MR. CARLIN: Rupert Fraser?

MR. FRASER: Good afternoon. My name is Rupert Fraser. I'm not from around here if you can tell it or not. No, my office is based in Pennsylvania. I'm here to tell you about Fibrowatt's solution to what to do with poultry litter. We have a technology which builds poultry litter fired power plants. It's proven technology. It's carbon neutral. We simultaneously improve and protect local water resources while producing local, green, renewable energy. It's proven technology because we've been doing it for 14 years in the UK. We built the world's first, second and third plants to do this. We're currently building a plant in Minnesota that is going to burn 700,000 tons of turkey litter. That was financed

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in December 2004 and is due to come on stream in two months time.

It is; however, for us very important to remember that we work in partnership with the poultry industry. What we see ourselves as doing is helping to make poultry farming more sustainable and helping poultry farmers to have more flexibility in what they do with their byproducts.

I'm going to look very quickly at our track record and get onto what I hope you'll find a bit more interesting in terms of how it works. There's a picture of somebody you may recognize on the left, although he doesn't look quite as young as that anymore, but that was an environmental award that we won back in the 1990s. This is our first plant that's been running now for 15 years in the UK. It burns about 170,000 tons of poultry litter and it has proved this technology is reliable and works well.

Our second plant burns poultry litter and more recently has switched across to burning meat in bone meal because in the UK meat in bone meal is no longer allowed to be used as an animal feed additive, but, of course, since meat and bone meal

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was an ingredient in poultry feed and, therefore, in poultry litter we were able to prove that our technology if it can handle one animal byproduct can handle others.

This was our third plant built in 1998. This was representative of scaling up of our

technology. It burns half a million tons a year of poultry litter. It's located in a very environmentally sensitive area in the middle of a national forest in the UK right next to a trout stream that it puts nothing into and is surrounded by material oak woodland which is heavily monitored by environmentalists and local residents alike. And we believe this project speaks for itself in terms of proving that we can produce a plant which fits well within the local area.

Moving on to the Fibrominn project, this is the plant that we're building in Minnesota. As I said, it will burn 700,000 tons of primarily turkey litter. West central Minnesota is the largest turkey producing area in the country producing about 45 million turkeys a year and this plant occupies about a 50 acre site. It has an electricity contract to sell its renewable energy to Northern State Power of Minnesota that lasts for 21 years.

It has signed up the majority of the poultry litter it needs under long-term contracts with the poultry farmers. And remember, none of them were forced to sign with us. They came to us because they liked the look of what we were offering them in terms of a long-term alternative use for their poultry litter. But above all, this plant gives us the credibility to say we can do this, it is real, it's got plenty of challenges, but that's what we do.

And here's a couple of pictures just to show you what it looks like. This is the turbine rotor inside the plant. That thing is actually about seven feet tall and about 15 feet long and that's what the steam will drive to make the electricity. And that is the site as a whole, slightly compressed because I think we've got a bit of a perspective problem on the projector, but it is, as you can see, a large site. There's about three or 400 Minnesota workmen up there at the moment assembling things and in about two months time, I would say, it will fire up for the first time on poultry litter and we will be obviously welcoming anybody from the commission who would like to come and look at it.

This is perhaps more interesting to you on how the process works. I just want to give you a quick photographic run-through just so you can see for yourself that this is a practical solution.

These are poultry houses. They're actually British poultry houses, but they're pretty similar to the ones that we have found all over the United States. What we do is we help the farmer remove the poultry litter from his house more quickly, more efficiently and with greater biosecurity. One of the innovations that we brought was the introduction of this covered conveyor which reverses into the poultry house. The farmer fills it with his little bobcats inside and it means the litter only sees the light of day, if you like, for a very brief period as it enters the top of the truck. Immediately after that the truck is tightly tarpaulined.

The truck drivers are very much conscious of the need for biosecurity, the need to improve both in terms of its rapid turnaround at the farms and keeping their trucks clean and following pre-agreed routes between each poultry farm and the power plant. When the truck arrives at the power plant, its load is weighed and tested. We

want to make sure that they've sent us something which we can indeed recover energy from.

