SHALE GAS INTERNATIONAL

INTERVIEW

Is remote monitoring the key to cutting methane emissions?

Bill Powers, President/CEO, PixController

In this week's interview we talk to Bill Powers, President and CEO of PixController. A recent winner of the Ben Franklin Shale Innovation Awards, PixController were recognized for their self-contained, real-time methane detection and monitoring systems. With regulations pending by the Environmental Protection Agency, that would require the shale industry to reduce methane emissions 45% by 2025, remote monitoring could be key.

Monica Thomas (Shale Gas International): **One of the reasons we became interested in your company is that it was one of the four technology companies which won the Ben Franklin Shale Innovation Awards. I understand that you were recognised for the methane detection solutions, but that this is not the only thing that PixController does, can you maybe tell us a bit more about what the company does in general?**

Bill Powers(President/CEO, PixController): Sure. In general we develop wireless technology that lets people connect to devices in remote areas that don't require power or internet. And that's kind of what our niche in the market is, so with that we are able to connect not just sensors but we can connect cameras and monitor in ways that you typically cannot do with the current technology.

A lot of technology that is currently used today – especially in the gas industry – is legacy technology that they've used since the 1970s and they try to innovate a lot of these big, antiquated solutions but they just don't work well in remote areas.

Our forte is being able to take smaller technologies and more current technologies and apply it to not just to the gas industry but also to other environmental monitoring, also wildlife monitoring.

MT: **When I did research on your company I found something about Bald Eagles?**

BP: Yes, we got a chance to stream bald eagle cameras – the first time that eagles were nesting in Pittsburgh, Pennsylvania in over 200 years.

Pittsburgh, as you know, was a very industrialised city at the turn of the century, all of the way through the 60s and 70s and it pretty much destroyed the city environmentally so when we had this opportunity, when bald eagles came back, we were able to stream that and it went viral. It became a big national event here in Pittsburgh. It was an interesting opportunity.

MT: **I did have a look at the camera but unfortunately the eagles were not there.**

BP: Yes, we had a bad spring this year and they only laid two eggs and they were not viable – both eggs broke, so last year there was a big event; but this year nature kind of took over.

MT: **That's such a shame. Coming back to shale gas and your methane detection system; can you maybe tell us a bit more about why methane emissions are a problem? Is it a concern with active wells or is it across the board with abandoned wells as well?**

BP: Methane is becoming a big issue because it is a big greenhouse gas. The concern before was carbon dioxide, but methane itself is twenty-one times more potent than carbon dioxide is, so the Obama administration in the United States has now put together what they call a "Climate Control Action Plan" and the public will get to see the first regulations this summer.

These regulations are going to go into effect next year, I think, so they are really trying to curb the oil and gas industry in the United States because it is such a methane emitter and it's unregulated at this point in time.

What they are trying to do is cut emissions by 45 per cent from a study they did in 2012. So, they're going to try to monitor that and figure out ways to cut the emissions by 2025.

A lot of techniques that are used today are basically manual methods; you send a linesman out, he monitors a site to look for emissions and you get one data-point. Whereas our technology, which is much cheaper for the industry to afford, gives you a lot more data and it really shows you what the true emissions are. It gets you real finds, because a lot of the controversy is that the study that was done wasn't done properly because it used methods that don't really give a true idea of what the current methane emissions are.

Our technology lets the gas industry and environmental firms monitor emissions in real-time. We also

take into account the environmental and atmospheric conditions because methane gas moves with barometric pressure, temperature, maybe even humidity, so we record all this data so they can get a lot of correlation. I think that scientists in general are going to learn a lot from being able to study methane emissions in real-time with our technology.

MT: **Do you also do baseline monitoring, before exploration takes place, or only during exploration and production phase?**

BP: Yes, that's a great question. You do baseline monitoring beforehand because if you don't then there is no way of proving that the shale gas provider actually caused the problem, or if it was a naturally occurring problem.

A lot of methane is naturally occurring, especially in some areas in the north-east of the United States. You have old abandoned wells that cause problems, you have migration from shale layers up into the aquifers that might be naturally occurring so there's no way of proving of whether drilling for shale gas actually caused the problem. So a baseline definitely has to be done and it has to be done as a continuous process – probably a couple of years after the well has gone from the place.

MT: **So before actual exploration takes place, do you just take one set of measurements? I remember being told by a monitoring company that to do it properly you should do it over twelve months before actual exploration takes place, because seasonal factors can affect the measurements, is that correct?**

BP: Yes, that's correct. The problem is that the regulations here only require three or four months, but you're absolutely right, you really should do it for a whole year.

We're actually monitoring a couple of abandoned wells now that have naturally occurring paths from the shale gas layer up into the atmosphere and we're seeing a tremendous shift in the way the gas moves over the seasons because it won't move as quickly in winter as it does in summertime. So baseline should be done for twelve months, but as some regulations only require it to be done three months beforehand, I would say that the regulations probably will change here at some point.

> ***"Methane is becoming a big issue because it is a big greenhouse gas. The concern before was carbon dioxide, but methane itself is twenty-one times more potent than carbon dioxide."***

MT: **I imagine that an upstream company would be eager to drill once they've secured**

acreage, telling them that they have to wait twelve months before they can start drilling is probably not what they want to hear.

BP: No, but the permit process probably takes a year, so it would be a good idea to start baseline monitoring when a gas driller applies for a permit. It's just something that is going to be necessary to be done because this is such a potent gas.

