements for this assessment in the codes - would Tuesday be OK to do this?

Peter Waite

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 Registered Safety & Environmental Professional IChemE
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----- Original Message -----

Subject: RE: Corrib - Earthquake off Belmullet
From: "Orla Ryan" <Orla.Ryan@dcenr.gov.ie>
Date: Fri, June 08, 2012 5:27 pm
To: [REDACTED]

Thanks for this Peter.

On a slightly separate note, the following Parliamentary Question has been put to our Minister

"To ask the Minister for Communications, Energy and Natural Resources his position with regard to assessment of prospective loss, damage or injury arising from earthquake or tsunami on the Corrib gas pipeline, however unlikely such occurrences may be;; and if he will make a statement on the matter."

We need to be able to say what levels of movement etc the Corrib design allows for and what level of earthquake it could reasonably be expected to withstand. I wonder if it would be possible to give me some material for response based on your assessment of the pipeline on Monday please?

Thanks and apologies for disturbing you break!

Orla

From: [REDACTED]
Sent: 07 June 2012 07:56
To: Orla Ryan
Cc: Jon Hancox
Subject: RE: Corrib - Earthquake off Belmullet

Orla

I was intrigued so I did a quick search. The expected frequency of earthquakes of this magnitude in Belmullet is 1 in 50 years.
<http://www.chinci.com/travel/pax/q/2966208/Belmullet/IE/Ireland/0#>
 Earthquakes are generally caused by movement of the earth's crust either side of a fault line. If we are certain that there are no fault lines crossing the pipeline route then there is no concern. Even if there are fault lines in the area the pipeline would be able to with stand considerable movement. There are many pipelines in areas prone to regular earthquakes of greater magnitude in places such as California, North Africa and Turkey.

Perhaps if more technical detail is required then Jon could find a geologist able to comment on likely maximum movement and we could calculate any impact on the tunnel or pipeline?

Regards

Peter Waite

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----- Original Message -----

Subject: Corrib - Earthquake off Belmullet
From: "Orla Ryan" <Orla.Ryan@dcenr.gov.ie>
Date: Wed, June 06, 2012 5:05 pm
To: [REDACTED]

Peter,

Could you give me a call please?

Thanks,

Oela

*Orla Ryan
Petroleum Affairs Division
Department of Communications, Energy & Natural Resources
29-31 Adelaide Road
Dublin 2*

Tel: +353 1 678 2135

Fax: +353 1 678 2619

Email: Orla.Ryan@dcenr.gov.ie

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Orla Ryan

From: Ciarán Ó hÓbáin
Sent: 12 June 2012 15:54
To: Orla Ryan
Cc: Michael.J Purcell; Mary Nolan
Subject: FW: CCMC

Attachments: Letter to O Connell Clarke Solicitors re CCMC (18.05.2012).pdf



Letter to O Connell
Clarke Sol... Orla

Copy of response to letter of 7 June.

Ciarán

-----Original Message-----

From: Ciarán Ó hÓbáin
Sent: 12 June 2012 15:53
Subject: RE: CCMC

Dear [REDACTED]

Thank you for your letter of 7 June, 2012 with regard to the most recent issues you raise in relation to the Corrib Gas Pipeline Development.

With regard to your suggestion that an investigation should be carried out by an independent consultant in relation to any potential environmental or safety impact which the recent earthquake that occurred off the Mayo coast, may have had on the Corrib Development, I would like to confirm that the results of the post event survey being undertaken by the developer will be reviewed by this Department in liaison with independent consultants Environ and any issues arising will be fully considered.

(35)

Orla Ryan

From: [REDACTED]
Sent: 13 June 2012 10:29
To: Orla Ryan
Cc: Ciarán Ó hÓbáin; [REDACTED]om
Subject: FW: EQ WoI 6th June 2012
Attachments: WoI EQ 6-06-12 Summary.pdf

Orla,

Here is a set of slides on the earthquake. The survey photos from the Normand Subsea will be available in due course.

Regards,
Gerry

From: Conroy, John j SEPIL-UIE/T/I
Sent: Wednesday, June 13, 2012 10:16 AM
To: Noel Murphy
Cc: Michael Hanrahan; Costello, Gerry SEPIL-UIE/T/I; Michael Hanrahan
Subject: EQ WoI 6th June 2012

Noel,

Ref the recent reported earthquake offshore the west coast of Ireland, we have pulled together some slides here re its location in relation to the Corrib Field infrastructure for review with management. I thought you might be interested in having a look as well from a general interest perspective.

