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24 MR. CARLIN: Dr. Heber? Do we have a
25 Dr. Heber here?

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1 MR. HEBER: Yes.

2 MR. CARLIN: Purdue University. You're
3 on.

4 MR. HEBER: All right. Thank you. I am
5 from the agriculture and biological engineering
6 department at Purdue University and I'm the
7 director of the Purdue agricultural air quality
8 laboratory.

9 The Air Consent Agreement was
10 established between the livestock industries and
11 EPA and the basis of that air consent agreement,
12 and I'm assuming that you understand what that
13 is, but in question and answer I could clarify it,
14 but the basis of it is that EPA needs scientific
15 data and producers need compliance status.

16 Now, of all the pollutants that come from
17 the livestock producers, we have ammonia, sulfide,
18 volatile organic compounds, particulate matter,
19 odor, greenhouse gases and pathogens and we have
20 several questions that always come up with each of
21 these is how bad is it, how much is emitted and
22 how far does it disperse and if it is a problem then
23 what can be done about it, abatement.

24 Now, I circled the pollutants that are
25 being addressed by the Air Consent Agreement in

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1 the National Air Emission Monitoring Study. It
2 doesn't address odor and greenhouse gases and
3 pathogens unless an add-on study is provided and
4 USDA has actually provided funds to add odor to
5 some of these sites. And the other thing is that
6 the Air Consent Agreement is only addressing the
7 quantification of how much is emitted, so it's only
8 answering the question how much.

9 Now, over the last decade, similar types
10 of research have been conducted and it started
11 with an industry funded project in 1996. And 76
12 barn months of data were collected for ammonia,
13 hydrogen sulfide and odor and then the EPA
14 provided funds to establish and standardize the
15 methods for making ammonia and particulate
16 matter emission measurements.

17 And then the USDA provided a six day
18 study -- funds for a six day study that looks a lot
19 like the National Air Emission Monitoring Study.
20 There were two consent decrees, one in Missouri

21 and one in Ohio, that required similar
22 measurements, so they had already collected a lot
23 of emission data from farms.

24 Currently we have a study being done at
25 layer operations in Ohio and Indiana and also

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1 there's a court-ordered project in Kentucky out of
2 our other facility for measuring ammonia. Now,
3 that study was upgraded to meet the requirements
4 of the Air Consent Agreement so that the producer
5 there qualifies for that. We are now embarking on
6 the largest study ever conducted because it will
7 generate 840 barn months of data and 72 lagoon
8 months of data involving eight Universities, 40
9 barns, 14 barn sites and ten area sites all across
10 the country and it will be very comprehensive in
11 what it measures.

12 This is a picture of the method study.
13 This paves the way for this study, this national
14 study, because it addressed a lot of the technical
15 issues associated with measurement. And we
16 measured emissions. There are three variables
17 that we need as we measure emissions from barns,
18 for example. First of all, we measure the inlet
19 concentration of the fluid and in this case
20 ammonia is coming in 1.6 parts per million and
21 it's leaving the barn at 25 parts per million and
22 the air flow is 186 cubic meters per second, so
23 those three variables are used to calculate the
24 emission at this particular point in time.

25 Now, one point is that you can't measure

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1 emissions by just taking a concentration
2 measurement because you have to take it times the
3 airflow, so even if you smell ammonia in a barn it
4 doesn't mean that emissions are high because it
5 depends on how many fans are on.

6 The -- so the two thorough projects that
7 we conducted, one, of course, was EPA -- with EPA
8 oversight, we conducted the consent decree project
9 and then that is at the top of the page. The
10 picture of the Missouri site where we tested
11 abatement ideas, as well as getting baseline
12 emission data and then the middle figure shows
13 the layer site in Indiana as part of the six state
14 site. Now, the six state study had four pork sites
15 and two chicken farms in the study and then the
16 consent decree study was being done at the same
17 time.

18 The National Air Emission Monitoring

19 Study is what I want to talk about next in more
20 detail. And the objective is to find out whether
21 livestock farms are likely to emit the particulate
22 matter in the bioorganic compounds in excess of
23 the Clean Air Act or whether they're emitting
24 ammonia and hydrogen sulfide in excess of the
25 recording requirements of EFRA and CERFA. And

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1 we will monitor the farms for 24 months and at the
2 area sources we will monitor every season for the
3 24 months for about 20 days each time and we are
4 measuring ammonia, hydrogen sulfide, bioorganic
5 compounds and particulate matter on a continuous
6 basis.