The truck then reverses into one of the atmospherically controlled fuel reception bays. We control the atmosphere in a very simple way. When you're burning poultry litter to produce energy, you're burning something which is nearly 50 percent water. You need to put a lot of air into the furnace to make it burn because remember, we're not coal burning with fossil fuel or anything. Once the fire is up and running, it's self-sustaining. So we're blowing the wet air into the furnace to make it burn and we draw that air from the fuel reception storage hold. What that means is that if you open the door there, the air flow is inwards past you and if the air flows inwards, the smell can't get out. It's simple, but it works and the residents of the city of Flatfoot, which is 10,000 people one and a half miles away from this plant, have gone on record saying it works.

Inside the facility the trucks tip onto conveyor belts which in turn go to feed the boiler and to be mixed and homogenized. We've learned how to make sure the poultry litter, which is a

natural substance and varies naturally, how to make it burn evenly and securely in such a way as

to maximize the efficiency of the plant.

As the trucks leave our facility, this is very important, they are cleaned with two layers of high-pressure water spray in a sealed system and using a biodegradable biocide. This has represented for the British poultry industry, and will be representing for the Minnesota poultry industry, an improvement in the biosecurity of manure management which is very valuable to them. And the poultry farmers in the UK have told us that it is valuable to them, so they can be relaxed now -- not relaxed, because they never relax. All poultry farmers are working hard to prevent disease at all times, but this adds to their confidence that a good job is being done in terms of minimizing the possibility of cross-contamination from poultry trucks, poultry litter trucks.

Inside the plant is the same arrangement as a typical solid fuel power plant with the fuel coming in, being combusted at about 1,500 degrees Fahrenheit sufficient to sterilize anything that's in the poultry litter. The dust and acid gases are

removed using state-of-the-art, best practice emissions control equipment.

We recover all of the ash we can because, of course, that's a great fertilizer. It still has almost all of the nutrients that were in the poultry litter but at a much higher concentration and only ten percent of their former weight, so we can afford to transport that ash to where the litter is -- to where the nutrients are actually needed.

And in the bottom of the system is a recycling boiler where the water is boiled, steam drives the turbine and it's condensed back to water.

That's the inside of our fuel hold and the next slide is fuel conveyor belt showing the fuel on its way up to the boiler. The final picture there is of the interior of the boiler.

And this brings us to the last few slides that I wanted to focus on, which are the benefits of what we do. And here I would ask you if there's anything which I say here which you think sounds like just my opinion, you know, please, do go to, for example, the web site of the Swift County Monitor, which is the local newspaper adjacent to the plant we're building in Benson, Minnesota

where the editor came to the UK himself, talked to the local residents, talked to the local poultry farmers and it's his view that I think we're representing here. It's not just our view. We believe that what we do helps sustain the poultry industry. It gives them a long-term solution, a long-term alternative use for poultry litter and interestingly a 12 month a year use for poultry litter because at the moment if you're poultry farmer and you want to get rid of your poultry litter when there are crops on the land, you can't. And, of course, we also improve the biosecurity and help with disease control and hopefully reduce the need for that.

The benefits to the local economy and neighbors I won't dwell on. They, I think, speak for themselves, including there are new highly skilled jobs being introduced into the area. There is a lot of spin-off work for power plant, maintenance, welding, fitting and so on. There is support for the sustainability of the poultry industry and we, as I said, are good neighbors, we believe.

And finally the benefits to the environment, again, are fairly self-evident. This is

free energy being produced from local resources in rural areas where sometimes the local grid is actually weak. We are recycling the nutrients in the ash. We are helping to improve local water quality and we are, of course, helping to reduce greenhouse gas.

And I will finish with a picture of the carbon cycle showing the biomass which has absorbed carbon dioxide from the atmosphere going through the chicken to produce the manure and then to the electricity generation showing that it is a closed circuit in terms of carbon dioxide production and, of course, also in terms of the ash recycling of the nutrients.

MR. CARLIN: Very good. We're going to have to have some questions because we cannot count on our Swedish-Norwegian friends in Minnesota to have really done their job with you Brits. I mean, my apologies, but we just can't totally trust them.

MR. FRASER: They're nice guys, but you're right. You should do your own due diligence.

MR. CARLIN: The poultry farmer you work with, you don't pay -- you don't buy the

litter, you just take care of it for him?

MR. FRASER: No. We took a decision very early on that made great business sense for us to say we are here because the poultry industry is here. It's very important for us, therefore, to make sure that our effect on the poultry industry is beneficial not just in terms of that in improving biosecurity that, you know, reducing the headache the poultry farmer has in terms of managing his byproducts, but also economically neutral.