Regards,
John

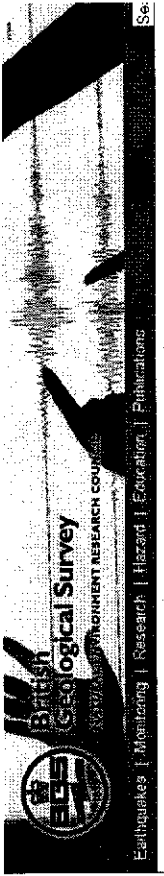


EARTHQUAKE – WEST OF IRELAND

Review

Confidential

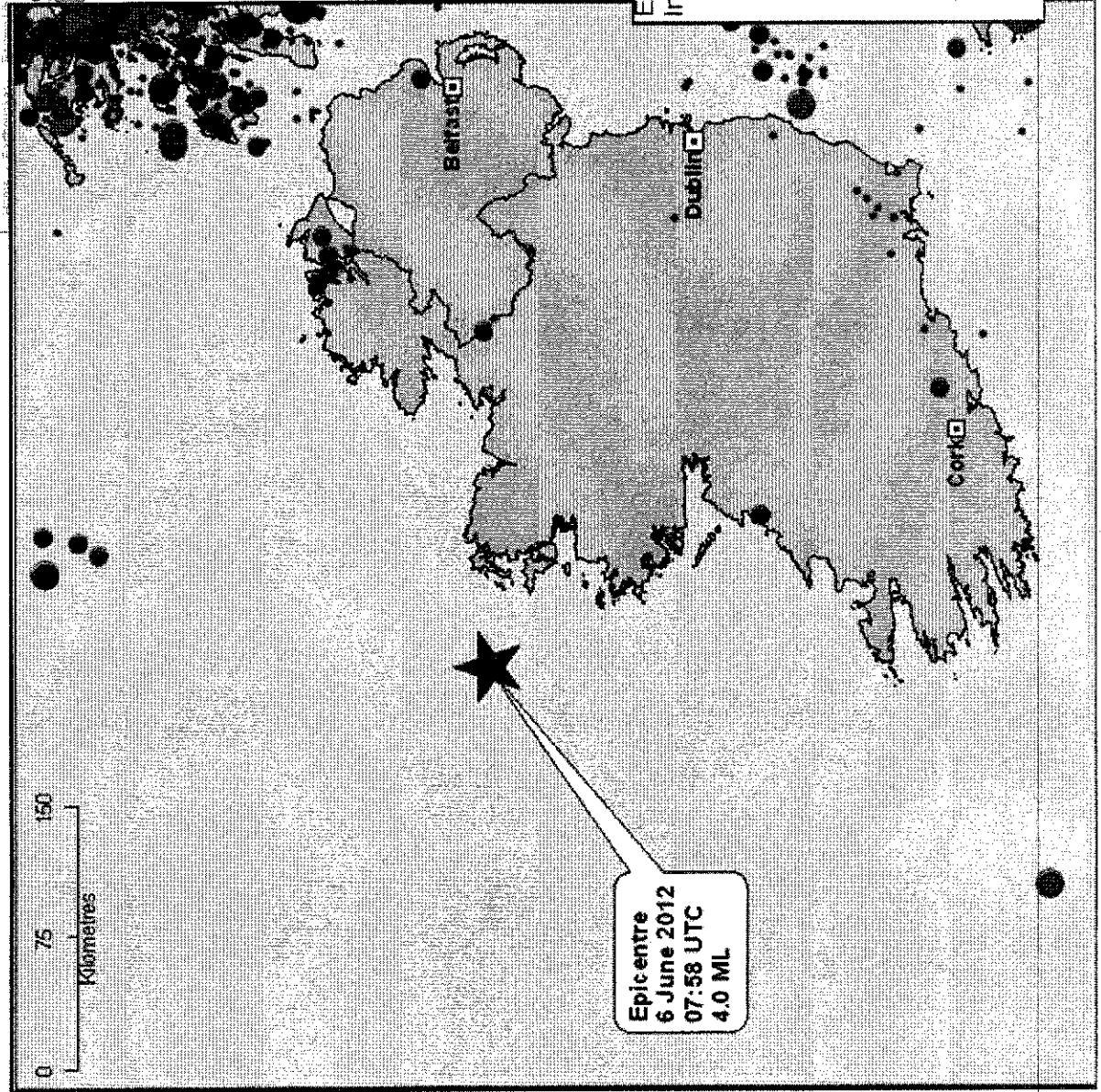
Earthquake details and BGS location map



Summary
 Maps Additional information Did You Feel It?

DATE	06/06/2012
ORIGIN TIME	07:58:13.9 UTC
LOCATION	54.151 -10.904
DEPTH	3 km
MAGNITUDE	4.0
LOCALITY	WEST COAST OF IRELAND
OFF W COAST OF IRELAND	

Location is approximately 50km west of Belmullet, County Mayo. Felt in the Counties of Mayo, Sligo and Galway



European Macroseismic Intensity Scale

1. Not felt — detected by seismic instruments only
2. Very weak — felt by very few people
3. Weak — felt by a few people indoors
4. Noticed by many people, windows and doors rattle
5. Strong — some small objects fall over
6. Slightly damaging — objects fall off shelves
7. Damaging — parts of chimneys fall
8. Very damaging — large cracks in walls
9. Destructive — some houses collapse
10. Very destructive — many houses collapse
11. Devastating — most ordinary buildings collapse
12. Completely devastating — practically all structures above and below ground are heavily damaged or destroyed

