Report on the Energy Inquiry – Volume 2
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COMMITTEE FOR ENTERPRISE, TRADE AND INVESTMENT
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MINUTES OF EVIDENCE
14 February 2001
Members present:
Mr P Doherty (Chairperson)
Mr Neeson (Deputy Chairperson)
Mrs Courtney
Dr McDonnell
Ms J Morrice
Dr O'Hagan
Witnesses:
Ms S Morrice) S Morrice & Associates Ltd
Mrs R Gries) Priority Oil and Gas LLC
1.
The Chairperson: Good afternoon, you are very welcome. I propose that you make your submission to the Committee after Ms J Morrice says a few words. We will then ask you some questions.
2.

Ms J Morrice: I want to declare an interest because Susan Morrice is my sister. I would, therefore, prefer not to ask questions during this session.

3.

Ms S Morrice: Thank you very much for inviting us here today. I would like to introduce Mrs Gries and her company, Priority Oil and Gas, from the United States and then tell you a little bit about our background. Then I will outline the history of this area and how we reached the conclusions that we will tell you about today. I will also tell you about what we see for the future, and about how important a new energy aspect would be for this area.

4.

Mrs Gries is president and chairman of Priority Oil and Gas in Denver, Colorado. Her company was particularly suited to this area because of its expertise in exploring for and developing natural gas. Additionally, the company has expertise in the infrastructure needed to convert natural gas into electricity. That will be particularly important in this area.

5.

Mrs Gries has more recently become rather famous worldwide because she has been elected president of the American Association of Petroleum Geologists, which is a global body comprising 50,000 explorers. In 84 years a woman has never been nominated for president of the group, let alone achieve it first time. I am particularly proud to have Mrs Gries as my partner in Northern Ireland because she brings a tremendous global perspective to the project.

6.

I have been based in Denver, Colorado for the last 21 years and have been working in the exploration for oil and gas internationally. Eighteen years ago, a consortium actually explored for natural gas in Fermanagh, Tyrone, Armagh, Cavan, Leitrim and Sligo.

7.

This is a geological map of Ireland. It will give the Committee some idea about what we are doing. The colours on the map represent the different rocks, the ages of which go back 400 million years. A huge geological time-span is represented on the map. I believe that the Committee has copies of the Northern Ireland section of the map. Our focus has been on the blue-coloured area, which we call the north-west carboniferous basin. The word carboniferous indicates that hydrocarbons were found here many years ago.

8.

Marathon drilled this area 38 years ago and discovered the first signs of natural gas at the Dowra Well, just across the border from the Blacklion and Belcoo areas. There was quite a significant gas flare which some of the older locals in the area remember well. That show was not significant to Marathon then because of the lack of infrastructure and the pricing of natural gas. In addition, they discovered natural gas offshore Kinsale, and they have since brought this supply onshore by pipeline into the Dublin area and to Dundalk, Cavan and Limerick. That natural gas at Kinsale has been the backbone of some of the developments that have occurred in Dublin.

9.

Eighteen years ago a consortium came to this area, and I was involved as a consultant. Again, we drilled four wells in this area, two on the northern side of the border and two on the southern side. All the wells had natural gas shows. But given the price structure, the lack of infrastructure and interest, and the different technological concepts of the time, it was not deemed the right time to proceed with the project. The whole area was left aside again, and interests were

