

**Oral History Interview of  
David Miller**

**Interviewed by: Andy Wilkinson  
March 14, 2014  
Lubbock, Texas**

**Part of the:  
*Wind Interviews***

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### Preferred Citation for this Document:

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### Recording Notes:

*Original Format:* Born Digital Audio

*Digitization Details:* N/A

*Audio Metadata:* 44.1k/ 16bit WAV file

*Further Access Restrictions:* N/A

### Transcription Notes:

*Interviewer:* Andy Wilkinson

*Audio Editor:* N/A

*Transcription:* Leah Blackwell

*Editor(s):* Cammy Herman, Elissa Stroman

*Final Editor:* Andy Wilkinson

## Interview Series Background:

The roots of the National Wind Institute run almost fifty years deep. In the spring of 1968, a powerful sandstorm blew through Texas Technological College, taking down two light standards at the school's football stadium. As the relatively-new structures had been designed to withstand such winds, two of the college's engineering professors, Kishor Mehta and James McDonald, thought that the incident bore investigation. Two years later, on May 11, 1970, a massive group of tornados struck the surrounding city of Lubbock, killing 26 people, injuring over 1,500, and doing over \$200 million in damage (in 1970 dollars). The day after the storm, Mehta and McDonald hurried to investigate as much as they could of the wreckage strewn along its path, knowing that the evidence of how the storm winds worked would be quickly destroyed during rescue, recovery, and clean-up. They were joined by two other engineers from what was now Texas Tech University, Ernest Kiesling and Joe Minor, and by the end of the first day, the group realized the need for focused study on wind and wind damage.

From the beginning, their work was interdisciplinary and soon involved researchers from atmospheric science, economics, and social science. The focus of their work broadened as well, first strictly on wind mitigation, then on education, and eventually including wind energy. Along the way, the organization added faculty, students, and degree programs to include the doctoral level. At the time of this writing, 2014, it is among the most highly-regarded wind science and energy programs of any university anywhere.

The collection includes oral history interviews from most of the key founders and developers of the program, along with a substantial number of leaves of documents.

## Transcript Overview:

This interview features David Miller. Miller discusses his work with Texas Tech and NIRE. Miller also describes his views on innovation in the industry of Wind Energy.

**Length of Interview:** 00:37:09

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### Keywords

NIRE, Texas Tech, Wind Energy, Entrepreneur

**Andy Wilkinson (AW):**

This is the fourteenth, I think, of March, 2014. Andy Wilkinson in the office with David L. Miller, lately of group NIRE [National Institute for Renewable Energy], I guess, is that appropriate? (laughs)

**David Miller (DM):**

Well, yeah, kind of.

AW:

Are you still affiliated?

DM:

Not really. Really unaffiliated with that group at this point.

AW:

Okay. Let me just get some of that basic information that I mentioned to you before we turned this on. What's your date of birth?

DM:

Four-twelve-Seventy-one. [4-12-1971]

AW:

Okay, and where?

DM:

Carthage, Texas.

AW:

Carthage?

DM:

Yep.

AW:

And did you grow up there?

DM:

No, my father is a Baptist minister, and we moved out to the West Coast and lived there for a long time.

AW:

Oh really? California?

DM:

Oregon and California. And then we moved back to Texas, to Paris, Texas when I was a freshman in high school, and I've been in Texas since.

AW:

Okay, did you graduate there in Paris?

DM:

I graduated from high school in the Paris area, ended up going to Midwestern State in Wichita Falls, got my undergrad degree.

AW:

And what did you get that in?

DM:

Criminal justice and political science, and then got a law degree and an MBA from Texas Tech.

AW:

Okay. And getting criminal justice—had you intended to go into law enforcement?

DM:

Yeah at the time I was planning on going into law enforcement, and my dad wanted me to go to law school so I wanted to fulfill his dreams more than mine. So I figured out I didn't want to practice law, but it was a good education.

AW:

Oh yeah, it's a great way to learn how to think.

DM:

Exactly. That's exactly right.

AW:

So you get your degrees from Tech, and then what do you do?