Regional cross section

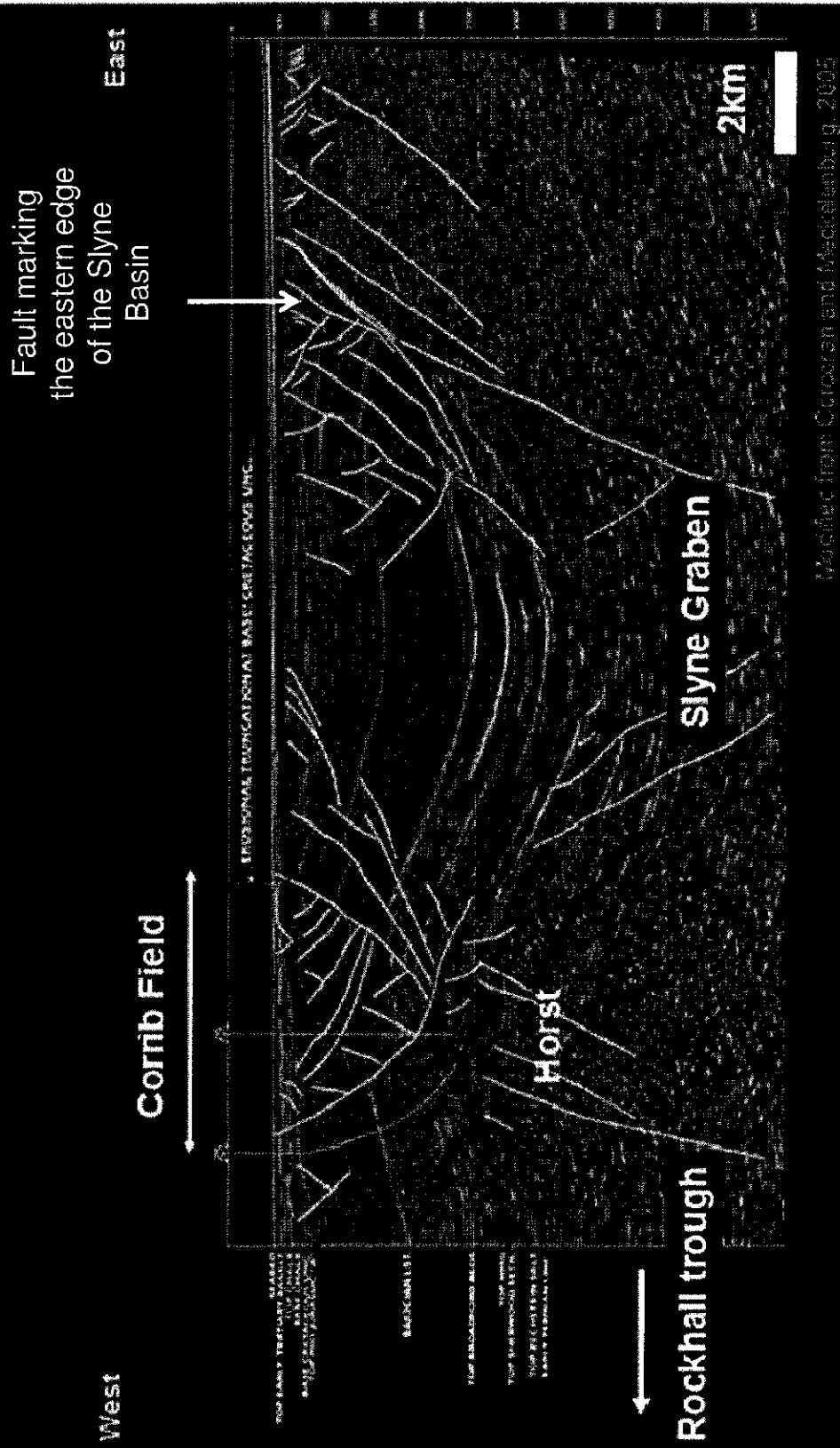


Fig.4: Corrib Cross section, (modified from Corcoran and Meckelenburg, 2005).

Observations

- Structural elements maps indicate that the earthquake epicenter is associated with existing known fault zones southeast of the Corrib Field area - the N-S trending fault marking the eastern edge of the Slyne basin and the E-W trending Central Slyne Transfer Zone (CSTZ).
- Any movement caused by the earthquake is most likely to have been accommodated by the fault systems around the epicenter (Slyne Basin bounding fault and CSTZ).
- Corrib lies on a separate structure in the centre of the Slyne Basin with fault trends predominantly along field and at different orientations to the predominant trend in the area of the epicenter.
- It is considered highly unlikely that a Magnitude 4 earthquake would have resulted in fault reactivation in the vicinity of the Corrib Field and/or damage to the subsurface wells or equipment.

Recommendations

- Following on from the earthquake on June 6th, 2012 along the fault marking the eastern margin of the Slyne basin, any potential damage to the subsurface wells or equipment in the Corrib Field and/or any damage to the Corrib infrastructure is considered highly unlikely.
- To provide additional support for this view and as an additional precautionary measure, a visual survey of the subsea infrastructure was undertaken in the days following the reported earthquake, using the Norman Subsea DSV.
- The visual inspection survey showed that there was no evidence of any structural damage to the well and subsea equipment.

Orla Ryan

From: Jonathan Hancox [REDACTED]
Sent: 14 June 2012 05:27
To: Orla Ryan
Cc: peter@astriduk.co.uk
Subject: RE: Corrib - Earthquake off Belmullet

Orla

I've been discussing this with Peter and we think it is worth specifically asking SEPIL:

- To demonstrate that the governing load on the pipe is the operational pressure and fluid flow loading at 345bar or the load imposed during pipe laying and that all accidental loads and environmental loads defined in the governing codes are less. They should include consideration of earthquakes and the 1 in 100 year event calculated from the 1 in 475 year data quoted - the load may be an acceleration or it may be a displacement. Other considerations would be free span lengths and current drag loadings, vortex shedding etc.

Regards

Jon

From: [REDACTED]
Sent: 12 June 2012 10:13
To: Orla Ryan
Cc: Jonathan Hancox
Subject: RE: Corrib - Earthquake off Belmullet
Importance: High

Orla

Pipelines are normally designed taking account of the largest loads they are likely to experience during their life including, transport, loading, installation and operation. Operational loads include those due to the pressure and flow of the fluid they contain and the externally imposed loads from the environment, both normal and accidental (such as earthquake loading). Normal practice is to design the pipeline to withstand the largest of these loads taking account of the likelihood of extreme events.

In the case of the Corrib pipeline the original design pressure (345 bar) and the forces imposed during laying of the offshore section will have determined the strength and therefore material and wall thickness of the pipe. In the North Sea and North Atlantic regions these loads dominate over the environmental or accidental loadings and provide a margin of safety for any loadings due to earthquakes experienced in the region. The risk of earthquakes of magnitude 5 or more is assessed by BGS as less than very low, the lowest risk assigned to any area. Earthquakes of magnitude less than 5 in these low risk areas will not give rise to forces on the pipeline greater than their design allows for.