returned to the respective governing bodies — Dublin taking responsibility of counties Leitrim, Cavan and Sligo and Belfast for the Fermanagh and Tyrone area.
10.
Eight years ago, Mrs Gries and I were very involved at a significant conference in Denver, which was attended by Ministers from all over the world. In fact, Mrs Gries was the chairperson of that conference. At that time, one of the key factors was the importance ofa country's natural gas as a backbone to its development — it was the backbone of clean development in the United States. We told those Ministers and their staff about the exploration for natural gas right into the electrical units in Colorado, and that provided a seed model to go forward on.
11.
Four and a half years ago, Mrs Gries and I discussed the validity of returning to this basin in Ireland. A lot of work had to be carried out, looking back at the old data, and some of the records were very old. More important was the new technological perspective which Priority Oil and Gas had gained — it now knew how to actually open the rocks and allow the natural gas to flow more freely and, therefore, more economically, into an area. It also recognised the importance of developing an infrastructure that makes sense for a local community, both industrial and domestic, and of creating access to the grid.
12.
Mrs Gries will outline her expertise and explain the technologies that have been adapted here. We will then take your questions.
13.
Mrs Gries: There are acute similarities between this basin and those located in the immediate surroundings of Denver, Colorado. Until approximately 15 years, Colorado was a net gas importing state. Our energy needs could not be met by our own indigenous oil and gas, of which we have considerable quantities. This was the case until new technology was developed which allowed us to excavate tight gas sands and develop the natural gas there, particularly in the Denver area, but throughout Colorado. Tight gas sands occur where there are small holes in a rock that contain the gas. However, the rock is not permeable enough to allow the gas to flow out of the rock and into a well-bore.
14.
This is a rock sample from the Fermanagh area. The white rock is sandstone — we call it reservoir rock, as it holds the gas. You can tell, even by feeling it, that it is porous. If you poured some water over the rock, you would see how porous it is. This black rock comes from Bundoran, and it is known as the source rock. The black colour is derived from the organic material that was buried with the sediment and has since been converted to hydrocarbons, mainly natural gas.
15.
Once the gas was produced, it was then squeezed into the sandstone. The problem is that the pores in the sandstone are not permeable enough for us to access the gas by simply drilling a borehole. The technology, that has been developed over many years for use in this area, is called hydraulic fracturing. A borehole is drilled, steel casing is set in it, and cement is put around the casing so that all other rocks, from the surface right down to the sandstone layer, are completely sealed off from the open borehole. That means that no fluid can go back and forth from behind that pipe, until the reservoir is reached.
16.
The section of pipe which runs through the reservoir, is perforated.

If the sandstone were very very permeable, the natural gas would automatically flow into the well-bore, allowing us to pick it up at the surface, and pipeline it off for sale.
17.
But the sandstone here does not allow gas to flow into the well-bore. Our new technological device is to pump water into the reservoir, through these holes, at such a high pressure that the sandstone is literally fractured. This creates little fissures throughout the rock. Sand is then added to the water and it passes down in to these fractures. When the water stops pumping, the cracks would close up, but they cannot because of the quartz sand, which we get from England. The natural gas can therefore flow automatically back along those fractures up into the well-bore, which can then be put in to production.
18.
Early on, this technology cost an enormous amount of money. Twenty years ago the technology could fracture rock just a short distance from the well-bore and perhaps only 15,000 pounds of sand would be packed into it — this did not make the process cost-effective. Technology has really improved in the last 15 years. Today, 10 times the amount of sand can be pumped into the rock for just half the cost of 20 years ago. It is now possible to fracture rock at a further 1,000 feet straight out from the well-bore, and up to 2,000 feet below the ground, allowing gas within this radius to flow back into the well-bore. If more gas can be accessed, the cost of this new fracturing job will be covered.
19.
Wells in the Denver basin, which were totally uneconomic, are now able to pay for themselves. They are economic enough for companies to continue to drill them and put them into production. The state of Colorado has become a net exporter of gas as a result of the new technology, and the Denver region exports one trillion ft3 of gas a year. It is an enormous help to the Colorado economy that we no longer buy in a portion of our energy, but instead produce all the energy we need and export some for use elsewhere, particularly the Chicago area, which I can assure you is a great deal colder than Denver.
20.
The technology has of course never been tried in Ireland. There are similar rock formations with tight gas sands running at around 2000-3000 ft in drill depth which can be practically exploited with small portable drilling rigs — we do not need huge structures like those in the North Sea to go into these areas. We can go around with smaller drilling rigs the size of a large lorry and drill wells to a depth of 2000-3000 ft, fracture them hydraulically, and with this effort see if we can access and test the gas known to be in the counties of Fermanagh, Tyrone, Armagh, Leitrim, Cavan and Sligo. If we can do that, we can find out — it is to be hoped in the next year or two — whether they will be economically viable, with enough flow to produce saleable gas in large enough quantities.
21.
We encountered a second problem in examining the viability of this area for exploration. In the United States, if an exploration company like my own finds reservoirs of natural gas, we bring it to the surface. A gas purchaser will connect it up to his gas pipeline, examples of which are all over the United States. I offer to sell it to the person concerned for a given amount per 1000 ft3, and that is the end of the matter.
22.
However, there are no gas pipelines in this area, so we had to come up

