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IN RE:

NEW JERSEY CLEAN AIR COUNCIL
APRIL 13, 2011 PUBLIC HEARING

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TRANSCRIPT OF PROCEEDINGS

WEDNESDAY, APRIL 13, 2011

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T R A N S C R I P T of the stenographic notes of the proceedings in the above-entitled matter as taken by and before RUTHANNE UNGERLEIDER, a Certified Court Reporter and Notary Public of the State of New Jersey, held at the NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION, 401 East State Street, Trenton, New Jersey, on Wednesday, April 13, 2011, commencing at approximately 9:30 in the forenoon, pursuant to notice.

B E F O R E:

TOBY HANNA, Chair, Clean Air Council
NICKY SHEATS, Chair, Hearing Sub-Committee
JOSEPH CONSTANCE, Vice-Chair
ROBERT LAUMBACH, M.D.
JOYCE PAUL
JOHN ELSTON
RICHARD OPIEKUN, Ph.D.
HOWARD GEDULDIG
SARA BLUHM
MOHAMMAD ALI, Ph.D.
MANUEL FUENTES-COTTO
KENNETH THOMAN
PAM MOUNT

MR. SHEATS: Let me introduce to you Commissioner Bob Martin with the New Jersey Department of Environmental Protection.

Commissioner, thank you for coming.

The Commissioner will make some introductory remarks and will take some questions from the Council.

COMMISSIONER MARTIN: Thank you very much.

Good morning.

Good morning, Council, and thank you all very much again. I talked with you last year. And I'm very proud that you are back again.

You are one of the environmental groups that, again, that work with the DEP on an ongoing basis. Your work in the past has been sensational. And we've taken very good counsel from you. You provided some really good insightful direction in the past.

This topic is extremely timely. As you know, both myself and the governor are very committed and very focused on cumulative impact to the communities in this state. There are a lot of communities in this state that we need to focus on pretty dramatically.

There has been a lot of hard work done so far. We are very focused on redirecting even further our group within DEP on environmental justice. We believe there are several issues that in the past have been raised, but not addressed. And we believe we are going to continue to start focusing in on that very directly going forward.

So I thank you very much initially here for the work that you are doing. It's extremely timely, and extremely helpful, to the Department, and to the State, and to all the people of the State of New Jersey.

Understanding and evaluating and reducing unequal impacts of pollution is a major challenge. And the governor and I continue to be very committed to making that happen long term.

We recognize and are committed to addressing this disproportionate environmental burdens that face primarily low income and minority communities across the State. We think that is a priority that must be addressed. The governor has spoken up very clearly that this is a priority, and we will continue to address it through this administration.

We focused so far in this

administration on several and numerous areas of air pollution right across the State, and will continue to be a key focus of this administration.

As you know, the 126 petition, which you filed with EPA, EPA has rendered their opinion and sided and agreed with our 126 petition for the Portland Power Plant. The Portland Power Plant, across the river from Warren County. The hearings are scheduled for later this month.

We think that is an incredible victory for the people of the State of New Jersey.

As you know, in our rough estimates that we continue to have, about a third of the air pollution in this state continues to come from sources outside the state.

We could address a lot of issues within this state around air pollution, and we will continue to do that, but we must address those outside the State.

The governor has given us very clear direction that we must fight both within the State and outside for the polluters that continue to bring pollution into this state.

The 126 petition is one of those first examples. We had been languishing in the courts for several years on the Portland Power Plant.

EPA heard our case. Our air team here did a phenomenal job modeling that air pollution. And now we are going to address that very directly.

I plan on testifying at the EPA hearing that will be up in Warren County at the end of this month. Lead off that, and defend the State's rights to protect ourselves from emitters outside the State.

Also, we've joined on with other states for the three plants, Allegheny Energy, out in Western Pennsylvania. We are battling that in federal court right now again. Forcing those plants to put on emission controls, which they refused to do. And, again, we're downwind. So we continue to fight that legal battle.

One of the largest coal-fired power plants in the country is in Homer City, Pennsylvania. We have also joined a suit there to have that plant put scrubbers on that plant.

I believe it is a plant of some size, of almost 1900 megawatts, which is just phenomenal in size, but the amount of pollutants that come out of that plant is significant. And we will force that push in the courts to keep doing that.

We have adopted also, as you know, tighter rules, significantly reducing the sulfur content in home heating oil. We've led the nation on our work on that front. We are going to keep pushing to make sure those standards are in place.

There is still much more to be done, and especially focusing on injustices to a lot of the communities that are overburdened by air pollution.

As you know, the air quality in the State still does not meet current health standards. Ozone levels statewide exceeds statewide standards, or federal standards. Fine particulates, 13 of our 14 counties exceed federal standards. Cancer risk from diesel-powered vehicles and engines, which, as we know, affect our EJ communities significantly, statewide average is 300 per million risk. In the urban areas, we're looking at risks that are 2000 in a million risk.

Which is unacceptable.

We know that issues with children with asthma and lung-related issues need to be addressed. We believe that addressing issues, especially diesel, is extremely important, besides other pollutants overall.

On vehicle emissions, we recognize that minimizing emissions from existing fleets is extremely important to focus on. Inspection and maintenance is required. Vehicle and engine retrofits are necessary. And we need to reduce engine idling. Engine and vehicle idling, which we see in areas especially like the Port of Newark and Elizabeth needs to be addressed.

We need to accelerate the turnover of newer and advance technology fleets. So we need to make sure those vehicles that are on road, and those that are off road, start to be turned over in the future. We also need to reduce the activity of vehicles, especially trucks, the number of trips, and the number of vehicle miles in this state that trucks are on the road. Especially as they are closer to a lot of the urban areas.

Some of the priority actions we have already taken is reducing idling. As of May 1, sleeper berth exemptions expire. Trucks will no longer be able to be sit overnight and idle unless they have the newer equipment.

Public school vehicles and

particulate retrofits have occurred. For school buses, we've already completed those in the State, the diesel retrofits. Garbage trucks are almost done in the State. Other buses across the State are just getting started.

Publically owned vehicles and equipment, begins this year. They are working on those that are off-road vehicles. We expect those to be completed by 2015.

We're working on executive order right now for the first initial pilot of diesel retrofit for off-road vehicles. We're hoping to get that signed in the next couple of weeks.

That will be a pilot project with the DOT for the first set of equipment that is off road that are tied to state contracts. We expect that to be the model for the future. With the ultimate goal in the future of getting all off-road vehicles that are under state contract, for work that is done with the State, must have the proper retrofitted equipment on it or must be the newer equipment.

So it is a big jump for us.

The Port Authority has played a key role in this. We continue to work with them very closely, with my office, or our department, with the governor's office, and with the Port Authority, to try to focus on the future of how we can make the programs there work.

As you know, their current strategy is to ban all trucks -- pre-1994 trucks are banned this year unless they are retrofitted. All pre-2007 trucks will be banned by 2017 unless they're retrofitted.

We're working very closely with the Port Authority to make sure that the current bans are being enforced and they continue to collect the data and the transparency to make sure that that happens.

The Port Authority has committed to work with both community and with the DEP to make sure that that happens.

One last couple of things that the Port Authority, that they focused on. They focused on using electric cranes. Yard equipment, they are replacing. They're spending over $7 million to replace yard equipment. And they are also investing $6 million in clean fuel for ships.

So they moved rapidly ahead in getting clean fuel into the ships going forward.

At the DEP, our focus on the Office

of Environmental Justice, as you know, we named two new coordinators for the DEP -- for our department's environmental justice program, Riche Outlaw and John Gray.

Are you both here?

I see Riche there.

They're both here.

If you guys don't know them, please get to know them. They are now coordinating our program.

We decided it was time to revamp what we were doing, refocus that mission, and be out in the communities more so than ever. And I have asked them to be out in the communities. That that role was to be talking to the communities, not in the office here.

Wait, what are you doing here? You are not supposed to be here.

The bottom line is, we need them out in the communities working, understanding the issues, and understanding, where do we go from here, and make sure we got a strategy long term. To make it not just talk, but actions, to make things happen in those communities.

If you start looking at other areas

that we started focusing on cumulative impacts in the State, we also have been looking at air monitoring in Camden. We have several projects going on there for modeling air toxin emissions in Camden. And in Paterson, we continue to do air monitoring for years. In fact, we had additional money from EPA for additional air monitoring in Paterson, after we had a couple of anomalies occur on issues there that we followed up on.

We expect to have the final report from Paterson by early next year that gives us a long term read on the air emissions in that community. Which I hope will feed into whatever you are doing here with your group, the game plan you take on this.

As you know, we've also been focusing on dry cleaning equipment. The first program in the nation New Jersey had, replacing dry cleaning equipment, to purchase newer, more efficient equipment, that does not use PERC as a solvent.

That program has been extremely successful. Unfortunately, to the point where the demand far exceeds the money we have in that program. But we're looking to see what we could do in the future to expand that.

We continue to focus on air toxic emitters, focusing both on facilities, looking at large emitters, and using reported emissions from various different department databases to focus on it.

The last major area on this front is the cumulative impact screening method.

I have directed my staff to continue developing and expanding the cumulative impact method, which includes new data and seeks additional stakeholder input.

We see this as, absolutely, one of the critical models to be able to model cumulative impact in the communities. We see this tool as very effective, as a long-term tool, as we start looking at permitting in those communities for other programs.

So, again, we think this is revolutionary in the model that we have right now, and, hopefully, our team will review that with you.

Last area I want to discuss is the transformation of the DEP.

The DEP continues to transform. If you heard me say it, my guess is you're probably tried of me saying it. I see some smiles out there.

But we need to continue to change how we do things at the DEP. Components of that include looking at how our air program works. Is there a better way to look at the air program? How do we focus on outcomes at the end of the day? How do we plan the planning process and the permitting process long term? How do we enforce long term? Is there a better way to do it?

I'm very much about having the science. I'm very much about having the outcomes of what we are focusing on. Last thing I want to see is more process. I want to see less process, less paper. I want to focus on outcomes at the end of the day. And I want to be able to measure it long term.

Our decisions are going to be based upon a lot of input besides the science, data, facts, and cost benefit analysis where necessary. We're also going to take input from stakeholders. We need input. I know you are going to hear a lot of experts today. Which I think is fabulous. I have seen the list.

I think that's extremely important, to have the experts.

I also think it's extremely

important, we have the stakeholders of the State actively involved in this. The people of the community, community representatives, and other organizations, businesses, all those who play a key role on this, should have an opportunity to provide us input on the direction in going forward.

As you know, we've also put together a science advisory board. That science advisory board is playing a key role in addressing numerous topics within the DEP. We expect to have them take and look at everything from different toxic issues, on air, water, and where we need the science.

As you know, that team is made up of some of the best and the brightest scientists in the State on the science advisory board. We plan to give them numerous topics over time to deal with air-related issues.

We're focusing, also, on a ten-year air reduction plan.

As you know, the recommendations you have made in the past, have been extremely important. The report you provided in the past had focused on clean trucks, which the Port Authority has worked on. Truck idling, you guys made recommendations back in 2004 on that. And launching anti-idling campaigns across the board. There are over 10,000 anti-idling signs. And we're out there, both putting up signs, and distributing the information to focus on anti-idling in several places.

Again, input from all of you in the past.

In conclusion, I want to say a couple of things. One is, I want to thank, first, all of you for the work you have done in the past. I appreciate the time and the effort that it takes from all of you in what you are doing on making sure we get to some good answers, some good recommendations, and I am hoping what you come out with is, again, another list of actionable items that the DEP can take in the future, that we can turn from policy to real actions, to get things done.

So I thank you for your work there.

I thank the group here, both people from my department, who have done a fabulous job with the air program in the past, cumulative impact in the communities, you guys have done great research on there, and all the others in the community itself, and the stakeholders that are in the room today, I thank you for your input. We need your input. Please help us shape the future on where we are going to go with air in this state. And I thank you all very much.

Thank you.

I am glad to grab a few questions from the Council, if you guys have any questions. If you don't, that's fine too.

MR. SHEATS: Commissioner, I have a question.

Thank you for coming.

I don't want to sandbag you with a tough question, but I'm sure you're used to answering tough questions.

COMMISSIONER MARTIN: Oh, yeah.

MR. SHEATS: Can you envision cumulative impacts, the concept of cumulative impacts, being incorporated into the permitting process for DEP in such a way that it will affect the decision on whether a new permit will be issued or not issued?

COMMISSIONER MARTIN: Yes.

MR. SHEATS: You had no problems answering.

COMMISSIONER MARTIN: No, I mean --

the answer is yes.

I can see that we need to have the right model that works, and that is why we are going further with the model, the computer model we have right now. Our team has done a phenomenal job with that. So I see us moving down that path. And I think we have to evaluate -- there has to be other factors evaluated, and including the community, that it's in there, and the multiple variables that come with it. And we realize that certain communities across the State have been overburdened with pollutants. And we have to address it.

You look at the statistics on kids with asthma-related issues, and breathing issues, in cities like Newark, we can't stand back and just watch. We have to bring in other factors. And we have to make sure we are looking at the picture as a whole going forward.

What shape it takes, and how it looks right now, I don't know that answer, but that is the direction I would like this to go.

Thank you all very much. I appreciate the work that you do.

MR. SHEATS: I want to thank the Commissioner for his remarks.

And so we will start -- we'll lead off with the substantive part of our program now.

First up, Professor Rachel Morello-Frosch, from UC Berkeley.

And as I said before, Rachel is certainly considered one of the leading experts on cumulative impacts in the country. Arguably, the leading expert.

Thank you, Rachel, for your time.

PROFESSOR MORELLO-FROSCH: Okay. Good morning, everybody.

So I am going to start us off today both talking a little bit about the science behind cumulative impacts. Why are we having this discussion and what is the scientific evidence behind it? And, then, what we have been doing in California to sort of leverage that science to develop a tool that can advance decision making relating to cumulative impacts. And then talk a little bit about what the implications have been for community engagement and action, particularly in the State of California, but implications more broadly.

So just to be clear, I think that we need to acknowledge the role of environmental health and environmental justice advocates in encouraging both the regulatory community and scientists like myself to do a better job in terms of really thinking about cumulative impacts and making sure that the science reflects the realities of the multiple environmental hazards that communities face in their different environments, where they live, work and play. And coupled with that is the need to consider social vulnerability factors that can enhance individual community susceptibility to the toxic effects of pollutant associated adverse health effects.

So those vulnerability factors range from poverty, malnutrition, underlying chronic health problems.

The list is quite extensive.

So a picture says a thousand words.

This is what we are talking about when we are thinking about cumulative impacts. This is the 710 in LA. It goes to the port. Thousands of trucks go back and forth all the time. And, obviously, the communities that are nearby are not happy about the health impacts of that. And there is a huge fight now because there is proposals to widen it. This freeway.

Again, this is other examples of

cumulative impacts. These are kind of the pictures behind the statistics that many of us have been working on over the last several decades to address EJ questions. Both to inform regulatory decision making and to improve the community health and reduce exposures.

And this is a community that I have been doing a lot of household exposure studies on. This is a community called Liberty National Village, which is very close to major transportation corridors, as well as the largest refining operation west of the Mississippi.

So these are the kinds of things we are talking about when we are talking about cumulative impacts.

So what does the science tell us right now about cumulative impacts? What is the state of the evidence?

We have a lot of publications on this and so forth, some manuscripts on this, which I'll be happy to share with anyone who wants to E-mail me.

But the first assertion is that there are disparities and exposures in environmental hazards. And that has been the focus of a lot of EJ research. And that they are significant and they're linked to adverse health risks. And they're linked to social inequality.

So this is a map of the United States looking at the major Metropolitan areas of the United States and looking at multi group segregation. The separation of racial and ethnic groups from each other in our major metro areas.

And as you can see, the red areas are the places where we have the most intense segregation. Which the northeast, the midwest, and parts of the south are kind of the epicenters of higher segregation in this country right now. But there are also places in the west that are slightly segregated.

So what does this mean for air pollution and health?

So this is a study that we did a little while ago looking at racial residential segregation and what it means for disparities in estimated lifetime cancer risks associated with air toxics in these metro areas that I just showed you on that map. So this X axis here looks at metro areas with very lower segregation. And then these are metro areas with extremely high levels of segregation. Each one of these lines represents a racial or ethnic group.

There are two take-home messages from this chart. First, racial disparities in air pollution burdens are much greater in areas that are hyper segregated. That's not surprising. With the burden falling most heavily on communities of color, compared to the white counterparts.

But the other take-home message which I think is important for policy and politics addressing cumulative impacts, is that air quality overall, for everyone, worsens in areas with higher levels of social inequality.

So this really gets to the need that cumulative impacts and the inequality that sort of drives it is something that we need to address to improve environmental equality overall, and that places with higher levels of social inequality have worse environmental quality, and that communities of color are bearing the highest burden of that.

And the other assertion is that these disparities are not just related to income, that there are racial disparities that persist across income categories. And I am not going to show you charts on that due to time limitations.

The other assertion that I think is important to think about is that social inequality can amplify the health effects of environmental hazards. And this can play out in the individual level, as well as community level.

So what do I mean by individual vulnerability?

This is a study that we did looking at the relationship between exposure to different kinds of PM, PM10, PM2.5, and source PM, and its effect on average birth rate among women giving birth in California over the course of ten years. And what we see here overall is that each one of these colors represents a racial or ethnic group in terms of reporting maternal race. And we can see overall that there is a decrease in average birth rate with increasing exposure to PM. But we see that the effect is most pronounce in terms of lowering birth rate among African-American mothers, compared to their other counterparts.

So everyone is adversely affected, but the effect is most dramatic among black mothers.

And we see, there was a similar study that was done in the east coast, in the northeast, in Massachusetts and Connecticut, and you can see, they just compared the birth weight effects among black mothers among white mothers, and the PM effect on birth weight among black mothers was much more dramatic.

We also can see affects of place on health. This is a study that was done in Los Angeles looking at traffic density and the risk of pre-term delivery.

And what this shows is that they didn't really see an association between increased traffic density and risk of pre-term birth among mothers that were living in high socio-economic status neighborhoods, but they did see an effect among women who were living in low socio-economic status neighborhoods.

So it's not just about your individual level income or your individual race. Your health could be very much influenced by your neighborhood environment as well.

The last thing is that it's constant exposures to poverty and things that go along with it, malnutrition, having trouble putting food on the table, these kinds of things, have been shown to erode the body's resilience against the ability to deal with the toxic effects of environmental hazard exposures.

This was an interesting study that was done in Massachusetts that looked at the risk of incident asthma in little kids associated with traffic density. And what the study found, it was published in Environmental Health Prospectus a few years ago, is that they asked kids about whether or not they had witnessed violence. Not whether the kids had actually personally experienced violence, these were not kids that were abused themselves, but in terms of their neighborhood, had they witnessed violence, fights, shootings, these kinds of things.

And what they found was that the traffic incident asthma relationship was not significant among kids who were not witnessing very much violence, but among the kids that lived in neighborhoods were they were witnessing a lot of violence you saw a much stronger and significant relationship in terms of the relationship between traffic density and the risk of asthma, or incident of asthma.

So, again, neighborhood quality matters. Those social factors about neighborhoods definitely can affect modification, where you see stronger health effects from pollution, compared to people who live in higher SCS neighborhoods.

So the implications are that the science really is indicating that cumulative impacts is real. That it plays out at the individual and community level. And so the question really has been, at least in California, among agencies, how do we translate what we know now about cumulative impacts in terms of the epi and the animal evidence into tools for decision making, even as the science begins to evolve? And, yet, right now the science is really playing catch up to community wisdom on the issue of cumulative impacts. So what do we do about it?

So we were funded by the California Air Resources Board to really think about how we might translate the science into tools for action and were asked to develop what we call an environmental justice screening method. And the idea was to develop indicators of cumulative impacts that was left, research on air pollution, and also one of the metrics that were relevant and transparent to policy makers and communities. Diverse stakeholders.

And the idea was also to apply the screening method to multiple uses, not only regulation and permitting decisions, in terms of the Air Resources Board mandate, but also to inform local land use planning decisions at regional levels. Because we all know that transportation development, industrial development decisions, zoning, these kinds of things, also influence the distributions of people and pollution.

And lastly, this tool was also aimed to be used to target areas that would require additional community outreach.

So the things I'm going to show you today are three categories of cumulative impact that we use in our method. The first category is looking at neighborhood proximity to hazards and sensitive land uses. So really highlighting where you might have incompatible land uses. The second category are metrics that get at health risks and exposure from air pollutants. And the last one are metrics related to social and health vulnerability.

We are currently in the process of adding a fourth category, which is getting a climate change vulnerability. This is due in part to air mandate to implement California's global warming solution act. They are very interested in adding this additional metrics. So we are working on that.

So we use land use data to develop this tool. And we are very fortunate in California that we have very good land use data that tells us where people live, what land use is industrial transportation, and what is open space.

So the white areas are the places that we are focusing our screening on. This is where people are, this is where schools are, daycare centers, this is where people hang out.

So very often a lot of early work was, you identify the hazard, you draw a buffer around that, and then you see what is going on there.

What we are saying is, let's figure out where people are, draw a buffer around polygons and the neighborhoods, and see what is in the neighborhoods themselves.

So we are taking a slightly different approach here.

So just to give you an example.

Here is land use polygons given to us by the Southern California association of governments. As you can see, there are a bunch of different land uses here. And here is a cemetery. So we are probably not going to do a lot of screening there because those people are already dead. So we spent a lot of time cutting out areas that we don't want to highlight because that is not where people are hanging out.

And we take the land use polygons and intersect them with census tract blocks. And then we highlight these what we call our cumulative impact polygons that are associated with specific locks and the land uses, and then we, essentially, are giving each one of these polygons a cumulative impact score.

So this is vacated. This is to sort of give you an overview of our process.

So the first category is looking at proximity to hazards and sensitive land uses. And we are focusing on publicly available databases. We want this to be accessible. We want this tool to be something that is easily updatable. So this was all data that is available to us from agencies in California.

So this is the kind of information that we had. And these are the kinds of sensitive land uses that we are focusing on.

And the polygons receive a score of one if they contain at least one sensitive land use.

And then we look at hazardous land uses.

Again, all of this information is from publically available databases from the different agencies in California.

So we are looking at area emitters, we are looking at hazardous waste processing facilities, and then we are looking for potentially hazardous land uses, like rails, ports, and large industrial facilities, like refineries, chemical facilities.

And we count the number of sites within different buffers of the polygon edge to derive a score for each polygon. And we use a distance weighted approach, which I don't have the time to go into here, but I have a slide here, and I'm happy to make it available to anyone.

This is the map that is derived for the Southern California area for the category of hazard proximity and sensitive land use. And we derive this at the census track level in part because a lot of the air quality data is really only available at the track level.

And so you can see that, you know, a lot of the hazardous land use, which is also influenced by traffic corridors, is concentrated along 710 and different parts where kind of the usual suspects where you would expect where there has been a lot of environmental justice organizing, but the beauty of this map, it also highlights places like Panoma. And I know you are not familiar with LA. But the beauty of this approach is that it also highlights communities that we may not be organizing. That we may not know about. That may have pretty significant issues. And that is the point too. We want to find out about those communities that maybe don't have high organizing capacity to speak out and get on the radar screen.

The second category is health risk and exposure. And these are the data sets that we use. We use the risk screening environmental indicators database from U.S. EPA. We use the National Air Toxics Assessment. We are currently updating to '05, which is just recently released. And we estimate respiratory hazard and we are also estimating cancer risks. We are using toxicity factors from both California's Office of Environmental Hazardous Assessment and U.S. EPA's Environmental Database.

And then we are also fortunate enough

to get information from ARB that looked at -- interpolated PM 2.5 concentrations and ozone concentrations over the course of four years to the census track level. So they made this data available to us.

So this is the kind of map that you get. You can see that it differs from the previous map because we are looking at a different metric and category.

Again, you are looking at these layer by layer to see how these maps play out. So this is what the layer looks like. And you can see the pattern is slightly different, but there is a lot of overlap.