Details of statements in the EIS and code requirements follow:

The EIS Volume 2 Book 6 of 6 Appendix Q6.4 Section 6.3.2.16 states that as the area is categorised as less than very low for earthquake risk. DNV state "Hence, in accordance with the codes, the pipeline design incorporates no specific provision for seismic activity".

Note that the BGS reference upon which they rely is only addressing Magnitude 5 and higher events (it does not define the scale). The recent Belmullet event was Magnitude 4 (i.e. ten times smaller).

The EIS Appendix Q6.3 has considered seismic events leading to a release from the sub sea equipment and onshore in the Qualitative Risk Assessment. However these were screened out of consideration for the Quantitative Risk Assessment by DNV see Appendix Q6.4 6.3.2 as being a non-credible cause for loss of containment.

The Corrib pipeline has been designed in conformance with the recognised codes as defined in the EIS and also confirmed with the NSAI. These codes require consideration of earthquake loads as accidental loads (see e.g. DNV-OS-F101 quoted below). The requirement is to consider earthquakes with a much longer return period (1 in 475 years) than that of the recent Belmullet earthquake (stated to be 1 in 50 years) and therefore the design should take into account a much more severe event, if necessary. The design has been independently verified by DNV as conforming with their code in its offshore section and the other relevant codes onshore.

Relevant Codes:

1. Offshore Standard DNV-OS-F101, October 2007

Sec. 4 Design - Loads

C 500 Earthquake

501 Load imposed by earth quake, either directly or indirectly (e.g. due to failure of pipeline gravel supports), shall be classified into accidental or environmental loads, depending on the probability of earthquake occurrence in line with accidental loads in F.

Guidance note:

Earth quake with 475 years return period may be taken from International seismic zonation charts as in Eurocode 8. This can then be converted by importance factors to 100 years return period.

[F 100 General

101 Loads which are imposed on a pipeline system under abnormal and unplanned conditions and with an annual probability of occurrence less than 10^{-2} shall be classified as accidental loads.

102 Typical accidental loads can be caused by:

- extreme wave and current loads
- vessel impact or other drifting items (collision, grounding, sinking, iceberg)
- dropped objects
- seabed movement and/or mud slides
- explosion
- fire and heat flux
- operational malfunction
- dragging anchors.

103 Size and frequency of accidental loads, for a specific pipeline system, may be defined through risk analyses. Reference is also made to DNV-RP-F107 Risk Assessment of Pipeline Protection.

2. IS 328 2003

No mention of earthquake

3. BS 8010 Part 1

6.4.6 Fatigue

6.4.6.1 General

All cyclic stresses due to pressure, thermal, or external loading, occurring during the entire life of the

pipeline, should be taken into account when establishing the predicted significance or effect of fatigue.

In the assessment of stress ranges, the effect of construction that can cause stress concentration should be taken into account.

All cyclic stresses between the threshold limit and the maximum allowable design stress should be

addressed (see ASTM E1049).

NOTE 1 Typical sources of cyclic stresses include:

- transportation, installation and testing activities;
- dynamic stresses (wind, waves, currents, rivers, vortex shedding, road/rail and other traffic-induced stresses);
- pulsation-induced vibration (at or near stations, reciprocating pumps and compressors);
- vibrations caused by surge and product flow;
- full stress cycles (start-up to shutdown cycles);
- fluctuations in operational (pressure and thermal) cycles;
- external thermal stress cycles (above-ground pipelines);
- earthquakes and ground movements.

F.2.3 Terrain and subterranean conditions, including geotechnical and hydrographical conditions

The geography of the terrain traversed can be broadly separated into surface topography and subterranean

geology, and it is usually convenient to consider both natural and man-made geographical features under

these two headings.

The potential impact to local water supplies and ground water regimes should be minimized.

The principal geographical features which are likely to be encountered and should be taken into account

include:

a) land surface:

- 1) agricultural: crops, livestock, woodlands;
- 2) heritage: natural beauty, archaeological, ornamental;
- 3) natural barriers: rivers, mountains;
- 4) natural resources: water catchment areas, forestry;
- 5) occupation: population, communications, services;
- 6) physical: contouring, soil or rock type, water, soil corrosivity;
- 7) environmental: designated areas, protected habitats, flora and fauna;

b) subterranean:

- 1) geological features;
- 2) infill land and waste disposal sites, including those contaminated by disease, radioactivity or chemicals;
- 3) the proximity of past, present and future mineral extractions, including uncharted workings, pipelines and underground services;
- 4) areas of geological instability, including faults, fissuring and earthquake zones;
- 5) existing or potential areas of land slippage, subsidence and differential settlement;
- 6) tunnels;
- 7) ground water hydrology, including flood plains.

Adverse geotechnical and hydrographic conditions should be identified and mitigating measures defined.

In some instances, it can be necessary also to review meteorological conditions.

G.3 Environmental loads

G.3.1 Classification

Loads arising from the environment are classified as environmental, except where they need to be

considered as functional (see G.2) or, due to a low probability of occurrence, as accidental (see G.5).

Environmental loads can occur on above-ground pipework, buried pipelines and pipelines within water

crossings. Above-ground pipework is subject to wind, snow and ice.

Buried pipelines are affected by road and rail traffic but could also be subject to subsidence due

to mining,
 earthquake or other surface and sub-surface instability.
 Loads from vibrations of equipment and displacements caused by structures on the ground are also examples of environmental loads.

G.3.5 Earthquakes

Consideration should be given to pipelines located in regions of known earthquake activity. The following effects should be taken into account when designing such pipelines: direction, magnitude and acceleration of fault displacements. In particular, the following should be taken into account:

- a) flexibility of the pipeline to accommodate displacements for the design case;
- b) mechanical properties of the carrier pipe under pipeline operating pressure (conditions);
- c) design for mitigation of pipeline stresses during displacement caused by soil properties for buried crossings and inertial effects for above-ground fault crossings;
- d) induced effects (liquefaction, landslides);
- e) mitigation of exposure to surrounding area by pipeline fluids;
- f) engineered backfill that can flow around pipe and reduce twisting and sagging or hogging.