with an idea of what we could do with the gas once we found it. At present, there is no system by which we could transport it to any place where it might be used. As you probably know from laying cables all over the country, building a pipeline is very expensive because they are buried underground, out of harm's way. After looking at the region, we felt that the most effective way of dealing with the sale of gas would probably be "gas by wire", in other words gathering it at a central location and putting it into a gas-fired electrical generating plant. That is our idea of how we could use the gas.
23.
The advantage of moving immediately to electrification with natural gas stems from the fact that the by-product of converting natural gas to electricity is heat. We have projects in the Denver basin where this is being done. It was found that "co-gen" projects blossomed in the area, examples being greenhouse businesses, pig farms and any kind of vegetable operation. One could have pulp or incinerator operations. Any number of "co-gen" projects can draw on the waste heat from converting gas to electricity. We see this as a quite attractive way of using the process in the area.
24.
Our big question at this point is whether the volumes are economic. Can we produce and sell the gas in a way that would pay for the drilling and testing of the wells? That is the point we are at now.
25.
Ms S Morrice: Working a cross-border project of this magnitude, which involves both Government Departments means that there are different types of incentive schemes on either side of the border. These are very interesting. In the South, the Government has reduced its corporate tax rate substantially, but it has also done away with the Government royalty. That means that we can find less gas in Leitrim, Cavan, Monaghan and Sligo, and there will still be an economic gain, because the Government taxation rate is not as onerous on the driller.
26.
In Northern Ireland the Government has a 7·5% royalty and a higher corporate tax rate. That has not made the situation impossible, because we are forging ahead on both sides of the border now. However, when economics start to dictate operations, my concerns would be that the focus of drilling may be in Cavan, Leitrim and Monaghan, on account of the incentive scheme available there.
27.
We are also dealing with the rather different issues of planning permission and development on both sides of the border. I am lucky, in that I studied at Trinity College in Dublin, therefore quite a number of my friends, with whom I studied geology, now work in the relevant Departments. On the other hand, having been born in Belfast, I know some of the geologists and people working up here. We have been able to get together to talk about how to achieve this project together. When it comes down to economic incentives, planning permission and procedures, the situation differs a great deal. I would like to find a way for such a large-scale energy project to work in a cross-border administrative setting in the future. That would make the economics of drilling for natural gas and the logistics of electrical and gas pipelines across the border more feasible for us.
28.
I thank you all for listening and for looking at the rocks. This is very much a preliminary discussion to outline what we are doing. We are here this time with a company and we have been to a number of the drilling sites to look at the exact locations involved. Hopefully, our next appearance before the Committee will be to give you the results