DM:

We started a company, got fortunate, didn't know much about business, just fresh out of school, ended up in a small company, fourth or fifth employee in a small company that ended up in



Lubbock, going public and becoming very large, called Alamosa PCS [Personal Communications Service], telecommunications. We ended up taking it public when any company could go public, which was in the 2000 kind of time frame. We didn't have much revenue, but that didn't stop companies from going public then. So we did pretty well, had the highs and lows of beyond 2001 after the stock market crash, almost went out of business because we couldn't raise more capital, but long story short, we ended up selling it for 4.3 billion dollars to Sprint Nextel in 2006, so it was a great experience in entrepreneurship.

AW:

And after you sold it, did you stay on with the company?

DM:

No, we sold the company. I had a non-compete agreement so I was trying to figure out what to do next and somehow I got involved with the university [Texas Tech University] with [Chancellor] Kent Hance trying to figure out what they were going to do with technology commercialization.

AW:

Is that the Emerging Tech Fund?

DM:

No, I actually went to the university system, and because the question for the university was, we hadn't historically been good at protecting and licensing intellectual property developed inside the system, and given my background, I thought, Well that would be a place where I would be of interest. I could be helpful there. So I took a job working for the system with Kent Hance and mainly doing intellectual property work and overseeing that office. And then over a period of time, I started trying to figure out, what is our biggest opportunity for protecting intellectual property and what is the university good at? What are the strengths? And that's when I was asked to become involved in the Wind Science and Engineering program.

AW:

Great. Who was thinking along the same line as you were?

DM:

You know, I think there was a lot of people, but I'll tell you the biggest proponent of trying to—at the time the conversation was about first, best, and only. What are we the best at, what can we be first at doing, and what could we be the only organization that does these things that are contemplated? And the Chancellor and a few people around him, Jodey Arrington and others, along with a lot of people at the university, looked back at this history, this very rich history in Wind Science and Engineering related to a lot more than wind power. At the time it was really

focused on the destructive forces of wind and tornadic activity, and how can you build structures. But from that came a lot of other offshoots, which is, we were becoming ever stronger in wind power and power electronics related to wind science and engineering.

AW:

Is it fair to say that—I know Jodey, I don't know much about his background, but I'm thinking that taking the three of you—we're talking about people who are more entrepreneurial, more organizationally driven than in the standard academic mold of colleges, departments, that kind of thing?

DM:

Definitely. Jodey is probably more of—he's spent a lot of time in federal government. He's probably less of the business side in his background, but he certainly has an entrepreneurial mindset. The Chancellor has both. The Chancellor has run successful businesses, and he is what I would consider to be very entrepreneurial, highly entrepreneurial in the way that he looks at things. So he has a good balance I would say.

AW:

Then as this group of people that we're talking about—was it apparent to you, or did it even enter into your calculations, that this was an interdisciplinary program, and that made it also very different than other things?

DM:

Yes, several of the scientists, including Schroeder and others, had already done that. We didn't add anything to that. They had already seen, which was really visionary I think, to say—and much more difficult to have an interdisciplinary approach, than it is just to have it in the engineering college — and they understood that wind science and engineering was much more than just engineering. There are a lot of legal components to it, there's a lot of business components to it—

AW:

Social components—

DM:

Social components to it, exactly. Environmental components. And so they really were visionary and I had really—the system had really no involvement in that vision, and so really the scientists were really the ones that were forward thinking in that regard.

AW:

Well that's very interesting. But it would also be true, would it not, that at the system level you



would have to appreciate that that was a different thing?

DM:

Yeah, that's right, and especially in academic environments, it's very difficult, because there's a lot of question over who gets credit for the student hours—just how money flows.

AW:

And tenure.

DM:

And tenure. It's very difficult to do. But that had a lot to do with us saying this is an area where we want to focus—one of the things. Some of the other things were they were very—there was a lot of real meat in terms of—we had one of the very few—I think the only PhD in wind science and engineering. There's a lot of academic programs with community colleges, in terms of associate degrees. So from end to end, we kind of had it covered, and they had just done a really good job. The biggest challenge though, is that, at least in my view, it hadn't been marketed very well. It had been marketed well from academia, but industry, we didn't really have—we had an advisory board. But in terms of how I really consider if industry is involved or not is when they trust you enough to put money into it, their own R&D money and say, It's better spent here than in my own company, or collaboratively. And that's what wasn't being validated at that point.

AW:

And so what was your thinking about how to overcome that?

