UNIVERSITY OF HOUSTON
ORAL HISTORY OF HOUSTON PROJECT

Interview with: Craig Beskid
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CC: This is an interview with Craig Beskid, the president of the Mickey Leland National Urban Air Toxics Research Center. It is 7000 Fannin, Houston, Texas. Today is August 2, 2006. Mr. Beskid, would you state for us your position and the mission of the Center?

CB: Sure. My name is Craig Beskid. I am the president of the Mickey Leland National Urban Air Toxics Research Center and our mission as defined in the Clean Air Act is to study the human health effects of volatile organic compounds, specifically the hazardous air pollutants that are listed in the Clean Air Act. There are 188 of them. That is our specific mission.

CC: And you study them and do what with them?

CB: We provide that information as part of our research to the public, the scientific community, decision makers, regulators, everyone- we make that information available.

CC: So, your goal is to just identify?

CB: Our goal is to identify and provide the scientific facts for decision makers to make decisions based on the facts.

CC: O.K. I noticed that on the board, you have a scientific advisory panel and corporate sponsors as well as the board of directors. A lot of these seem to be people from corporations. Do they feel that there is any conflict of interest as they are always the ones that everybody points the finger at?

CB: Well, I think to properly answer that question, a little background is necessary. As I stated, the mission of the Center was created by the U.S. Congress when we were created as part of the 1990 Clean Air Act amendments. As part of that enabling legislation, they mandated that we be a public/private research organization but be composed of representative perspectives ofthe business community, the academic community, and the government community. That way, all perspectives would be represented in the study designs that we would go forward and implement our research mission. So, the idea, to get back to your question, was to eliminate conflict of interest because if all parties are involved in organizing the studies, choosing the studies and funding the studies because we are publicly and privately funded, then there would be a consensus as to what studies would be done, how they would be done, and there would be less argument about the results. The objective really was to eliminate the thing that we see often in the environmental field and several fields which is a concept of doing science. Industry representatives higher their scientists. Academic representatives do their work. Government representatives. And then, everybody throws that together and nobody knows who is right. Well, if we design those studies together and work together, then there is no argument about the individual results of those studies. There can be discussions and disagreements about the application and policy implications of whatever research comes out but that is left to the decision makers to then work out.

CC: And then, when you come up with these studies, who do you forward them on to?

CB: Well, the actual product of the research center is publications in national peer-reviewed journals. So, all of our research follows the NIH guidelines and then, we submit the research to noted scientific journals - Environmental Health Perspectives,

Journal of Epidemiology, Journal of inhalation Exposure- those journals, and they use their editorial boards and rigor to examine our science and publish or not publish if it passes those specifications. We have not been rejected by any of those so are studies are considered of very high quality.

CC: Is there a group that then decides what to do with these studies or do you not have any part of that?

CB: No, we definitely have a part of that but it starts much earlier. As part of the reason for creating the Center and having the three perspectives - business, government, and academia - it was thought by Congress and by the folks that created this Center that understanding what regulators and the public want to know scientifically about the environment in advance of the need to know would be a good thing. So, we routinely talk with the research arms of EPA, the State of Texas and the regulatory arms of both of those organizations as well as many states to understand what they think are public health hazards. We also do that with the public and years in advance, because that is what it takes to do research, we start research in those areas so that when the questions are asked, we can have a scientific answer for them that is timely. And then, that can be used in either the development of a regulation, a modification of an industry process, for instance, a reduction in admissions. We are recently getting into providing design information for roadways because if roadways are being built through large neighborhoods, there can be or potentially could be exposure to air toxics from mobile sources. So, we advise the department of transportations and environmental organizations about how far you should allow residential to be built close to roadways

that have high volume traffic so that the exposures are minimized. So, that is how we do our work.

CC: And I noticed one of the objectives is to develop new approaches and methods for assessing the potential risks resulting from exposures to air toxics? Does that include new ways to monitor air pollution?

CB: Absolutely. Before I took this job about 4-112 years ago, one of the things that I did for 20 years was measure the air from an air toxic standpoint. Measured ambient air. Ambient air measurements are measurements in regions and local areas that give you a picture of what is going on in the neighborhood. Part of my job was then to communicate those results to the public and to state regulators and to anyone who really wanted that information. Over the years, people got very comfortable with understanding what ambient air measurements were but they kept asking me questions about what does that mean to what I am breathing in my home, out in my yard, as I travel to and from work each day, as I go and do my daily errands, because that ambient monitor is 2 miles, 3 miles, 5 miles from my home - it is not right where I breathe. So, I began to be concerned that we weren't measuring right where people breathe and the foundation of all air quality regulation is the protection of public health and welfare. So, when this job at the Center came up, one of the goals of the Center is to develop new technology to actually measure where people breathe and to understand the differences between ambient measurements- 1 mile away, 2 miles away, or what people actually breathe. And we called that personal exposure measurement. So, one of the major areas of research that the Center got into was we quickly understood that there weren't good techniques for measuring what people breathe on a daily basis as they go through their

daily routine, you know, taking their kids to school, going to work, shopping- all of those things. So, we put a large ... with the direction of our board and our scientific advisory panel, and our contributors, put a large effort into developing technology that would measure personal exposure. And there are two ways to do that: there is passive, where people don't have to do anything except wear a small device and go about their daily activities, and there is active, where they may have to wear a pump that actually pulls air. And I know you can't see this on the tape but I brought some demonstrations along so that you can actually see how we do it, and I understand you spoke with Tom Stock, and he is one of our researchers that helped on this. But we took ...