of the drilling or at least of the progress we have made.
29.
Dr O'Hagan: I must declare my ignorance of this subject, so please bear with me. Am I right in saying that the major consideration is location of quality reservoir rock? In the last five years, what advances have been made in locating this quality rock, and what amount has been found? If it is not too early to tell, how finite are these resources?
30.
Mrs Gries: A couple of your questions have some history to them. Nine wells have been drilled in this huge basin, which covers one million acres. Those wells gave us a lot of information about the extent of some of the reservoir rocks. The first sandstone to be drilled is the Mullaghmore sandstone, which is named after Mullaghmore Head, in north Sligo, where the sandstone crops out onto the Atlantic Ocean. That reservoir was visible in the well-bores, because of drilling that had taken place in the past.
31.
We have ways of sending down geophysical tools through the drilled sandstone, to map the thickness of that rock and its characteristics, such as how permeable and porous it is. From those old well-bores, we were able to make some calculations about how widespread that first horizon is. Under that, there are actually two or three more horizons which have prospectiveness.
32.
Our feeling is that if we do not make an economic venture out of the most shallow rock — which will be the least expensive one to develop — we will probably not be able to develop the deeper ones either. We are therefore focusing on the shallow rock. Because of those nine wells, we have some idea of the extent of the gas — we have a minimum aerial extent. We know, for instance that, at a minimum, it stretches from Garrison down to Glen Gevlin, as far east as the Glenaan Mountain, and as far west as the rocks that are cropping out around Sligo. However, where it crops out, it will no longer trap gas, therefore we have to back off the coast a little bit and find a location where the rock is completely sealed off from ocean water, or anything else.
33.
We have a fair idea of the aerial extent, and we know the thickness of the rock from drilling. What we do not know are the quantities of gas that might be stored in it. We know that there was gas, because when the early wells were drilled, gas shows came up to the surface. Some of those flared for several days.
34.
Tests showed that it is methane gas, which is very clean. At the time these were drilled, gas prices were extremely low. In the 1960s, 1000 cubic feet of gas cost 10 cents. Marathon, and other companies, would not deem this to be economical at all, because the quantities were very low, compared to those in Kinsale. It is only because of our recent technology that we can perhaps think that this will be economical. These will always be considered low-volume wells. They will not produce millions of cubic feet of gas in a day. They will always be small producers, but in the United States we gather supplies from a lot of small producers and use that. The advantage of the small producers is that they produce for a very long time, say 20 or 30 years. If you put an electrical plant on track with natural gas that way, you can count on your gas supply for 30 years. You can then continue to drill wells and add your supply to it for 50 years. It can work, even though the quantities are small, if it is done on an economy of scale.

35.
Ms S Morrice: I would like to add one extra point, because it is fascinating. These big lines running through Ireland are like the San Andreas Fault system in California, where many earthquakes have occurred. (Indicates on map) This one is quiet, but it was veryactive 300 million years ago. In fact this whole northern part of Ireland, including Donegal, was part of Canada. The rest of Ireland was part of Europe, and there was a whole ocean, called the Protoatlantic, through the middle. That sounds amazing —
36.
Dr McDonnell: We knew there was something wrong with it.
37.
Dr O'Hagan: It sounds like a new concept of the repartition of Ireland.
38.
Ms S Morrice: But we cannot get it to go backwards. Had we lived then we would have been trilobites, which are like little slaters. Why it is relevant today —
39.
Dr McDonnell: There are still a few of those around.
40.
Ms S Morrice: These major faults create major cracks in the rock which, if located, would be the sweet spots for natural gas. If we are successful in locating these cracks, we would see there being some more linear fields in this direction. So that is an additional point to Mrs Gries's more extensive response.
41.
Dr O'Hagan: On to a slightly different subject, I know that licences are required to carry out agreed work programmes, and that these have to be reported to the Department. What sort of work programmes have you developed with the Department, and how advanced are they?
42.
Mrs Gries: We have done a couple of things. We have carried out complete magnetic and gravity mapping of the area. These gravity and magnetic readings give us an idea of the bottom of the basin structure, and tells us where the old long-range faults are located. We took all of that data and made structure maps that covered the area between Lough Neagh and the west coast. This gives us the structural configuration of the entire basin. We also collected a lot of rocks and had them measured in special laboratories for organic content. In other words, we wanted to see how much organic material was available to turn into oil and gas. Then we had them measured for maturity — to see how far into the gas-making process those rocks were pushed.
43.
We took samples from everywhere — from the coast near Sligo through to the south of Lough Neagh, and in the Armagh area. We ran approximately 60 samples. We took a lot of samples out of the well bores too, and mapped the organic content, the maturity and gas-generating ability across the basin. We have done a good deal more, but those are the major projects.
44.
Mr Neeson: I am fascinated by what has been said this morning. In many ways, what you are trying to achieve reminds me of a lignite-type operation. In other words, to maximise the potential you would need to develop an on-site power station — bearing in mind that you are covering a very wide area. Can you quantify, even at this early stage, the size of the power station that could be developed to maximise the potential resources of the area.
45.
Mrs Gries: We have made projections, based on the gas production of