And the last category is social health vulnerability.

These are the metrics that we are using.

We had an academic peer review committee that reviewed our work as we went along. We had folks from NCHS and UCLA as our peer reviewers. And we also did extensive peer review from environmental health advocates as we were developing this. And we settled on this final list because it was decided that we needed metrics from

SES that are commonly used in the socio-epidemiological literature and in the EJ literature. We wanted some neighborhood metrics that might get at biological vulnerability. So looking at health outcomes. And one metrics, at least, of underlying health conditions. So we used birth outcomes. We had very good birth outcome data in California. Which gets at the proportion of pre-term or small for gestational age infants. We are looking to integrate also asthma prevalence data if possible. It is a little bit of a challenge to get that at the track level, but we are working on that.

And then we added two metrics that we thought were important to look at civic engagement capacity of communities. What is the capacity of these communities to engage in the regulatory process, to get themselves on the regulatory radar screen about the issues of cumulative impact?

So we used data looking at the linguistic isolation of households and voter turn out.

This is what the social and health vulnerability map ends up looking like.

So we bring it all together. So we

peel the layers. I showed you the layers. And now we bring all these scores together. And the cumulative impact scores, again, each map looked at all the scores for each of these categories. We had a span from one to five.

You could score differently. If you want to use deciles, you can use deciles tiles. We made our method nimble enough to allow for flexibility. Here we are using quintiles.

The maximum score for a particular track is 15, and the lowest score is three.

So this is what the cumulative impact scores look like, from a span of three to 15. And as you can see, the interesting thing is that we have a fairly normal distribution of the scores. And we have done some sensitivity analysis in terms of different scores and the like. The map is pretty robust and doesn't change significantly in terms of what we are highlighting.

This is zooming into the South LA area, which has been a big epicenter of environmental justice concern, and it is where the 710 corridor is and where a lot of the goods move from both Long Beach and LA ports.

So there are some caveats to this.

Our method has been developed with specific reference to air quality. We were initially funded by the Air Resources Board. So they want to know about air. But we are also funding in some new metrics. For the hazardous land use we are folding in a metric of traffic density. And we're expanding this to areas in the California Central Valley, which is our bread basket there. So we are looking at pesticide use. We're also looking at drinking water quality. That is a big issue in that region. And then as I mentioned, we're adding another category for climate vulnerability. Because agencies are interested in this due to their mandate to implement California's global warming solution act.

This method performs best when you have land use data with high spacial resolution. We are now applying it to places in California that do not have great land use data. And those maps are being produced. And I think we're actually pretty successfully at dealing with this issue and we will probably be publishing those results in the fall.

Again, I just want to be clear, that this is screening. This is not risk assessment. This is not predicting health effects. So neighborhood monitoring is really needed.

We applied this and then worked a lot with those neighborhoods that are turning red in our maps to actually walk those neighborhoods to find out what we are missing. What we are capturing. What might be wrong.

So I think it is key, also, community knowledge about additional sensitive land uses for hazards that are not captured by regulatory databases are important to take into consideration.

Here is an example of ground trouping that we have done in a community in Southern California. These are hazardous land uses that have been captured through ground trouping that were not captured by the databases that we were applying.

So adding ground trouping is important to this when you are highlighting areas for concern of regulatory action.

So I think that this kind of strategy can do a lot towards identifying communities that are exposed and socially vulnerable. And you can use it in terms of policy and regulatory change.

California is also considering this as a way of thinking how to target resources. Our climate change law is going to be generating revenue. So the idea is that a portion of that revenue should be re-vested in highly impacted communities. So this type of method can be used to help identify what communities might be appropriate for these kinds of investments.

The other thing is, you really want to have a transparent approach. So, yes, our scoring method may seem somewhat pedestrian, but you want to have something that is transparent that people can understand.

The reality is, the results in terms of the mapping, especially your mapping and regional level, really don't change that much, depending on your approach.

And you want something that is open to modification. You want to allow some flexibility to change scoring weights, depending on your decision making context. And you want to be able to allow for updating data and adding new data later, as appropriate.

I think the other issue is that, as we have developed this, and I think the key to its success has been, we have been doing an interacted and engaged process throughout its development. We had academic peer review from the beginning. We had community and peer review from environmental health, environmental justice advocates, as we have developed it, and we had significant agency review across agencies. So that everyone sort of has gotten under the hood, kicked the tires, and gets a sense of how this thing was developed. We didn't just go and develop it and then screen it and get a lot of questions. We spent a lot of time doing informational meetings, getting feedback on that. There is a lot of trust now in how this thing is working from a diverse array of stakeholders, including some industry stakeholders, giving us some input.

So ultimately the goal of these kinds of screening methods is to make the science better, and make good science, informed regulatory decision making. Move us away from chemical by chemical and source by source regulation. And ultimately move towards precautionary approaches to get at exposure reduction. Even when the effect mechanisms may not be there.

Thank you.

MR. SHEATS: Thank you, Rachel.

DR. LAUMBACH: Rachel, that was very impressive. It is a very useful tool. And the process of developing it is really impressive.

You did mention how it is being used for outreach and targeting resources, and then you also mentioned the policy and regulatory change.

What are specific examples for California this tool has been used or planning process used for permitting?

PROFESSOR MORELLO-FROSCH: There is a couple of examples. One is that the Office of Environmental Health Hazard Assessment is looking at -- they have cumulative impact precautionary approaches initiative. They came out with a report at the end of last year, talking about different methodological approaches towards it. And they highlighted our method as one potential way to do it. And they are really trying to get their boards and program to begin to think about how they would incorporate cumulative impacts in their decision making.

There hasn't been yet like a concrete instance where this screening has influenced policy.

The air resources board is taking what we developed for them and trying to decide what metrics they want to focus on. Because agencies are going to have different priorities in choosing which metrics they want to use. So we have been giving them some ideas about which ones they might want to focus on. We have been comparing our results with theirs. Ultimately, they are going to have to apply some kind of screening approach in the implementation of the Climate Change Act because there is very specific language that implementation of carbon reductions is going to have to make sure that policy and regulatory action to reduce greenhouse gas emissions doesn't create hot spots. They are charged with implementing either a fee structure and/or a cap and trade system. There is some concern that cap and trade could create hot spots. So they are struggling with how to do screening to ensure that any kind market-based approach can do that. And the screening can help them do that.

And the third example is, in the City of LA, the planning commission is probably going to be applying some form of this screening method to inform its land use and zoning decision making. And it looks like they are going to be using it to combine -- do a combination of carrots and sticks to get businesses to provide them the support they need to do the right thing to clean up emissions. And then, also, to inform zoning and land use decision making in areas that are already highly impacted.

So it's called like a clean up green up campaign for these highly impacted areas.

So there has been -- there is sort of movement in terms of translating the method towards, actually, application to inform decision making. It's just starting, though.

DR. LAUMBACH: Thank you.

DR. ALI: Just one question about the index -- the cumulative impact index, five to 15 is the highest score, to the lowest score.

What sort of health impact do you find in terms of asthma or any other health conditions, heart attacks, when your score is close to 15 or so?

PROFESSOR MORELLO-FROSCH: Well, so, again, this is not looking -- this is to look at cumulative -- screening for cumulative impacts. This is not an epidemiological tool to look at any association between the score and health in these tracts.

We have used a lot of the air pollution data to look at birth outcomes, and we see very robust relationships in areas that are more highly polluted.

We are looking to add asthma information into our tool not as a -- not as an outcome, but as an indicator of underlying chronic health conditions of the communities. Because we know that communities that already suffer disproportionately from underlying health conditions, whether it's cardiovascular disease, asthma, high incidence of poor birth outcomes, are also likely to be vulnerable to air pollution exposures.

So we are not using it as an outcome to predict the score, but, rather, as another metric of underlying health vulnerability.

A VOICE: That was a very good presentation. Very thought provoking.

I was wondering whether the results that you presented here have gone through a public hearing process, particularly in the areas of the vulnerability polygons, particularly in the most hazardous areas.

If so, has there been a response by the individuals, or by the community as a whole to what you have presented here? And this can be both positive and negative. Perhaps a real estate company might criticize you for doing this; whereas, a public health service would be very supportive of what you have done.

I wondered if you could maybe hone in on some of the feedback that you got on this.

PROFESSOR MORELLO-FROSCH: Yes.

We have actually subjected ourselves to a fair amount of public review and public forums. We did a pretty extensive Webinar, statewide Webinar, at the air resources board to present these results. People either E-mailed or called in questions.

It was a very large hearing room, like this.

Actually, the reaction has been pretty thoughtful because what we have tried to emphasize with this tool is, this is not just to identify places that are bad. It's to identify what we like to call environmental justice opportunity zones. Because this is also going to help inform where potentially investments can go towards moving us, for example, toward a low carbon economy, towards investments in places that have been disproportionately impacted by large industries that are either still there and are probably on their way out or they're neighborhoods where they have been subjected to a lot of industry that are now gone. So they are brown fields.

So the idea is not just to say these are places that we need to kind of not have no businesses and the like. These are places where we need to be thoughtful about how we target investments and what kind of investments we are trying to encourage in these neighborhoods.

So it is not a yes, no, permit, don't permit, kind of situation. But it is also being used by the Metropolitan commission towards thinking about where they want to do infill development. This will help them decide population growth, where they want to have transportation hubs, and these kinds of things.

So it is really a process to kind of both think about how to target investments, but also how to think about permitting.

So we haven't had a lot of push back of, oh, you can't identify us as a red community. It's more, this is helpful to us because it is showing things that we already know, but it is also highlighting the areas that we may not have realized actually have pretty significant issues.

A VOICE: I wasn't clear on -- I believe you mentioned that there was funding from climate change? Revenues were available and were being used in this process?

How are they being used?

PROFESSOR MORELLO-FROSCH: California global warming solution act has pretty ambitious greenhouse gas reduction goals. And they are going to achieve it through dealing with mobile emissions, but also stationary emissions.

So now what the air resource board is grappling with is what kind of mechanisms, what is the mix of mechanisms they are going to use to get large greenhouse gas industries, for example, power plants, cement kilts, refineries, whatever, to achieve these goal?

And so the idea is to do a mix of either fees and/or cap and trade to allow some flexibility in how industry achieves those goals.

So now industry is going to have to pay, to some extent, for greenhouse gas emissions. That is going to be phased in. How much they are going to pay and whether or not these allowances are going to be optional or not is still being debated.

But to some extent there is going to

be revenue generated from the implementation of these greenhouse emissions regulations.

The question is, what is going to happen to those revenues?

And the idea is that a certain proportion of those revenues should be re-invested in communities that are disproportionately impacted by a lot of these polluting sources, many of which emit high levels of greenhouse gases as well.

So it could be used to encourage further mitigations and entice industries and help them defray the costs. It can also be used as investments to stimulate green jobs production and these kinds of things.

So that is kind of whats's being debated.

So this kind of mapping tool can help identify what communities might be right for that kind of investment and those kind of funding strategies to encourage further mitigation by the industries that are there.

MR. SHEATS: Can I just ask you one last question, then we'll have to move on.

In discussions I had with people before within DEP, not necessarily DEP staff, but with other people, I heard cumulative impacts described as junk science, not robust, you are advocating a lot of things, so it is not as robust as, say, risk assessment.

Could you respond to that?

PROFESSOR MORELLO-FROSCH: Well, risk assessment is a useful tool, but it's biggest limitation is that it relies very heavily on -- and I do a lot of risk assessments. I am an environmental health scientist by trade. So I live, breath and -- do a lot of risk assessment.

The problem with risk assessment is that it is very limited by available toxicology data. And so, if you don't have the data, it is very hard to do the analysis comprehensively to look at all the kinds of pollutants and hazards that people are exposed to.

So it's because of this heavy reliance on quantitative toxicological data and the reality of those data limitations, risk assessment leaves us in a situation where we are focusing on looking for the keys under the lamp post situation.

And we are also -- I am going to be tending to move towards a no data, no problem situation.

Cumulative impacts assessment says, okay, we don't have toxicological data for everything, but we can assess exposures and do at least preliminary screening based on the data that we have, to at least look at the distribution of impacts, whether we're talking about exposures, and where we can do some risk assessment.

So, as you saw, there was a category where we did do some risk assessment when we could. We folded that in. But we didn't leave out the other metrics that everybody really knows are important, including incompatible land uses, exposures to pollutants that we know are not good for health, like PM 2.5 and ozone. And the social vulnerability metrics, which are not conducive to risk assessment. We don't do tox data in terms of looking at social vulnerability metrics.

It allows you to sort of look at these things in combination and also peal off the layers. It also allows you to decide which metrics are most important. Maybe all the social vulnerability metrics are not what you would look at all the time. Maybe not all the air pollution metrics is not what you would look at all the time.

So it allows you the flexibility. It

is screening. It is not risk assessment. And it allows you to take a more holistic approach to what communities are facing.

MR. SHEATS: Thank you, Rachel.

Thank you very much. Spectacular presentation.

And we have next up from the University of Michigan, Professor Paul Mohai.

You heard me say that Paul has done some similar studies on correlating race and income to citing environmental hazards. He redid one of the most famous studies recently, as you will see in his presentation today.

PROFESSOR MOHAI: Thank you, Nicky.

Since Rachel has sort of tested this device for me, I will be looking in her direction if I have problems.

The presentation I am going to make is pertaining to a study that we have done in Michigan where we looked at pollution burdens around public schools in Michigan. And we used a number of databases. Many of whom that Professor Morello-Frosch has used herself, with her colleague, including the National Air Toxics Assessment. And we've also used data pertaining to industrial emissions coming from the toxic release inventory, which many of you, maybe all of you, are familiar with.

What we did in our particular study was to take the air pollution data from these various data sets and then assess the pollution loads around all the public schools in Michigan.

And this first map that you see here, is a map that shows the location of all the 3,660 public schools in Michigan. We used geographic information systems to identify the locations, but we also employed a team of graduate research assistants to use aerial maps to make sure that we got the locations of the schools as accurate as possible.

So we went to great lengths to make sure that the locations of these schools are as accurate as they could be.

One of the data sets that we used to assess the pollution burdens around the schools was from the database that Professor Morello-Frosch had mentioned, risk screening environmental indicators geographic microdata.

Essentially, these are pollution burden estimates that are generated by the EPA using the emissions data that's reported by the industries for the annual toxic release inventory.

The EPA tracks attracts over 600 chemicals that are being emitted from these industries, and for most of these chemicals, they've developed relative toxicity rates.

Just to give you an idea about the idea behind the relative toxicity weight, a pound of one chemical could be as toxic as a thousand or 10,000 pounds of some other chemical. And the toxicity weights are intended to take into account those relative toxicities.

And what EPA has done is they have summed the weighted quantities of these chemicals to come up with these -- to come up with a total air toxic concentration from all industrial sources for every square kilometer in the U.S.

And what you see in this particular map is, the one kilometer squares in the State of Michigan, which there are several hundred thousand, and they have been sorted into deciles, from the least polluted, to the most polluted, areas of the state in terms of these industrial sources.

What we also did was, we took the top most polluted decile and we divided it into deciles again, to see where the hot spots are in Michigan. And that is what you see here.

So, again, this represents the concentration of pollution from industrial sources based on sorting the one kilometer squares into these deciles, from least polluted, to most polluted.

Now, not only can, with this particular database, can we look at the total air pollution burden from industrial sources on each one of these kilometer squares, but we can also separate out individual chemicals.

And what our research team did was, we looked at the dispersion of manganese in the State. And that is what the manganese map looks like.

Here are the hot spots for manganese.

Here is another map showing the dispersion of -- we also did lead.

Here is the map showing the dispersion of lead in the State of Michigan.

Here are the hot spots.

And we have done maps like these for at least a dozen chemicals, which I will talk about also in a minute.

What we did for each of the schools is that we drew circles of one, two and three kilometer radii. And what we did was, we used geographic information systems to aggregate the pollution burden estimates within each of the squares that are captured by those circles.

Now, this particular diagram shows all the circles that are intersected by a radius of two kilometers. Which is a little over a mile.

One of the reasons we did this was because oftentimes the schools are on the boundaries, and our assumption here is that the adjacent pollution in these adjacent squares could be also affecting the school. So we wanted to get an aggregate estimate for fixed distances of one, two and three kilometers.

When we looked at the chemicals that made up the total air toxic concentration from industrial sources around the schools, we found that 12 chemicals made up about 95 percent of that total toxic concentration score. And so we focused a lot of attention on those 12 chemicals. You can see what they are here. Diisocyanates, manganese, sulfuric acid, nickel, chlorine, chromium, trimethyl-benzene, hydrochloric acid, molybdenum trioxide, lead, cobalt and glycol ethers.

And in this particular table, we show all the various health effects from each of those chemicals.

As you can see, most of them have respiratory effects, but also other kinds of effects are also associated with these chemicals. Developmental, cardiovascular, carcinogenic and neurological.

One of the things that we did -- what we did with the pollution burden estimates around the schools was to look to see how -- look to see if there was a link between the pollution burdens around the schools and school attendance rates and student performance on standardized tests. And I'm going to show you those results in a second, but one thing I wanted to show you also was this environmental justice analysis that we did here.

Those ten deciles of air pollution, going from the least polluted, to the most polluted, we looked at the number of schools and the number of students in each one of those deciles. And for the most polluted decile, we found that 48 percent of all the schools in the State are in the most polluted decile, 53 percent of all the students in the State are in the most polluted decile, 44 percent of all the white students in the State are in the most polluted decile, but when we look at the African-American and Hispanic students, we see that the disparities -- we start to see the disparities here because we see that over 80 percent of the African-American students and over 60 percent of the Hispanic students go to school in the most polluted ten percent of the State.

We looked at the percentage of students enrolled in the free lunch program, which many studies used as an indicator of social-economic status for students. And, again, almost two-thirds of those students in the State are going to schools in the most polluted decile in the State.

Now, as I said, one of the things that we were interested in looking at was the links between the pollution burdens and students' performance on the principal standardized test in Michigan, which is called the Michigan Environmental Assessment Program Test. The acronym is MEAP, as you see in the title.

And what those graphs represent are the percentage of students that fail to meet the standards broken out by grades three to eight. Each line represents a different grade. For example, that is the third grade right here. And these lines up here, go from four to eight. And the top half of this figure represents the percentages of students failing to meet the English standards. And down here are the percentage of students that failed to meet the math standards.

And what we found was that when we looked at the schools in the first three quintiles of pollution, we didn't see much of a relationship between the pollution and the percentage of students failing to meet the MEAP standards. But when we went to the fourth and the fifth quintiles, we began to see a fairly clear relationship here, both for English and for math.

We went on to do a statistical analysis to see if what we saw in the graph were statistically significant.

The answer is, yes, that they were statistically significant.

The schools in the fourth quintile of pollution and the fifth quintile of pollution, the percentage of students failing to meet the MEAP standards, there is a statistically significant link with the pollution around the schools and the percentage of students failing to meet the MEAP standards. And that relationship holds up even after you control for compounders that are often used in these kinds of studies. We took into account the rural, central city, even suburban location schools, we took into account attendance rates, expenditures per pupil, the size of the school, in terms of hundreds of students, the student-teacher ratio, and the percent of students enrolled in the free lunch program.

And even controlling for those compounders, we still found a statistically significant relationship for the pollution burden.

I showed you the results for English.

This is the results for math. And pretty much the same outcome, except that, once we controlled for the compounders, it was only the fifth quintile of pollution where there was a statistically significant relationship between the amount of pollution around the schools and the percent of students failing to meet the MEAP standards.

Now, this particular table shows the relationship between pollution levels and attendance rates. And we found the same thing as before, that the more pollution, when you get to the fourth and fifth quintiles of pollution, we find that the attendance rates in those schools tend to go down before and after controlling for compounders.

Now, one of the things that we were very curious about, and this is similar to Professor Morello-Frosch's interest, is looking at some of the scientific studies that have been published, looking at the cumulative effect of multiple pollutants at the same time.

This is a recently published paper, and I believe there were copies made that could be passed around of this particular paper. I don't intend anybody to read the abstract. I just want to convince you that this paper exists and it is available.

This was a paper that was published in Environmental Health Perspectives just two years ago that looked at synergistic effects of multiple air pollutants. And what is interesting to me about this particular review is that they were specifically interested in synergistic effects, not necessarily additive affects.

And the difference between additive and synergistic is, additive means that if you look at one chemical and you measure a certain amount of effect for a certain amount of that chemical, and you got chemical number two, you measure the amount of effect for a certain amount of that chemical, and if you find the two chemicals together, that the effect is the sum of what you would find for those two chemicals individually. The sum together.

That would be an additive effect.

A synergistic effect means that when you put the two chemicals together, the effect is even bigger than the sum of their parts. So the total is greater than the sum of their parts.

So this study was specifically interested in synergistic affects, and is one of the first reviews of its kind. And they found quite a few studies that demonstrated these synergistic affects.

This particular paper is even more recent. It was published about a year-and-a-half ago. November of 2009.

What I found very fascinating with this study was that they looked specifically at combinations of manganese and lead in the blood of children and then correlated those quantities with children's IQ's. And the thing that was fascinating for us to see in this study was that this study showed a clear synergistic effect. That, in other words, they found that the impact on children's IQ's was much greater when you had high levels of both manganese and lead. More so than simply adding the two affects together.

And so this gave us an idea, because we realized that we found that both manganese and lead are in high concentrations around the schools in our study of Michigan.

So we thought, okay, this is a different kind of study now. We are not looking at blood levels. We are not measuring IQ's. What we are going to do is look at the amount of lead and manganese within two kilometers of the schools and then see how they are linked with the student performance on standardized tests.

What we first did was we looked at the link between the different levels of manganese and then the students' performance on the English MEAP test. And as you can see, there is a fairly pronounced relationship here, that the more pollution around the schools, the higher the percentage of students failing to meet the English standards. The more manganese around the school, the higher percentage of students failing to meet the math standards.

And then we also looked at lead. And here we got a much more linear relationship that the lead we started to see affect the second quintile for both English and math. It is very consistent with what a lot of studies have shown, that there is no safe amount of lead in children's blood. That any amount of lead will begin to exhibit facts.

And we were seeing this in our study as well.

So what we did then was we looked at the interaction. The approach is very similar to the study that was published a year-and-a-half ago. We looked at combinations of lead and manganese estimated to be in the air around the schools. And we found the same synergistic affects, that once we get to at least medium levels of manganese and medium levels of lead, we start to see significant affects on the standardized test scores. When we get up to high levels of both, the associations are particularly strong, and they hold up even after controlling for the compounders.

But these are the results for English. And we got similar results for math, as you see here.

I guess I want to say one thing. Maybe two more things.

A lot of these results are going to be published in the May issue of the journal Health Affairs. So much of the details about the methodology of these results, you can find there if you look up that journal.

I just want to mention one other thing, and that is that we have, as Professor Morello-Frosch and her colleagues have done, we have used the National Air Toxics Assessment as well in the analysis, and, essentially, got the same kind of results.

Now, this is the 2005, which came out only a couple of months ago, but our research team has been eagerly awaiting for these data. EPA, every time we contacted them, said, they're going to come out next week.

It's almost like, it's in the mail, it's in the mail, it's in the mail. And at least a year has gone by before they finally came out with these data.

But they finally came out with it, and we did the same -- well, what is different about this data than the other data, the other data only looks at major industrial sources. The National Air Toxics Assessment tries to look at everything, major industrial sources, minor industrial sources, mobile sources. And the other thing that they do is they take the multiple chemicals, and EPA directly estimates cancer risks, neurological risks, and respiratory risks. So they already do a lot of the work for you that we had to do ourselves by hand with the toxic release inventory emissions data. They already combine the chemicals. And they track over 180 chemicals. And they combine them in such a way to produce cancer risk scores and respiratory risk scores and neurological risk scores for every census track in the United States.

And what we did in Michigan was the same thing.

This is a map focusing on respiratory risks, and we divided the State, once again, by area into quintiles for the least polluted, upper peninsula here, to the most polluted. And we also looked at the hot spots.