4. IGEM/TD/1

Has similar requirements to BS8010- in particular section 6.7.10 of TD1 but is not available electronically

Finally the US Code (not used in the design of Corrib also has reference to earthquakes but is not as specific or as stringent as the DNV/BS/IGEM requirements:

5. U.S. Pipeline Safety Regulations (i.e. 49 CFR Parts 191, 192, 194 and 195)

TITLE 49--Transportation

Subtitle B--OTHER REGULATIONS RELATING TO TRANSPORTATION

CHAPTER I--PIPELINE AND HAZARDOUS MATERIALS SAFETY ADMINISTRATION, DEPARTMENT OF TRANSPORTATION

SUBCHAPTER D--PIPELINE SAFETY

PART 191--TRANSPORTATION OF NATURAL AND OTHER GAS BY PIPELINE; ANNUAL REPORTS, INCIDENT REPORTS, AND SAFETY-RELATED CONDITION REPORTS

Appendix C to Part 195-Guidance for Implementation of an Integrity Management Program

B. The rule requires an operator to include a process in its program for identifying which pipeline segments could affect a high consequence area and to take measures to prevent and mitigate the consequences of a pipeline failure that could affect a high consequence area. (See §§195.452 (f) and (i).) Thus, an operator will need to consider how each pipeline segment could affect a high consequence area. The primary source for the listed risk factors is a US DOT study on instrumented Internal Inspection devices (November 1992). Other sources include the National Transportation Safety Board, the Environmental Protection Agency and the Technical Hazardous Liquid Pipeline Safety Standards Committee. The following list provides guidance to an operator on both the mandatory and additional factors:

(12) Potential natural forces inherent in the area (flood zones, earthquakes, subsidence areas, etc.)

Peter Waite

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----- Original Message -----

Subject: RE: Corrib - Earthquake off Belmullet
 From: "Orla Ryan" <Orla.Ryan@dcenr.gov.ie>
 Date: Tue, June 12, 2012 7:59 am
 To: <peter@astriduk.co.uk>

Sorry for not responding yesterday Peter – I was out of the office unexpectedly. I would be very grateful if you could provide me with some text for response to the PQ as early as possible this morning, this question should have left me for upward clearance yesterday – it's for response tomorrow!

Thanks,

Orla

From: [REDACTED]
Sent: 10 June 2012 22:31
To: Orla Ryan
Subject: RE: Corrib - Earthquake off Belmullet

Orla

I need to check the statements made in the EIS - I doubt that a "design earthquake" would really feature as the critical load factor in the design. I also need to check any requirements for this assessment in the codes - would Tuesday be OK to do this?

Peter Waite

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----- Original Message -----

Subject: RE: Corrib - Earthquake off Belmullet

From: "Orla Ryan" <Orla.Ryan@dcenr.gov.ie>

Date: Fri, June 08, 2012 5:27 pm

To: [REDACTED]

Thanks for this Peter.

On a slightly separate note, the following Parliamentary Question has been put to our Minister

"To ask the Minister for Communications, Energy and Natural Resources his position with regard to assessment of prospective loss, damage or injury arising from earthquake or tsunami on the Corrib gas pipeline, however unlikely such occurrences may be;; and if he will make a statement on the matter."

We need to be able to say what levels of movement etc the Corrib design allows for and what level of earthquake it could reasonably be expected to withstand. I wonder if it would be possible to give me some material for response based on your assessment of the pipeline on Monday please?

Thanks and apologies for disturbing you break!

Orla

From: [REDACTED]

Sent: 07 June 2012 07:56

To: Orla Ryan

Cc: Jon Hancox

Subject: RE: Corrib - Earthquake off Belmullet

Orla

I was intrigued so I did a quick search. The expected frequency of earthquakes of this magnitude in Belmullet is 1 in 50 years.

<http://www.chinci.com/travel/pax/q/2966208/Belmullet/IE/Ireland/0#>

Earthquakes are generally caused by movement of the earth's crust either side of a fault line. If we are certain that there are no fault lines crossing the pipeline route then there is no concern. Even if there are fault lines in the area the pipeline would be able to withstand considerable movement. There are many pipelines in areas prone to regular earthquakes of greater magnitude in places such as California, North Africa and Turkey.

Perhaps if more technical detail is required then Jon could find a geologist able to comment on likely maximum movement and we could calculate any impact on the tunnel or pipeline?

Regards

Peter Waite

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----- Original Message -----

Subject: Corrib - Earthquake off Belmullet
 From: "Orla Ryan" <Orla.Ryan@dcenr.gov.ie>
 Date: Wed, June 06, 2012 5:05 pm
 To: [REDACTED]

Peter,

Could you give me a call please?

Thanks,

Oela

*Orla Ryan
 Petroleum Affairs Division
 Department of Communications, Energy & Natural Resources
 29-31 Adelaide Road
 Dublin 2*

*Tel: +353 1 678 2135
 Fax: +353 1 678 2619
 Email: Orla.Ryan@dcenr.gov.ie*

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an t-eolas. Murab ionann tusa agus an té a bhfuil an teachtaireacht ceaptha dó bíodh a fhios agat nach gceadaítear nochtadh, cóipeáil, scaipeadh nó úsáid an eolais agus/nó an chomhaid seo. Más trí earráid a fuair tú an teachtaireacht leictreonach seo cuir, más é do thoil é, an té ar sheol an teachtaireacht ar an eolas láithreach.
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Orla Ryan

From: Orla Ryan
Sent: 15 June 2012 13:20
To: [REDACTED]
Subject: FW: Corrib - Earthquake off Belmullet

Agnes,

In light of recent earthquake activities, Environ ahs requested the following information

- That SEPIL demonstrate that the governing load on the pipe is the operational pressure and fluid flow loading at 345bar or the load imposed during pipe laying and that all accidental loads and environmental loads defined in the governing codes are less. They should include consideration of earthquakes and the 1 in 100 year event calculated from the 1 in 475 year data quoted - the load may be an acceleration or it may be a displacement. Other considerations would be free span lengths and current drag loadings, vortex shedding etc.