DM:

You know we thought—we looked at the constraints for industry and spent some time talking about the constraints, and most of the constraints were around how the speed that industry moves versus the speed of academia and research inside universities and all the restraints in terms of contracting, in terms of moving in a timely way through what their R&D [research and development] agenda was, intellectual property restraints about us wanting to claim our part of that and then what does that mean for their intellectual property. Does that hold them up? I mean there's a significant number of restraints. So that's what led to trying to figure out, Okay how can we do it differently or better?

AW:

Yeah. And so how did the notion of the model of NIRE, this thing that's part and not part of the university? Which strikes me as being a brilliant idea, but not one that you would sit down and say, Oh let's do it this way.

DM:

Yeah, you know in hindsight, it makes a lot of sense. At the time it made a lot of sense too. It was a very painful birthing process for a university just because the mindset isn't there necessarily to do it. So it was difficult initially for the university, the system, the Board of Regents, from top to bottom, to say, Well yeah they'll be this for-profit company out there that works almost exclusively with the university and to the extent it's successful, over the longer term it's actually another organization that provides research revenue to the university, but most notably it could move at the speed of business. It can quickly contract with organizations. It has people there that speak the exact same language as CEOs and R&D researchers from industry and doesn't have the traditional restraints. And frankly, it has a profit motivation which over the longer term could be good for the university. So those were kind of the things that we thought made a lot of sense. It was difficult for the university to contemplate how all that worked the first time. But even now, it's clear that NIRE has a real advantage from those perspectives, and we're starting to see a lot more collaboration and growth because of the mentality. And so what it allows to happen is that it allows researchers to do what they do best, which isn't contracting.

AW:

Or being rushed.

DM:

Or being rushed. Yeah, that's right. It allows them to do what they do best. It allows NIRE to negotiate deals that are effective and are hopefully realistic, but it allows you to get to, in a good conversation with industry, what do we need to accomplish with your R&D budget? And even more than that, provide an infrastructure—facilities, testing facilities, and the best know-how in the business to really be a magnet for industry.

AW:

Yeah that struck me as being one of the advantages of NIRE, is having the access to the physical side of the university.

DM:

Absolutely.

AW:

But before we get to that and how it is attractive to a university, is it fair to say that the difficulty in this birthing process had more to do with having to develop a different perspective and an understanding versus just a purely entrenched opposition to the whole notion of doing something outside? I mean I can see that you could have both probably, but one or the other—did it make a difference or were they both things you had to wrestle with?

DM:

Well, you know it's hard for me to determine what the opposition was focused on honestly. Initially it was just the fact that when something's new, especially in a university environment, there's, I think, a higher perceived risk because I'm not sure people—this may sound worse than I mean it, but there are a significant number of jobs in a university that evolve over time into risk management. And it's an important function especially when you're dealing with public money. But what happens over time, in my view, is that people aren't rewarded for taking risks. They're rewarded for mitigating failures. They've learned that over time because when something blows up, there's not a big celebration when things go right sometimes. But when something blows up, everybody feels it.

AW:

Yeah. No one was ever fired from a university for saying no.

DM:

Yeah that's right. So culturally, that's a challenge. And so I think most of it came from that perspective. And it was just different—it was very unique. And if you can imagine the structural conversations about who owns this for-profit entity, who receives the equity, if it fails as a for-profit company, does that give the university a black eye? On and on and on. Contracting challenges between how money flows, between NIRE and university and back and forth. So there's one part of it. It's just more complex than other deals that the university has done before. On top of that, it's new and different. And to your point, I think it's hard for me to isolate the two, but it was clear that both of those were at play.

AW:

Yeah. Putting on your industry hat, what attracts industry to NIRE?

DM:

You know what attracts industry to NIRE is really simply, initially it's the, I have somebody there that speaks my language, they move at my speed, they rarely ever say no, they don't tell me all the reasons that it won't work. They look for reasons that it will work and that we can accomplish it. They're realistic in what can be accomplished. Those are all the big things early. Later, as NIRE evolves, it's— well, in addition to those things, NIRE is the only way I can really access these world-class researchers because of how it was structured. So now it's been marketed as one of the best, if not the best program in the United States or perhaps the world in wind science and engineering. So I if I want to get access to that as industry, I have to go through NIRE. Over a period of time that's how that moves.

AW:

Was that an inevitable thing? To make it work that would have to be a part of it?