Looking at this map, I could tell every city in the State of Michigan by that map. Here is Detroit, here is Grand Rapids, Lansing, Muskegon, Kalamazoo, Battle Creek, Jackson, Saginaw.

So when you look at the hot spots, you can see where the organized areas are.

So we did the exact same analysis as we did before. I would say that the main difference, using the National Air Toxics Assessment, is that the relationships are even stronger.

When you do the environmental justice analysis, you can see that two-thirds of all the schools are in the top ten most polluted areas of the State.

And I am having trouble reading my own graph here. I don't have my glasses on.

I think that says 69 percent.

Sixty percent of the white students go to school in the top ten most polluted parts of the State. Almost all African-American students do. And three-fourths of all Hispanic students do. As well as three-fourths of all the students enrolled in the free lunch program.

We did the same thing as we did with toxic release inventory data. We sorted the schools into quintiles based on the amount of pollution around the schools and then looked at the percentage of students that failed to meet the English and math standards. And what we saw was fairly striking relationships in both using the National Air Toxics assessment.

We did the same statistical analysis. Got the same results.

Here is English. Here is math. Here are attendance rates.

Pretty much the same results.

Again, generally, the results are stronger. I think it's because we are looking at all pollution sources.

And that's it.

Thank you.

MR. SHEATS: Any questions?

DR. ALI: That is a very interesting study.

How does the performance of the kids in the polluted areas in math and English are impacted by other factors, like broken families, drug abuse? Do they have some impact in all those areas?

THE WITNESS: You ask a very good question.

This is kind of the challenge in any

study. Have you controlled for all the possible compounders that you can?

Part of the limitation is just that the data aren't readily available. We had 3,660 schools. In theory, you could interview every household that has children in those schools, but that would, both in terms of time and money, we would not be able to do that.

So what we have done is try to control for all the things that we can from the publicly-available databases that are out there. And as I've said, the compounders that we used are ones that not only make a lot of sense to us, but we're somewhat reassured because we have seen other studies, including Professor Morello-Frosch's studies controlling for many of the same things.

So we tried to look at the relationship between the pollution levels and student performance, just looking at that, and then recognizing that there are compounders, let's try to control for them.

I think the compounder of interest, or concern, that you mention, I think will often be tied into the socio-economic indicator.

So it is very significant, by the

way, but even controlling for that does not explain away the effect of pollution.

DR. ALI: Thank you.

DR. OPIEKUN: In New Jersey, it is extremely difficult to get hold of student test records.

Were you able to get individual level, the identified scores, or were they aggregated.

THE WITNESS: Yeah, that is an excellent question.

As a researcher, who has spent most of my life trying to get individual level data, it is almost impossible to get in studies like this. This is also true for health data.

And where it is available, we just can't get it.

Maybe I shouldn't relate to something this personal, but in one of the school districts, I won't mention which one, we were trying to get individual level school data. And I think the school administration has become so accustomed to being asked for the data, you are not met on the phone by an irritable, irritated, angry person. They are very, very friendly. They are very, very polite. They will answer all your questions. They will tell you that they are going to look into it and then they'll get back with you.

Well, time goes by and nobody gets back with you. So you call them. You get the same, very kind, friendly, polite person, and they promise they're going to get back with you.

And we figured out after I don't know how many tries. My colleague, Dr. Kweon, and I, I guess were somewhat naive. We tried quite a few times. And we realized that what we were facing was a tactic for deflecting the request.

So I think that is probably the best example of the difficulty of trying to get individual data.

Now, we've had people working in some of the school districts that off the record will tell us that they have individual data, and some of those data are very, very shocking. There is one data set that we are aware of where they have blood lead analysis for all the students that were suspected of being lead poisoned. And they have actually gone as far as using geographic information systems to plot their location.

And when we compared -- and this was

all visual. You know, we don't have the data. We were giving a presentation to someone who wanted to be off the record. The patterns that we saw in the children where the biggest concentrations of lead poisoning were, matched our maps.

It just really surprised us very much.

And we were very interested in those data, but I don't think we'll ever get those kind of data.

Rachel, you probably know better than I do about trying to get data from the CDC and other sources. They'll give you data at the zip code level, or sometimes at the tract level, but they'll never give it out on the individual. Or at least I have not been able to do that. And I don't know anyone else who has.

Rachel, am I right? Has your experience been similar?

PROFESSOR MORELLO-FROSCH: Yeah, it is challenging. Sometimes you can strike a bargain with them, where they'll give you the identified data. So you can send them your census information, and they merge it with their data, and then they de-identify it, and you can analyze it that way.

DR. LAUMBACH: I was wondering if this might be an opportunity if some of the pollutant levels have changed over time, and those changes aren't correlated to changes in socio-economic status or other factors, that might be an approach to disentangling the socio-economic factors from the pollutant.

PROFESSOR MOHAI: Let me repeat what I think I am hearing just to make sure I understood the question.

Have there been longitudinal studies done to look at pollution changes and to see if the pollution changes have also resulted in --

DR. LAUMBACH: Yes, essentially.

PROFESSOR MOHAI: Very good question.

I suspect it might be possible to do that for very localized studies, where the researcher has collected their own data.

When we are using something like the National Air Toxics Assessment, unfortunately, they change their modeling approach for each run.

And they rerun this once every three years. With a timeline of at least six years. It is 2011. The most recent data that came out two months ago is 2005 data. And each time they up date -- and this is not a bad idea -- you improve, if you know how to improve your modeling procedure, you should be doing that, but even EPA warns you not to try to use those data in a longitudinal analysis because of those modeling changes.

However, having said that, I don't see why EPA could not take the basic data that they have and them rerun the data using the new modeling procedure.

Now, my understanding with the toxic release inventory, they are attempting to do that. In other words, they have been collecting the pollution data since 1988 and modeling dispersions, air pollution dispersions. They, too, keep changing the models. So if you are trying to do a longitudinal analysis, you run the risk of the changes you see are more modeling changes than the real changes on the ground.

But they told us that it would be possible for them to take the data that they already have on emission sources from industry, and then rerun all the previous years.

If they did that, we could actually do what you are saying. But so far, we have not been able to get that data either.

It's not as bad as, it's in the mail, or we'll get it to you. It's possible, but there are a lot of hurdles we have to go through.

We're hoping, actually, in the coming year we'll get those data.

But the National Air Toxics Assessment, I don't know. It's interesting, the EPA, there are two different offices that generate the National Air Toxics Assessment, and then the TRA Michigan modeling is done in a totally different office. Different group of people, different leadership, and so on. I know the heads of both, but have gotten different feelings about what is likely to happen in the future.

MS. MOUNT: Thank you.

Both your and the previous speaker was very compelling data. We really appreciate it. One of our charges is to figure out what to do with data like this. And I am wondering if Michigan has taken all these compelling results and made a leap to try to figure out how the State, the communities, can do something with it?

THE WITNESS: Yes.

My colleagues and I have actually made presentations to a lot of small groups in

Michigan and we found a lot of interest in what we have. We haven't -- at this point, we have not pushed too hard on things until we had a peer review publication. Which we are expected to have next month.

So that is going to help us do that.

But I think the more general response to that question is that data like the National Air Toxics Assessment and the toxic release inventory, those data alone would allow the EPA to do a baseline assessment. For example, the National Air Toxics Assessment estimates pollution burdens for every census track in the U.S. Well, obviously, that could be married with the demographic coming from the census borough.

So we could do a baseline analysis of current conditions, and then if we make that a new policy, or make a new rule, EPA could try to predict what the changes in the environmental disparities would be as a basis of that rule.

It's similar to the idea for me as the environmental impact statement that was required under the national environmental policy act. The EPA, if they were going to do -- any -- if there was going to be a major action that would have a significant effect on the environment, the environmental impact statement was supposed to show something like eight different alternatives, and Scenario A would do this, Scenario B would do that.

Well, they were predicting the future. And if you are making a prediction, you are not going to be a hundred percent on the money.

But when you go through that exercise, and then you have to make that document available to the public, and the public gets a chance to scrutinize your data and methods, I think you are going to see some improvement.

So I see a lot of potential in Professor Morello-Frosch's and her colleague's screening tool.

One thing that was going through my mind, well, with the data that you have, you are taking a baseline assessment of current conditions.

California wants to pass a new law that will affect the environment. Alright. What will the rankings of 315, how will they change as a result of implementing that rule?

I think it can be done.

I'll be honest with you, over the years, I am personally frustrated by the fact that one of the defenses I hear often made is that "we don't have the data."

Well, if that is the case, let's sit down and figure out what data we need, and let's go out and collect it. We can do it. It is not an impossible thing to do. We could do that. There are some good databases, like the National Air Toxics Assessment. And we could do better. We don't have a lot of good data on water and other kinds of hazardous substances, but we have some, and we could try to get more.

MR. SHEATS: Thanks very much.

So next up, we have some of our homegrown talent. Robert Laumbach, from EOHSI. And Rob I think is going to talk about an interesting study he is going to be doing with the Ironbound Community Corporation. And he has worked a lot with communities in New Jersey.

DR. LAUMBACH: Thank you very much.

I am going to talk about a very different approach than what we heard from the first two speakers about how to assess specifically non-chemical stressors and their interaction with chemical stressors, using the example of asthma, and looking at in the community level, and an individual level, at the Ironbound community here in New Jersey, where we are trying to understand how non-chemical stressors can interact with, in this case, diesel exhaust and other traffic-related air pollutants to make asthma worse.

So we're looking at how biologically stress can act through common pathways with chemical stressors to make things worse.

As Dr. Morello-Frosch pointed out, there are many ways that socio-economic status can be associated with poor health outcomes, like increased asthma, poor access to care, poor nutrition, poor general health. But one way, and sort of highlighted by the example that Dr. Morello-Frosch gave of the clarity study, which showed that exposure to violence was associated to having a response to traffic-related air pollution. There was a higher incidence of asthma in that case. In the case that stress may be one of those factors. And stress we do know has a biological activity in the body, which can influence health.

So we know that stress can influence health. And we also know that air pollution influences health. And our study here, in collaboration with the Ironbound Community

Corporation and the Ironbound neighborhood in Newark, is a sign to try to answer how that could happen.

So this is an example of an academic community partnership that we have to try to answer this question about how psychosocial stress can make air pollution on asthma worse. This was a study that we designed sort of from grass roots, from the bottom up, with the Ironbound Community Corporation, with Ana Baptista as one of the co-PI's on the project, in response to an EPR to try to get more information about how non-chemical stressors can interact with chemical stressors to cause health effects. Because there is an emerging epidemiology indicating that, but it's really, at this point, not that clear how that occurs. So we designed this four-year project in the Ironbound to look specifically at individuals with asthma, and how stress and traffic-related air pollutants and diesel exhaust, in particular, affects their health.

I'm sure Ana is going to speak later this afternoon and give more details about the neighborhood in the Ironbound, but it is about 50,000 people who live in an, approximately, four square mile area. That is bordered by -- we heard earlier about the concerns about ports -- the Port of Newark Elizabeth. The largest port on the east coast. Adjacent to the neighborhood. New Jersey Turnpike. Heavy diesel truck traffic. Route 1&9. And then throughout the neighborhood trucks pass and they also park and idle on streets, again, adjacent to the port and industrial areas.

Here is a school here that we are focusing on, which is near Route 1&9, and near these two major -- within the community arteries, Raymond Boulevard and Ferry Street, which have a lot of truck traffic passing through.

And then, of course, there is also Newark Airport, with another source of air pollution in the area.

Asthma is a recognized problem in the community. I think it was pointed out earlier, there is community wisdom about air pollution and asthma that science is catching up with. And, certainly, there is a lot of demonstration now in studies that air pollution does affect asthma. And then in the community, you will see trucks everywhere in the neighborhood.

And then it is also recognized, I think generally, that chronic stress, and stress of many different types, can affect asthma. And there too, I think there is scientific data supporting that.

But there is still an open question as to whether or not, especially in this neighborhood, whether cumulative impacts of chronic stress and air pollution, particularly diesel exhaust, are affecting asthma in the community.

It is not known how high the rates are of asthma in the Ironbound, but it is known in Newark, in general, that the rates seem to be about four times within Newark, the hospitalization rate at least, compared to the surrounding communities in Essex County.

The community has taken some action by doing some truck counts. In front of that Hawkins Street School, a couple years ago a truck count counted 144 diesel vehicles passing by in one hour around the time the kids go to school. They walk to school in this neighborhood.

There is a variety of different types of trucks that go to and from the port. There are also local trucks as well.

And then some data has been collected about the impact of that, in terms of exposure to air pollution. This is data from an eight kilometer, which measured black carbon. Which is a pretty good specific indicator of diesel exhaust exposure. In front of the Hayes Park Pool, which was on that prior map. Also near the school in that neighborhood, in east Ironbound. Showing that there is a piece of exposure, this is compared to a background neighborhood, without the trucks, a piece of exposure that are attributable to the trucks.

So there is an issue about overall exposure, but then also about the impact of these peaks, which occur in very specific times and places, potentially near where kids are who have asthma.

There are many different types of stressors. I think we are all familiar with acute stress, which cause a fight or flight response. And all though kids in the Ironbound are not going to be exposed, I don't think, to charging lions, there are other stressors that may occur in the Ironbound and elsewhere.

And, you know, it's interesting, stress has been known to affect asthma clinically, and I think people who have asthma, I know people, even families who have asthma, recognize that stress can affect asthma. But in controlled exposure studies, where people are exposed to acute stressors, it's sort of mixed. There's some evidence that stress could actually be protective.

When you think about it, really, it should be physiologically, biologically, because the fight or flight response should activate us, open our airways, get us ready to fight or flight. And the stress hormones that are produced in the acute stress response are cortisol, which is an antiinflammatory, the major agent used in treating asthma, and epinephrine, which is adrenaline, which is also a Beta II agonist, technical term for the kind of medication that we use to open the airways when people have asthma attacks.

And then shortness of breadth itself should be a powerful acute stressor. And so it makes sense that an acute stress response should sort of combat or protect against an asthma attack.

So there are acute stressors, and then there is also chronic stress. So we are either repeated acute stressors over time or life events that lead to long lasting stress.

There is some developing evidence that suggests that chronic stress over time down regulates the acute stress response. And it's been shown in studies of people who have post-traumatic stress disorder, or people who are caregivers, or people who are chronically ill, and other people who have chronic stress, that they have reduced cortisol levels, and also reduced levels of receptors for cortisol. So they may be more vulnerable to situations where they need an acute stress response, such as an asthma attack.

And this makes sense in an evolutionary sense because we mobilize a lot of resources, our heart starts to beat faster, our blood sugar actually goes up, and we are exposed to an acute stressor. And so it makes sense that that would be down regulated if we are repeatedly having sort of false alarms.

So we think that -- well, actually, we are pretty sure then that traffic air pollution can affect via increasing pulmonary inflammation and also directly probably through irritant mechanisms decrease pulmonary function, and that leads to people having asthma exacerbation or worsened asthma.

And then our hypothesis is that chronic stress sort of acts by decreasing these protective mechanisms. So by reducing the amount of cortisol that is released in an asthma attack, reducing the amount of adrenaline, and other substances in the body that combat an asthma attack, that that makes asthma attacks worse. People who are chronically stressed.

So what we are going to do in the Ironbound is we are going to recruit 40 kids, age nine to 14, who have asthma, and really intensively monitor their daily asthma status and measure their personal exposure to black carbon, using small personal monitors that can give a realtime, you know, minute by minute, black carbon measurement, and then small badges that measure their nitrous oxide, another marker of traffic-related air pollution exposure. And do this for up to 30 days with each kid. So it is really intensive. It is at the individual level.

So the first question communities are interested in is whether or not the exposure to the diesel exhaust and other traffic pollutants makes asthma worse in that neighborhood?

The next question is, does chronic stress make the affects of the traffic air pollutants even worse?

And to assess that we are going to do a six-month period -- excuse me, a chronic stress interview, a standardized interview, with the children, that is going to measure their stress levels over the previous six months. So major stressors, episodic stressors, chronic stressors.

Then we are going to actually measure their acute stress response.

So the ideal thing to do would be, from a scientific point of view, to induce an asthma attack and see how they respond to that in terms of stress.

Obviously, we can't do that.

But we can do a short-term stressor, an experimental stressor, which has been standardized in children, where they do a small public speaking task, and that elicits an acute stress response, and we can measure that, and see how that also affects -- well, that is a marker, sort of, whether people are going to have better -- or, actually, worse outcomes from exposures to traffic air pollution.

So the implication of this hypothesis are that because this affects a pathway by which many stressors could influence asthma, is that it is, actually, simplifying the problem of having many different stressors that may affect asthma and interactions with other outcomes and other types of exposures as well. Other types of socio-economic stress may all act through this type of pathway, potentially, in terms of stress response. It may be one of the ways they they'll act through. And then it may be not just relevant to the asthma triggers that we are looking at, traps, but, perhaps, other asthma triggers as well. It may be one way of simplifying this multiple stressor, multiple outcome problem.

So in conclusion, you know, the studies, the community, academic partnership, can seek answers to focused questions that we're interested in scientifically, but that the community is also interested in, and we're further interested in the community trying to do something about the trucks, particularly trucks from the Port of Elizabeth and Newark that go through the neighborhood.

And then ultimately -- you know, it's a four-year project. So I just don't want to it talk about how much data we have today and how we understand it. It takes time to collect the data, but, ultimately, it may help to improve and actually make possible cumulative risk assessments that include non-chemical stressors, as well as chemical stressors. Or at least help to advance that.

Thank you.

MR. HANNA: The Commissioner talked a little bit about the Port Authority's plans for improvements, and it sounds like some of that is taking place over the duration of your study.

Are you going to be able to correlate the two? How will you approach that?

DR. LAUMBACH: In this study, each subject, we are looking at exacerbation of asthma in kids who have asthma. They sort of act as their own control. So each subject has different levels we're expecting of diesel exhaust exposure from day to day, and then we correlate that to their asthma outcome. So as long as there's differences from day to day, our site should be able to detect that. If over time, longitudinally, some of the children are less exposed because we only can do three or four children at a time because of the expense of the equipment that we need to use, that probably won't have too much of an outcome, affect on the outcome, except in terms of, perhaps, being less sensitive in the later years because there will be less variation day to day in exposure if the trucks aren't cleaned up.

But I think because the average life of diesel vehicles is, perhaps, 30 years or more, and several million miles, that it will take time before there are really substantial changes. And even with the Port's program, and it is not clear how successful that is going to be, as well as the fact that there are many other trucks in the neighborhood that are not from the Port as well.

MR. HANNA: And whether you could project improvements to your results, you'd probably have to repeat that years out, I guess, to really measure that, right?

THE WITNESS: Right.

This study isn't so much designed for that. It is only 40 kids. And it's really to get at the mode of action, biological mode of action, by which stress may interact with diesel exhaust. Whereas, other studies, larger studies, population-based studies, would be more appropriate probably for looking at changes over time.

MR. SHEATS: Thank you very much.

Next up, we have Professor Tina Fan,

also from EOHSI. The Environmental and Occupational Health Science Institute. Tina has also done a lot of work with communities, especially down in Camden. She continues that work. And also does some work up in Newark. And, particularly, of course, for the Clean Air Council.

PROFESSOR FAN: Thank you for your introduction.

I am glad to be here.

Today I am going to present an approach that we generally use for the community exposure to air toxics. So as you heard from the previous speakers, it is a challenge to assess a community's health risk associated exposure to air pollution.

So it is challenging to assess a community's exposure to air toxics because one of the reason is, it's very challenging because many air toxics have multiple sources, including both like, for example, on road or off-road source. Also, some industrial source.

Also, it is a given, the communities which have many source of those air pollutants, there is a large -- there could be a large spacial variation. So, therefore, it is also from the general like one central monitor site may not really capture those local air pollution levels, which some people also call those hot spot of air pollution.

So, therefore, the community exposure to air toxics could be underestimated based on those long-term data.

So another thing we like to also characterize is, we understand as a personal exposure also associated with personal behavior and activities. One of the things we realize, based on the literature review, many of the activity data, activity data we collected previously, are from the telephone interview.

So for some of the local community members who are particularly the one that is socio-economic disadvantage groups, they don't have phone service, or they often move like more to different places, so they are not really necessarily being reached by those survey. So, therefore, there is lack of data for the activity for those EJ groups.

So today I am going to use one of the studies we conducted in Camden, which is a joint effort from U.M.D.N.J. EOHSI with the New Jersey DEP. We did a study in Camden New Jersey, which is one of the neighborhoods called the Village of Waterfront South.

This particular neighborhood, as you see, is very small. If you look at the -- this is waterfront south. So this is a small neighborhood. It is about a half by 1.5-mile square.

If you look at the black dots, there are a lot of industry located right actually in the neighborhood.

Actually, previously I was told about 53 and later some have moved or closed up. There are still about 26 of them located in that area.

So the source of air pollution in this neighborhood is really a mixed source of air pollution, including a lot of small sources. And there are also high risk, like 67, going around here. And there is a major -- one of the major ways that people actually need to go to 676, to Philadelphia, they have to pass through there, the community to get there.

There are also -- another concern is this neighborhood is also downwind of Philadelphia. So it could be transport of air pollution from like what we call urban air pollution, from Philly to the neighborhood.

So here is some pictures. Many of you, particularly the local people, are very familiar with Camden. So there are some pictures we took over there previously.

As you see, there is a lot of like metal processing industries, and there are a lot of junkyards, car scraping facilities. And, also, you see, this is a highway built like right pretty much on the top of those public housing.

When we started the study at that time, they were like still building the public housing right on the highway. And this is a sewage plant, Camden sewage plant, located right in the backyard of the elementary school.

There is data compiled by the New Jersey DEP. You could see there are all different type of facilities. Some of the data that the company said was emitting, including many of the air toxics, as well as other particulate matter.

Here is the demographic information. As you see, waterfront south, many people live under the poverty levels. And, also, many of them are minority groups. And when you compare to either New Jersey State, as well as nationwide.

And there are a couple of data I

would like to mention here. This is the community next to waterfront south. So we selected that neighborhood for our control. What we call urban reference site. They are about 2-miles away from waterfront south, but they have similar demographic information.

The objective of the study is to, basically, we try to determine the local ambient air pollution level, as well as the personal exposure of the waterfront south residency. And, also, we try to assess the impact of those industry facilities, the emission from the industry facility, personal exposure, and, also, we try to identify what are the particular sources of the concern.

And another objective, we try to characterize a time and location pattern of those particular groups and see whether they are the same or different from the general population.

So the study's design is simple. We, basically, recruit about a hundred subject from the neighborhood. 60 from waterfront south and 40 from CDS. And we monitor them during the two seasons, summer, winter, and also weekdays, weekends.

So all participant were monitored like four times.

During the monitor time we also collected questionnaire data.

Here is just like a typical time activity sheet we gave to the subject. So they will fill in the information about, how much time they spend outdoor, how much time they spend indoor. Also, indoor/outdoor, will also differentiate whether the indoor in local area or is it indoor like in other area.

And here is some monitoring site. We did the sampling site. As you see, this is a personal sampling. Has some personal monitors. You can kind of capture the air toxics which are more close to the personal information group. And we also have local state monitoring in that neighborhood. And this is Sacred Heart Church. We got great support from the local community. So they provide the space for us to place a monitor in the community.

And this is New Jersey DEP's monitoring site at Copewood/Davis.

And besides those monitoring, we also did another campaign to look at spacial variation of the air toxics in the two communities. So as you see, these are very intensive sampling. That is what we call saturation sampling.

One of the reason is because there are so many different small point source in the area. So we want to see whether there is any difference from this street block to the next streets.

And, also, these are personal monitoring we used for this saturation sampling.

And here is just some data I would like to show you.