7 The sites were selected last year, 2006,
8 and we considered these criteria for making the
9 selection of sites. We considered
10 representativeness, convenience. We needed to
11 have someone who couldn't be too far away from
12 researchers and they actually had to sign up for
13 the Air Consent Agreement as well, so that was
14 another criteria.

15 And so the sites include five dairy sites,
16 one in California, Washington, Wisconsin, Indiana,
17 and New York; five pork farm sites and those are
18 located in Oklahoma, Iowa, Indiana, North
19 Carolina; and three layer sites, California, Indiana
20 and North Carolina; and then one broiler site in
21 California. Now there's another broiler site as
22 shown in Kentucky that's not part of the National
23 Air Emissions Monitoring Study, but as I said
24 earlier, that was upgraded to be included as an Air
25 Consent Agreement monitoring site.

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1 If you look at the egg production in this
2 country, you'll see, you know, this is just a -- it
3 gives you an idea of where the sites are with
4 respect to the geographical location of the egg
5 production. And then the next one, it does the
6 same thing for broiler chickens and so we have one
7 site in each geographical area.

8 Now, the National Air Emissions
9 Monitoring Study is funded by industry and so the
10 milk, pork, egg and chicken industries have all
11 stepped up to the plate and provided funds and
12 given those to the not-for-profit organization
13 called the Agricultural Research Council which
14 was formed for this Air Consent Agreement. They
15 contracted with Purdue University. I'm the
16 science adviser. I have my leadership team and

17 also the principal investigators at the
18 subcontracting universities along with several
19 producers that are collaborating with us in
20 opening up their farms.

21 And in all the studies that we've done
22 since 1996, you know, the producers have been
23 very collaborative with us. And the barn
24 monitoring will be done like this: mobile
25 laboratories will be set up near the barns, the

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1 gases will be extracted into high-quality
2 instrumentation inside the trailers, particulate
3 matter will be measured in real-time out there
4 near the fans. You know, just as important as
5 concentrations, we need to get good airflow
6 measurements. And the instrument shelter
7 protects the instruments. We will -- this is a
8 picture of one of the gas sampling points inside
9 the barn and we will provide calibration gas right
10 to that point. This gas sampling system was
11 developed over a period of ten years and is really
12 state-of-the-art.

13 The microwave technology provides
14 real-time measurement and with different inlets we
15 can measure PM2.5, PM10 and total suspended
16 particulate. And besides emission, we're going to
17 monitor other things that affect emissions on the
18 farm.

19 Here's a picture of the Southeast layer
20 site, the monitoring plans, the two barns out of
21 the entire facility we monitored. And the broiler
22 site, there will be two barns out of the complex
23 there that we monitor.

24 Now, the progress is that the quality
25 assurance project was written last year. It

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1 includes about, almost 2,000 pages, all the
2 standard operating procedures, site monitoring
3 plans. This was approved by the EPA in November
4 and our contract was signed on December 6th and
5 we're in the middle of equipment acquisition. We
6 should finish by the end of this week, if not early
7 next week, in ordering all the equipment. The
8 updates for this study will be available at our web
9 site, agairquality.com and I think my time is up.

10 MR. CARLIN: You did very, very well.

11 MR. HEBER: Thank you.

12 MR. CARLIN: Do you have a 50 minute
13 lecture you give automatically to students that
14 just fit that 50 minutes perfectly?

15 MR. HEBER: I do.
16 MR. CARLIN: I bet so.
17 MR. HEBER: For 50 minutes, I know
18 there are 50 minutes on air emissions.
19 MR. CARLIN: Question, Jim.
20 MR. MERCHANT: Yes. Thanks for that
21 presentation and obviously a tremendous amount
22 of work is going into this, but EPA is set up to
23 really protect the public's health and what this
24 study is doing is really concentrating on
25 conditions at the site or emissions from the site.

