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CITY OF LUBBOCK, TEXAS  
REGULAR CITY COUNCIL MEETING  
THURSDAY, MAY 12, 2016

TESTIMONY OF JAHAN RASTY, PH.D., P.E., M.B.A  
AND JAMES DICKENS, PH.D., P.E.  
ON BEHALF OF OMEGA FLEX, INC.

Transcribed By: Julie G. Davault, CSR  
Job No. 051516

1 MR. SCANLAN: So what I'd like to do for  
2 a few minutes is turn this over to Dr. Dickens and Dr.  
3 Rasty from Texas Tech and they can do go over some  
4 recent testing that was conducted on these types of  
5 products.

02:31PM 6 DR. RASTY: Thank you for the invitation  
02:31PM 7 to come here and speak to you. My name is Jahan Rasty  
02:31PM 8 and this is Dr. James Dickens. We're both faculty at  
02:31PM 9 College of Engineering at Texas Tech. I'm in the  
02:31PM 10 Mechanical Engineering Department and Dr. Dickens is in  
02:31PM 11 Electro Engineering. My area of expertise is I'm a  
02:31PM 12 materials scientist by training. My area of expertise  
02:31PM 13 has to do with damage mechanics, metallurgy. And  
02:31PM 14 Dr. Dickens is the director of Pulsed Power Laboratory  
02:31PM 15 here at Texas Tech.

02:31PM 16 A little background about why we're here.  
02:31PM 17 About 9, 10 months ago, Chancellor Hance called me and  
02:32PM 18 told me about this new proposal for this new standard  
02:32PM 19 that's going to be adopted. And he told me that the  
02:32PM 20 proposal was made by a manufacturer that claimed that  
02:32PM 21 their product actually met this new standard. And they  
02:32PM 22 wanted us to conduct a series of experiments to see if  
02:32PM 23 the product meets their -- the alleged standards or not.

02:32PM 24 So we decided to put a series of experiments  
02:32PM 25 together. We actually conducted experiments over over

02:32PM 1 30 CSST, corrugated stainless steel tubings. And we  
02:32PM 2 wanted to make sure that -- one of their -- one of the  
02:32PM 3 things that they told us was that it was very important  
02:32PM 4 to do the testing according to what the standards  
02:32PM 5 specifies, which means treating the CSST to --  
02:32PM 6 subjecting it to the required 96-hour accelerated  
02:33PM 7 corrosion testing and also subjecting it to normal tear  
02:33PM 8 and wear that it experiences. That's another one of  
02:33PM 9 their -- the requirements because when they put these  
02:33PM 10 things in -- into residential places, it goes through  
02:33PM 11 studs, stud holes, and it creates nicks and -- on the  
02:33PM 12 surface and could actually deteriorate the material and  
02:33PM 13 degrade it somewhat.

02:33PM 14                   So we put it through that testing. We  
02:33PM 15 put it through that corrosion testing. One of the  
02:33PM 16 things that we noticed is that because of the fact that  
02:33PM 17 the mulched layer nature of this thing is that it has an  
02:33PM 18 aluminum mesh that comes in contact, at the very end,  
02:33PM 19 with a brass fitting. And there's a phenomena called  
02:33PM 20 galvanic corrosion that could occur when two dissimilar  
02:33PM 21 metals come in contact in the presence of some sort of  
02:33PM 22 electrolyte. And the electrolyte could have bigger  
02:33PM 23 sources. You know, when they install these things, they  
02:34PM 24 could do this bubble testing or -- to apply some  
02:34PM 25 solution to see if -- if it bubbles out or not, to see

02:34PM 1 if there's a leak, or other means of electrolyte.  
02:34PM 2 And we noticed that that, in fact, could create  
02:34PM 3 corrosion at the interface of the aluminum mesh. And  
02:34PM 4 some of the tests -- And it -- Of the 30 tests, 10 of  
02:34PM 5 those actually failed. And we noticed that there was a  
02:34PM 6 breach to the inner core. And our conclusion was that  
02:34PM 7 it -- it -- the product doesn't stand up to its claim as  
02:34PM 8 setting the standard.