MT: **What about the abandoned wells? You obviously need to monitor them continuously but once they've been abandoned, who actually pays for this kind of monitoring? If the company has already completed and abandoned the well and, in some cases may no longer be in existence, how does that work?**

BP: That's, kind of, the thousand-pound gorilla in the room, because you are absolutely right. A shale gas company that might come in and has an abandoned well that might be on a 100 acre parcel that would be affected by their drilling, they think that they aren't responsible for that. Because they are very expensive to cap – typically what they'll do is they'll drill all the way down to the bottom of the well – which might be several thousand feet - and fill it with cement, which is a very expensive process.

I think that those questions are up for debate right now. In retrospect, if there are any problems, they still need to be fixed. So what we're seeing, especially in Pennsylvania where a lot of natural gas drilling started over a hundred years ago, are abandoned wells all over the place, where the well integrity, the bore, has broken down. A lot of the piping was used during World War II for scrap metal, so a lot of the wells are just sitting open at this point in time. So that's a big problem.

I don't think it has been decided yet who is going to be responsible for those, but there's going to have to be somebody who will fix it.

MT: **When it comes to measuring methane emissions, can you explain where exactly you take the measurements? Where do you install the meters?**

BP: We try to measure as close to the source as we can, if we can find it. So we will measure over the whole gas chain, you know, from upstream through midstream. At the well-site, compressor stations, pipeline, especially the exposed parts of the pipeline, because these are the places where you are going to most likely get methane emissions.

Methane is a very light gas and as soon as it gets into the atmosphere it tends to rise very quickly, it's a single molecule. And it's only explosive when it gets to five per cent in a hundred per cent volume, through to fifteen per cent. The five per cent is what they call the LEL (lower explosion limit), and fifteen per cent is the UEL which is the upper explosion limit.

We monitor for that lower explosion limit so we proliferate the area with a lot of sensors, if we get anything near that, that's when you have a problem and you need to send someone in to fix something.

We try to make this sensor technology very inexpensive for the industry to use and be a lot more valuable in terms of the data they collect over the current methods, so that's how the industry can really use this and monitor a lot of parts of their infrastructure.

With that said, it's real-time data and lets them respond to problems in real-time instead of a month or maybe even a year later.

MT: **So what happens when a methane leak is detected? I understand that your devices can communicate via the internet but also using a mobile network?**

BP: Right, we can communicate over a Wi-Fi network, over a mobile phone network and even over a satellite network to transmit all the data to a cloud and you can see all your data in real time as well as your historical data. You can look at that through your cell phone, your tablet, or just through your PC.

If something does happen, it will alert you in real time. Say you have a leak that's above a certain level of methane, the sensor will send you a text message or an email to let you get on site. You then would send a team of people who would bring in higher-grade equipment to find the exact source. Sometimes they actually look through video cameras – there's a technology that is called Forward-looking Infrared (FLIR), and that technology is basically a thermal camera that allows you to see the methane plumes through the video camera, and if you see something like this, you can send people in to fix it.

MT: **In other words, your solution replaces the need to send an employee to the site to carry out these measurements manually.**

BP: The manual way is very expensive for the industry and it doesn't give a lot of data either. What we're seeing in monitoring natural-occurring methane sources is that methane might be moving one

day and might not be moving the next, so if somebody is checking something manually, they might not get anything.

Those methods of checking methane using a linesman that goes out maybe once a month or once a week are really inadequate for finding these problems.

MT: **You mentioned legislation – are there any guidelines currently that say how much methane can be emitted?**

BP: They are really looking for a "zero-emission policy". In the state of Colorado in the United States right now there is the Bureau of Land Management, or the BLM. They have already put regulations in place, and it has been challenged by the industry, to have a zero-emission policy, especially for new gas wells going in.

The current federal regulations by our Environmental Protection Agency, the EPA, would only cover new gas wells that go in – the problem there is that there is so much existing methane that's emitting and it's not addressing that. So I think that is something that needs to be looked at as soon as these policies are released this summer.

MT: **Do you expect your company to benefit from this movement towards more environmentally-conscious regulations within the industry?**

BP: That's why we did it, yes, because it is beneficial to us but it is also beneficial to the industry and people in general. It's something that does need to be addressed, we are just trying to find an inexpensive solution that makes it profitable for gas companies to look into these kind of things. And quite frankly it is a way in which they can curb emissions, but also make more money because they are not losing the gas. I think these companies will really want to comply with these regulations when they come down.

MT: **Are there many oil and gas companies already using your solutions?**

BP: We are in pilot programmes with several big energy companies right now, so I would say that within the next few months we will see a lot of other companies coming to ask to use our technology. We are in the infancy stage just now, but we're getting a lot of great feedback about what we're doing.

MT: **So, following on from the previous question, where do you see your company in the next three to five years?**

BP: I see ourselves developing more products within the oil and gas industry, especially for

environmental monitoring. We're looking at some water quality products at this point in time, but I see shale gas in general being a global issue so I see us expanding globally into this market very quickly.

MT: **In terms of shale gas outside of the U.S., where do you think it's going to happen?**

BP: That's a tough question! From what I see globally, I would suspect it would happen in Europe first just because it seems to me that Europe seems to buy a lot of its natural gas right now from Russia – which can be an issue – I would think they would want to become natural gas independent, so that would be my first guess.

The sources of shale gas are, obviously, global so it's a fantastic energy source if it can be harnessed and done properly.

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