DM:

It was, is that it would have to be filtered through that for it to work. Which it wasn't a big issue at the time because it wasn't like there was so much industry coming to that program early that they would want to go around NIRE. And, you know, they quickly saw the benefits, and the first companies that moved through it and did a deal with NIRE, we had a lot of really positive feedback about how things worked, how it was executed under some timelines in which people thought, Well that's not possible. One of the biggest things was that when we were moving toward national research university status, we had to meet certain benchmarks. And a few of the—a couple of the NIRE projects, one of those provided I think four million of the incremental money to get us to that status. And had it not been there, I don't know that we may or may not have met that goal. And so the university quickly saw, Gosh this NIRE quickly played a big role, not just in wind science and engineering, but in our ability to qualify for NRUF [National Research University Fund], which was a big step for us. So I think that was part of it early. The bigger part later, I think you made this point or asked this question earlier, as NIRE grew more infrastructure, meaning that the department of energy had a test facility out there, you had several turbines, you had some of the data collection, capabilities—

AW:

It was like an engineer's candy store when I was walking around there looking.

DM:

That's what it's become. That's what it's become. And so now, it's another reason to go there and it's continuing to grow. So you think about energy storage, energy generation, micro-grid, there's so much—it is becoming such a robust testing facility, that to get access to that, well you need to go through NIRE, and that's the way it was contemplated, but a lot of things you contemplated you don't end up actually being the case. But in this case it's definitely becoming a—

AW:

And if I'm in industry, if I'm Pattern Energy for instance, why don't I build a research facility?

DM:

Good question. The challenge that—and we looked at this early on, because where we initially started was, I wanted to negotiate access to large, privately owned wind farms. One reason we couldn't get that done is I was still part of the system, and so it was very difficult to negotiate with the university on several things. The other issue is just they have profit motivation which they should have. And so the idea, one was if I have to turn down turbines to give you access, I'm losing money. The second one, which was I think a bigger one, is if you want to use my wind farm and you want to bring out students and researchers, what happens when something goes wrong, when somebody falls or there's a workforce accident? And so, you know, trying to



cover those contingencies and indemnify people against some risks that are known and some that are unknown, is very difficult. And the other thing is that like any industry, the willingness to put unproven technologies in a commercial wind farm, there wasn't a lot of openness to doing that, so the idea—

AW:

Sure, I mean who on the investor's side is going to want in on that?

DM:

That's right. That's right. You're going to go with what you know, what has been tested and proven. So to put a new technology that we wanted to test in a commercial wind farm, it was clear early on that that was going to be even more complex than what we proposed to do with NIRE.

AW:

So, and I'm going to try to phrase this in a way and you correct the phrasing as I get it wrong, but one of the things that NIRE does, is take the slower process of research at the university and find a way to interface that or marry that to the much faster speed at which industry wants to put those things to work.

DM:

Right.

AW:

And the second thing might be an interface between the distance of the vision. In other words university researchers not necessarily worried about a problem today so much as a general problem or problem that may not even have an apparent use at the moment, but industry is focused on quarterly profits or—

DM:

That's right. That's well phrased. You know, both happened under the structure. NIRE is unlikely, it happens occasionally, but NIRE is unlikely to get the R&D deals that are more—hey we're looking at this five years from now. They're more likely to get the deals where somebody says, I need to certify this turbine, I need to certify this energy storage technology or this grid or cyber security, whatever the technology is. They're more likely to get, Hey I want to test this because I'm trying to move this to market. So applied research is most of what NIRE does whereas there's still a huge amount, I think, hopefully a growing amount of basic research that the university researchers do where they're working with DOE [Department of Energy] or DARPA [Defense Advanced Research Projects Agency] or some other federal agency to look at, Okay, where is grid integration, power generation, power electronics, cyber-security. Where is

that going to be three or five years now? Or even some things about what can we do in terms of how the grid works with a variety of different technologies. How can we optimize power distribution with new technology and new transport and infrastructure technology? Those are things that are still used with the same infrastructure that are much more basic but where the time constraints aren't the same. An example of that is the DOE facility that's out there now. They're working on some things that have much longer term implications about basic atmospheric science and the role that it has in wind power generation in terms of microbursts and a variety of things.