similar rocks in the United States, and we have come up with several case scenarios. Once we start drilling, however, none of these scenarios may apply, because there might not be enough gas production to fire even one electrical plant. That is the risk that we always take in exploration.
46.
However, from the readings that we have had so far, we will go in and assume that we will have enough gas in a certain thickness of rock to begin production. We suggest that the gas development should start with small plants — for example, five megawatt plants. If there is gas over the entire area that we are looking at in our first reservoir, we can visualise that we might have enough gas for a 110 megawatt plant, or a 330 to 350 megawatt plant — that range is very large. If we knew that we would only be able to develop enough gas to supply a five or 10 megawatt plant, I can assure you that we would never find a company willing to spend $5 million or $10 million to drill for such a small supply.
47.
We have convinced ourselves — from looking at the scientific facts and at other companies — that there could be the potential here for, at the minimum, a 110 megawatts plant. That would be very far in the future. It will take five to 10 years to drill and develop each of these well bores and gas systems. Therefore, even though we think that there could be widespread potential, we envisage small projects working up to a larger project. That will allow you to ascertain slowly whether it is economically viable — whether people can afford to drill and produce, and whether technology can be refined for this specific area.
48.
Mr Neeson: I want to move on to exploration licences. They are granted for five years and can be renewed for a further five years. Will the consortium seek to renew the existing five-year licence, and what progress on exploration still needs to be made?
49.
Ms S Morrice: Yes, we have already discussed extensions and renewals. Both sides — North and South — have been very positive about working with us. For the next phase of work we are talking about a minimum of $5 million to drill the wells. It involves "fracking" and looking at the flow rates to ascertain economic viability. We are here this week to start that process.
50.
Mr Neeson: What has the consortium's experience been of working in Northern Ireland compared to working in the Republic? Was there any difference?
51.
Ms S Morrice: Both sides have been very good to work with — particularly from a people point of view. However, it is clear that the incentives of no royalties and a lesser corporation tax in the South will have an effect on the project.
52.
Dr O'Hagan: This is not a politically loaded question. Which is the more economically viable — North or South?
53.
Ms S Morrice: From the rock point of view?
54.
Dr O'Hagan: From your company's point of view. You mentioned the lower corporation tax rates in the South, which is obviously an advantage. Which is the better economic climate to work in?
55.

Ms S Morrice: For going forward and discovering the gas, the better economic climate will be in the South.
56.
Dr O'Hagan: We need to catch up then?
57.
Ms S Morrice: Yes.
58.
Dr O'Hagan: As I said, that was not a politically loaded question. I just wanted to know which was better.
59.
Dr McDonnell: You mentioned some of the technology, and we will perhaps leave going further into that for another occasion. I am sure that you will be back with us. However, what is the environmental impact of the drilling? Is it wholesale destruction or is it environmentally sensitive?
60.
Mrs Gries: Natural gas represents one of the easiest ways of accessing energy with the least environmental impact. The drilling equipment is the size of some large lorries. It is on location at a drill site for a maximum of five or six days once the drilling environment has been learnt. It will probably start in a 70m x 100m area — to have room to move the trucks around. Once natural gas has been found in the well bore, a metre high gauge with a cap is put on. That enables them to gauge the amount of gas coming out.
61.
They connect it to a pipe which is buried in the ground to transport the gas to the gathering location. In that actual spot you end up with a pipe with a meter on it, three feet tall and very small in circumference. We usually cover it with a little kiosk, so that it is unobtrusive.
62.
Dr McDonnell: Your technology may also include horizontal drilling. Would that have any extra impact on the landscape?
63.
Mrs Gries: The effect is the same, because all drilling is carried out underground. The pipe that comes up to the surface is vertical and would still have the same type of cap.
64.
Dr McDonnell: Has community consultation been an issue?
65.
Ms S Morrice: That has actually been very important. Five years ago, before we even licensed this area, we held cross-border county council meetings. We invited all the representatives to hear about the whole concept, and asked for their feedback. We found that there is already a grouping of county councils in this very area — which practically follows the geological boundary, something they did not know about. They were rather amazed and interested.
66.
Dr McDonnell: Are you sure of that?
67.
Mrs Gries: Indeed, how do you know?
68.
Dr McDonnell: You have concentrated a lot on Fermanagh, Cavan, and Leitrim, up as far as Armagh. There are two shaded areas in Antrim on one of our maps. Who is involved in those, are they covered by two different companies?
69.
Mrs Gries: Are you talking about the Cookstown/Dungannon area?
70.