For example, this is ambient particle concentration in the fixed location. The red represent the waterfront south and green is for Copewood/Davis. In general, for PM 2.5, we did find a significant higher level from south than Copewood/Davis. However, actually, the personal data, actually they are similar. Because one of the reason we know, there are many other indoor sources as well for PM 2.5. So, therefore, the outdoor contribute to the PM 2.5 and also the other sources contribute to the PM 2.5 on that one.

And this is another data about benzene.

For benzene concentration, actually, we did not find a difference between these two locations. As you know, benzene, one of the major contributor is from automobile exhaust. And, actually, in the CDS area, although there are no identified local point source, however, there are still a lot of local roads with heavy traffic.

So this is a BaP. One of the ph. Which is a carcinogen. We also found a higher level in waterfront south and CDS.

You know, based on those monitorings, we are able to look at the association between the outdoor concentration to the personal level.

So we, actually, for some species, not all the species we measure, some of them we really found a very significant association between the outdoor level to personal. So that, actually, verified the significant contribution of the local air pollution source personal exposure.

So this is another data. We look at the time activity data. As I mentioned, the personal level really associated with your particular behavior.

You look at the Camden study cohort, they actually spend significant more time out doors than other general population. So their particular behavior also placed them at a greater risk to exposure to local air pollution.

We also look at their time activity by like gender or also subject type.

The red bar represent -- that is a U.S. general population, their behavior, and the bar is what we found in our study.

We found, generally, like men, like outdoor more than women. And also regarding age wise, older people, generally, they stay in house more, and the children play outside more.

So it is like a typical behavior like you will see, the kids are more active.

That is also another indicator of potential risk for small children.

I would like to talk a little bit more about the spacial saturation sampling we did.

As I showed you earlier, we did not find benzene difference between the two locations from the fixed monitoring site. From the spacial variation, since then we did not find significant difference between the two locations.

However, for some particular pollutants, for example, toluene, we actually found really the hot spot. There are some sites with a much greater level than the rest of the sites.

So we did a proximity analysis. Looked at the distance from each location to the mountains or spacial saturation sites. So, actually, we were able to identify what are the potential sources that contribute to the spacial saturation.

These are the names of the facilities that we found. Most of them are some of the metal processing facilities.

This is in waterfront south.

When you look at the CDS, you see only the roads, local roads, were found as a significant contributor to those spacial saturation. So only one facility to waterfront south was also found contributing to the CDS air pollution.

So, anyway, our study in general, really proved that the approach about spacial variation sampling, also monitoring in the community scale, the air monitoring is a really powerful tool to identify the potential area of hot spot of air pollution. Also, the population at risk. And, also, we need to pay attention to this particular subgroup about their behavior. So which we could probably through, like community outreach, to guide them during higher air pollution days, you really should probably stay inside more than being outside.

I would like to thank all the investigators from EOHSI and the collaborators from DEP, as well as many of our staff and students from EOHSI, as well as the funding agency from Health Effects Institute.

Thank you.

MR. SHEATS: Anybody have a question for Professor Fan?

DR. LAUMBACH: Very nice presentation. Thank you.

I am wondering, did you look at the extent to which meteorologic conditions might affect levels of air toxins in the communities. In the sense that, I know Charlie Turnin here has some concerns about how that is not really assessed, in terms of how air toxins locally in the community may be affected by stagnation or other meteorologic conditions.

PROFESSOR FAN: That is a good question.

Actually, if you look at -- we definitely look at the meteorologic condition as the proximity analysis data.

Actually, on the right column, those

are one speed and one direction.

So when we did the proximity analysis, all those factors were included in them.

DR. LAUMBACH: Did you find that overall like at community levels, that levels were higher, I would assume so, when say wind speed was lower?

THE WITNESS: Yes, wind speed is definitely one of the major factors that affect the air pollution level. Yes, we also found that.

MR. SHEATS: Thank you very much.

So that ends our EOSHI team. We're going to start our government team. Starting off with Steve Anderson.

Oh, I'm sorry. I skipped somebody.

Forgive me, Professor Isukapalli.

Let me give a special thanks because you are coming with short notice. We didn't give you much notice about the presentation. And I know you don't feel very confident right now so I missed you. But we do appreciate you coming.

PROFESSOR ISUKAPALLI: I am going to talk a little bit about an overview of the modeling tools, compilation and simulation type modeling tools that help support both state implementation plans of the NJDEP and how these tools are applicable for more wider domains of interest. And give you how we systematically go from air pollution to multimedia pollution and community exposure.

So when we are looking at air quality, initially our focus was mostly on -- was on levels in New Jersey and the northeast.

Once we look at just air pollution itself, it is a multi pollutant problem. Multi state problem. Things happening because of multi emissions from power plant, interacting with emissions from southern states. Coming up to New Jersey and producing those in the air.

And this requires computer models that will follow all the basic transport processes. Collection of all the data. Simulating the chemicals of all the reactions happening.

Now, once we solve this problem for ozone, the same technique, the same computation for framework is applicable for studying the concentrations of PM. And as we look at the problem with more focus, we see that the same approach can be extended to other chemicals, air toxics, and so on.

So here is an overview of how the air

quality in New Jersey has been turning in the past few years. Very good improvement in overall air quality. And the same thing with some of the air toxics, formaldehyde and benzene.

However, in both cases the levels are a little bit above the benchmark.

And this is all despite, we are driving longer and longer distances, but still there is a reduction in overall ambient levels of those chemicals.

However, people are not exposed just to ambient air, they're also exposed to multiple chemicals that are being released in doors. And some of these chemicals are interacting with ambient air to produce new products.

Here is an example of studying the formation of particulate matter in the environment. Ozone.

So we cannot look at the whole problem as one pollutant at a time, but, also, we need to consider the mixture impact. So that is the rationale for going for a multi pollutant framework for assessing the ambient levels for assessing the human exposure.

And, also, to briefly touch on how

this impacts even once this pollutant enters the body.

So the whole framework is, basically, a process-based framework that follows from the emissions to the health effects is a systematic sequence of steps. Contaminants are released into the environment, they are transported over large regions, they interact with other chemicals. Meanwhile, people are moving from different microenvironments. Moving from different locations. They are coming into contact with the chemicals. And this has an impact on how much gets into the body, the physiological characteristics, their activity, lifestyle attributes, impacts how much is absorbed within the body. And then some chemicals have synergistic health effects and some have antagonistic.

This framework focuses on the entire sequence.

Here is one example of what are the steps we use in studying the exposures to this particulate. We have estimates of the background concentration, and using the photochemical models, just like the ones we used for supporting the DEP's, we use enhanced versions of that, which can also study the multiple air toxics.

We take that information with the information on population demographics, socio-economics, and fuse it to obtain what people are really exposed to at different microenvironments within the entire region of study.

We couple that with what are the particular activity patterns of individuals and obtain how much they are exposed. And we can study how much affect goes into the body.

So this is done in a statistical manner using a large number of what we call multiple variables that we define based on the demographics and statistical attributes of multiple physiological and socio-economic variables.

So that when we perform these studies for a large number of variables, as we increase the number of samples it slowly converges towards what the real population exposure would be happening.

Here is one example of step one of the process where we are estimating the concentrations of formaldehyde and benzene.

As you can see, in the case of formaldehyde, in the summertime there is a more high intensity; whereas, in the case of benzene, you have higher concentrations during the winter.

So when you are following an individual over a period of a year, or multiple years, you need to consider the cumulative impact of all these contaminants together.

Here is one example where the monitoring information is limited to the summertime for benzene; whereas, you have higher concentrations happening during the wintertime. However, since we are using comprehensive mechanisms based on air quality monitoring, we are able to capture hour to hour for the entirety.

Here is the corresponding thing for formaldehyde. You can capture activity for formaldehyde.

From there we identified the corresponding population exposures. Here we are looking at the different percentages of the people that are exposed to benzene as part of -- due to just ambient contribution from ambient sources.

As you can see, there is a wide variation. Two orders of magnitude within this small area, the Philadelphia Metropolitan area.

And, likewise, we go one step to the corresponding exposure concentrations. It is the same thing.

We can look at the contributions to time spent indoors and outdoors and across different seasons. And you can see the patterns in the ambient concentrations do not necessarily need to be maintained. These patterns are impacted -- patterns of exposures are impacted not just by the concentrations, but also by the make up of the people, the housing, and so on, within the area.

You can see that when you are looking at concentrations of periods of high exposure, you see some areas that have much higher exposure concentrations than these.

This is the same example with formaldehyde. You see almost an inversion of the exposure.

And using this system, we can study the impact of exposures either by considering the impact of those exposures alone or together, total exposures.

This helps us interpret health risks in the context of corresponding health risks arising from indoor contaminants.

So why do we need to look at sources that are not just ambient air quality and exposure concentrations?

Because once the source enters the body, they don't stop interacting with each other. In fact, for many VOC's, the metabolic of each VOC is impacted by the presence of other VOC's. There is mostly an inhibition for the same enzymes within the liver.

So here is one example where if you do not -- this shows the impact considering the binary actions around the chemicals. There are more complex interactions happening because of presence of these multiple chemicals.

You can see, if you are arriving at a risk estimate, you are more likely going to substantially overestimate or underestimate depending upon the presence of these interactions.

However, to calculate these things you need a fairly complex physiologically pharmacologic models. And our lab has been focusing on developing some sort of a study for these approximations to these models that can be used by non-specialists for a large number without having to run complex models.

Here is one example we looked at simplifying the model in order to get a quick estimate of capturing more complex exposures in that area.

The same model, the same base model that we used for air toxics has been expanded to characterize the impact of pollutant emissions and looking at exposures to pollutants. And, also, mapping future scenarios affecting the land use, land cover, and different meteorological patterns. How it will impact in the future.

The same approach we are using. Somebody spraying pesticides from aircraft. We are looking at exposures to the general public and occupational for the cabin crew. We study the distribution of the contaminants. We follow the same principle of following as they go through different tasks. And it helps us to interpret the risks to pesticides being sprayed in the cabin environment with respect to what the general population is exposed to from other media.

Here we are looking at blue lines and green lines, inhibition or thermal exposures occurring in the cabin due to one spraying incident. And the red line shows what the general public is exposed to from foot, using the pesticide.

So this helps us interpret these

risks in the overall context of multimedia exposures.

We are expanding this for not only contaminants like pesticides, but also looking at how this will be able to explain the risks and exposures of passengers to other chemicals within the environment. Ozone from the stratosphere being pulled in and reacting in the cabin and producing various VOC's.

And to come back to the importance, here is one example of how minor improvements in refining our estimates of different types of emissions can help us evaluate different strategies.

This shows the composition of NOX and VOC's for the entire region, which includes the southern states.

If you can see on the right most side, there is a substantial difference in the levels of the benefits that we see from the simulation. Just by using a slightly improved science, model for characterizing the emissions of biogenic VOC's in the area.

And this has an impact on assessing how much the benefit will be not only on the ozone, but also on the environment.

So the conclusion is that by using this integrated model that follows the same principles throughout, any improvements in individual competence will directly benefit all of the pieces together.

On the other hand, if you are looking at one chemical at a time, it will take a substantial amount of time to pull these benefits into other scenarios.

So the conclusion is we do this integrated type modeling.

The one approach that we started with air pollutants, it is now evolving into one environment approach we have. You can interpret health risks and assess different strategies or cumulative strategies in the holistic framework by following what is known as a personal direct approach.

This approach is gaining more action in the environmental community.

We are able to do this because a lot of synergistic projects are funded and on the computer. We can make them all fit into the same framework. Some of these efforts are also intended to supplement other field studies. We are collecting a large amount of environmental data. So we use computer models to provide some background level estimates for different chemicals and exposures.

This is a large group. It was initially started through funding through the DEP and the research center, and FAA, FDA.

Thank you.

MR. SHEATS: Questions from the Council?

Just one question.

I notice you had microenvironment.

Could you define that very quickly for us?

PROFESSOR ISUKAPALLI: The microenvironment is where people are spending their time.

So if a person moves from indoors, to outdoors, and back and forth, the microenvironment is the personal space around this individual.

MR. SHEATS: Thank you very much.

We're going to do -- am I safe in saying -- well, we want to do one more before lunch. Steve, you ready to go?

Am I safe in saying now we are going

to go to our governmental talent now?

And, Jerry, can you stay until after lunch?

DR. FAGLIANO: I could, or I could be really quick.

However you want to do it.

MR. SHEATS: You have too much to say to be really quick.

Steve, why don't you go.

Steve Anderson, New Jersey Department of Environmental Protection, to talk about a screening tool that he has been instrumental in helping to develop.

MR. ANDERSON: Thanks, Nicky.

I will be very, very quick.

Professor Morello-Frosch really set a good foundation for what I am going to talk about. So I think I can go through some of this stuff really quick. It was a real benefit to have her research in front of us. And we used, in discussions with her, in coming up with what I am about to go through now.

Just real quickly, a little bit of history background of what we have been doing, a little bit of other similar research, and where we are going forward based on the Commissioner's direction to us to keep going.

Just real quick, the Department has been looking at cumulative impacts for a while. Started with the environmental equity rule, if Melinda is still here, that she did. Where we looked at a screening model to estimate cumulative impacts, to enhance the public participation in the permitting process, a series of executive orders. We are working very closely with the environmental justice advisory council. We first kind of started with a self identifying model, where communities could identify themselves. Then that EO kind of ran its course. The second EO, where we really started looking at screening methods, where the council did a lot of research, we did combined research with them. They presented us kind of a very detailed report. And the Department responded to them, where their basic recommendation was to try to develop some type of screening approach.

And what I am about to go through is, basically, our response back to the council on that. We have done a couple of things that has been done. Some presentations. Working a little bit with Ana, the Ironbound community, in cooperation with her, and the EPA care program. The science advisory board, what was on their list of things to look at.

Real quick, Professor Morello-Frosch kind of went through this, as far as what this is and what this is not.

Impact is not a risk assessment.

It's just using civil indicators to try to figure out where multiple sources of hazards and exposures may be operating to impact a particular area.

It's comparing relative impacts.

It's really a bias for action. As science continues to develop, what can we do in the interim for some of these things to try to make some progress?

As we talked about, as far as categories of indicators, the same basic three. Environmental exposure categories, social and vulnerability categories, public health.

Right now, this method that we are focused on right now, is really on the environmental exposure indicators is really what we looked at up to this point. Where we are really kind of comparing those indicators with some of the social vulnerability indicators, race and income.

So we are not adding them together like some methods do. We are comparing them.

Real quickly, other similar methods.

EPA, the enforcement program, developed something called EJ SEAT. Strategic enforcement assessment tool.

We looked at that.

Faber research, up in Northeastern, in the State of Massachusetts, has issued, actually, two reports on unequal exposure. That is a method we looked at closely. And then, of course, all the research going on in California, where Professor Morello-Frosch did mention the final report that was issued in December. We looked at that, as well as all the work that went into that as well.

This is just a real quick picture of what the EPA model does, where it goes through the demographic indicators and health indicators and kind of combines them together into one basic score. And that is the basic set up of what they do.

Right now we are really focused on the environmental indicators. It's actually kind of a combination of the environment.

This is the indicators that the Faber research looks at, as far as different kind of proximity indicators, different types of sites, cleanup sites, and yellow sites, landfills. They have given different scores and come up with kind of a facility density type indicator, or proximity.

We don't do kind of the scoring that they do. Actually, what we do is give more of a simple density approach.

And this is from the California report, where they do have several indicators as far as the socio-economic ones, race, income and poverty, the sensitive populations, the exposures, which we really kind of focused on, were very similar to this, environmental affects, and health outcome, as far as birth outcomes and so forth.

That Jerry will be talking about in a little bit.

That is kind of the stuff we looked at. This is the basic outline of what we do. Where we're at. We identify the indicators. We quantify those indicators on a very, very fine geographic scale. There are different options, as far as quantifying them and then aggregating them. Then we scale those up to do basic comparisons to race and income, is the basic path that we are on right now.

This is -- I could spend a lot of

time on this, but I won't. But these are the indicators here that we have. There has been a lot of talk about NATA. It kind of dates the research back. We are using the 1999 right now. We are waiting for the 2005 to come out. I was going to use 2002, but I figured I might as well wait until 2005.

We are looking at the risks per million. We are looking at the diesel numbers for NATA, because diesel is not included in that calculation from EPA.

We developed our own estimate for benzene impacts from stationary sources at a very fine geographic scale of a hundred meter grid basis.

Then we have traffic indicators. We put a thousand foot buffer around all the roads, and we have traffic counts for all that traffic, as well as heavy trucks. Then we have proximity indicators, the density of major regulated sites, major air sources, large hazardous waste facilities, major surface water dischargers, and so forth.

Contaminated sites, we looked at those, contaminated sites here. Dry cleaners. There is a lot of those. We do have a density for that. And junkyards as well. Recycling facilities.

That are kind of concentrated in urban areas.

I mean, in general, we have kind of regional indicators, where the cancer risk is at a census track level. It was interesting that Professor Morello-Frosch used both the EPA recede, the risk indicator, the risk data from individual facilities, as well as NATA. We're kind of caught in between that too. And that is really where the benzene indicator came from, where we recede, just have the TLI facilities. There is so many more. We built a database with our air pollution database, our underground storage tank database, and some right-to-know data, and came up with an inventory of about 9,000 facilities. We were able to do some basic modeling for that. That was our fix to the problem. To try to get that local variation with the problem with access to data.

So those are the basic indicators we have and how we kind of rolled them together.

On a geographic basis, what we have done is, if you are familiar with GIS, we are working in a raster system, not a becker system. So we have a hundred meter grid for grabbing those nine indicators. And for each one right now we are calculating a Z score of 4. To get a percentile and other things. And a lot of it will come out very similar, as far as what Professor Morello-Frosch said.

But we're looking at that, as far as whether there should be a percentile or not. But right now we use a Z score.

We have two different scores for each grid. There are nine indicators, so there are nine grids stacked on top of each other, with the tenth kind of added everything together. We could either sum them all together or count the grids with a Z above one. So we have a max of 27, we have a max of a Z score of three, or a max of nine, depending on, I think, what you use. That is nuts and bolts.

This is just the result statewide for what it looks like. It's not really surprising. This is the count methods. So the max would be nine. You have nine indicators that are above a standard deviation of one. Northeast is right across, New York City. As well as Camden.

Those are the areas that show kind of a common sense from this.

So that is the environmental side.

Real quickly, we don't add the socio and demographic, but we do correlate it. So this is at a block group level what the state looks like for percent minority.

What we have done is, we have taken the hundred meter grid data and came up with what an average impact would be to race and income.

And this is the kind of relationship that you would do that it shows, the X axis, that is the percent minority here, the Y, this is the count method. The top would be nine. Shows how an estimate of cumulative impact increases as percent minority on the block goes up. And percent poverty kind of shows the same relationship.

That is where we are at as far as work needed. The Commissioner has kind of directed us to keep going. A lot to do. First kind of updating the existing indicators that we have. The first will be an example where we talk about NATA for diesel. This is a map that we have on the air program on diesel risk in the State. Which is very high. The red areas are between a hundred and a thousand in a million risk. That is the total risk for diesel right there.

Just a couple others.

This is breaking up between non-road diesel, sort of construction equipment, so forth, where it is centered in those areas.

There is the on road. You can see a little bit of the transportation quarters going on.

The existing indicators we have all have to be updated and those would be the important ones. And there is a lot of other indicators that we are working on. We worked very closely with the Department of Health. Jerry will be speaking in a little bit on the environmental health tracking program, developing drinking water indicators. We want to get to some of the things I just talked about as far as ambient data using the SMAC data for ozone 2.5. And also doing more on, for example, facility release data, using the recede data or expanding our benzene approach to other pollutants. As well as looking at additional vulnerability and health data. That is primarily what we are working with the Department of Health on.

That was quick in between you and lunch, but I would be glad to answer a question or two.

MR. SHEATS: Thanks.

Steve presented to the Council, actually, a report. So we really wanted him to present to the public.

Thanks very much, Steve, for coming out, once again, the second time in presenting to the Council and to the public.

I think what we would like to do, we were scheduled to start at 1:15. Although could we post a sign we started 15 minutes later?

How about if we start at 1:30?

It seems like we're way behind, but we are not because, unfortunately, we had a speaker cancel this afternoon.

So please come back at 1:30.

I am looking at Willa when I say this, all speakers in the room can have lunch upstairs with the Council if they want to.

We recommend to everyone else, because we know you don't want to miss a minute of the afternoon, maybe go to lunch at the cafeteria, that is only a few feet away.

(Whereupon, a luncheon recess is taken.)

MR. SHEATS: I think we're going to call it back to order.

I hope everybody had a good lunch, a brief respite, and we're going to start back again with Dr. Jerry Fagliano, from the Department of

Health and Senior Services.

Thank you for coming.

Jerry doesn't necessarily know where all the dead bodies are, but he knows where all the data in New Jersey is.

DR. FAGLIANO: Good afternoon, everybody.

I am going to talk about public health data in New Jersey.

What I want to talk about, there are a few parts to it. First, I just want to go over quickly what are the public health data sets that are available in the State to even think about, to look at, in terms of understanding a community's vulnerabilities.

So I am going to describe a couple of data, public health data resources, that are available to the public that we are building in New Jersey. And, then, at the end, talk a little bit about how we might want to try to integrate some of this information into the work that Steve Anderson presented earlier in an overall model.

So we have data in New Jersey on public health. Some of it is difficult to get, as was alluded to earlier, or difficult to get at the scale that people want to see it. But let me just go through what those basic public health data sets are. There are many more, but these are the ones that are at least relevant to the environmental public health issues.

We have vital events data. So we have information on births, deaths, and infant and fetal deaths. We have specific registries for certain health outcome. Cancers, all cancers are reportable to the State health department.

So we have a comprehensive database that goes back to the late 1970's to track the incidence of cancer. So this is occurrence, not deaths. This is occurrence of cancers. And, also, we have a registry of birth defects statewide that has been comprehensive since about the early 1990's.

We also have administrative data that tracks hospitalization and emergency department use.

This is primarily collected for the purpose of understanding billing and costs of healthcare, but associated with that data is information on each patient in terms of diagnoses. So we can actually track the patterns in hospitalization by cause throughout the State.

We also have a data set that relies

on laboratory reports of exposure and childhood blood lead is one that is tracked statewide on all children, or all tests performed on anybody, but especially children.

So those are the kinds of data sets. And what we are trying to do is make available to the public as comprehensively as we can, as many of those data sets as we can. And we are in the early stages of making this information available to the public.

So what I am going to do is describe the efforts that we are doing and where we are now and where we want to head.

We are one of about 25 states, and New York City, working with the Centers for Disease Control in Atlanta to put together what is called the environmental public health tracking network. In New Jersey we are working closely with our partners at DEP, who are providing on the environmental side, and working with us as well on many other aspects of the program.

The resource we're using in order to display public health information is what we're calling the State Health Assessment Data System, or New Jersey SHAD, and in that system we have both links to publications, but, more importantly, we have indicator reports on a variety of different sorts of measures, public health measures, as well as a custom data query system that allows the public user to ask their own questions about the data.

So I am going to go through some of those features right now.

So this is the entry page to our environmental public health tracking. You don't need to look at this in detail, but on the left side, just gives an indication of the kinds of content that we have in the system. We have air and drinking water quality data for New Jersey environmental quality, human exposure data in terms of lead and carbon monoxide, and a variety of health outcomes, from birth outcomes, death, to due to various outcomes, cancer, heart attack, hospitalization, asthma hospitalization, et cetera.

So we try to bring all these kinds of measures together. And these pages have a lot of background information on these outcomes.

We also can link, at the bottom, we can link to the New Jersey SHAD system to get actual data sets and to look at indicators.

So this is the SHAD system, and as I

said, there are two primary ways of looking at data. You can look at it in terms of pre-written and predigested, essentially, indicators for a variety of factors, as well as the custom data query system.

The indicators are cross categorized. And we have it according to a variety of different sorts of interest areas. One of them is health disparity priority areas, which is a very big issue in public health to understand and to document disparities in health status across different demographic factors. And these are some of areas for which there are indicators.