CC: That little badge we talked about?

CB: We took this little badge that is commercially available from 3M Corporation, developed a partnership with 3M, and wrote a specification that then was a research proposal that we went up for bids for and Dr. Stock and Dr. Mirandy were successful as being the awardees for that, and had them develop a methodology for analyzing the chemical substrate, the actual filters that are here, that would tell you about 17 air toxics in the air as you walk through your day. So, you merely wear this on your lapel and you go about your day for 24, 48, 72 hours and then we take these badges and have them analyzed according to the Stock and Mirandy technique and it can tell you down to one part per billion of those 17 air toxics, what you were exposed to.

CC: Does it change colors?

CB: No, it all has to be done through chemical analysis. So, you can't really tell. But we are talking about very low concentrations. And this is my demo so you can certainly have that if you want it. If Tom didn't give you one, you can certainly have that.

CC: Thank you. That will be useful.

CB: Sure. Another new technology area was we found that particulate matter was very important. Now, this is an active measurement, so there has to be a pump that pulls air through this. But very small particulate causes cardiopulmonary problems. And we had no way of measuring how much people were exposed in their daily lives, their personal exposure, to small particulates. So, again, through our proposal process with the guidance of our board and our SAP, we commissioned Dr. Costas Sudas at the University of Southern California to develop a personal cascade impact sampler which is what I have here and it is a small, wearable device that will capture particulate matter in the breathing zone of individuals as they wear this on their lapel from 0.25 microns to 1.25 microns which is precisely the size range that causes cardiopulmonary difficulty in people.

CC: Now, would this also include diesel particulates?

CB: Yes, and the way this works is you see the slits here? Air is pulled through. The slits are of varying sizes and there is a filter in between each stage of the slit and as air goes through, it is accelerated or decelerated based on the size of the slit and particles can't make the tum. So, inertia. Kind of like think bodies like to go in a certain direction. If a particle is large and it goes through a large slit, it makes it through the slit but it can't make it around the comer to get to the next slit so it impacts on the filter and we collect it there and we can count the number so that we know the concentration of those small particles and then we can chemically analyze those small particles to know their composition. So, not only do we know how small they are so it can determine how far they go into the lungs but then we know their chemical composition if they are taking

benzene or butadiene along with them into the lungs. That will enhance the kind of health effects that may seen from those particles. So, that is another area, because we knew we needed sophisticated measurements, we had this device developed and it is now being used by several researchers and also being used by the U.S. Army and other places out in Afghanistan and Iraq. They don't tell us what they are actually measuring using the device but they are using it, which we feel is a significant contribution. There are also several researchers that are using it for public health and environmental things.

CC: Is that heavy?

CB: It is not. I mean, these being this size, this is an adaptation of an air pollution control device that is used in industries that is the size of a house or larger. So, it is substantially smaller and to be a wearable device. And the last piece on the new technology in that we developed again with the partnership with a company called SKC is the Leland Legacy Pump named after Mickey Leland, the 18th Congressional District of which our senator is named after and it is a small portable pump, battery operated for 24 hours, rechargeable pump that they use with this, maybe wearing a pack around your belt as you use it with the personal cascade impacter. One of the things that is important about it is it is small and quiet. I know that doesn't seem as quiet as you would think but once it is in its pack, it is relatively quiet. And what is important is that it runs on the battery for 24 hours so it gives you remote capability - you can go anywhere. And that is important when we want people to use this for 24 hours, for instance, if they had to put it beside their bed. It would be a little annoying.

CC: Is there an attachment that goes with it?

CB: Yes, there are two being . . . that would connect the two and the personal cascade impactor would be on your lapel so that would be in your breathing zone and you go through the daily activities. We have had students wear these at high schools, students in college wear these and our REOPA project, the relationship between indoor and outdoor .

CC: So, these belong with these posts here . . .

CB: Right, the small personal cascade impactor. So, we do that. These are being used all over the place. We thought this would mostly be used for personal sampling but we find that it is actually used for ambient sampling because there are areas where there is no power. So, they merely take this . . . they buy two of them because it will run for 24 hours . . . they buy two of them and they go out to a remote location where they want sampling- they set up their filters or whatever, they turn this pump on and then 24 hours later before the first battery fails, they come and they swap another one and get continuous sampling.