Dr McDonnell: No, I am talking about the areas around Coleraine and the Glens of Antrim.
71.
Ms S Morrice: Those are not shaded in; they represent the licenses of other people who have been exploring. Our ambit extends to the boundaries of Lough Neagh, and includes Portadown and Dungannon as well. It does not stretch into the Larne basin, which is covered by other people's licenses.
72.
Dr McDonnell: Have you any information on them?
73.
Ms S Morrice: The Larne basin is a more difficult area in which to carry out exploration because of the Giant's Causeway, which is formed by Antrim basalt. It is represented by the purple area on the map, which extends all the way down to Belfast. The presence of basalt makes exploration and studies more difficult. We do not know if there is natural gas in this area but, due to previous drilling, we do know that there is natural gas in our basin area.
74.
Dr McDonnell: Could you give us any indication of the expenditure, including previous costs on your basin? What sort of money are we talking about and how far short of commercial viability are we? That is the big question for us.
75.
Ms S Morrice: Interestingly, there are almost two separate questions there. To date, the costs are probably the equivalent of $30 to $40 million, depending on the rate of exchange, given that this figure relates to a period of 35 years. But to go forward, you cannot count those costs alone, even though you do use the information. This next phase will cost between $5 million and $10 million. After that the project would cost in the region of billions of pounds, because the development will include power station construction.
76.
Dr McDonnell: I am a little worried about the electrification of the gas. Have you studied the pipelines that may be constructed?
77.
Ms S Morrice: We are keeping up to date with where Enterprise's pipelines will run. The Corrib discovery is offshore and the Enterprise pipeline is coming onshore at Mayo. It would be ideal if that pipeline could come across as far as the point, just south of Cavan town, where the Kinsale pipeline extends from Limerick. I do not know if it has been decided that the pipeline will extend down as far as Limerick/ Galway in order to service that area. Ultimately, it would be excellent if the whole of Ireland was served by a ring pipeline. If a ring pipeline were in place, industry could use the gas. You would not need to electrify it, and there would be a choice of energy sources.
78.
Dr McDonnell: I would anticipate, sooner rather than later, a pipeline from Dublin or Drogheda to Portadown. That would solve a lot of the questions that you have raised.
79.
Ms S Morrice: That would be handy for that part of the licence area. There is a power station south of Derry which could use a natural gas supply. Beside Lough Allen there is the old Arigna power station which we have looked at carefully. The north-west carboniferous basin is part of Donegal Bay and basin. So that is another area that needs to be looked at.
80.

Dr McDonnell: I gather from what you are saying that it will take five to 10 years to make it work. What is the timescale? At present, it could be 15 years before anything happens, even if there is good news.
81.
Mrs Gries: Fifteen years would be pushing it. With new technology in the next two to three years we will have drilled and tested enough wells to decide if we should go ahead. If we can find enough gas to go ahead, then a more active drilling programme would commence. We could then start making projections, based on those first five or 10 wells, of how much gas we can count on. You cannot move on to that next step unless you know how much gas you can count on. We will not know that for two to three years. We can then project a medium or small-sized programme.
82.
Dr McDonnell: Is that when the five to 10 year period starts?
83.
Mrs Gries: Yes.
84.
Dr McDonnell: That is why I was adding two to three years. Would it, therefore, take eight to 13 years?
85.
Ms S Morrice: It could happen sooner.
86.
Mrs Gries: You would not wait until you got enough gas with which to do something major. You would try to market that gas immediately because a company cannot do without cash flow into a project for a long time.
87.
Dr McDonnell: That conveniently brings me to the next part of the question. How do you raise cash for the exploration? Is it venture capital? How much public funding, if any, would be involved?
88.
Ms S Morrice: At this stage, none. Our philosophy is that we want a company which will totally understand the risk and which has the expertise to take it forward and finance it. So we are not going to the public markets. We are closely considering a public company in the United States, which has been drilling in the United Kingdom and has the correct rig capabilities.
89.
With regard to public funds, whether they are market funds, cross-border grants or power generation situations we will have to address the variation as it comes up. For example, Quinn's facilities — glass and cement — are in our basin. End users are particularly important because they allow us to develop a cash flow to keep the whole project going while we get to these major capital-intensive positions.
90.
Mrs Gries: The initial part of the project is high risk and we look for people who are sophisticated and who are accustomed to that kind of risk. We are talking to three or four companies with a view to their joining us, and we expect them to have the money to do this, while remaining aware that they might have to walk away from $5 million or $10 million if the project is uneconomic. We find those people in our business.
91.
Once it is established that there is a commercial value in gas here, there are many things that we envisage happening. For instance, a company with which we were in the west of Ireland this week has its own drilling, hydraulic "fracking" and logging crews from Colorado. It