So what we will do is we will make an offer to all the poultry farmers in an area and say we are prepared to pay what we have through surveying the market worked out as about the average of what you're getting at the moment. The difference is we're going to underwrite that for ten years, and generally speaking, we find that a lot of poultry farmers find that an attractive option and they sign up for us. But, no, we pay for the poultry litter.

MR. CARLIN: Okay.

MR. FRASER: We believe it's in our interest to pay for the poultry litter.

MR. CARLIN: And the energy you produce, you've obviously got a buyer that sees

that price as something that's attractive to them to buy that energy from you?

MR. FRASER: Clearly the secret to what we do is the fact that somebody attributes value to the production of green energy and there, I believe, I can say with great confidence that we're on the coattails of a trend that is pointing firmly in the right direction. And indeed, in the five years that I've been coming out here and meeting people and talking about what we do, I've seen that part of our equation change quite dramatically. A lot of people now who used to say, well, green energy is never going to become really valuable here are now saying green energy, tell me more, I need some of that.

MR. CARLIN: All done without any government assisted tax incentives?

MR. FRASER: I think like any part of the energy industry it is impossible to tell where the actual market is because there is so much government setting of energy prices. You know, if you were to say what does coal-fired energy cost, the answer is nobody knows because there are so

many subsidies in there it's impossible to work it out. What I would say is the market drives the

way in which policymakers respond and, although at the federal level the United States has not signed up to Kyoto. At state level, I'm hearing people again and again and again saying that we need some renewable energy. We need this state to start producing its own energy. We're fed up with relying on other people's oil. Let's do something about that. That's the trend that we are finding is making what we do practical rather than just theoretical.

MR. CARLIN: Jim?

MR. MERCHANT: Very interesting. Two questions. One, in terms of the emissions, you present state-of-the-art emission controls. Are your emission controls superior to those for a similar plant, to a coal-fired power plant in terms of SO2 NOX particulates?

MR. FRASER: We believe so. In Minnesota the Minnesota Pollution Control Agency gave a very, very thorough investigation to everything we were proposing to do and required us, as is appropriate, to use the very best, the latest technology. We're given -- we're given no favors and we don't ask to be given any favors. We want to live up to the latest that can be done, so

we believe that we can achieve better emissions than today's ten year old coal-fired power plants or gas-powered power plants, that we can achieve as good emissions as a new power plant in any discipline that would be being built today with today's regulations and we would make it our target to do that.

MR. MERCHANT: Okay. Second question. Is there a market to extend this technology, say to hog waste? That's a much bigger issue, a much bigger environmental issue and if you could solve that one you'd have a real market.

MR. FRASER: It won't surprise you to know we are working very hard on that. My father founded this company 15 years ago. We've burned 7,000,000 tons of chicken and turkey waste in that period and we have experimented with adding a number of other clean biomass fuels. So where there are organic -- organically originated farming or agricultural or food residues that could be

added into the mix, we are experimenting with them.

Hog waste is a very important one there and we're working actively to see if we can either

mix it with the poultry litter having perhaps dried it centrifugally or indeed come up with a technology that could deal with it on its own, but we are confident given our track record. We've burnt chicken litter, turkey litter, meat in bone meal, wood chips, food processing wastes, chicken processing wastes, out of date dog biscuits. I could go on for some time. We've burned a lot of -- as long as they're not chemically contaminated, our technology can, generally speaking, work with them.

MR. CARLIN: Fred?

MR. KIRSCHENMANN: Yeah, a fascinating concept and generates a lot of questions. I have three, I guess. First of all, has anyone done a full life cycle analysis of this system for you, for the company?

MR. FRASER: Various studies have been done about parts of it. To give you an example, somebody said to us, well, aren't you creating a lot of extra transportation, isn't the litter traveling extra miles? So we had a study done on that. What turned out was that poultry litter was already being transported around the place. What we do is we replace a lot of small vehicles moving

poultry litter around with fewer large vehicles moving it on three to five routes and the net effect is a positive one. I wouldn't say that I could immediately lay my hands on a sort of a full life cycle analysis, but we've certainly looked at most of those kinds of issues and not come up with anything that we didn't like.

MR. KIRSCHENMANN: And in terms of energy efficiency ratios, energy in for energy out, do you have an analysis of that?