I would appreciate SEPIL's response in this matter please.

Regards,

Orla

From: [REDACTED]
Sent: 12 June 2012 10:13
To: Orla Ryan
Cc: Jonathan Hancox
Subject: RE: Corrib - Earthquake off Belmullet
Importance: High

Orla

Pipelines are normally designed taking account of the largest loads they are likely to experience during their life including, transport, loading, installation and operation. Operational loads include those due to the pressure and flow of the fluid they contain and the externally imposed loads from the environment, both normal and accidental (such as earthquake loading). Normal practice is to design the pipeline to withstand the largest of these loads taking account of the likelihood pf extreme events.

In the case of the Corrib pipeline the original design pressure (345 bar) and the forces imposed during laying of the offshore section will have determined the strength and therefore material and wall thickness of the pipe. In the North Sea and North Atlantic regions these loads dominate over the environmental or accidental loadings and provide a margin of safety for any loadings due to earthquakes experienced in the region. The risk of earthquakes of magnitude 5 or more is assessed by BGS as less than very low, the lowest risk assigned to any area. Earthquakes of magnitude less than 5 in these low risk areas will not give rise to forces on the pipeline greater than their design allows for.

Details of statements in the EIS and code requirements follow:

The EIS Volume 2 Book 6 of 6 Appendix Q6.4 Section 6.3.2.16 states that as the area is categorised as less than very low for earthquake risk. DNV state "Hence, in accordance with the codes, the pipeline design incorporates no specific provision for seismic activity".

Note that the BGS reference upon which they rely is only addressing Magnitude 5 and

higher events (it does not define the scale). The recent Belmullet event was Magnitude 4 (i.e. ten times smaller).

The EIS Appendix Q6.3 has considered seismic events leading to a release from the sub sea equipment and onshore in the Qualitative Risk Assessment. However these were screened out of consideration for the Quantitative Risk Assessment by DNV see Appendix Q6.4 6.3.2 as being a non-credible cause for loss of containment.

The Corrib pipeline has been designed in conformance with the recognised codes as defined in the EIS and also confirmed with the NSAI. These codes require consideration of earthquake loads as accidental loads (see e.g. DNV-OS-F101 quoted below). The requirement is to consider earthquakes with a much longer return period (1 in 475 years) than that of the recent Belmullet earthquake (stated to be 1 in 50 years) and therefore the design should take into account a much more severe event, if necessary. The design has been independently verified by DNV as conforming with their code in its offshore section and the other relevant codes onshore.

Relevant Codes:

1. Offshore Standard DNV-OS-F101, October 2007

Sec. 4 Design - Loads

C 500 Earthquake

501 Load imposed by earth quake, either directly or indirectly (e.g. due to failure of pipeline gravel supports), shall be classified into accidental or environmental loads, depending on the probability of earthquake occurrence in line with accidental loads in F.

Guidance note:

Earth quake with 475 years return period may be taken from International seismic zonation charts as in Eurocode 8. This can then be converted by importance factors to 100 years return period.

[F 100 General

101 Loads which are imposed on a pipeline system under abnormal and unplanned conditions and with an annual probability of occurrence less than 10^{-2} shall be classified as accidental loads.

102 Typical accidental loads can be caused by:

- extreme wave and current loads
- vessel impact or other drifting items (collision, grounding, sinking, iceberg)
- dropped objects
- seabed movement and/or mud slides
- explosion
- fire and heat flux
- operational malfunction
- dragging anchors.

103 Size and frequency of accidental loads, for a specific pipeline system, may be defined through risk analyses. Reference is also made to DNV-RP-F107 Risk Assessment of Pipeline Protection.

2. IS 328 2003

No mention of earthquake

3. BS 8010 Part 1

6.4.6 Fatigue

6.4.6.1 General

All cyclic stresses due to pressure, thermal, or external loading, occurring during the entire life of the pipeline, should be taken into account when establishing the predicted significance or effect of fatigue.

In the assessment of stress ranges, the effect of construction that can cause stress concentration should be taken into account.

All cyclic stresses between the threshold limit and the maximum allowable design stress should be addressed (see ASTM E1049).

NOTE 1 Typical sources of cyclic stresses include:

- transportation, installation and testing activities;
- dynamic stresses (wind, waves, currents, rivers, vortex shedding, road/rail and other traffic-induced stresses);
- pulsation-induced vibration (at or near stations, reciprocating pumps and compressors);
- vibrations caused by surge and product flow;
- full stress cycles (start-up to shutdown cycles);
- fluctuations in operational (pressure and thermal) cycles;
- external thermal stress cycles (above-ground pipelines);
- earthquakes and ground movements.

F.2.3 Terrain and subterranean conditions, including geotechnical and hydrographical conditions

The geography of the terrain traversed can be broadly separated into surface topography and subterranean geology, and it is usually convenient to consider both natural and man-made geographical features under these two headings.