will also bring these crews over here and use them for the project. If it is successful, the company will want to put together a training programme and send people from Fermanagh, Tyrone, Cavan and Leitrim to Denver and train them to carry on the work. You do not want someone from Pueblo, Colorado, living here for 20 years when they could be drilling wells in Colorado.
92.
Dr McDonnell: So, are you telling us that Derrylin will probably join Denver and Dallas as a world energy source? Or better still, Teemore.
93.
Mrs Courtney: I want to welcome Ms S Morrice and Mrs Gries to the meeting; it is nice to see two women in the positions that you are in. It is not often that that happens. You said that you have one million acres in the south-west. Do you know the extent, at this stage, of the reserves in each of your seven licensed areas? Have you calculated the environmental cost, as discussed by Dr McDonnell, of producing gas at this location, taking into account the contribution of the climate change levy and the levels of reduced emissions?
94.
Ms S Morrice: Mr Neeson loosely compared it to lignite. But I would like to explain a very important environmental point — the natural gas we are looking for is about a quarter of a mile under the ground, while lignite is usually on the surface and requires strip mining. Therefore, a hole the size of a dinner plate has a depth of a quarter or a third of a mile, and you take the gas out from there. Let us visualise a farmer's field — in the corner is a green box the size of a car while the rest of the field is grazed by sheep. The gas comes out from under the ground at that gauge box. So the impact is minimal, much more so than in the extraction of oil, for instance —
95.
Mrs Gries: Or peat.
96.
Ms S Morrice: Obviously, for peat. The sourcing of peat, lignite and other materials has a greater environmental impact, and, in addition, these materials are not calorifically equivalent. In other words, they do not produce the energy per unit that natural gas does. So you are getting "a better bang for your buck", as they say in Denver.
97.
Mrs Gries: And the emissions are so much lower with natural gas.
98.
Mrs Courtney: You referred to other explorations throughout Ireland — both off and on-shore — and you mentioned the Corrib gas field off the coast of County Mayo. Do you know of any other exploration programmes that might affect your enterprise? For example, if gas were found at Rockhall, how would your business be affected?
99.
Ms S Morrice: I believe that a country can never have too much of an indigenous natural resource. As Mrs Gries said, if you move from being a net importer to becoming a net exporter, it can only be good for the economy. With the EU directives, if Rockhall comes in, or Porcupine, or our basin, we might be selling to Monte Carlo through the grid. That is the advantage of the EU link.
100.
Mrs Courtney: You made reference to the plant at Derry. At the moment, we are fighting very hard to get a gas pipeline to the north-west and we are hoping that an announcement will be made shortly. Everything possible has been done to try to get one there. It may now be economically viable, but you are right that it costs an awful lot. You referred in your presentation to the gas by wire system. How would