MR. FRASER: Well, we are limited by the traditional combustion technology which has a thermal efficiency that, you know, recovers a certain amount of the energy inherent in the material and loses a certain amount of it in condensing. We are always on the lookout to see whether we can incorporate into our plant design a customer for the heat and thereby raise the overall thermal efficiency of our plant. That's

tremendously difficult to do, not technically but in economic terms because while its easy to find a buyer for electricity who will sign a 20 year contract and be himself a bankable entity like a utility, it's very difficult to find a buyer of heat who will give your financiers that same 20 year

confidence.

MR. KIRSCHENMANN: Okay. And my final question is you say you buy the litter from the growers and then process it and then the ash goes back to the field, so I'm assuming you sell the ash back to the growers.

MR. FRASER: Sell it to the same growers. Sorry. We market the ash to farmers who want it who may be, of course, a long way away because it's easy to transport. Sorry.

MR. KIRSCHENMANN: Yeah, but my question is what nutrient value does the ash have? In other words, what have you lost by extracting the energy and then how does that figure out in terms of cost per unit of fertilizer?

MR. FRASER: Poultry litter, as I understand it, in terms of NPK is about three, three, three. Three percent, three percent, three percent. Poultry litter ash is about 20 percent, 18 percent, zero -- sorry, zero, 20, 18. So the nitrogen is gone --

MR. KIRSCHENMANN: Gone.

MR. FRASER: -- but the phosphorus and -- so it's mainly turned into free atmospheric nitrogen, which is 40 percent of the air we breathe

and gone up the chimney. But the phosphorus and potassium are all still there and have gone up in concentration enormously and, of course, all the other micronutrients like zinc, magnesium, manganese, copper and so on are there in good balances and it turns out that this as a fertilizer is regarded by the fertilizer industry as unusually rich in terms of those nutrients.

MR. CARLIN: Michael?

MR. BLACKWELL: If you are concentrating the substances that you just named, I didn't hear arsenic. Could you comment on that?

MR. CARLIN: I'm pleased to be able to comment on arsenic. The Minnesota Pollution Control Agency looked particularly at the arsenic issue, as it should do, and they concluded that the levels of arsenic in poultry litter were actually

slightly lower than the background level of arsenic in the west central Minnesota environment and they concluded that the arsenic emissions from our process, which was so low it would be very difficult to measure, was certainly two orders of magnitude less than the threshold where they started to be concerned. They regarded that as, you know, being adequate and concluded it was

okay.

MR. CARLIN: Alan?

MR. GOLDBERG: Were there other potentially toxic metals, mercury, lead, that you looked at?

MR. FRASER: The conclusion in terms of mercury was pretty similar to the conclusion for arsenic. The level of mercury in poultry litter, which is there because it's in the background, is well below the level at which the Minnesota Pollution Control Agency thought there was any concern.

MR. CARLIN: Michael?

MR. FRASER: But, I mean, basically nothing toxic is eaten by a chicken at levels that people who regulate chicken feed would be unhappy with. And since that's all we're burning, it's difficult to see where it'd be toxic coming from our plant burning.

MR. BLACKWELL: Just a quick question because in some operations arsenic is actually fed and you're saying in spite of that it's below background?

MR. FRASER: That's what I'm saying the Minnesota Pollution Control Agency's tests, so,

yes, you know, arsenic may be being had but it's in such small quantities that in terms of its effect on the poultry litter and on our combustion, they studied it and they concluded it was okay.

MR. BLACKWELL: It's not a question about the effect of the litter. The question is the product that you call the ash that later gets distributed back onto the land. I'm concerned about the levels that you are reapplying to land as a result of your process.

MR. FRASER: Well, as I said, they studied the actual litter and found that the levels in the litter were low enough. Clearly the ash itself was also the subject of separate studies to make sure that its levels are also acceptably low

and will be regulated appropriately by the Minnesota authorities to ensure that.

MR. CARLIN: I believe that does it. I would just simply request that -- I'm assuming you'll be staying in this area a few days to check out real estate opportunities and that if you're interviewed by local press would you give credit to the commission for the huge opportunity we've given you to advance your economic interest.

MR. FRASER: Thank you very much for

the time.

MR. CARLIN: Thank you. I would say to the staff if we would have started with this gentleman then we could have eliminated two or three speakers because we would have had the problem solved, or so it appears.