The environmental public health tracking site, which is our component in the system, also has a variety of different categories of content for which there are numerous indicators in each one. We have about 57 indicators across these different categories at the moment.

Just to give you an example, this is an indicator profile. We always talk about why it is important, we also have text related to what is being done about a particular problem, and this just shows a line graph of the death rate due to heart disease in New Jersey and the U.S. Which has been improving steadily over the past few years. And I will come back to this in a moment.

In addition to sort of line graph presentations, we also have bar graph type presentations, which show particular outcome by, in this case, by race, ethnicity and sex, which indicates that, you know, heart disease mortality varies by race group. In this case, African-American mortality rates are higher than in the white population, which are, in turn, higher than Hispanics and Asians.

We also in our indicators have some maps which show the geographic pattern. This is by county in this case. These are two indicators which kind of parallel each other, looking at the percent of births with low birth rate and children under age five years living in poverty. Which, of course, show a very similar pattern.

So in addition to all these indicators, which people can access, we have an ability for people to look at and query the data, asking their own questions. So we have the birth data sets and mortality data sets currently in the system and infant and fetal mortality.

So these can be queried.

I just did one graph here that looked

at percent of infants with low birth rate by mother's education and prenatal care.

So you can ask for and you can ask questions about these kind of health outcomes by a variety of different maternal and infant characteristics. In this case, obviously, showing the very strong relationship between the lack of prenatal care and the high percentage of low birth rate. And that is persistent across education level.

This is a series of slides which just indicate for mortality the downward trend in all causes of death, heart disease, cancers, and cerebrovascular diseases, or stroke, over the past decade or so. Six years or seven years.

What is striking is that it is going down in all ethnic groups, but there are still discrepancies between or disparities between the groups that are persistent and not being reduced very much. So the upper lines in each of those are mortality rates in African-Americans, and the middle lines are among whites, and the blue lines are among the Hispanic population.

And just another query. This is just a mortality query that can be done. I just wanted to illustrate based on geography. So these are five particular counties. So we have a bar graph looking at mortality rates of cancers in these five counties by race group.

And, again, it shows that there are, indeed, differences that we need to be aware of.

So you can ask questions like this from our system. It's available for you to ask whatever questions you wish.

So what are we planning to do to improve this system?

Currently, we are working on a capacity to do dynamic mapping of the query output from whatever questions you're asking. Right now you cannot generate a map, but we are working on that capacity.

In addition to births and deaths, we are going to be bringing in the hospitalization and emergency department data set, hopefully within the next couple of months. So that can be custom queried by the public.

Next, after that, we hope to bring in the childhood lead exposure database.

And finally, we do have a capacity for people to query cancer in another system right now at the county level, but we do also want to bring that into our New Jersey SHAD system eventually.

We also are developing a secure portal for internal use where the data can be queried at a finer geographic scale.

The query system for births and deaths at the moment, you can ask questions at the municipal level. In the secure portal we are hoping to be able to build capacities to ask questions at the zip code and the census track level as well.

So let me kind of shift gears a little bit and talk about how we might want to use public health measures in this kind of model that Steve was trying to develop.

First of all, I think public health measures are by their very nature cumulative impact measures. Unfortunately, there are cumulative impacts due to a variety of many, many factors that go beyond the environmental occupational exposures.

To really understand the interactions among all these different factors is the challenge of epidemiology. And I think that is a long, long battle that we have to fight, in terms of really understanding how these factors interact to produce health impacts.

But for our purposes, I think we can use them as is, as indicators of vulnerability to potential added environmental stressors. So it is a matter of choosing the right ones to integrate into a particular kind of model to show communities that are, perhaps, at increased risk of harm from particular stressors.

So we are in the process of trying to determine which ones will be the best kinds of indicators to use for vulnerability assessment. There are a variety of different options that we have. We can look at sort of general measures of health, overall mortality, mortality due to heart disease, or cancers. We can look at infant health, infant fetal mortality, low birth weight. I think Dr. Morello-Frosch mentioned small for gestational age or prematurity. There are other measures as well that could be used.

We could also look at more specific measures like childhood lead exposure, hospitalization or emergency use due to, say, heart attacks or asthma specifically.

We could look at cancer incidents overall. We could look at very specific kinds of cancers that may have a relatively strong component due to environmental exposures. And we can also potentially look at things like birth defects.

The problem with some of these outcomes is that they are rare. And so trying to develop indices that have meaning at a local level and can be integrated into sort of community level assessments is pretty challenging.

So that is where we are. We're still trying to figure out which measures we would be able to use in a meaningful way and how to use them with respect to the kind of indices that Steve is developing.

So I think I'll stop there. I just would encourage you to visit the environmental public health tracking and the New Jersey SHAD Web sites. And there is also, I would point you to a health department strategic plan to eliminate health disparity, which is also on our Web site.

Thank you.

MR. SHEATS: Questions from the Council?

Jerry, what do think is going to be the biggest challenge as far as continuing the work, finding the data, making it available?

DR. FAGLIANO: Making it available to the public, I think the biggest challenge is the issue of scale that I alluded to earlier.

The data sets that we have available to the public now, like I said, are available at the municipal level.

The fact that a lot of towns are very small, with relatively small numbers of outcomes, limits our ability, unless we do things like merging, creating different geographies that put different towns together. You know, data for certain cities could easily be -- put out an even smaller scale than the municipal level potentially.

In terms of integrating these kind of metrics into a set of measures that would fit into a model for vulnerability, again, I think they're similar. One of the problems that we have is to understand outcomes, we would have to take into account age. Because we weren't trying to compare across different geographies, whatever populations, the age structure of those populations has a big impact on the health outcome. So it's important for us to adjust these measures for age.

And we don't really have intercensal estimates by age and race for small geographies below the county level. So we have to come up with those so we can adjust for age at smaller scales in these kinds of metrics.

MR. SHEATS: Thank you.

Thank you for coming today.

I think we're moving from -- it has been very data laden so far. Which I think has been good, but I think we are moving more toward the policy end.

We have next, Ray Werner, Chief of Air Branch EPA Region 2, who came on short notice.

MR. WERNER: I am not going to turn out the lights. I know it is right after lunch. So I am going to do everybody, I think, a big favor.

Thank you very much for this opportunity today.

We go out into the community often, and we hear all the time concerns about cumulative health risks. What is it? What about the air? What about the water? What about the different sources? What about what I eat and what I breathe? Et cetera, et cetera.

And it is conundrum for scientists. It is not an easy question. And I'm sure you have gotten the flavor of that.

I am Ray Werner. I am chief of the air programs branch. Normally, I'm involved in implementing the air quality laws. I am not a research scientist. In fact, Nicky did reach out, I think to our office of research development and office of science and policy, to see if they could get an individual to talk in a very detailed way about the kinds of risk assessments that we are considering in headquarters. Unfortunately, they could not be there.

But I think I could give you a flavor of what is going on. And I am joined here by Carol Bellizzi, a colleague of mine who has been here since this morning listening to these excellent speakers.

And I want to convince you that EPA is invested in cumulative health impact studies because I have seen it in the way I do business and the way I see everyday changes in how we are going about looking at science in the areas that I am involved in.

At the national level there are cumulative risk technical panels that meet with NJAC, that meet with communities, that meet with scientists. I am not going to talk about that in very much detail, but what I am going to do, because I can't talk about the science in a lot of detail, I will leave will Willa, or send to Willa Williams a list of links on EPA's Web site. I am going to refer to a number of things, and if you are interested in more detail, through these links, you will be able to get as much detail, hopefully, as you would like.

I think that could be either put in a report or made available to the participants so I don't have to go into much detail.

EPA is required to set criteria air pollutant standards. And there are six criteria pollutants. And you heard of them. Sulfer dioxide, particulate matter of various sizes, carbon monoxide, et cetera. And every five years we review the health research information. There is a long process for coming up with new standards.

In fact, former Commissioner Jackson announced that in July of this year we will announce our decision on a reconsidered ozone standard.

So we do look at the health effects data. What we use is something call ISA. This is the government. So we have acronyms. Integrated science assessments. And they are the scientific basis for these air quality standards, which we call national ambient air quality standards.

And the changes that we've noticed, that I've noticed, is that we are starting to look at non-chemical stressors, such as socio-economic status, educational attainment, and reduced access to healthcare, much more than we have in the past in reviewing this health information.

In December of 2009, EPA released its ISA, integrated science assessment, for particulate matter. And in January of 2010, we released an ISA for carbon monoxide.

You can access this on the Web, but if you want to avail yourself of this information, you could see the kinds of things we're now looking at in addition to the just simple health effects.

In addition, in March of this year, EPA announced a power plant mercury and air toxics rule.

The importance of this, I guess, in terms of cumulative impact is, mercury, which is probably the primary pollutant that was addressed in this, in fact, it would require about a 90 percent reduction, emissions for mercury, is not typically a problem when you inhale it. It is an ingestion issue. It is particularly important to developing neurological systems to unborn babies, pregnant women, because the avenue into the human is not by breathing, but it is ingestion.

We don't normally think of power plants as much in urban areas, we probably think more of cars, trucks and buses and local factories, and, certainly, they are a factor, but, in fact, the power plants do get into our air, and they do get into our water, they go up the food chain, and they have a number of ways of getting into our body.

So we are not just looking at inhalation. We are taking actions to look at other pathways for air toxic compounds.

Other activities and changes I have seen, we recently released the National Air Toxics Assessment.

I don't know if you looked at this information. We'll have the information on the Web site. But it is very, very cool, I think. You could go into your street address, your zip code, et cetera. And we look at 187 passage air pollutants. We do a cancer and a non-cancer risk estimate for them.

Now, this is based upon emissions

information. Some of it is calculated. Some of it is measured. Some of it is estimated. We use models to predict the impact. We use the health information we have in terms of exposure and hazard.

But if you look at that, you go into your own neighborhood, or some other neighborhood, you get a pretty good assessment, an estimate, of what the cancer risk is, where they might come from, at least the category of sources.

And this release that we just made was based on 2005 emissions information.

In the next year or two we are going to release a revised National Air Toxics Assessment using 2008 emissions data, but what we're looking into is something called a national air pollutants assessment, NAPA, instead of NATA. This is, of course, the federal government.

The difference being is, when you go into your -- use this tool, which is Google earth based, go into your location, find your cancer and non-cancer risk, we're also going to overlay on that information about the criteria of pollutants. The carbon monoxide, the particulate matter, the sulfur oxide. So that a reader can see not only the risks from hazardous air pollutants, the air toxics, but the criteria groups for which we have health related standards.

So it is an attempt to provide more information to more communities and locations on exactly what the state of their health is, and where, in fact, the pollution comes from.

We, actually, set standards for sources of air toxics. In the business, we call it the MAC standards. Maximum available control technology. And, basically, it is a part of the law where we have identified sources that can emit air toxics.

We have to set a standard.

Now, congress at one point developed the Clean Air Act that had us looking at the health impacts of all of these hazardous air pollutants, and we made no progress. We made no progress for ten or 15 years. And the problem was, there was not enough health information about all of these compounds that we could set standards.

So in 1990 the law was changed. They said, never mind. Here are the hazardous air pollutants. Get rid of 90 percent of emissions.

We side stepped the health assessment part because we didn't know how to do it. So now it is, here you have a refinery, here you have a smelter, et cetera. Ninety percent reduction if it is of a certain size and category.

But congress also said, you know, go back after you set those standards, go back later, and just make sure that the residual risk, whatever is left coming out of the smoke stack, or emission point, isn't still a hazard.

And so we are in the process of looking at this residual risk for these standards we set for sources.

And one of the latest developments is, is that we used to just look at the emissions from that source for which we set a standard. So we would go in and we would only look at that one source behind the chain-link fence. Now in doing our assessments we are going to be looking at all the other sources behind that chain-link fence.

So when we do our assessment to see, did we go far enough with our standard, we will actually be looking at emissions from those other sources.

And that is, again, a shift for more of a broader look at the air quality impacts on health.

If you indulge me for a minute, because I want to get this right, I am going to read a couple of things, which I know is typically bad manners for a speaker, but I just want to make sure I get this right.

There is a cumulative risk screening tool that is under development. It is called CFERST. Community focused exposure and risk screening tool.

And I am going to read from our Web page. And, again, you can go there and get more.

CFERST brings estimates of environmental concentrations, human exposure via all routes, and human health risks, into the same tool as information about health outcomes, exiting health conditions, demographic, economic, and social indicators, and sources of stress on the community. Vulnerability inspectors.

Now, this is now under development with our office of research and development, it is a new tool, but it is broader. It starts to look at some of these other stressors that we know communities are interested in and we should be interested in.

Again, I will give you the Web site

for that and you can go and find out a lot more information.

We are also evaluating other tools possibly for use in minority, low income and indigenous communities that may experience high burdens from air pollution. Now, it would be a screening tool. I think it looks even more at the socio-economic factors.

It doesn't exist yet, but it is one of the things that EPA is evaluating. And I wanted to bring that to your attention.

I just want to close -- one more thing.

Again, I am going to read, and I apologize for this, because this is typically my area of focus. I am going to read a press release, January 11.

"EPA awards $7 million to study effects of pollution exposure and social stressors on communities. It's to fund human health risk assessment research. Scientists around the country will study a combination of harmful factors affecting human health. Including research on poor and underserved communities with extensive pollution based problems. This groundbreaking research will focus on environments where people are exposed to multiple stressors, such as chemicals, anxiety, and poor nutrition. When these stressors are combined, they can lead to a much higher risk of health issues."

So this 7 million is not one grant. It is a number of grants. And I understand, Carol, one of those is in the New York Metropolitan area, and I think was awarded to the West Harlem Environmental Action Group.

If you live or work in the air pollution community in the New York area, you are probably familiar with them.

And I will read it, and I apologize again for reading, but I think it's important, "EPA studies are generally confined to single chemical affects. These studies are useful and important, but can be difficult to apply to the combinations of chemicals people are exposed to outside the lab. These types of studies rarely address social and societal factors that can play a major role. The STAR grant" -- and this is under the STAR grant, again, STAR is an acronym for science to achieve results -- "these STAR grants will research both societal and environmental factors," including, and there is a whole list of those.

I'm probably running short of time, but I wanted to give you a flavor of some of the kinds of things where I am noticing EPA looking more and broader at health effects. And also, again, I am not a research scientist, but information that I have gotten from the Web site, or we got from the Web site, that was prepared by these research scientists and our office of research and development. Some of the things going on. And I think we can look forward to a number of changes in the future, and, hopefully, that is a direction that I think most of the communities would like to see us go.

So I will stop there.

MR. SHEATS: Thank you.

MR. HANNA: Ray, thank you very much.

Maybe you don't know, but I will at least ask the question.

Your office of research and development, where are they in the process? You mentioned that they have CFERST up and available at least on the Web site for a look.

Is that something that is rolling out for the states to use, or is that going to be an EPA only tool, do you know, and what is the timing overall I guess for having a tool like that available for consumption and for use in other purposes?

MS. BELLIZZI: I don't have any time line on it. And my information is really from the Web site and the presentation I found there. But they are in pilot testing. So they have some communities, one of them happens to be in our region in Brooklyn, where my understanding of it is that these tools have to be populated with the health outcome information.

Apparently, the community had done some kind of survey. And so, I guess, with EPA's help, the information was put into the tool, and now this community, with their New York City Department of Health, their local Department of Health, they are going to do some screening.

So it is in the pilot testing phase. And maybe some care communities. Community action programs for renewed environment, that kind of care, are going to be using these also. And I don't really know any detail about that.

This tool was developed in response to care communities' requests for a tool so that they could do risk assessments on their own, risk screens on their own.

MR. WERNER: I think if people had a particular question we, obviously, won't know all the answers. If you wanted to share that, write it down and share it with Carol and myself, how we could contact you. If we could follow up. If nothing else, if we could give you a contact name within the agency to get you that information.

MR. HANNA: Just another data point that's interesting. And that was helpful, Carol. Thank you. To see that where these pilot studies, what you're calling them, or grant funded studies that are happening, in some cases, around the country, that we heard about today, they all seem to be in, more or less, that pilot stage still. I am trying to gage when is the next step beyond that?

We may not have an answer.

MR. WERNER: I think probably not. I think, obviously, our attempt is to make this available to anyone who wants it and who has the database that can use it.

We can try to find out more about the time frame for that. But our intent is to get this out as quickly as we.

DR. LAUMBACH: I want to make a comment that we have one of those STAR grants here in New Jersey.

I know that in the past there was some speculation that the EPA has talked about cumulative risk assessments. I think for several years now. But hadn't actually done cumulative risk assessment.

Part of that could be the fact that EPA thought it wasn't under their purview, the social sciences, or didn't have the resources to do that.

Is there like an effort to get those resources, in terms of personnel people, that can understand better social sciences, could understand more the impacts on both health as well as interactions?

MR. WERNER: I am sure there is. Resources are always an issue.EPA I would point out that, EPA does do cumulative impact studies as part of its Superfund program. For example, they look at various compounds and various pathways into the body.

So there are some programs that do actually use that kind of approach. Air not so much, I think. And that is where the big change is, and that is what I was referring to.

I know that this was one of incoming administrator's seven priorities, was to look at community health, and to be transparent, and to share with the community information we have and the way that we use it.

So I know there is an intent to do that.

Resources, I am sure, is a problem anywhere.

MS. BELLIZZI: There was some big workshop or something in October, where they brought together experts and people to work on cumulative risk. I don't know the name of it. And I don't know if that was part of the risk assessment forum. I guess they have a facta under it. A technical panel. And Ray mentioned the technical panel. And that is under the risk assessment forum. So I don't know if all the experts are necessarily in EPA. I think the facta means they're not in EPA.

DR. LAUMBACH: That's a good point.

Thank you.

MR. SHEATS: Thank you, Ray.

Instead of going to the policy or the

efficacy community representatives, we are going to have a presentation, next up, by Joseph Suchecki, from the Engine Manufacturers Association, and from Chicago. And he is going to talk about recent developments in diesel engines.

Thank you from coming from Chicago to talk to us.

MR. SUCHECKI: Thank you very much for the invitation. I think I came and talked to the group several years ago at Peg Hanna's invitation as well and got into a lot of trouble there because I was saying that diesel wasn't so bad.

But I do want to talk to you today about a couple of things.

First of all, Engine Manufactures Association is a trade association representing the major manufacturers of internal combustion engines. And, basically, pretty much all the diesel engines that are put in on highway trucks, non-road equipment, boats, locomotives, stationary sources. So that we pretty much do all the diesel engines. We don't represent the auto folks. They have their own association.

Some very brief comments on the

topic, which is cumulative impacts of air pollutants, and then really focus on discussing some issues with diesel emissions, and provide some of the latest information on how successful we have been. It is, actually, a great story.

In terms of the cumulative impacts of air emissions, I think a lot of research, obviously, is going on, and people are just starting to focus on that. We know that both EPA and the Health Effects Institute are really now looking at this multi pollutant problem.

And the Health Effects Institute, which the auto and truck folks support half and half with EPA, are really concentrating on this multiple pollutant analysis. And have done a lot of research on that. And I think also EPA has redirected a little bit of stuff there.

In terms of, you know, was just mentioned by your health information person that, really, if you look at epidemiology studies, they really are looking at the affects of multi pollutants because they are really capturing what is happening out there.

Now, the issue is that, the researchers go in there and try to parse out what pollutant that is from. I think that is a very difficult job. It is really hard to get that, what health effect is involved with each individual pollutant.

For New Jersey, being from the outside, of course, from Chicago, I would just kind of leave a question for the Council is, this is such a big task. I would think that it would be very difficult for a single state to really look into that big question. Obviously, there are a lot of things you could do specifically in New Jersey. But looking at that whole question of multi pollutant analysis is really a bigger issue.

So let's talk about diesel emissions.

Your commissioner this morning gave me a good entrance because a lot of what he talked about was diesel. It is still a big concern in the State and across the country. In terms of multi pollutants, you have to remember that diesel is not a single pollutant. It is really a mixture of pollutants. You have all kinds of different stuff in there, NOX, PM, hazardous air pollutants.

So it really is a mixture. It is a multi pollutant mixture.

Diesel is really a source. It is not

a pollutant. All though people try to classify that.

A couple of other important things.

You really can't tell diesel emissions in the environment. Once it is in the air, you really can't tell a diesel PM particle from an auto particle. There is really no unique marker for diesel exhaust. Certainly, there are some things, like elemental carbon, that put out more. But there is no unique marker for diesel PM.

There will always be diesel exhaust. We can't get rid of diesel exhaust. There is always going to be something coming out of the tail pipe. What we have done is change the composition of that.

I will make the statement here, that if you look at all the PM research, there is really nothing in there that indicates that diesel PM is really any more or less toxic than other PM's in the environment.

And importantly, as I think also was shown a little bit earlier, along with PM, diesel PM has been decreasing for about 20 years now. If you look at any of the work that has been done by the EPA or the State of California, there is a constant decrease in the amount of diesel PM in the atmosphere.

So we do know that diesel emissions contribute to the ambient air pollution. And, really, that amount, it really varies, depending on what the sources are. And it also depends on what method you use. Again, there is no direct marker. So you can't really tell if you use source apportionment. And how you do that depends on whether you have ten percent diesel or 30 percent diesel. So that is also important.

But the overall approach by the regulators has been to say, well, there is lot of questions, but why don't we go ahead and reduce diesel emissions as much as we can.

That is what we have done. So that now I will show you it's near zero emissions from new diesel technology.

This is a slide of the standards for on highway vehicles. We have gone up from 1994, kind of the top, the big box, with .1 grams of PM, and over 6 grams of NOX. And we're now, 2010 was the first year that we are down to, the very bottom there, we are down to .01 grams on the standard and .2 NOX on the standard.

So that is really 99 percent

reduction over that time period. And we have done that also by reducing the sulfur content of the fuel.

I just want to talk about traditional diesel exhaust, which is pretty much the pre-1998 exhaust, which really had no controls, or very little controls, up through 2006. And that is really where all the work has been done on health effects of diesel exhaust, which is in the past there.

And here is just a list of the various hazard assessments that have been conducted by EPA and a lot of other agencies in terms of diesel exhaust. And, remember, that is a traditional diesel exhaust.

So then we talk about the new stuff, the new technology diesel exhaust, which is exhaust from engines using our new technology. And, essentially, what we are defining that as is anything after 2007. 2007 the standards came in. We had to really reduce that PM level. And it is a fully integrated control system. We have oxidation catalysts and diesel particulate filters on everything. And we're also reducing NOX as well.

And that applies whether it is a new

engine or if you retrofit the engine with the same technology.

This is just a view -- this is, essentially, the technology that we are using now for new diesels. This would be the after treatment system. You come into an oxidation catalyst, which helps prepare the exhaust. The exhaust then goes through this diesel particulate filter, which pretty much takes care of all the particle. After that, to control NOX, we have two systems. We are putting a selected catalytic reduction system on here, which will reduce the NOX down to that level. And if we don't use an SCR system, some companies are using an exhaust gas recirculation, which recirculates and cools the exhaust entry to reduce that NOX level. But this particulate filter, the way this works, it is a catalyzed exhaust filter. So we have the exhaust. And everything coming in here. The exhaust goes in. These are closed off out here, so it forces the exhaust through these porous walls, and that traps all the particles in there. And then the exhaust comes out pretty clean.

And then what happens is, we have a regeneration event, where the particles build up in there, and depending on the technology, those particles are burned off. So you have, essentially, complete combustion of those particles, and that really results in some great reduction.

Getting into some of the results now.

You have to remember, as I said, diesel exhaust will always be there. And, actually, the majority of diesel exhaust has always been water and CO2. And some NOX in there.

This is for traditional diesel exhaust.

And then you have very little amount of these PM and hydrocarbons and things like that that really cause some of the problems.

So we always had this as being a little part of the problem.

So we had a study that we are doing with EPA and funded partially by DOE. It is being run by the Health Effects Institute. And it is really looking at the emissions and health effects from new technology diesel exhaust that is ongoing.