02:34PM 9 And Dr. -- Let me -- Okay. Let's see if  
02:34PM 10 we have some of the pictures -- Yes. Here on the left,  
02:34PM 11 you see the actual new, as received, material, and then  
02:34PM 12 on the right, that's specimen number 3 and specimen  
02:35PM 13 number 11, on the right side is the actual corroded  
02:35PM 14 specimen. As you can see, the duration and size of  
02:35PM 15 corrosion versus the new material, as you see it on the  
02:35PM 16 left side.

02:35PM 17 And then when we tested those -- Another  
02:35PM 18 thing that we wanted to test is that the whole idea  
02:35PM 19 about CSST is that its flexibility makes it an ideal  
02:35PM 20 material because, unlike the solid black pipe, the fact  
02:35PM 21 that it can bend through various areas, it gives it the  
02:35PM 22 advantage that it has. So it's not really fair to test  
02:35PM 23 this material under ideal conditions, laboratory  
02:35PM 24 conditions, as a straight pipe, without any nicks on the  
02:35PM 25 outer surface, without any corrosion testing and without

02:35PM 1 any mesh, because that's what it's really -- its real  
02:35PM 2 advantage is, the fact that it can bend. So we also  
02:36PM 3 bent it according to the manufacturer bending criteria.  
02:36PM 4 And we noticed that because of this bending, the actual  
02:36PM 5 shield, the aluminum shield that it is supposed to  
02:36PM 6 distribute the energy, and, therefore, not cause the  
02:36PM 7 arcing to go through, failed at the bend point. And we  
02:36PM 8 got a lot of holes right at the bend points. So as you  
02:36PM 9 can see at the top picture.

02:36PM 10                   And the bottom picture there shows the  
02:36PM 11 type of corrosion that can occur as a result of the  
02:36PM 12 accelerated corrosion testing that we put this material  
02:36PM 13 through.

02:36PM 14                   Here is the type of wear that you get or  
02:36PM 15 deformation that you get when you bend this thing. The  
02:36PM 16 actual shield opens up and it doesn't provide the  
02:36PM 17 protection that it claims.

02:36PM 18                   Here's, again, another -- You can see the  
02:36PM 19 hole, actually, right through the area where the bend  
02:36PM 20 is. And the real reason for that is because the mesh  
02:37PM 21 comes apart when you bend this material.

02:37PM 22                   Another phenomena that we observed was  
02:37PM 23 the fact that because of the corrosion at the interface  
02:37PM 24 of the aluminum mesh and the brass fitting, you get  
02:37PM 25 additional resistance. And Dr. Dickens will speak more

02:37PM 1 about that. This resistance deteriorates the conduction  
02:37PM 2 of energy. You get some sort of a shock effect as the  
02:37PM 3 arc travels through it. You can see that the -- the  
02:37PM 4 pipe actually collapses under compressive stresses,  
02:37PM 5 right at the point where the -- where it connects to the  
02:37PM 6 brass fitting. And we observed this thing on a multiple  
02:37PM 7 number of the tests of specimens.

02:37PM 8 Here's a situation where I can point  
02:37PM 9 where it was bent. The thing not only created a hole,  
02:37PM 10 but it just snapped in two.

02:37PM 11 This is a different series.

02:37PM 12 But Dr. Dickens right now, I'll turn it  
02:38PM 13 over and he will talk more about the electrical --

02:38PM 14 (Unintelligible.)

02:38PM 15 DR. DICKENS: So one of the -- the goal was  
02:38PM 16 to test to the LC-1027 standard. There's a lightning  
02:38PM 17 standard in there, a particular shape. I've spoken with  
02:38PM 18 many of you about it. In addition, there are certain  
02:38PM 19 treatments that have be done to meet the standard, and  
02:38PM 20 incorporation of the LC-1 is also in there. So when you  
02:38PM 21 do all of that and you apply all this to these samples,  
02:38PM 22 as Dr. Rasty said, they failed 10 times out of 30. All  
02:38PM 23 of the samples were treated according to the LC-1027  
02:38PM 24 standard, except for the bend is not explicitly called  
02:38PM 25 out in there; however, the bend is -- is the recommended

02:38PM 1 bend radius by the manufacturer. And so the result of  
02:38PM 2 that, though, is several failures occurred at as low as  
02:39PM 3 36 coulombs and then we had multiple failures at the 85,  
02:39PM 4 95 coulomb level as they are now. So we had both 37  
02:39PM 5 coulomb failures and we had 95 coulomb failures when  
02:39PM 6 they were treated as you see there. That's exactly the  
02:39PM 7 -- the real specimens that were -- were tested.