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1 The concern is what's going on in residences close
2 by, schools close by. There are a series of studies
3 that are coming out in this country and in Europe
4 that show increased rates of childhood asthma in
5 proximity to CAFO's, so I guess my question is
6 what is EPA doing and what is this study doing to
7 measure these pollutants at residences in
8 communities that are downwind from these sites?
9 Because that is really the issue the EPA ought to
10 be addressing and it's an important one because
11 we're getting the health outcome data reported but
12 we're not getting the environmental conditions.
13 The elegant data that you're collecting
14 here is not available at the residences at the
15 community level, so you can draw some conclusion
16 about what's -- you know, how the pollutants
17 ought to be better regulated. So I guess that's my
18 concern about this study, are you really measuring
19 what needs to be measured to protect the public's
20 health?
21 MR. HEBER: Well, I think we are. I
22 think the -- there are national ambient air
23 standards and one of the ways the EPA tends to
24 achieve those national air quality standards is
25 through regulation of emissions from various

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1 facilities. For example, they require that no
2 facility emits more than 250 tons per year,
3 otherwise you have to get a permit and have
4 controls and the purpose of that is to lower the
5 ambient air quality.
6 And in order to regulate livestock, they
7 need to know how much is being emitted, emission
8 factors. That's a very important aspect of the
9 overall regulatory program, to know what the
10 emission rates are and right now they have very
11 limited data on knowing, you know, how many
12 cattle emit 250 tons of a particulate matter per

13 year so that they can regulate it. And there are
14 dispersion models that require source emission
15 data in order to predict how far -- what the
16 concentrations are down here and are at the
17 residences. One of the inputs to those models is
18 the emission rate, so we are getting that emission
19 rate.

20 And I guess another -- there's a lot of
21 things I could say about that but very limited
22 time, but here's another opportunity with this
23 study and that is since we have 14 sites and we're
24 monitoring emission rates from those sites, at the
25 same time we could be measuring downwind

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1 because whenever you do a downwind study of a
2 facility you want to have the emission rate, the
3 weather and you want to have the ambient
4 concentration. Now, it's true we're not getting the
5 ambient concentration, but with -- we could
6 leverage and add on a study like that.

7 And, in fact, at one of the sites we are
8 measuring downwind for odor. That just got
9 funded with an internal grant from Purdue
10 University. We're going to measure odor
11 concentration downwind miles and miles away
12 while the odor emission is being measured at the
13 facility.

14 MR. MERCHANT: I hope that those of you
15 involved in the study take the opportunity to do
16 that because what you say is true about dispersion
17 models. The validating of dispersion models with
18 real data is really what's needed. You have a huge
19 investment in terms of technology, access to the
20 industry, and so on. If you would add that second
21 step, which is to measure downwind in proximity
22 to these units to more accurately use the
23 disbursement models, then that would really
24 advance EPA's understanding of what's going on
25 with this industry, so that is critical and I really

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1 strongly encourage you to do it. It's the missing
2 piece of what we lack in terms of understanding
3 emissions from CAFO's and their impact on
4 communities.

5 MR. HEBER: I would have to say there
6 are studies that have measured downwind
7 concentrations of ammonia and hydrogen sulfide
8 and the EPA enforcement office has been involved
9 in some of those studies.

10 MR. CARLIN: Alan?

11 MR. GOLDBERG: Yeah. Thank you very
12 much for the presentation. Can you give me some
13 indication if you just pick something, one of the
14 pollutants, of levels that will produce health
15 consequences in the animals?

16 MR. HEBER: Okay. I think the poultry
17 industry is concerned about ammonia and they see
18 some symptoms in their birds when ammonia levels
19 are too high. I'm not going to tell you what those
20 levels are, but that's something they work with on
21 a day to day basis to control the ammonia levels in
22 the litter and also -- well, you know, they have the
23 air quality standard now for animal welfare of 25
24 parts per million in layers so I know producers
25 that have hired people just to address the

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1 ammonia issue full-time. And so I think for
2 poultry, I think ammonia is the biggest air quality
3 issue for -- and they address that for bird health.
4 I think for swine and dairy it's less, so, but for
5 chickens it's pretty high priority to control
6 ammonia inside the barn, control that
7 concentration inside the barn.

8 MR. CARLIN: Fred?

9 MR. KIRSCHENMANN: Yeah. From a
10 human health perspective, have you or your
11 colleagues been able to determine which of any of
12 these particulates or compounds are the most
13 troubling in terms of human health?

14 MR. HEBER: We have not conducted the
15 health research. That is not my expertise and we
16 don't have a medical school at Purdue University
17 that I can team up with. We have -- I am in
18 collaboration, you know, at least talking with
19 Indiana University professors to do that type of
20 thing.

21 MR. CARLIN: Anything else? Thank you
22 very much.

23 MR. HEBER: Thank you.