AW:

I was really struck by one of the charts that Mark showed me, that how the wind going through a wind farm was extraordinarily complicated.

DM:

Yeah, the weight dynamics.

AW:

Yeah it's just amazing. And to think about you just put them up there and this will work and here's this complete other picture that's evolving.

DM:

Right. But, you know I consider it to be pretty basic science to say, Okay what are the atmospheric conditions? How do weight dynamics and microbursts, things that only the best engineers in industry would be considering. And then be able to come back and apply it and say, If you contract with NIRE and our engineers, we believe we can lay out a wind farm that is going to have 4, 5, or 6 percent more generation capacity which is enormous in terms of the balance sheets and the P and L's [profit and loss statement].

AW:

Yeah, especially in an industry where nothing runs at 100 percent.

DM:

That's right.

AW:

So that 4 percent or 5 percent could be a 25 percent increase.

DM:

That's right. When you have 30 or 35 percent capacity, 4 or 5 percent added is a big number. And so that's part of what they're doing now. Another thing they're doing that I consider to be



basic is how to enhance forecasting technologies and wind power forecasting technologies to look at how you manage the grid for like ERCOT [Electric Reliability Council of Texas] and some of the larger grids. How can you manage where power is coming from and how you utilize it based on better forecasting. So some of that NIRE has a little bit of involvement in, but that has more to do, going back to the reason it was initially formed with the expertise that the university has. And some of the money that we got, we received in grants from the emerging technology fund early on, did the best part of that which is it brought in more world-class scientists to that program.

AW:

Another thing that seems interesting to me is that if you think back fifty or more years ago, this kind of science was being done by industry—I mean, Bell Labs, Rockwell, these were all for-profit companies but they had a—I mean you know the people at Bell Labs were the ones that came up with the idea of the expanding universe, background radiation.

DM:

That's right.

AW:

That seems like a pure science issue but American business changed. That was a time when profit forecasts had a lot longer distance I guess for lack of a better word. And so now this is a way to combine the two things. Is this a model that can be applied elsewhere in the university or taken to other universities?

DM:

I think it could be. You know, you'd have to have an environment to where—you have to have a lot of support to do this. You have to have a focus on innovation, and you have to find a way to eventually get it done. I think a lot of ideas like this would end up getting killed not because people are evil or they don't want the university to be successful, it's just—there's too much of a head wind to do it. So I think that's the challenge that universities will have in doing it, but I think on the brighter side perhaps, I think universities, forward thinking universities, understand that our economy today is largely driven by innovation and to the extent that universities don't put themselves in a place to where they can be a big part of innovation on the research side, the question is, over the longer term, how relevant are they? So when most of the funding that comes from—to universities is government funding, so over a period of time, I personally believe that universities that can't be more relative to industry, over the longer period of time, they may have a real challenge with research funding.

AW:

Yeah. Well who can imagine, no matter what your political point of view is, government dollars

for research going up?

DM:

It's hard to picture.

AW:

I mean there's so many other things to spend government dollars on in today's world that it's just hard to imagine that. Within the university world, there are other kinds of things though that should fit this, for instance, agriculture, water, there are all kinds of issues that seem to be where this—not schism—but lack of meeting up between industry and research occur.

DM:

Right. And that's a good point, and I think that at least for Texas Tech—Tech is really well positioned because I don't think they've looked at it this way and I've never talked to them about doing this. But eventually NIRE could rebrand itself and do what it does today, but when there's an industry partner that wants to do something that's unique in biologics or they want to do something in a place that we're not—NIRE is not currently focused on, it could become a broader vehicle for industry relations to work with a variety of different partners. I think it was right to focus initially on, Hey let's just focus on what we're best at because otherwise we wouldn't probably have gotten the momentum we did. But over a period of time they may look at NIRE and say, You know that's a vehicle for us to have these same industry relations over a period of time so it ought to be expanded over to our next two, three, or four areas of strength to focus on those areas. So that's certainly something they could do over time.

AW:

What should I have asked you that I haven't about this so far?

DM: Oh that's a good question. I think your questions covered a lot of the strategic vision. The question that I hope NIRE and the university are thinking about, which I'm not sure they are at this point. I think they're focused on the next six months or a year because they have a lot more growth and—

AW:

And we're going to have a new chancellor, and we've just got a new president.

DM:

That's right. So there's a lot.