And we do have the initial results of that, which we can share with you today.

So for the results of the ACES' testing, which was done down at Southwest Research. This is the standard, up here, for hydrocarbons that we have to meet by EPA. These diesel particulate filters are so efficient, we're way down to this level. It is an order of magnitude lower than the standard on hydrocarbons. And these FTP and 16 hour are just different cycles that are used in the ACES' test.

Again, on PM emissions which is really the concern with diesel, the standard is .01 up here.

Again, we are actually an order of magnitude below the standard that we have to meet. So, again, these filters are just incredibly efficient. Much more so than they need to be. But the technology is there. You might as well use it. So that is what everybody is using.

And then there is also concern about particle number. There was some indication out in the community there, that, yeah, we're reducing particle mass, but the numbers are going up.

Here is a comparison of the ACES' study with the traditional diesel exhaust particle numbers. With the new technology. This is a bunch of different studies here. But particle numbers are just incredibly lower as well.

More particle number information.

And then the other thing is, well, there is always an issue about, well, maybe you're just reducing the level of PM, so you are still going to have the bad stuff in there, you are just making it lower.

What I want to point out is that diesel emissions is now completely different than what they used to be. The composition is totally different.

You can see here that in traditional diesel exhaust, we had lots of PM, and now we are down really low. But the composition hasn't really changed.

The elements of black carbon used to be a very high percentage. With the new technology diesel, it's a very low percentage. So not only are we decreasing the actual amount, but the percentage is less.

So now you can see that diesel exhaust is very similar to gasoline. It's mostly, actually, sulfates coming out of the exhaust.

Most of the contaminants that are found in traditional diesel exhaust, you had a whole list of about 40 mentioned, they are, essentially, not found anymore. So in our studies of ACES and other studies we found, we can't even detect a lot of these compounds that were in there previously.

Here is a chart for polycyclic aromatic hydrocarbons and volatile organic compounds. Again, you can see the great amount of decreases with the new exhaust compared with the old exhaust.

So these are numbers, again, from ACES' study. You can see that for some compounds, elemental carbon is 99 percent, organic carbon 96 percent reduction, metals 98 percent, furans and what have you.

So, essentially, 80 to 100 percent reduction in all the bad things that used to be in diesel exhaust.

Here is a couple of slides that just show you comparisons of various substances with natural gas engines and gasoline engines. And you'll see that in all these slides, pretty much diesel engine exhaust now is on a comparable level with natural gas engines in terms of what is there.

In terms of mass emissions, again, we are at the same situation, gasoline and natural gas, the NTDE is actually lower pretty much than a lot of things now.

The ratio, this is just two different types of tests of elemental carbon to total carbon ratio. Again, we're very similar to natural gas and gasoline.

There has already been a couple of studies that have looked at toxicity of the new diesel exhaust. Here is one study that looked at traditional diesel exhaust and new diesel exhaust and then filtered air. And you can see what the old diesel exhaust used to do. This is acute toxicity in animals. When we get down to the new technology diesel, it is the, essentially, the same as filtered air. So we really got rid of all the bad stuff we think. There is a lot more work to do on that. And what have you.

There has also been a couple of reports of human trials. One here that reports problems with human subjects inhaling regular diesel exhaust and then new technology diesel exhaust under controlled conditions. That were undoubtedly approved by some ethics committee somewhere. I forgot which. Probably out in California.

What you had, similar solutions of the new technology diesel. You didn't see those affects anymore in human subjects.

So what we have is really fundamentally different type of exhaust now coming from diesel. The PM levels are a hundred fold less that what we had before. It's chemically very different. The composition has totally changed. You don't have a lot of the air toxics or the hazards in there that used to be there. And, essentially, it's similar or even lower than the emissions you're getting from gasoline or CMG engines.

And some of the preliminary results are indicating that in the biological affects tests in humans and animals, that you're not getting the same kind of responses that you used to get with traditional diesel.

And I will say that the ACES' work is continuing. We had a short-term mouse test that was done at Loveless, in New Mexico, which is completed, but HEI is looking at those analysis. That information, I think some of it will be coming out at the May HEI meeting as to what the effects are. Then we have a long-term rat study that's been going for two years. Trying to look at carcinogenicity in rats. And that will be done in a couple of years. That still got a couple years to go.

So it really requires, I think, people to really look at or relook at diesel exhaust, since it has really changed today, and it's here today.

So in terms of what that means for New Jersey, if we can introduce as many vehicles out there with the new technology, it's going to reduce ambient levels of PM's and lessen exposure to multi pollutants. We really need to recognize that there is a difference between new technology diesel and old technology diesel. You have to start thinking that there's old technology diesel and new technology diesel. And you have to think about them really differently, because they are not at all the same.

One of the things that we like to say, or think about is, you know, people are still out there doing a lot of studies on traditional diesel exhaust. And we, and I think the Health Effects Institute, are thinking that there is not a whole lot of value in that anymore. That is the old technology. It is being replaced. All of the regulations for all the various sources of diesel, from the large marine engines, heavy-duty vehicles, on highway vehicles, off-road vehicles, locomotives, marine, EPA has now issued new regulations that, essentially, get us down to these levels. Not quite this low for the big marine vessels because we simply don't have the technology to put particulate filters on those huge engines that are about the size of this room.

Stationary sources, the other folks at EPA, have issued emission standards for new stationary engines and also a knee shaft that will cover existing engines. So it is really in the works, and we have the technology, it is just a matter of introducing it.

So in terms of state programs, while you still have a lot of concern about diesel, the best thing you could do is to find ways to transition to the new diesel technology, because that really improves and very quickly improves the emissions from diesel and the multi pollutant environment.

And I think there was a question here about how long is it going to take at the ports.

Well, I think in the Los Angeles ports they have actually done some studies because they have been switching over -- got rid of -- because of their program out at the Los Angeles ports, they started switching over to diesel already, and folks have been out there measuring diesel PM. And even in a year there is a significant difference already in terms of the pollution that is out there.

Just some information for you to think about as you go forward.

Again, thank you for the opportunity. And I'll be happy to answer any questions.

MR. SHEATS: You mentioned one thing.

I was wondering, you said there's no need to do a study on traditional diesel emissions because you are going to be switching over.

Can you give us a ballpark estimate of how long it will take -- we know diesel engines can last a long time -- how long that switch over will take until you get rid of the traditional diesel engines?

MR. SUCHECKI: All together it's going to be a long time. And, frankly, the recession has not helped at all. I mean, from our point of view as manufacturers, and truck manufacturers, you know, nobody was buying new trucks in 2009 and 2010.

So in terms of projections, the

economic situation really set back when folks are buying new vehicles.

That is changing now. We are seeing an upturn in the number of new vehicles being ordered and sold.

I think I saw some figures on one of the big national truck carriers where they are already at 40 percent their fleet is new technology diesel. Since 2007.

And, again, a lot of people put off buying new vehicles in the last couple of years, but that's changing.

It is going to be longer for the construction equipment, since construction equipment, traditionally, last a lot longer. Some of those bulldozers and cranes and stuff just stick around for a long time.

But, again, whatever you can do to encourage that.

We have been very supportive of the diesel emission reduction plan in congress that helped pay for retrofits.

Unfortunately, that program has been zeroed out by the president actually, which is a great concern to a lot of us, but by 2004 that program was canceled out, and I am sure a lot of the funds are gone.

That is what it takes, is money.

In California, ARB has taken an aggressive approach, where they have the ability and the authority under the Clean Air Act, to have mandatory retrofits.

As the California folks will tell you, that ran into a buzz saw of concerns because of the cost of that. And even the ARB has gone back and revised that. So it is not as an aggressive schedule. But that is one way that we're looking at it.

It is a number of years, but if you get the ports to agree to do it, it could be a very quick turn over time. You know, especially getting rid of the really old vehicles.

MR. SHEATS: Thank you.

Next up is Mr. Bruce Groves from EMILCOTT. He is going to talk about innovative ways to measure concentrations of pollutants.

MR. GROVES: Hi. My name is Bruce Groves. And I am going to talk a little bit about from a practitioner standpoint, and not an academic standpoint, some of our experiences in conducting integrated realtime monitoring of not just air, various air detection type equipment, but also other environmental type equipment.

The one thing I was going to mention with Joe is, my experience with diesel equipment is exactly what you are saying, is that the equipment today is very clean. And one of the things about the technologies that we are using, we can see multiple particle sizes on a lot of these construction and hazardous waste sites, and we have shown that the biggest offender are old diesel trucks in a lot of the work that we are doing.

So that has changed the behavior of a lot of the clients that we work with, which are the pharmaceutical companies and the chemical companies, that say that since we have data with such high levels of PM 1, PM 2.5, in old diesel exhaust, that they spec out that nothing but clean diesel, low sulfur fuel, is going to be used. So it changes the behavior once they start seeing the data.

I am going to talk about how do we improve air quality in high density areas.

Where I come from we conducted quite a bit of integrated air sampling at various construction sites, various hazardous waste sites.

Learned a lot about how to bundle this equipment, learned a lot about how to use the data, and I think this is a great application to expand beyond the source areas that we worked on and look at the whole issue of urban or high density or air pollution in general.

I think Dr. Fan was talking in one of her slides about how the pollution source is when you are dealing on a micro standpoint are much different than looking at regional air pollution. I think everyone understands that we got numerous sources. And when you start looking at realtime data, you realize that you have many more sources than you really thought you had in the first place. They are diverse. All different types. Combustion, abrasion, just general dust, chemicals. All sorts of different types of sources out there. They can be stationary, they can be mobile, episodic. They come at different times for different lengths of times. And there is a tremendous effect that we have seen in trying to bundle meteorologic data, local meteorologic data, not just the weather that is being done on a regional basis, to show that there is a tremendous impact on wind speed direction and temperature of these various site.

The solution from my perspective, and I have been doing exposure assessments for 25 years, working with EMILCOTT, and I have conducted samples in many ways, but the future, clearly, is realtime data. Realtime data integrated in a platform, either an agnostic platform, where you have a neutral platform, where you could have all sorts of data being fed to show you a lot of different situations and indicators at the same time.

We want to focus on what are the specific areas. And we're seeing that the detectors are becoming smaller, cheaper, faster, you have more types of applications, it becomes less expensive to put these detectors out there. So we can focus on a lot of polluted areas, or a lot of different areas of challenge.

And one of the things that is nice about realtime data is when you have, instead of studying a lot of this stuff, if you have immediate action, once you see the data, and once it comes up, you can take some action. Not just take action to try to reduce the source, but also to try to observe what are the actions are being conducted at that point, so you could determine what future things you could do to reduce the overall pollution.

Here you see some integrated data right here. This is a construction site in New York City. This, actually, was a point source. This is two-and-a-half micron dust. This is actually an animated slide showing wind speed. Wind direction, I should say. You can't quite see the arrows. But this moves across the site. You can see the movement over a period of about 15 minutes. And it identifies various sources, where if you are just looking at tabular data, you are looking over a period of time, you just don't see what is happening at that moment.

One of the things about the system that we work with and the tools that we work with is we do focus a lot on sampling for multiple particle sizes simultaneously. We not only look at two-and-a-half microns and ten microns, we look at one, four and look at total dust. You see a lot when you have multiple detectors on a site. You see changes in various particle sizes. And that is not just a threshold that you exceed, but you see a Delta between 2.5 at certain areas, and you can see this graphically.

So that gives us an opportunity to say, "okay, what is going on? Is there a diesel truck that has come on site that doesn't have the filtration it is supposed to?" It could be a maintenance issue. Or whatever the issue happens to be.

We also focused on total volatile organic compounds, photoionization detection, flame ionization detection. And part of that is, as part of the integrated system, we correlate all these readings with wind speed and direction. So every sample has a specific location of knowing what vector that the wind is coming. So the issue when you are in Camden at the waterfront you will know in realtime if the wind is coming from Philadelphia, or if it happens to be coming from Center City Camden, or whatever point source, then you can track this on a map to see exactly where the movement happens to be.

We also include other types of detection, video, digital imaging. And I'll talk about some of the other environmental data. And this is valuable because if you start seeing an increase in one of your surrogate sampling up here, this is all automated, and you know it is a certain wind direction of interest, then you can start taking pictures. And these pictures being all internet based, you could have an alarm and actually capture what could be the offending issue at the time. To gather more and more data. Again, with the purpose to try to reduce the overall pollution levels on the site.

The whole other aspect about when you integrate data and you have all these data points, we have done a lot of work in the whole human factors end of how do you get all this data represented graphically so someone can see it at that point and make some sense of it?

In this case, this is an IPad. Our people on site can operate the system and see what is happening using any internet based Smart Phone, or Ipad, or whatever.

The issue here of course is creating safer neighborhoods.

The same technology can be used in neighborhoods. And I know the Ironbound district was talked about, with regards to all the different stressors involved. When you have particulate vapors and other contaminants.

And we focused again on surrogates.

When we start looking at particulates, we have the ability to not just alert personnel whatever action can be taken, and possibly take prompt action to reduce pollutants, or take prompt action to observe what is happening on site, so that could help policy, future policy and gathering data. We also have the ability to start analytical sampling. And with costs being what they are, we tie in analytic sampling to realtime data. So if there is an increase in particulates, we may start taking samples for metals. If there is an increase in vapors, we may start take samples, an IS 1501 method, or a TO 17 method, to actually get some qualitative data to support what we are assuming to be action levels that are appropriate for the various surrogate sampling we are taking.

We also integrate data from other monitoring as part of the integrated systems. Noise is one. We have a system where noise is part of the whole process. Where it is not just the noise levels, but if the noise levels exceed a threshold, we take a thirty second audio clip. So someone can say what happened at two in the morning and listen to the thirty seconds. Because that becomes very valuable in trying to determine what are the sources of noise when you start looking at various sites.

Vibration has a lot of interest not

necessarily as a stressor, but from an engineering standpoint, when you are dealing with construction and things like that.

Temperature, radiation, these are all realtime.

We have a database -- this is not realtime data here, but when people are looking at odor, they can actually put odor into the database and say, we smelled it at a certain period of time, and then we can play back and determine what was happening at that time. Where was the wind coming from, what were the TOC levels, and so on.

Benefits.

Realtime monitoring, you can identify in realtime local pollutant sources, look at contributing conditions.

We had one project where tides were contributing and there would be a vapor intrusion. So we could monitor the VOC's and tidal levels. Again, that is not realtime. We put that in retrospectively.

You can look at specific contaminants when thresholds are exceeded.

A big thing for the work that we do is the return on investment. If you are going to invest in new diesel, for example, it is okay to say, this is the right thing to do, but if you could actually measure what is the impact at various levels, look at the PM 2.5 as an example, show what it was before, show what it is afterwards, that is a much better data point than just saying, we know it is going to be better.

We have a single platform.

And the last one is, we have a lot of models out there, a lot of ideas, but when you have empirical data, this is a wonderful way to test these models.

So I just threw up some policies here, scientific policies, knowing that this is the area that you guys are interested in doing. So to help out a little bit here. You are going to see radical changes in detector technology. It is already there. Radical changes in how data is being handled. I predict you're going to see like closed-circuit TV's out there in many urban streets. You can have multiple particle size detectors. And I think it is a time to really look at some pilot studies out there, and listening to some of the data here, some of the studies you are looking at, sophisticated realtime monitoring, I think, would be perfect to support some of these.

Continue to look at detector technology. Identify what is out there. That is something we are doing all the time. Who has got the neat little gadget and what applicability does it have in trying to control the local air pollution and the environmental stressors.

Particle size.

We are getting lots of data in looking at contaminant transport and predicting movement, looking at particle sizes between one, two-and-a-half, four. And I think a lot of work in the research can be done in trying to use particle size as a surrogate for a whole bunch of different types of contaminants.

Legislative policy.

There is a lot of inconsistency out there with regards to who is doing what in monitoring when it comes to at least temporary sites, like construction and hazardous waste sites. And I think it is good to determine what is out there and what kind of thresholds would be appropriate, using some of the surrogate data that we were talking about earlier.

I think it is a time to also look at

current practices and try to get some consistency. So you don't have one site that has a very sophisticated system, but you have other sites that aren't being monitored at all.

Thank you.

DR. LAUMBACH: I'm curious, very nice presentation, I'm curious and also impressed with the technology, but I am curious if you have been at construction sites that have had old diesel technology and then those with new, whether you have data that would indicate the degree to which new diesel technology at construction sites reduces community exposures?

MR. GROVES: Well, the data that we have is really particulate matter data. So it clearly -- not just trucks. I mean, we have construction equipment, VAC trucks.

When you deal with various equipment, you may have brand new dump trucks coming on, but a lot of the supporting construction vehicles have been around for a long time.

So we do have that, yes.

DR. LAUMBACH: I thought you said that some of your clients, the pharmaceutical companies, had required that contractors have clean diesel.

MR. GROVES: Right.

DR. LAUMBACH: So comparing those to your clients who don't, I mean, is there anyway to make a comparison?

MR. GROVES: I would say at this point, I risk saying you could make a comparison with scientific certainty in a sense, because our data sets aren't that big. This is part of the issue with the pilot studies.

Anecdotally, absolutely. And, in fact, even anecdotally, we identify when you have a problem truck coming on site.

MR. SHEATS: Thank you.

So now we're coming to the policy section, law section, folks who have been working with this for a while and are on the cutting edge of creating ideas.

First up will be Dr. Peter Montague from the Environmental Research Foundation. Peter is a nationally-recognized expert on precautionary principles. Before he supposedly retired last year, he was famous for writing Rachel's Precautionary Reporter, which is a weekly newsletter. And now in his retirement he is currently writing a book on cumulative impacts and helping environmental justice and the environmental community think through ideas on this.

Thank you, Peter.

MR. MONTAGUE: Thank you, Nicky.

I want to start talking about the overall problem of cumulative impacts. It's really an important problem. I think it is the central problem that we all face. We are destroying the biosphere one little bite at a time. And we don't know how to deal with that. And that is what we are here to talk about. We are here to talk about the air part of it, but it is an overall general problem.

For 200 years we have assumed that the biosphere, the part of the planet that we inhabit, could tolerate an endless series of small environmental insults, or harms, that result from the pursuit of economic growth.

This is shown in figure one, where benefits are growing without limit, which are accompanied by costs that are growing without limit.

This is how our legal system pretends that the world works.

Benefits are going to go on forever,

and so long as the benefits outweigh the costs, costs are going to go on forever.

However, we now know that this view that the biosphere has limitless capacity to absorb harm is not supported by science and is false.

So our whole legal system is set up on a false premise.

Figure two represents the true situation. As benefits grow without limit, and, therefore, costs grow without limit, it is inevitable that we will sooner or later exceed ecosystem limits. After all, it is a limited planet.

So here is the reality. As benefits go up, costs will go up, each one of them benefit justified in a cost-benefit analysis. But, oops, at some point you exceed ecosystem limits and you begin to degrade the whole planet as a place suitable for human habitation.

We are destroying our only home in the universe one little bite at a time.

There is abundant evidence that we have already exceeded at least three ecosystem limits.

I did prepare a paper. There are

some copies over there. There is much more detail about this in the paper.

I can also send it to you by E-mail if you would like it.

CO2 limits have been exceeded in the atmosphere. The rate of biodiversity loss, we are between a hundred and a thousand times, causing extinctions between a hundred and a thousand times as fast as historical averages. And our mobilization of phosphorus and reactive nitrogen is about four times as large as what the biosphere can tolerate.

We are moving about four times as much fertilizer into the system as the system can tolerate.

Many scientists and many scientific associations are now revealing ecosystem limits that we did not previously appreciate. For example, the Millennium Ecosystem Assessment, published in 2005, 1360 scientists took five years studying 24 ecosystems systems and found that 64 percent of them are being degraded by humans now.

The chief scientist of the World Bank at the time the Millennium Ecosystem Assessment was released said, "we are undermining our ecological capital all around the world."

The Board of Directors of the Millennium Ecosystem Assessment said when they released the report, "At the heart of this assessment is a stark warning. Human activity is putting such strain on the natural functions of the earth, that the ability of the planet's ecosystems to sustain future generations can no longer be taken for granted."

That is a pretty harsh message to be passed along to our grandchildren. "Sorry, folks, we used it up. It is not available to you."

But that is what we are doing. That is really what we are doing. We are using up the planet, and passing it along to our children and grandchildren badly degraded.

As we exceed ecosystem limits, we are running the risk of destroying the biosphere as a suitable place for humans. We are risking the loss of our only home in the universe. Which would be an infinite loss.

There is no amount of benefits that can compensate for an infinite loss. And so under these circumstances, cost-benefit analysis ceases to provide good guidance for future action.

We, therefore, need to change the way we make decisions. We need to change the over arching goal of the human enterprise from promoting economic growth to preserving the integrity of the biosphere.

I don't mean to minimize the nature of that change, but that is the change that we need to make.

It is going to be hard to do. And either we're going to do it willingly, or nature is going to impose it on us. And I doubt that nature is going to be very kind in doing that.

In recent years we have come to rely on quantitative risk assessment and cost-benefit analysis for regulating chemicals, but new information makes it clear that these tools are not adequate to the task.

Now I am just going to give you some new information about chemicals that we learned in the last 15 years that I believe, essentially, eliminate the utility of doing a risk assessment on a single chemical. I think it is pretty much a useless exercise at this point.

Here is some of the new information. Eight points.

One, endocrine disruption. Many chemicals can interfere with the hormone system, a biological signaling system that controls growth, development, metabolism, tissue function, mood and behavior. And these hormones kick in within a week of conception and they are operating until the moment you die.

Your body is under hormone control.

So the idea that industrial chemicals interfere with that, either mimic hormones or interfere with hormones, is profound new information.

Some chemicals can disrupt cell signaling at parts per billion, or even parts per trillion.

Timing of exposure is critical. The effects of exposures in the womb, or shortly after birth, can vary dramatically, depending upon the exact moment of exposure. A dose makes the poison, but timing makes the poison.

Think of what this means for doing an animal experiment. Suppose you dose the animal at the wrong time in its life, and you don't see what is going on.

It greatly complicates animal

experimentation for toxicological purposes.

Low doses can sometimes be more biologically disruptive than higher doses. The dose response curve is sometimes shaped like an inverted U.

Again, think of what this means for typical dosing of animals, where you give them the maximum that you can without killing them, to see what will happen, on the assumption that the high dose of the thing is what matters. But if it is really the low dose that matters. If the high dose shuts down biological systems, which can no longer show a reaction, show an effect, but low doses cause that system to show an effect, it means that our animal testing at high doses is simply irrelevant.

It's missing a lot of essential information.

Perinatal exposures near the time of birth can program a person for life, thus, determining events that will occur during midlife, such as cancer or other disease.

This indicates that the delay between exposure and effect can sometimes be measured in decades.

How do you take that into

consideration in a toxicological study, or a quantitative risk assessment?

You, basically, don't.

We are exposed constantly to a mixture of chemical toxicants.

We heard a speaker earlier today talk about the toxic soup. Well, that is quite right, we are living in a toxic soup. And the assumption is of a quantitative risk assessment is that we are studying the effects of one chemical at a time.

You can never study the effect of one chemical at a time.

I have a second handout from a DEP study of 2003 talking about routine toxic exposures in New Jersey. There is no question that we are taking a bath in toxic chemicals day in and day out. So to pretend that we can tease out the effect of a single chemical, we are kidding ourselves.

We all carry a body burden of chemicals and chemical mixtures, including in the endocrine disruptor chemicals. Even if we could now put ourselves under a Bell jar and keep new chemicals from coming in, we are already carrying body burdens of hundreds, if not thousands of chemicals.

This data is from the CDC in Atlanta. So this is a reliable source of information.

It is also evident that another premise of our regulatory system is false.

We require pre-market testing of pharmaceuticals because we know that humans will be exposed to them, but we have exempted industrial chemicals from pre-market testing on the assumption that people will not be exposed.

We now know because of body burden studies that we are exposed. And so that assumption is a bad assumption. It is a false assumption.