The potential impact to local water supplies and ground water regimes should be minimized. The principal geographical features which are likely to be encountered and should be taken into account include:

a) land surface:

- 1) agricultural: crops, livestock, woodlands;
- 2) heritage: natural beauty, archaeological, ornamental;
- 3) natural barriers: rivers, mountains;
- 4) natural resources: water catchment areas, forestry;
- 5) occupation: population, communications, services;
- 6) physical: contouring, soil or rock type, water, soil corrosivity;
- 7) environmental: designated areas, protected habitats, flora and fauna;

b) subterranean:

- 1) geological features;
- 2) infill land and waste disposal sites, including those contaminated by disease, radioactivity or chemicals;
- 3) the proximity of past, present and future mineral extractions, including uncharted workings, pipelines and underground services;
- 4) areas of geological instability, including faults, fissuring and earthquake zones;
- 5) existing or potential areas of land slippage, subsidence and differential settlement;
- 6) tunnels;
- 7) ground water hydrology, including flood plains.

Adverse geotechnical and hydrographic conditions should be identified and mitigating measures defined.

In some instances, it can be necessary also to review meteorological conditions.

G.3 Environmental loads

G.3.1 Classification

Loads arising from the environment are classified as environmental, except where they need to be considered as functional (see G.2) or, due to a low probability of occurrence, as accidental (see G.5).

Environmental loads can occur on above-ground pipework, buried pipelines and pipelines within water

crossings. Above-ground pipework is subject to wind, snow and ice. Buried pipelines are affected by road and rail traffic but could also be subject to subsidence due to mining, earthquake or other surface and sub-surface instability. Loads from vibrations of equipment and displacements caused by structures on the ground are also examples of environmental loads.

G.3.5 Earthquakes

Consideration should be given to pipelines located in regions of known earthquake activity. The following effects should be taken into account when designing such pipelines: direction, magnitude and acceleration of fault displacements. In particular, the following should be taken into account:

- a) flexibility of the pipeline to accommodate displacements for the design case;
- b) mechanical properties of the carrier pipe under pipeline operating pressure (conditions);
- c) design for mitigation of pipeline stresses during displacement caused by soil properties for buried crossings and inertial effects for above-ground fault crossings;
- d) induced effects (liquefaction, landslides);
- e) mitigation of exposure to surrounding area by pipeline fluids;
- f) engineered backfill that can flow around pipe and reduce twisting and sagging or hogging.

4. IGEM/TD/1

Has similar requirements to BS8010- in particular section 6.7.10 of TD1 but is not available electronically

Finally the US Code (not used in the design of Corrib also has reference to earthquakes but is not as specific or as stringent as the DNV/BS/IGEM requirements:

5. U.S. Pipeline Safety Regulations (i.e. 49 CFR Parts 191, 192, 194 and 195)

TITLE 49--Transportation

Subtitle B--OTHER REGULATIONS RELATING TO TRANSPORTATION

CHAPTER I--PIPELINE AND HAZARDOUS MATERIALS SAFETY ADMINISTRATION, DEPARTMENT OF TRANSPORTATION

SUBCHAPTER D--PIPELINE SAFETY

PART 191--TRANSPORTATION OF NATURAL AND OTHER GAS BY PIPELINE; ANNUAL REPORTS, INCIDENT REPORTS, AND SAFETY-RELATED CONDITION REPORTS

Appendix C to Part 195-Guidance for Implementation of an Integrity Management Program

B. The rule requires an operator to include a process in its program for identifying which pipeline segments could affect a high consequence area and to take measures to prevent and mitigate the consequences of a pipeline failure that could affect a high consequence area. (See §§195.452 (f) and (i).) Thus, an operator will need to consider how each pipeline segment could affect a high consequence area. The primary source for the listed risk factors is a US DOT study on instrumented Internal Inspection devices (November 1992). Other sources include the National Transportation Safety Board, the Environmental Protection Agency and the Technical Hazardous Liquid Pipeline Safety Standards Committee. The following list provides guidance to an operator on both the mandatory and additional factors:

(12) Potential natural forces inherent in the area (flood zones, earthquakes, subsidence areas, etc.)

Peter Waite

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----- Original Message -----

Subject: RE: Corrib - Earthquake off Belmullet
From: "Orla Ryan" <Orla.Ryan@dcenr.gov.ie>
Date: Tue, June 12, 2012 7:59 am
To: [REDACTED]

Sorry for not responding yesterday Peter – I was out of the office unexpectedly. I would be very grateful if you could provide me with some text for response to the PQ as early as possible this morning, this question should have left me for upward clearance yesterday – it's for response tomorrow!

Thanks,

Orla

From: [REDACTED]
Sent: 10 June 2012 22:31
To: Orla Ryan
Subject: RE: Corrib - Earthquake off Belmullet

Orla

I need to check the statements made in the EIS - I doubt that a "design earthquake" would really feature as the critical load factor in the design. I also need to check any requirements for this assessment in the codes - would Tuesday be OK to do this?

Peter Waite

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----- Original Message -----

Subject: RE: Corrib - Earthquake off Belmullet

From: "Orla Ryan" <Orla.Ryan@dcenr.gov.ie>

Date: Fri, June 08, 2012 5:27 pm

To: [REDACTED]

Thanks for this Peter.

On a slightly separate note, the following Parliamentary Question has been put to our Minister

"To ask the Minister for Communications, Energy and Natural Resources his position with regard to assessment of prospective loss, damage or injury arising from earthquake or tsunami on the Corrib gas pipeline, however unlikely such occurrences may be;; and if he will make a statement on the matter."

We need to be able to say what levels of movement etc the Corrib design allows for and what level of earthquake it could reasonably be expected to withstand. I wonder if it would be possible to give me some material for response based on your assessment of the pipeline on Monday please?

Thanks and apologies for disturbing you break!