AW:

And we're finally starting to win some ball games. (laughs)

DM:

That's right. Those are all good things.

AW:

Yeah but they're all—the next few months really are—so what should they be thinking about?

DM:

You know I think they should be looking at—I think they should be doing the same reflection that's going on in this interview, which I hope they do. I hope they go back and look at—most importantly, I hope they go back and look at how could we have improved the process with birthing NIRE, which I don't think they'll do this unfortunately, but I think that would be the most meaningful thing that the university system could do, is to go look and say, When we have innovative ideas, which I think happen all the time on the campus, how can we vet those to make sure we're making wise decisions to protect the university and the tax payers, but at the same time make innovation a more celebrated process.

AW:

On a practical side, to do that, would that involve getting to the discussion table people from the regents on down? Starting at that level? What are the key players who could sit down and say, Here's how we could have done this better?

DM:

I think those are. I think it's the Regents and the senior team, it's the Chancellor and the President who I think would be well served just to go back and say, You know, strategically, it's not just related to Tech, but culturally universities—just the appreciation that culturally universities are risk-adverse, and some of that is for good reason, but to the extent that our job is to challenge minds, to be involved in innovation, and we have some of the best researchers in the world. We have to continue to look at how we foster innovation as part of our culture. So that's kind of the high level and the more structural level is, okay are there processes, systems in place that are unnecessary constraints on that.

AW:

Yeah. And would it be fair to include in that, what were the things that made it possible in this instance?

DM:

Yes.

AW:

Because I think having—one of the other things I've noticed is that personalities in these two

programs have made a huge difference. For instance everybody that talks about the early years says, Well if it hadn't been for Kishor [Mehta], we'd have never lasted that long.

DM:

That's right.

AW:

And then I think in talking with Mark and with you, I sense that there's something going on in the law school that's turning out some people that are willing to look at things in a different way. And I just wonder if those—in addition to saying what were the stumbling blocks, what were the things that led us to overcome those stumbling blocks and how do we make sure we don't throw the proverbial baby out with the bathwater when you go after one?

DM:

That's right. And I think the other thing is that you do have to have people like Chancellor Hance who say, We are going to be first and if we have to run through a wall to do it, we're going to do it, and that's very difficult in that culture. And sometimes it's, gosh, it's uncomfortable and it's challenging. But you do have to have, and it's difficult early on in the culture, but you do have to have people who are entrepreneurial in their nature to say, to not accept, when they're told no the first ten times, they say—they're unfazed. They see that as an obstacle but not the end. And I think that's critical that we, meaning as a university and as a community, we model that for young people graduating from the business school, the law school, wherever they're coming from, because they're going to need that when they get out into a business or whatever they choose to do.

AW:

One of the questions that popped into my mind: did your experience with Alamosa help you in just a sense of having been through that kind of scenario before?

DM:

Yeah I think that's part of it and then the other part is I think, one of the things that we do in businesses I'm associated with now, is people have—the word that we use now is grit—people have determination from a wide variety of reasons. They're either a middle child, and they fought for everything they had; they had something happen in their childhood, but they're driven for different reasons. And I think that's probably part of where mine was developed from, is I saw a company that was highly impacted from things we didn't control, particularly the capital market environment. And you know, where people said that our company wouldn't survive, we wouldn't raise enough money, couldn't keep from going into bankruptcy. We found a way to do it and we found a way to sell the company and do well for our shareholders, and that has for me personally, that had a lot to do with my experience of knowing that there's something in the

worst moment, there's something on the other side of it and we just have to keep going. And you see that in people like Mark Harral and to your point, people inside that program just have—they've had a tenacity and a focus to stay with it, and despite all the challenges, you can imagine, we talked about all the challenges of forming NIRE, they had the same challenges if not more in developing a new program that was interdisciplinary and most people wouldn't have done that.

AW:

But I think part of that is that they were their own self-fulfilling prophecy in the sense that without a Kishor Mehta you wouldn't have been able to keep a John Schroeder.

DM:

That's right.

AW:

Or you may not have even found a John Schroeder.

DM:

That's right.

AW:

So that sort of thing, also in a good way propagates itself.

DM:

That's right.

AW:

That's interesting. Well thank you.

DM:

That's good. Thank you, I appreciate it. Thanks for taking the time.

*End of Interview*