We now know that people are constantly exposed to industrial chemicals. So they should be pre-market tested for the same reasons and in the same ways that pharmaceuticals are tested.

Seven, mixtures can be biologically active.

We now know that mixtures of chemicals, each present at insignificant levels, can combine to produce biologically significant effects.

Which means that if you really want to know about the toxicology, you need to study mixtures.

But that hugely complicates your

life.

If you had only 200 chemicals that you were concerned about and you wanted to test them in mixtures of three, you would have 1.3 million combinations that you needed to test.

Obviously, the money, the lab personnel, and the lab space, are not available to do that for very many chemicals.

So we are really not able to manage mixtures. Which I think is what this public hearing is sort of about.

Lastly, the eighth part, new kind of information about chemicals is epigenetics. It is a new understanding of ways that harm can be inherited.

There is much more detail in my little paper about what this really is, but the long and the short of it is, the common way of expressing epigenetics is that you are what your grandmother ate. That environmental influences on your DNA, which are not genetic changes as such, they are not mutagens, but they are alterations of the DNA from the outside, can be inherited, not only by children, but by grandchildren.

It puts a wholly new understanding of

the meaning of environmental exposures, and the importance of environmental exposures.

So some simple recommendations.

In my paper I got like ten pages -- my goal in the paper was to provoke thought about policy initiatives among members of the Clean Air Council. So I piled on a menu of options for public policy changes.

I am only going to recommend three here.

Focus not on risk reduction, but on exposure reduction.

We should reduce exposures to the extent possible. Particularly, protect women, since we know that these things are readily inherited, and that harm to the fetus is permanent in that fetus's lifetime and in, probably, its children's lifetime too.

Secondly, eliminate persistent bio accumulative chemicals. These are bad actors just because they stick around. We don't have to do toxicity testing. We don't have to do hazard testing. We just have to test whether or not they hang around in the environment and get into food chains and work their way to the top.

If they have those characteristics, they should be eliminated. And that should be a policy goal.

And based on the excellent screening tools that we heard about from Steve Anderson and Rachel Morello-Frosch, once we have identified EJ communities, overburdened communities, or vulnerable communities, eliminate emission sources from those communities. Make that a top public policy goal.

I would be happy to answer any questions that anyone might have.

Thank you for the opportunity.

MR. SHEATS: Questions from the Council?

Peter, on your first one, can you tell me, is there a focus on risk reduction, exposure reduction? Can you tell me what the implication of that is? How would we do things differently, if we do?

MR. MONTAGUE: Well, a lot of people are doing this in their own lives. They are eating organic food, for example, if they can afford it, to eliminate exposure to pesticides. They're not doing a risk assessment on pesticides. They're not deciding where to place the decimal point. They are saying, "I have heard enough about pesticides, that I would like to get them out of my life."

And people are drinking bottled water to try to eliminate water pollution from their lives. I think it is a mistaken approach, personally, but that is what people are trying to do. They are trying to protect themselves against what they conceive of to be toxic exposures.

In communities, you would eliminate emissions to the extent that you can. You would reroute diesel traffic, not waiting for the new diesel engines to kick in over the next 50 years, but you would get diesel traffic out of communities to eliminate exposures. You would take sensible urban planning steps to reduce exposures. Eliminate sources and move sources away from where people live. And don't build schools on toxic sites. Don't cap Superfund sites and brown fields. Actually eliminate the pollution to eliminate exposures in the future.

From that one statement, focus not on risk reduction, but on exposure reduction. A whole series of things fall out as to, will this cause exposures? Can we eliminate? Let's do it if we can.

But that is the approach. And once you accept that approach, it is quite different from saying, "we are going to rank these things and place the decimal point here. And then we are going to scientific peer review it. And then we're going to have it" -- no.

Let's eliminate exposures.

Fine for the science to go on. I am all in favor of learning more about toxicology and the nature of these materials, but we know enough to act now.

MR. SHEATS: Thank you.

MR. MONTAGUE: Thank you.

MR. SHEATS: Up next, we have Dr. Ana Baptista.

I am looking to see her official title in the Ironbound.

It is Director of Environmental and Planning Projects. And is also the vice-chair of EJAC. And, in fact, she is a triple threat for us. She manages things. Manages programs in the Ironbound. She is a great advocate. As those of you in DEP will know. But she is also a scholar. She was the primary author of a report from EJCA, you will have to talk a little bit about that, about cumulative impacts. And that report, and there was a public hearing then, was really kind of responsible for the tool being written, in large part, and for us being where we are here with this hearing.

Thank you for coming, Doctor.

MS. BAPTISTA: My name is Ana Baptista, and I work in the Ironbound community. I know it probably seems like the Ironbound is the most lethal place on the planet, you heard it mentioned so many times today, but I assure you, unfortunately, our community is not unique. There are many communities throughout New Jersey, generally very dense, urban communities, where a large portion of minority and low income people reside very close to industrial sources of pollution. Multi sources of pollution, mobile and stationary and other kinds.

So I want you to take the lessons that I present here from Ironbound and really think about them at the State wide level.

That is certainly what we do in the Ironbound. Although we work very close to the ground in our community, we spend a lot of time dedicated to solutions on multiple levels. At state, regional, federal levels, and at the local municipal level because these issues are complex, so they require action at multiple levels.

Nicky asked me to talk about two bodies of work that I focused on in particular. One was the EJAC, we worked with the EJAC, the Environmental Justice Advisory Council to the DEP, and some of the cumulative impacts we tried to take up in the Ironbound in particular.

So I will just try to touch on the highlights of those two. And I would like to really put it to the Council to think, really, to really be thoughtful about how we move this agenda forward. What are the policy recommendations that need to be put forward to move this? Because we have been talking about it for a long, long time. And we can keep talking about it for a long, long time. But decisions have to be made.

So a little bit on EJAC.

The Environmental Justice Advisory Council back in, I guess, in 2008, started to look at -- really prioritize what are the top issues of concern for environmental justice communities throughout the State. And we have representatives from communities throughout the State on EJAC.

And the number one thing, of course, that a lot of people identified was cumulative impacts. You know, time and time again, communities like Ironbound, Camden, other communities, were faced with an onslaught of disproportionate burdens, permitting requests, siting requests at the local level, state level, for polluting industries. And communities really felt bombarded. They really felt like, enough is enough. We have so many pollution sources already. Can't something be done, or at least look at to account for and factor in -- factor already the very heavily burdened.

And so we took on the task of really researching this issue. I thought we did, actually, a pretty good job of looking out into the world, into the country, and seeing what is really on the cutting edge. What are people doing, not just from the scientific perspective, but at the policy level, to address cumulative impacts. And we spoke to people like Rachel Morello-Frosch, and folks from the CARB, from Cal/EPA, folks in Massachusetts, and Connecticut, who were enacting EJ laws, and even lawyers, about what are some of the legal challenges or opportunities for moving this agenda forward.

And we looked, of course, at the EPA,

who has been talking about this issue for a long time.

Out of all that, after probably nine months of looking at that, we produced a report in March 2009, basically, outlining recommendations specifically to the DEP, but we tried to broaden it a little bit to multiple agencies within the State of New Jersey to look at cumulative impacts.

They are just summarized here as bullet points, but the report is still online. I don't think they have taken it off. I think it is still there on the DEP Web site.

The short and sweet of it is, we need a way to identify burdened and vulnerable communities.

Some of that you see reflected in the development of this tool that Steve Anderson proposed. Starting at the first steps of actually trying to figure out, what is the tool, what is the method for identification?

We tried the self identification method. That kind of worked, kind of didn't. I think at one point DEP had proposed some kind of really complicated scoring system across the State.

There are many different ways to do

it, but we said, "just do it."

It is not rocket science. We pretty much know what the areas of largest impact are. We know they are going to be along the most urban corridor of the State, for the most part. We know where most of the concentration of minority low income people are. You put those two things together, and you get a picture that nobody would be totally shocked to see.

So we said, let's move ahead -- you know, forward from identifying, to really trying to adopt recommendations that offer some relief to these areas that we call hot spot areas, and try to reduce and eliminate impacts in these communities.

And one of the things we also wanted to look at, the State to really pay attention to, was air pollution. And air pollution in the whole state. So when you reduce PM, for example, in the whole state, you will have a much larger benefit in urban areas, EJ communities, where some more of that is concentrated.

So it is good for everyone, but it is especially good for EJ communities.

And we went on from there and focused a little bit on municipalities, and what municipalities could do, what agencies outside the DEP EPA could do. But I think at the end of the day we were bias for action. Let's do something. Let's now wait for everything to be perfected. For the science to be perfected. We know communities are under constant assault. They need some attention brought to this issue. And so, surely, we can put something forward that would at least get us on that path.

Since then, since the report, we were really, I think, one of the first times ever that we had quite a bit of consensus around DEP and the Environmental Justice Advisory Council. We really loved Steve's tool. We thought it held great promise. It still needs, obviously, to be bedded more through the department and developed as a GIS application, hopefully online, and ultimately needs to be decided how this tool will actually get implemented in the decision making structures of the DEP.

And there's lots of different ways you could go with that. It could be used not just for permitting, which is, obviously, something the EJ community would like to see, but as an enforcement tool, as a tool to focus resources and target things like Green Acres funding, or look at areas of greater protections.

There hasn't been too much movement since that 2009 report other than the development of that tool. And so we are hopeful that more will come in the future from that report. More of those recommendations will get implemented.

A little bit about the Ironbound project.

We also work at the local level, and we wanted to see if there was a way we could tackle this issue on a much smaller scale. The Ironbound community, as I think you heard before, is in the East Ward, the political ward of Newark called the East Ward. That is about 50 to 60,000 people. Very ethnically diverse, Mexican, Latino, Portuguese, and African-American people living in the community.

We have a great community. It has wonderful amenities, but it also has lots of challenges. And to apply for this EPA care grant, I think it is a level one grant, so level one you get money to really do a stakeholder process, identify issues of concern, and prioritize action strategies. And if you are lucky enough to get to level two, and if there is any money left in the federal government, you can actually implement some of those strategies.

So we are at the level one. And we are coming to the end of that process. And we started the process off by saying, what we would really like to do is gather together some of the community best minds, and best community residents, really put them in a room together and ask them the question, what are your top issues of concern? Looking cumulatively. What you experience day to day. What you see on the ground? And what are the actions that will help alleviate those burdens?

And we really wanted privilege bias fraction and privilege cumulative impacts. We wanted to look at those issues that eventually had multiple affects on the community.

A lot of the people in the room here today are on that stakeholder panel.

Do you want to raise your hands, how many of you are on that stakeholder panel?

We have some great folks on that committee. You couldn't imagine the reames and reames of matrixes we developed with issues that were identified both by the public and by the folks in our shareholder group.

We took it out to the public for public input, and we had a very large cross-section, you can see, of environmental issues, which we asked both the public and the stakeholders to rank in order that they felt was of most importance to them, their health, their community's health.

The number one issue that both the community and the stakeholders ranked was air pollution. And I think the second might have been quality of life issues, and green space.

And waste related issues.

Those were the top three or four, but air pollution was by and large the biggest issue people were really concerned about.

Some of the data we collected, every bit of data that you could collect at the local level. And, of course, we found that we had very big challenges with respect to scale. A lot of the data, particularly the health data, is at the county level. A lot of it you can't even get at the municipal level. So it makes gathering data and really trying to understand, at the finer scale, what all the cumulative impacts are difficult, but, nevertheless, we tried as much as we could to find -- we found more than 38 waste-related facilities that either treat, handle, or burn waste, just in the Ironbound, over a hundred brown field sites, less than four percent of tree coverage, canopy coverage, in the Ironbound section.

The Ironbound section is this right here.

As you can see, we are close to the ports, and the airport here.

And we had a couple of really neat maps and opportunities to see some stuff that Steve Anderson, and even Jerry helped put some good data together for us, on combined sources, to try to get sort of a finer grade picture of what were some of the sources of pollution we were dealing with.

So this is just a little sampling. And I don't have the best maps available with me. Sorry. Hopefully, Steve will get that for us.

These are Steve's maps. So I won't answer too many questions about them, other than to tell you, they are really cool, and it's really exciting for the community to get our hands on real data. And for us, at the finer scale, it is interested to look at.

These are the Turnpike, 1&9, major routes here, going down this way, and rail lines on the other side, and I78.

So this is really the heart of the presentation.

I would like to encourage and urge this Clean Air Council to really move the DEP to finalize the model, the cumulative impact model. To put it into some use in a fashion that the public could access and use online. And more importantly, in a manner that the DEP could use in decision making within the agency.

And I would really like to see it, ultimately, really be used in the regulatory framework. As a way to screen areas for permitting. I would like to see it used for resource allocation. If you have a hot spot area, you get two points in your Green Acres application. You get, maybe, targeting enforcement and compliance. And we would really like to see implementation of strategies across the State that are just common sense, that would make good environmental policy for everyone, but especially for EJ communities. Certainly, PM 2.5 and diesel retrofits are some of the great policy tools that would help alleviate some of those burdens at the State wide level, but certainly EJ communities.

That is it.

I didn't mention too much about the local planning and zoning, but we are working on that in Newark. I am also a member of the Newark Environmental Commission and part of the master plan technical work group. And we are looking right now at Newark's master plan, in updating that, and the zoning. And we are looking at things like buffer areas. We are looking at things like checklists for our municipal planning and zoning boards that would require them to look at proximity to sensitive populations and sensitive receptors before they approve redevelopment plans. Looking at potential ordinances. And we even looked at some California policies that looked at things like, for example, an amortization rule that would eliminate grandfathered industries that are in conflicting land use zones.

So all of those things can help move it at the local land use and planning approval.

Thanks.

MR. SHEATS: Thank you.

Questions from the Council?

If you could do one thing, Ana, in the Ironbound to reduce cumulative impact, what would you do?

MS. BAPTISTA: That I could do, or that I would want somebody else to do?

MR. SHEATS: If you could choose one thing that would be done by you or someone else. And then on the State level, too, if you could answer that same question.

That is two questions. Sorry.

MS. BAPTISTA: You know, what is my wish list?

Honestly, a wish list is, really, having some regulatory tool to more carefully consider major new sources and even renewed existing sources of significant amounts of pollution.

And then the second thing is, what do you do with the mobile sources, which we are very impacted by with the diesel trucks and the ports and the airport, which is a much more difficult thing to do. And to especially do it at a local level. Because you can do all the truck rerouting in the world, but you got thousands of trucks in and around your community, it's hard.

One of the things we would like to see is truck fleets, private. We know we have done a great thing on the public end, the public fleets. We would like to see the turn over of large private fleets to newer cleaner trucks and retrofitting of diesel equipment as much as possible.

At the end of the day, it is like, you know, what is that tool that will put folks on the hook when there is a constant onslaught of new facilities that want to come in, or existing facilities that are expanding, that pose what we believe are pollution burdens within the community. And there is really no tool available in the community at this point to combat those.

MR. SHEATS: Thank you.

Next up would have been Joanne Held, recently retired from the DEP and still working on air pollution issues, but she is sick today. So she won't be here.

So we'll go right to William "BJ" Schulte.

BJ is the acting director of the Eastern Environmental Law Center. BJ and the center work closely with environmental groups, with the environmental justice community for years, have brought a number of significant cases. And BJ is going to talk to us about one way cumulative impacts has actually been used already, and that is in NEPA, the National Environmental Policy Act.

Thanks.

MR. SCHULTE: Thank you for the opportunity to come in and speak.

Towards the end of my presentation I had some information about modeling tools and stuff. As I am sitting here today, I am realizing that a lot of information has given about that already today. So I will try to focus more on the beginning part of it, which is about NEPA, and, basically, how legislation could help to enact some of these policies.

So, basically, I am sure most people are probably familiar, but just as an overview, the National Environmental Policy Act was signed by Richard Nixon in 1970. And, basically, NEPA requires all federal agencies, when they are undertaking a major action, to include in every recommendation or proposal for legislation, and other major federal actions, significantly affecting the quality of the human environment, a detailed statement of the environmental impacts on that action. And that detailed statement is commonly referred to as the environmental impact statement.

An important thing about NEPA is that it is a procedural statute and it doesn't contain any substantive requirements, which, in my view, is one of the limitations of NEPA.

What it means, basically, is that courts will be reluctant to tell an agency how to do an impact analysis under the statute. They will tell an agency that they have to do the analysis, but they will leave it up to the expertise of the agency to determine how to do it.

And another part of that is that there is no action requirement in NEPA other than to actually perform the analysis.

In other words, there is no requirement to take a certain action once the agency has come to a conclusion about the impacts of the action they are proposing.

But in a nutshell, NEPA's value is that its aim is to make better and more informed decisions towards preventing or eliminating damage to the environment and increased transparency and public participation.

NEPA requires federal agencies to consider three types of impacts; direct, indirect and cumulative impacts.

Direct impacts are caused by the action incurred at the same time. Indirect, caused by the action later in time, or farther removed in distance, geographic distance, but is still foreseeable. And NEPA defines cumulative impacts as impacts on the environment which result from the incremental impact of the action when added to other past, present and reasonably foreseeable future actions, regardless of what agency or person undertakes the other actions.

I guess two important things about that definition. It is sort of a mouthful, as most regulatory definitions are.

The first important thing is that, regardless of what agency or person undertakes the action that they are examining to do the cumulative impacts analysis, what this means is that when a federal agency is doing the analysis, they should also take into account state actions, local actions, and not only federal actions, that may also contribute to the cumulative impacts of the action that they are proposing.

One of the things -- or limitations with NEPA is that when it was adopted in 1970 the concept of environmental justice hadn't really been formed yet. And over the past 41 years that NEPA has been on the books, it hasn't been amended by congress. It's been tailored by case law, but the actual statute itself has not been amended at all.

So once the concept of environmental justice started to come to the forefront, they had to find ways to fit it in there.

In, I believe, -- I may be mistaken -- but it's either 1984 or '87 is when the Council of Environmental Quality issued regulations under NEPA. And in those regulations they required -- impacts were defined to include ecological, aesthetic, historical, cultural, economic, social, health impacts, whether direct, indirect or cumulative.

So there you begin to see how economic, social, health, these types of impacts were beginning to be incorporated into the NEPA review process.

Then in '94 we had President Clinton sign the Executive Order 12898, which directed all federal agencies to make achieving environmental justice a central part of its mission.

A couple years after that, the Council of Environmental Quality issued Environmental Justice Guidance under NEPA. And then a year after that the Environmental Protection

Agency issued its own guidance for incorporating environmental justice concerns into the EPA's own cumulative impact analysis.

Subsequent to the signing of that executive order, we saw the Council of Environmental Quality and EPA, and many other federal agencies,agencies I just decided to focus on the EPA, begin to sort of aggressively find ways to incorporate environmental justice into its cumulative impact analysis.

Subsequently, under the -- in the 2000's, under the Bush administration, a lot of these efforts weren't emphasized as much. However, sort of -- some of the key themes that come out are the Council of Environmental Quality guidance, and, also, the EPA guidance, are themes that have come to surface today in a lot of the talks people have given.

One, first, is identify the effective population.

One of the things that both the Council of Environmental Quality and the EPA guidance stressed is the use of non-traditional methods to identify the population, which would include reaching out to community-based organizations, municipal health boards, environmental commissions, because they recognize that sometimes there may be significant data gaps when it comes to federal and state level data.

Next, identify disproportionately high and adverse effects; past, present, reasonably foreseeable future effects; permitted facilities; proximity to high traffic areas; diesel hot spots; and, to the extent the information is available, the reasonably foreseeable future projects. This could be facilities that have submitted applications for review or development plans that haven't come to fruition yet.

There is a lot of case law out there that defines what the scope of those reasonably foreseeable future effects must include in the cumulative impacts analysis.

And the third theme in these guidances is public participation. It is a huge element of performing these cumulative impacts analysis. And all of the guidances, basically, state the agencies should aggressively seek to overcome linguistic, cultural, institutional, geographic, and other barriers to meaningful participation, and should incorporate active outreach to the affected groups, both to get information from them, and to dissimulate information to them.

So as I said earlier, one of the limitations to NEPA is that it doesn't contain any substantive requirements. And another limitation to NEPA, in my own opinion, is that federal agencies are only required to do these cumulative impact analysis when a major federal action is proposed.

So as a result, when you get this sort of piecemeal analysis, addressing proposals when they come up, is what often is part of the cause of the accumulation of negative impacts on communities. Because when you only do the analysis when an action is proposed, you don't necessarily take into account all of the other surrounding impacts.

And this has definitely been alluded to by many people, is taking the hot spots approach, identifying hot spots, and then using that information for future decision making. Incorporating it into future decision making.

I'm sure already is familiar with the concept of hot spots.

Hot spots are where vulnerable and

overburdened communities exist together.

Vulnerable populations being those that are more susceptible to the adverse effects because of their circumstances, whether it be age related circumstances, young, or older, or race related, income, access to health care, access to healthy sources of food, some of these non-chemical stressors that were talked about in earlier presentations. And overburdened populations are those that are disproportionately subjected to these multiple stressors.

Determining an overburden population begs the question of what a lot of regulatory agencies have struggled with, the geographic scope of the comparison population that they should use to determine which populations are overburdened. Which has also been the subject of a lot of case law.

So once these hot spot areas are identified, new and modified sources, and other proposals for actions, should be subject to additional analysis and scrutiny.

If the cumulative impacts exceed a certain threshold, additional actions may be taken to mitigate them.

An example of this could be, last

year, when I was here, the Clean Air Council gave a presentation, suggesting that under the Title V Clean Air Act Operating Permit Renewal Program, an agency like the DEP could take into account this information about vulnerable and overburdened populations, and combine that with an analysis of the facility that is up for renewal and an analysis of the pollution control technology that they have installed there, and whether that technology is up to date, and taking a biased action approach and a precautionary approach. In certain instances, upon renewal of these permits, it may require these facilities to install new control technologies to protect these neighborhoods and communities that have been identified.

My next couple of slides is sort of a feeble attempt in showing hot spots. A lot of much better maps have been shown today. But this is just PM 2.5 non-attainment areas and hospitalization rates for asthma. And I am not sure, but I am assuming that the county up on the left is probably a result of the Port Cement Plant, which is the subject of a DEP petition for a plant over on the Pennsylvania side.

Could be mistaken about that.

So, basically, at this point, I mean, the EPA, as I said, they issued the guidance in '99, or '98 maybe it was, but over the subsequent years incorporating environmental justice into cumulative impacts analysis had sort of not been emphasized as greatly, but now under the current leadership of Administrator Jackson, it has come back to the forefront of EPA's priorities. And over the summer, in July, EPA issued an interim guidance on incorporating environmental justice into EPA decision making.

That was just a draft guidance and is under comment now. So it will be interesting to see how that is incorporated into current EPA decision making and how that changes their policies.

So, I guess, sort of the take away from all of this, is in NEPA the federal government has a tool to make sure that these environmental justice issues are taken into account when going through cumulative impacts analysis. The problem for New Jersey is, New Jersey agencies aren't bound by NEPA, and we do not have a NEPA here in the state.

California has a mini NEPA, called CEQA, which I think stands for California

Environmental Quality Act, but I could be mistaken.

I am not sure exactly whether CEQA has any substantive requirements, but that would be one thing I would certainly advocate, were New Jersey to ever enact a statute that was similar to some form of a mini NEPA, which I know is one of the recommendations in the EJAC report that Ana mentioned earlier, but in order to really aggressively address these issues, a mini NEPA would, I believe, need a substantive requirement that would give agencies the authority when they identify overburdened communities to take actions to mitigate those cumulative impacts. Which could include giving them the authority to deny permits on the basis of their cumulative impacts analysis, or, like I said before, to require installing improved up-to-date air pollution control technology on facilities that are up for renewal.

To go back to that a little bit. In New Jersey we have five municipal solid waste incinerators. We have Essex, Camden, Glouster, Union, and Warren County. Three of those have baghouse technology on there to control for particulate matter pollution, which is, according to DEP, about twice as efficient as electrostatic precipitators. And the only two facilities that have electrostatic precipitators still are in Essex and Camden. Which are the red spots on that, basically.