02:39PM 8 I guess the one thing I -- you know, before  
02:39PM 9 I step down and turn it back over, I'm not criticizing  
02:39PM 10 that pipe at all. I think that pipe is great. I think  
02:39PM 11 all of the pipes that offer the lightning protection, to  
02:39PM 12 varying degrees, are more than acceptable.  
02:39PM 13 Unfortunately, I have yellow pipe in my house. My  
02:39PM 14 children, I have two young children, and we're going to  
02:39PM 15 work on getting it out of there. I've known I've had it  
02:39PM 16 for a while. And, you know, in the interim, when  
02:39PM 17 there's a lightning strike, the kids are instructed to  
02:39PM 18 go outside. And -- and we will replace it. But I would  
02:40PM 19 replace it with any of the lightning resistant  
02:40PM 20 materials. And so, again, I'm not criticizing that  
02:40PM 21 material, saying it's not acceptable. I think it's more  
02:40PM 22 than acceptable, but I think the standard as Lubbock has  
02:40PM 23 it now and the codes committee has written it, is not  
02:40PM 24 quite where it needs to be. You see the yellow pipe  
02:40PM 25 that was here, that yellow pipe, obviously, got a hole

02:40PM 1 in it. And the yellow CSST pipe like that has been  
02:40PM 2 shown to fail at .1 coulombs. That is nothing. That --  
02:40PM 3 that is awful. That is so dangerous. That is a  
02:40PM 4 dangerous product. There's no question about that.  
02:40PM 5 This product, any of the lightning-resistant products,  
02:40PM 6 according to LC-1, as I mentioned in my three-minute  
02:40PM 7 talk last time, that is a product that's appropriate and  
02:40PM 8 that I would stand behind in my house, with my children.  
02:40PM 9 Again, when you look at the damage that's caused to this  
02:41PM 10 pipe from a 10 coulomb shock, it blows the pipe in half.  
02:41PM 11 We don't -- we don't see that. We saw smaller holes.  
02:41PM 12 That's what we've traditionally seen. So take that  
02:41PM 13 under advisement.

14 MR. SCANLAN: And so I'd just like to  
15 reiterate what Dr. Dickens said, is that it's not our  
16 position that this type -- this FlashShield product is  
17 inferior or that it doesn't work. You know, it's a --  
18 it's a good product. It's a safe product. It just does  
19 not work as advertised. It does not meet the  
20 requirements that is currently proposed in front of the  
21 Lubbock ordinance. As we stand here today, there is no  
22 product that can meet the requirements of the Lubbock  
23 ordinance. And so voting in favor of that ordinance  
24 would, in fact, result in the ban of the corrugated  
25 stainless steel tubing.

(Transcription portion ended.)

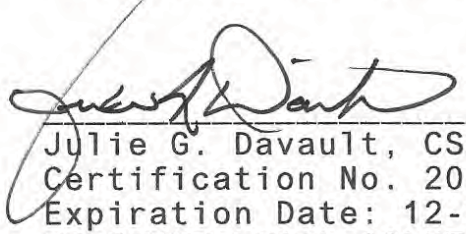


1 STATE OF TEXAS )

2 COUNTY OF TARRANT )

3 I, Julie G. Davault, Certified Shorthand  
4 Reporter in and for Tarrant County, Texas, hereby  
5 certify that the foregoing pages numbered 1 through 9  
6 constitute a full, true and correct copy of the audio  
7 file provided to me labeled as  
8 <http://lubbocktx.swagit.com/play/05122016-725/#54>,  
9 approximately minutes 16.41-27.41.

10 Witness my hand on this 18th day of May,  
11 2016.



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