Orla

From: [REDACTED]
Sent: 07 June 2012 07:56
To: Orla Ryan
Cc: Jon Hancox
Subject: RE: Corrib - Earthquake off Belmullet

Orla

I was intrigued so I did a quick search. The expected frequency of earthquakes of this magnitude in Belmullet is 1 in 50 years.

<http://www.chinci.com/travel/pax/q/2966208/Belmullet/IE/Ireland/0#>

Earthquakes are generally caused by movement of the earth's crust either side of a fault line. If we are certain that there are no fault lines crossing the pipeline route then there is no concern. Even if there are fault lines in the area the pipeline would be able to with stand considerable movement. There are many pipelines in areas prone to regular earthquakes of greater magnitude in places such as California, North Africa and Turkey.

Perhaps if more technical detail is required then Jon could find a geologist able to comment on likely maximum movement and we could calculate any impact on the tunnel or pipeline?

Regards

Peter Waite

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----- Original Message -----

Subject: Corrib - Earthquake off Belmullet
 From: "Orla Ryan" <Orla.Ryan@dcenr.gov.ie>
 Date: Wed, June 06, 2012 5:05 pm
 To: [REDACTED]

Peter,

Could you give me a call please?

Thanks,

Oela

*Orla Ryan
 Petroleum Affairs Division
 Department of Communications, Energy & Natural Resources
 29-31 Adelaide Road
 Dublin 2*

*Tel: +353 1 678 2135
 Fax: +353 1 678 2619
 Email: Orla.Ryan@dcenr.gov.ie*

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ar sheol an teachtaireacht ar an eolas láithreach.
Deimhnítear leis seo freisin nár aimsíodh víreas sa phost seo tar éis a scanadh.

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From: Jonathan Hancox [REDACTED]
Sent: 18 June 2012 20:48
To: Orla Ryan
Cc: [REDACTED]
Subject: Update on issues

Orla

4. **Post-earthquake investigation and data requests.** Is there any information/update from SEPIL in relation to:
- a. SEPIL's post-event inspection of its facilities
 - b. SEPIL's response to our design queries as per my email of 14/6/12 (attached).

Regards

Jon



Jon Hancox | Senior Manager

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Orla Ryan

From: Orla Ryan
Sent: 19 June 2012 07:57
To: 'agnes.mclaverty@shell.com'; 'Aoife.Reynolds@shell.com'
Cc: Michael.J.Purcell; Mary Nolan
Subject: FW: Update on issues
Attachments: RE: Pre- Commissioning Activity; Dewatering noise; RE: Data Request; RE: Data Request; RE: Data Request

Agnes, Aoife,

Please see below Environ's request for updates. I have advised of your most recent updates re dewatering noise and chemical analysis. You might advise with regard to the other issues please.

Thanks and Regards,

Orla

4. **Post-earthquake investigation and data requests.** Is there any information/update from SEPIL in relation to:
- a. SEPIL's post-event inspection of its facilities
 - b. SEPIL's response to our design queries as per my email of 14/6/12 (attached).

Regards

Jon



Jon Hancox | Senior Manager
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PARLIAMENTARY QUESTION NO. 135**Dail Eireann**

To ask the Minister for Communications, Energy and Natural Resources his position with regard to assessment of prospective loss, damage or injury arising from earthquake or tsunami on the Corrib gas pipeline, however unlikely such occurrences may be; and if he will make a statement on the matter.

- Catherine Murphy.

* For WRITTEN answer on Wednesday, 13th June, 2012.

Ref No: 28568/12 **Proof:** 170

REPLY**Minister for Communications, Energy and Natural Resources (Mr. P. Rabbitte)**

I am advised by independent expert consultants engaged by my Department to monitor compliance with the conditions of the Corrib consents under the Gas and Petroleum Acts, that pipelines are normally designed taking account of the largest loads they are likely to experience during their life including, transport, loading, installation and operation. Operational loads include those due to the pressure and flow of the fluid they contain and the externally imposed loads from the environment, both normal and accidental (such as earthquake loading). Normal practice is to design the pipeline to withstand the largest of these loads taking account of the likelihood of extreme events.

I am further advised that in the case of the Corrib pipeline the original design pressure (345 bar) and the forces imposed during laying of the offshore section will have determined the strength and therefore material and wall thickness of the pipe. In the North Sea and North Atlantic regions these loads dominate over the environmental or accidental loadings and provide a margin of safety for any loadings due to earthquakes experienced in the region. The risk of earthquakes of magnitude

5 or more is assessed by British Geological Survey as less than very low, the lowest risk assigned to any area. Earthquakes of magnitude less than 5 in these low risk areas will not give rise to forces on the pipeline greater than their design allows for.

Shell E & P Ireland Ltd (SEPIL) has informed my Department that the Corrib wells and manifold were inspected by a subsea support vessel last week after the earthquake and it has confirmed that there has been no impact on the facilities. A report will follow to confirm this, which will be reviewed by my Department in liaison with its independent consultants. SEPIL has also advised that the observations of the pipeline system during the week confirm that there is no issue with the integrity of the pipeline. The Corrib pipeline is due to be inspected this summer, and survey reports will follow. These reports will also be considered by my Department and reviewed by the consultants.

It should additionally be noted that that the Corrib Gas Pipeline is currently at construction phase and that prior to the commissioning and coming into operation of the development, it will be the subject of a safety assessment in accordance with the Commission for Energy Regulation's recently published Petroleum Safety Framework. The development cannot, therefore, be operated without a safety permit issued in accordance with the requirements of this new risk based regime which obliges undertakings to ensure

- (i) that any petroleum activity is carried on in such a manner as to reduce any risk to safety to a level that is as low as is reasonable practicable (ALARP) and

- (ii) that any petroleum infrastructure is designed, constructed, installed, maintained, modified operated and decommissioned in such a manner as to reduce the risk to safety to a level that is ALARP.