So I think I will leave it at that. If anybody has any questions.

MR. SHEATS: Thank you, BJ.

Questions?

You mentioned, and correct me if I am wrong, but you mentioned possibly requiring a human interpretation on EJ neighborhoods, overburdened neighborhoods, the industry to have the best available technology.

Would that be done under existing law, or would that take more rule making, or how would you envision that happening?

MR. SCHULTE: I mean, I think it could be done under existing law. I am sure there are lawyers out there that would disagree with me. But the Federal Clean Air Act, certainly, gives states that administer their clean air program, which New Jersey does, the authority to adopt requirements that are more stringent than the federal requirements.

So I think that would give New Jersey

the authority to do so.

Given the current climate in New Jersey, I am not sure how likely that is to happen, but I think the authority is certainly there.

MR. SHEATS: Thank you.

So we are down to the final two invited speakers. And next to last, that means he is batting third, so Dave Pringle is batting cleanup, next to last, batting third, will be Mr. Henry Rose, who is the Statewide Coordinator for New Jersey Environmental Justice Alliance.

And Henry is -- he serves two functions in the alliance. He is a primary organizer. So Henry is a former labor organizer. But he is also one of our top thinkers in helping us think through how to address cumulative impacts with policy and laws and any other way.

Thanks for coming.

MR. ROSE: Thanks for having me.

And I guess I want to say, first, that for anybody for the alliance, I am speaking for Henry Rose at this moment, and not for anybody from the New Jersey Environmental Justice Alliance. So that people have some type of plausible deniability for the things that I am going to say.

And when we look at what is going on with cumulative impacts and what is going on with EJ, I think about the inspector general's report on EJ not being integrated fully in the EPA. That there's no standards. That there's no guidelines. That there's no definitions.

New Jersey replicates the same thing. No standards. No guidelines. No definitions. And as such, no goals. No objectives. No criterias.

As I am growing older in the world I have become a more skeptical human being. Probably since I have been about four. And so I do wonder whether the lack of guidelines, whether the lack of standards, is by mistake, or whether it is a kind of willful neglect.

Now, it may be that after 17 years EPA isn't capable of coming up with definitions of who is burdened and who is not. Of what overburdened means and what it doesn't. Of what hot spots mean and what they don't.

And, perhaps, New Jersey, after ten, 11 years, since the executive order here, maybe all of these bright and committed people are incapable of coming up with standards and guidelines and criteria.

But I doubt it.

I in truth believe that the reason that these things are being ducked -- and, first, let me say how they're being ducked.

They're being ducked by analysis paralysis.

We need to take a study. We need to take another study. We need to take a third, forth and fifth study of the study, of the method, of the material used.

But this, of course, is Dorothy in Oz clicking her heels three times, saying, "there is no place like home" as though somehow or another the information will end up different.

I remember when Ana introduced the EJAC report, and I remember asking the question, was anybody in the room surprised on what was demonstrated?

Nobody was.

People know where the communities are. They know what the overburden is. They know what the problems are. And, for the most part, where they are emanating from.

This is a moral and ethical cowardliness. An unwillingness to deal with issues of race and class and power in New Jersey. And so people duck it.

And what we are looking at now is people ducking these issues as people die.

On a regular basis, we know who is dying. We know who has cancer. We know whose communities have higher rates of asthma. We know where high blood pressure is.

These are just right at the census traps. We don't need to look for this anymore.

And my fear always with this stuff is that what we are going to get is more tests, and more ways to look at the tests, and more ways to ask the question. Because people are asking the question because they don't like the answer. Well, that wasn't the answer we wanted. So let's figure out how to ask it another way.

Unfortunately, we have people, and particularly DEP, in my mind's eye, that has the fiduciary duty to protect human health and the environment. And I don't see it taking place.

I am still waiting for one single, just one, Uno, decision, saying that we are not going to do this because of environmental justice reasons.

And, perhaps, afterwards, if somebody has one -- or tell the truth, somebody could raise their hand and testify, because I know that there ain't one.

But one decision, on anything, from the State that says, you can't do this because of environmental justice reasons. You can't do this because this community is already overburdened. You can't do this because the people here are sick enough.

And it is this continued cowardliness, this running away of from race that I want to say Daniel Patrick Monaghan said to Nixon in '69, or 68, there is a fatigue. Benign neglect.

At this point the neglect is not benign. It's far closer to -- I don't want to say malicious -- but a willful neglect of human health, human beings. And it is ashame on the State, it's ashame on the agencies, and it's ashame on the people who have allowed these things to take place.

I was recently looking at Martin Luther King, and talking about his letter from the Birmingham Jail, about how good people by allowing evil to take place perpetuate.

There is a lot of good people who

work in this building, and there is a lot of evil that continues to be perpetuated.

MR. SHEATS: I know you thought about this. So I feel safe in asking.

Give us a regulatory approach, or legal approach, that you would recommend to reduce pollution in neighborhoods or to prevent new pollution from coming into overburdened neighborhoods.

MR. ROSE: I mean, first define what an overburdened neighborhood is, then look at what pollutions are already there, and figure out how to ratchet them down.

Is there a specific policy name to give it?

I don't know, but that is three steps, and it is relatively easily.

Here is a problem. Here is an area that is hot. Here is an area that has a problem. We are not going to allow anything in that is going to make it worse. And let's figure out how to put things in, how to bring things into being to make things better.

And if cumulative impacts take place by a lot of small incremental steps, then hopefully we can reverse them by small incremental steps going the other way.

But it is going to take somebody subconsciously stepping in to do that.

DR. ALI: My question is, the burden to the whole state, we know the State, places like Camden, Harrison, Newark, Trenton, those are the hot spot areas.

If you were the governor, what would you do for these places to clean up the mess?

MR. ROSE: That is almost difficult for me to conceive of me being the governor, but having said that, order EPA to do something.

What needs to take place? What is the best science that could take place?

You just named Paterson, Trenton, Camden, Newark, include Elizabeth, Jersey City, and East Orange, and you have a quarter of the State's black population that just happens to be poisoned.

I guess that is it.

DR. ALI: Thank you.

MR. SHEATS: Anymore questions?

DR. OPIEKUN: From all the tools you have seen talked about today, what would you think is ready for prime time to actually move this issue forward?

THE WITNESS: Steve Anderson's tool is great and very close to prime time, but I am sure that it needs to go through four-years of peer review.

What Rachel Morello, what they are doing is great.

EJ Vu, actually, from EPA, is very good.

But these things are -- no matter what tool we use, we know where the hot spots are. And so in some way, in my mind's eye, the tool is less important than the commitment to activity. And it is that commitment to act that we have the oral constipation.

MR. SHEATS: Thank you.

Where is Dave Pringle?

MR. PRINGLE: I am here.

MR. SHEATS: I said earlier that the environmental justice community has been out front on the issue of cumulative impacts. And that is true. It's been New Jersey Environmental Justice Alliance, Environmental Justice Advisory Council, but there has also been a third group, which is New Jersey Environmental Federation. Which has been right out there with us, in the league, and one of the leaders of New Jersey Environmental Federation is Dave Pringle.

MR. PRINGLE: Thanks, Nicky.

And I would like to thank the Council for holding this hearing on this subject and with this line up. I am honored and humbled to be a part of it.

I would also like to thank all of you for still being here. I am, actually, pleasantly surprised that more than half the Council is still here. It has been here throughout. That is a credit to you. Not only that you are still here, but you are all actually looking at me too. So I think there is some listening going on. And I promise to make it worth your while. I have a little different take than -- well, until the last couple of testifiers it was going to be a very different take, but I will talk about all the same themes as you heard from the last couple of speakers. And I am going to challenge all of you, and all of us as well.

I, actually, like batting cleanup because as long as people are still listening because I get to hear what is going on.

The Federation of the Garden State chapter of clean water action and national environmental group is one of the few mainstream environmental groups that does environmental justice. We truly do prioritize and have full-time staff dedicated to it. We have a hundred member groups across the state. Over a hundred thousand individual members across the state.

I have a biology degree from Princeton, so I you understand the science. But I haven't been a scientist for the last 20 years. It's not my or my group's expertise. You have currently gotten plenty of that today.

Our role is to turn that science and data in theory that we heard today into action. Take that environmental science, unfortunately, through a political science screen, and get real world results.

So I would like to sum up in very laymen's terms what I heard at today's hearing.

We know a lot.cumulative impacts is a big problem. Too much pollution. Major negative consequences to our health and the economy.

We don't know enough. And we'll never know enough. Our collective response to date, recent past and current immediate future plans are to keep studying things. Take some tentative steps to reduce or decelerate the trend further.

Yes, we might be doing a bit more of late. And, certainly, I am optimistic with today's hearing. But we still hear plenty of excuses.

This is going to be the only rhetorical from what I heard today. Particularly around the diesel expert's testimony.

It is a national problem. We don't have the resources.diesel isn't a problem. It is trace amounts.

I had the same conversation with the Chemical Engineering Council a couple of weeks ago. It is the same chemicals that are under your sink. And I got upset and I said, "Exactly. They are under your sink. They are not in your tap water."

Concentrations don't matter. Toxicity and biological action is what matters.

A couple years ago I testified before the U.S. Senate Environmental Public Works Committee on the problem of pharmaceuticals and other similar chemicals getting increasingly into our waterways. And the industry will say, "well, it is only the equivalent of a molecule in the Great Lakes, or in an Olympic swimming pool."

Well, that concentration is the concentrations that make a man a man and a woman a woman. It is called Testosterone. And how much you have of it in parts per trillion at a critical moment in a fetus decides whether you are a man or a woman physiologically.

So parts per trillion and trace amounts matter.

It has been five years since we have been talking about diesel executive order. Dozens of New Jerseys have died because of our lack of action.

Yes, I said deaths.

Including additional disease and corresponding economic cost because we haven't acted. We can't get a simple requirement through that says state funded justice projects in environmental communities shouldn't use the dirtiest equipment when there is cleaner equipment available.

We can't get that done.

So that is the status quo.

Unless and until the science is, basically, perfect to determine if and how to reduce cumulative impacts, we're going to err on the side of just studying it some more.

DEP estimates that 800 to 1200 premature deaths occur every year from particulate matter alone.

The status quo is a recipe for disaster.

So I challenge all of you, and myself, to make today a demarcation line and act now.

In 2005, Candidate Corzine committed to giving DEP the power to just say no to cumulative impacts. He made it in front of my board during our endorsement process.

Between 2006 and 2009, while he was governor, he didn't lift a finger to implement that commitment.

In 2009, Candidate Christie said, and this is a direct quote, "Too many communities bear a disproportionate share of the pollution burden, as they do to many others. Too often state decisions are made without keeping that in mind. I will require my administration to develop standards and guidelines and implement them so that cumulative and disproportionate impacts will carry much greater weight in out decisions."

Needless to say, we were very heartened when he said that. I have had numerous follow-up conversations with various folks in the administration, including the governor himself, and while we always like more progress faster, he already hasn't backed away from that statement the way Governor Corzine has.

I was further heartened to hear the Commissioner's statement earlier today here, not backing away from that, and filling in, in fact, a bit more detail that we seem to be applying cumulative impacts in our current decision making.

And where is Henry?

This may or may not be an example that works for you or not.

Candidate Christie, at the time, and has repeated since, has cited environmental justice in opposing something. He opposes the coal plant.

He opposes it. It hasn't been stopped yet. So I'm not sure if that counts or not. But I would rather him be opposing it than supporting it.

It also highlights one of the problems.

At best, it's questionable whether

the State of New Jersey currently has the authority to stop that plant. It might stop for a number of different reasons. But I think it is fairly clear that DEP would be extremely vulnerable to winning a lawsuit by PurGen if they denied the air permit today for that plant. Even though that plant doesn't make any sense for any number of reasons, to say nothing about environmental reasons.

Going back to that 800 to 1200 premature deaths every year in New Jersey because of particulates.

That is two to four people dying every day prematurely and unnecessarily. That is one Newark resident every week dying. That is a couple of Toms River and Brick residents dying every month.

So it is an urban, it is a suburban problem.

Now we have three proposed new power plants proposed for the Ironbound in Northern Essex County. The State legislature just passed a law subsidizing them hundreds of millions of dollars to build them. They might not be as bad as coal plants, but these gas plants, without corresponding offsets, will add to the pollutant loading, making too many New Jerseyans sick, and, again, leading to all those premature deaths and the corresponding increased healthcare costs and lost economic output.

That never gets factored into all these cost benefit analysis.

Now we don't know enough, and we never will, but we do know enough to act now to reduce these impacts. We can await the perfect widget, which may or may never come, and fail to get off the dime.

It's just like my dad's last job that he lost. Brilliant scientist of the best technology. He was about ten years ahead of everybody else in developing three-dimensional imaging through computers. The Department of Defense loved it because it was early training for tanks and simulations and all that. Plus, he was a scientist.

He never put the product to market because he kept, "oh, just one more thing. I can make it better."

He never did 3-D 101 and then 202 and 303. He just kept playing with it. Meanwhile, the industry caught up and got behind him, dad lost his job.

So we can keep waiting and dying, or we can act now.

So I challenge all of us here today, whether we are working at DEP, a volunteer, representing industry, environmental justice activists, frankly, probably most of us probably wear would consider a couple of those hats, and many others.

We know what needs to be done. Will we do it? Will we give DEP, the administration, and other decision makers, the support to fulfill that commitment. To stop using the need for study as an excuse for delay and act now? And as needed, hold those decision makers accountable.

A year from now, let us be able to look back at the next Clean Air Council hearing and see that today was the day we stopped talking and started acting, and work together so that DEP and others can start using -- can start ensuring that cumulative impacts have a greater weight in decision making.

We need a cumulative impacts policy in New Jersey to protect everyone, but especially overburdened environmental justice communities from pollution.

The policies should affect permitting of new facilities and allowing existing pollution to decrease.

Thank you very much.

MR. SHEATS: Questions for Mr. Pringle?

DR. ALI: In terms of the action items, what should the Department of the State do in the next five years to reduce the impact action items?

MR. PRINGLE: The governor today should sign an executive order that state funding will no longer go to any construction project that isn't using clean diesel, either through retrofits or clean engines.

The technology is there today.

The World Trade Center, all the construction going on today at the World Trade Center, is doing that. That is a massive project. Rhode Island has that policy. Cook County, Illinois has that policy.

When we first started talking about this years ago, it was state of the art. We were ahead.

We are that brilliant scientist that

my dad worked for. We kept playing around with it. And now we are not even doing it. And everybody is leaving us behind. Their folks are healthier, ours are sicker.

There is no reason we can't be rationing down on permits. The Clean Water Act actually requires it. Though we don't do it.

CAFRA is one of the few laws that actually has the words cumulative impact in it.

DEP has never proposed a rule in 20 years. Even though the law gives them the discretion to use it, they never have.

It is a matter of political will.

DR. ALI: Thank you very much.

MR. SHEATS: Do you have any other suggestions with respect to incorporating cumulative impacts into the regulatory process, Dave?

MR. PRINGLE: It's going to be difficult to define, when does a burden become a disproportionate burden, or is the accumulation so great that you are now going to say no, as opposed to something else.

That is going to be a tough nut to crack, but we are not doing it.

Let's get into it. Where is the task

force?

I am one of the leaders of the -- the critics of the administration, 63 and counting, stakeholder processes. And I, certainly, don't need another one.

If I had to choose a stakeholder process that I was going to sink my teeth into, that one would be it.

Let's define what overburden is. Let's figure out what DEP already has authority to say no to. What do they need new regulations for. What do they need new legislation for. And let's have that fight.

Thank you.

MR. SHEATS: So all the invited speakers -- I just want to say, thank you for everybody who testified. For those of you who came in the afternoon, even if you felt maybe there was a sense of weirdness on the part of the Council, your testimony is important, it is on the record, the Council will be considering it when we go back to start writing a report. And we will engage over it.

We are to the point now where we have speakers from the public who want to come say something.

Let's take a five-minute break.

(Whereupon, a short recess is taken.)

MR. SHEATS: All right. We are going to finish it off.

Kelly Francis is not here. I do not see him. So he escaped.

We have Carrie Sargeant from the Heart of Camden.

MS. SARGEANT: Thank you everybody who has held in, and thank you for the opportunity to address you directly.

Since Kelly is not here, and he is also part of the same waterfront south environmental network that I am, we will be submitting written comments to the Council, but we always like to make sure that we are here as the singled out EJ community, Camden, to say our minds and speak to you directly, and be able to answer any questions that you might have.

The Heart of Camden is a nonprofit community development corporation based in waterfront south in Camden. Our community, as well as the City of Camden as a whole, are exposed to multiple air pollutants and consequently can be considered an air pollution hot spot, as you all heard today.

In the one square mile that is the waterfront south neighborhood, relatively high levels of particulate matter have been discerned and associated with at least seven toxic metals. This was ascribed to ten local facilities, but as Dr. Fan had mentioned, in our one square mile there are 26 permitted facilities.

An additional study -- this refers to her study -- an additional study has identified diesel emissions as a major source of personal exposure of the community. Fugitive dust is also a significant problem.

This is all especially important, considering the race, age, and socioeconomic condition of the majority of our residents, who can be defined as a vulnerable subpopulation.

It is for our children especially that I am here to express the need to address cumulative impact. And to do so sooner rather than later.

And I'll address that in a little bit.

First, I would like to recognize the current work taking place to address air pollution in our community that has been done collaboratively, among local nonprofit organizations, our local industry, the city, county, state and federal entities. Together we have worked to increase vegetative cover, retrofit vehicles and equipment, improve business practices and industrial practices, educate residents and industries, and even truck drivers.

However, without integration of cumulative impact to inform sound policy, permitting, and regulation, these efforts can and have been significantly undermine.

The example we would like to give is the recent permitting of a cement recycling facility in our neighborhood.

Now, our neighborhood is the EJ community that rose from putting the wholesome formerly St. Lawrence cement additive processing facility into our neighborhood in the first place. And this past year, February, March of 2010, a cement recycling facility was permitted to operate in our neighborhood.

Because the current practice is only to look at an individual facility and not to consider the existing facilities in the area, yet another air permitting industry was added to our one square mile, 1700 resident community.

This is unacceptable.

And because cumulative impact is not considered in permitting, only certain undertakings by that facility are addressed. Their truck traffic isn't addressed. The condition of their facility is not addressed. And the surrounding facilities that are there are not taken into account when their permit was issued.

Consequently, there are an additional 50 trucks a week rumbling around the neighborhood, and uncovered dusty piles of crushed concrete that loom over our heads, in addition to what was already there.

And the DEP, since we are in an EJ community, the DEP notifies us of all permit modifications.

We have reached out and discussed this lapse with them, and it is being addressed.

So we get notified of every permit modification in our neighborhood.

Why were we not notified of a facility seeking to acquire a new permit?

That is a gross oversight.

But if the permitters had to look and see what was in the community and what was being added, no matter how small they consider it, they would see that there is already 26 permitted facilities within one square mile.

Do we need a study to tell us that one more is too much?

It is crazy.

So our recommendations, get out your buzz word bingo for my first one, is to create a functional urban ecosystem should be a priority, and carried out through adopting holistic and adaptive approaches in place of the myopic rigid approaches currently employed.

If you are looking at our cities and our inner areas as an ecosystem, the industry is a part of it. It functions. It has a rhythm. It has a biological clock. It has inputs and outputs. Just like everything else. Like a plant, like a tree, like a person. That is how these things have to be looked at when you are looking at cumulative impact.

As Dr. Montague talked about, it is the biosphere. And everything is working in conjunction with one another. We can't just look at how much air this one facility is putting out.

It has to be contextual.

Cumulative impacts, both additive and synergistic, must be incorporated into the issuing of permits and permit renewal, development of regulations and policies. And we should get started now.

I heard Steven do his presentation how long ago? And the study came out how long ago? We do need to study. We do need to understand it. But in some of our situations, we are not fooling anybody. We know it is a problem. So why can't some form of control be started now, instead of waiting?

If I was to wait for the personal exposure study to be revealed to us, in which our residents walked around for months with vests on to see what kind of air they were breathing, we would have been doing nothing for six years.

That study was done six years ago.

And the final report has yet to be issued.

And a presentation was made to the community, saying, "yeah, but you can't go with anything that we are saying because these aren't the final results."

If the Heart of Camden and local organizations said, "oh, well, we can't do anything because we are waiting for the results," we still wouldn't have a two-and-a-half acre berm shelter belt, we wouldn't have a gas station that is becoming rain gardens, we wouldn't have education, we wouldn't have pamphlets for the truck drivers, we wouldn't have a good relationship with the industry.

So that is just an example of why we have to do some things now and then learn as we go. Adapt.

We would encourage state-of-the-art technologies and best management practices to be encouraged and incentivized for all new permits and permit renewals.

I would like to eliminate all emission sources from vulnerable communities, as was said earlier. That is a great start. Let's just do it.

We need to address on and off road mobile emission sources.

Overall facility maintenance and operations need to be addressed.

So it is not just the point sources

from these industries, but how are these industries maintaining their facilities? Are they dusty roads? Are their sidewalks concaved? Are the trucks idling outside their facilities?

All these little things go into it. And, again, you have to look at it holistically. You can't just look at it as a point source.

And, of course, you need to consider the added protections to be afforded to our vulnerable populations.

That is it.

Thank you all for the opportunity to speak to you.

MR. SHEATS: What is the status of the -- you said there was an additional permit about the Siemens recycling plant.

So where are you with that?

MS. SARGEANT: It was already issued in March of 2010. The facility is up and running. We called the DEP out on it. And they are operating within their permit.

MR. SHEATS: You say notice was not given about that?

MS. SARGEANT: No.

You know, there were rumblings, and

we were aware that it was going to happen, and I had given my name to the Solid Waste Advisory Council of the county, which was supposed to trigger the actions of the DEP.

And I was never notified from SWAC, who after that permit was issued, they seem to call me every time they have a meeting. But prior to that, I hadn't been call.

So we missed it.

MR. SHEATS: DEP is, basically, saying, there is nothing that can be done about that, the permit has been issued?

MS. SARGEANT: Correct.

MR. SHEATS: Thank you.

We have one last speaker, Bill O'Sullivan, head of the air division in the New Jersey Department of Environmental Protection.

MR. O'SULLIVAN: I'm Bill O'Sullivan. I am the Director of the Division of Air Quality here. I just want to thank the Council for another fine hearing, and Dr. Sheats, for a wonderful program. Every year I get up here and I say, this is the best hearing yet. And I got to say it again. Just a good balance in national experts, state experts. Very good representation by the environmental community. I am proud of that.

I remember it wasn't so long ago, five years ago, we didn't have the kind of representation from the environmental and environmental justice community we have today.

So I just wanted to thank the Council, and recognize Willa Williams, our new liaison with the council. She is at back. Willa Williams took over from Sonya Evans, who did this job for about a decade. Willa is doing a great job.

Best council. Best advisory group in the State.

I am bias, but I really believe it.

Thank you.

MR. SHEATS: So I want to give the last thanks to all the speakers, and to all the people who stayed until the bitter end.

We will see you next year.

Thank you.

(Whereupon, the deposition was concluded at 4:30 p.m.)

C E R T I F I C A T E

I, RUTHANNE UNGERLEIDER, a Certified Court Reporter and Notary Public of the State of New Jersey, certify that the foregoing is a true and accurate transcript of the stenographic notes of the deposition of said witness who was first duly sworn by me, on the date and place hereinbefore set forth.

I FURTHER CERTIFY that I am neither attorney, nor counsel for, nor related to or employed by, any of the parties to the action in which this deposition was taken, and further that I am not a relative or employee of any attorney or counsel in this case, nor am I financially interested in this case.

Ruthanne Ungerleider

RealLegal. Notary for E-Transcript.

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RUTHANNE UNGERLEIDER, C.C.R., C.R.R.
LICENSE NO. XIO1634, XIO0115

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