that work for us in the north-west? I find that technology hard to understand. It seems to us that we need a gas pipeline, yet you are talking about wires. What kind of technology is that?
101.
Mrs Gries: Gas by wire is a slang phrase, meaning that instead of building a huge system of pipelines, we access the energy locally and then transport it by wire rather than by pipeline. The natural gas is gathered as close to the source as possible, and a plant is built there, or an old plant used, to convert the gas to electricity. However, I would like nothing better than to have enough gas in our basin to supply the plant at Derry. That would be lovely.
102.
The Chairperson: I am fascinated by all of this. I myself have a copy of the map that you showed us, but I am a real amateur. If you do not look after those stones, I will put them in my wall, because I build stone walls when I get a chance. Does the same rock formation exist under the sea at Corrib?
103.
Ms S Morrice: It is different. Mrs Gries referred to Mullaghmore where the sandstone came from. If you drive to Mullaghmore, you will see the very rocks and their sequences, which are actually part of an ancient river system and delta. The rock outcrops at this part of the coast. If you look east from there, the rock dips to a depth of approximately one mile below the basin. We need it to be deeper because pressure must be built up, and the gas needs to be contained. Offshore, there has been a totally different geological history. That is why gas found in the North Sea, Kinsale and Corrib rarely exists onshore because the fact that there is a big ocean has created a totally different geological history. The Corrib rocks are much younger than these rocks.
104.
The Chairperson: You said earlier that the technology allows you to work about 1,000 or 2,000 feet out from each borehole. You used the term sweet spot when talking about these veins. Do they run for miles?
105.
Mrs Gries: I would not say miles. They can run for a mile or two.
106.
Ms S Morrice: However, they can extend for miles. The drainage of one well into a sweet spot —
107.
Mrs Gries: The system might be 50 or 60 miles long, but the drainage into a well bore might be from within just one mile or two.
108.
The Chairperson: You have answered my next question. I was wondering whether, if you hit one of these systems in the South, you could access gas in the North, but you could not.
109.
Ms S Morrice: Only if you were sucking it under.
110.
Mrs Gries: Or vice versa.
111.
The Chairperson: Which Departments are you dealing with in the South and in the North?
112.
Mrs Gries: In addition to the planning department, we deal with the Department of Enterprise, Trade and Investment in the North, and the Department of Public Enterprise in the South and the Transportation and Energy Division.
113.

The Chairperson: That is Mary O'Rourke's Department.
114.
Ms S Morrice: We have not met the new Minister.
115.
Mrs Gries: We tried to get together with her. We met the former Minister.
116.
The Chairperson: I have several questions. How many people would be employed, assuming that this was commercially viable? Can you quantify that in stages?
117.
Mrs Gries: The company that we are talking to about drilling in this basin has a similar project in southern Colorado. They started there about ten years ago with just a few wells, which they used to test the supply before deciding that the project was economic. They have now drilled several hundred wells and they have approximately 100 employees involved in that project directly, as well as many indirect employees from service companies who help those working in the field, such as welders who put together the well heads. People are needed to read the gas gauges, take measurements and draw up charts and mind the wells on a daily to weekly basis. So the project could directly involve as many as 100-200 people.
118.
Ms S Morrice: One of the key factors that impressed the foreign delegates we brought to Colorado, was the way in which natural gas was generated into electricity, and the very comprehensive greenhouse system in operation. That caused rural regeneration inColorado — a good deal of the rural farming population were able to come and work there as part of this process. They were cultivating tomatoes and selling them in huge quantities to McDonalds — at one stage, that was the most economically beneficial element of the whole chain. Neither gas nor electricity was as profitable as tomato production. That has been particularly advantageous to Colorado in the context of ruralregeneration. Ministers who visit from different countries are particularly keen on this concept because it creates more local jobs.
119.
The Chairperson: Can each rural community take its own supply from the main line?
120.
Ms S Morrice: Eventually that is certainly possible. In the Appalachians in the east of the United States, that is exactly what happens. A hospital, small town and university are fed by a natural gas system from a couple of wells. Had this basin been in the United States it would already have been developed because the rocks are the same. In fact, in the past,Newfoundland was stuck to the west of Ireland therefore the geology of the two areas are not just conceptually the same — they are actually the same as the Appalachians trend.
121.
Mrs Gries: Therefore, in areas around Pittsburgh, Pennsylvania, where they have been producing oil and gas since the mid 1800's, little pockets of gas were developed for use by local communities.
122.
The Chairperson: Thank you. Are there any further questions?
123.
Thank you for the presentation and for the way you dealt with all these questions. We will possibly see you at some time in the future.
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Wednesday 28 March 2001
Members present:
Mr P Doherty (Chairperson)
Mr Neeson (Deputy Chairperson)
Mr Clyde
Ms Morrice
Dr McDonnell
Dr O'Hagan
Mr Wells
Witnesses:
Mr L Hannaway) Banbridge District
Cllr S Doyle) Council
124.
The Chairperson: Gentlemen, you are very welcome. We are constrained by time, so you will have half an hour.
125.