CC: And this registers what is going on _____?

CB: Correct. And provides the basic background information, too, like temperature, pressure, relative humidity, the flow rate of the pump and it is easily hooked up to your computer with a USB download so that you can download that information.

CC: That is fascinating. Now, would this be put on the ground to get leakages or could they suspend it in the air?

CB: Yes. We have seen it in all applications. We have seen where there is an interest in the vertical gradation of pollution. Researchers would mount 6 or 7 on a pole that goes

up into the air as far as they want and they get ground level, they get a 6 meter, they get 30 meter, 40 meter, whatever they want, right up the pole.

CC: Now, as I understand it, _____ is saying that this personal badge doesn't do a very good job of registering butadiene.

CB: That is correct.

CC: How about that? Does that do an adequate job of registering butadiene?

CB: This is a pump so all it does is pull air. So, you have to couple it with a filter or another device. And when you do that with something like a personal aldehyde and ketone sampler, it does that. It will get butadiene. Of course, the thing about butadiene is it is photochemically reactive which means it doesn't stay around on a filter very long. So, you have to go and get the filter quickly. Don't leave it out there. So, the pump will help you capture it but you have to analyze it properly so that you get it.

CC: Well, ethylene and propylene are also very fast.

CB: Very fast but they are also not widely thought of as to have human health effects at the concentrations that we normally see, so they are not that studied. They may be contributors to ozone formation but really not that thought of as being very toxic as compared to butadiene.

CC: They are not considered a carcinogen?

CB: They are but only at very high concentrations.

CC: Which you would find at a plant?

CB: No, probably you would find it in a storage area of the . . . I mean, it has to be very high concentrations, you know, sort of like water. I mean, water is bad for you in very high concentrations, that is why we drown.

CC: True, and I also noticed that you all had been addressing the health effects of the 189 hazardous materials. Are you familiar with the mayor's study he had done?

CB: Yes, I am.

CC: And do you concur with how many they identified? I am sure there are a lot more out there but I believe they ... well, actually, they put 179 down here.

CB: I think what the mayor's panel did was a good compilation of work that has already been out there. I think that they put together folks that then could survey information that was available including some information that we had produced from our strategic health effects review panel and put it in an area where it is all in one place and that is very valuable because then, you can make some conclusions from several learned academic articles that have already been out there but in different places, put them all in one place and you can come to a conclusion like the chemicals that we should be concerned about are part of that 179 list here in Houston. So, that is what I think is valuable about that.

CC: And also, in the objectives, I noticed that it says evaluate by the end of the decade the potential health risks of air toxic. Which decade? Just out of curiosity here.

CB: I would say it is the end of every decade.

CC: It is reevaluated.

CB: Yes, it is reevaluated every 10 years.

CC: O.K., and in determining the actual human exposures to air toxics, I notice that you have done some studies on asthma. Would any of these studies ever include the effects of cancer? I noticed that there hasn't been ...

CB: Our emphasis is on the short-term effects of these volatile organic compounds. The reason for that is that we have a much smaller budget than, let's say, the American Cancer Society does or NYSOH or National Institutes of Health, and those organizations, because of their larger budget and their longer time frame . . . you know, they have been around since the 1930s, so they have been able to study the much longer latency periods associated with cancer and have the budgets to support those longer term studies. We don't. So, to avoid duplication of work and also to fill a niche that wasn't being filled - the short-term health effects - that was really why Congress created us. Not to study cancer but to study the things that weren't being studied which was more the short-term heath effects: asthma, COPD, other kinds of diseases that weren't being studied and also weren't definitively linked to air pollution at the time.

CC: But then, benzene and butadiene are extremely toxic.

CB: They are class A human carcinogens and they do cause cancer long-term. I think that is pretty well established. But they also, at their concentrations, have been alleged to contribute to asthma and to other short-term diseases. So, the thought is why should you want to wait to just understand benzene and butadiene the 20 years that are necessary to understand their cancer effects if short-term diseases show up earlier at lower concentrations and gives you an additional reason to avoid exposures to those concentrations?

CC: Yes, if you can't breathe, it doesn't matter if you get cancer or not.

CB: Right.

CC: I was looking specifically at your studies. The air toxic and asthma in children being done by Dr. Delclose, this was signed on for a two year study in December of 2001. Have there been results from that yet?

CB: There have, and we were planning on publishing the report by the end of this year. We have a draft report in-house that is being reviewed by our scientific advisory panel and by our board. I think it was a very good study, although small. It only studied approximately 40 asthmatic children in the Aldine school district and specifically, we were looking for the relationship between high ozone days, high volatile organic compound days, personal exposure to these compounds, and the triggering of asthma - whether there was an increased triggering of asthma on high air pollution days, very specifically. We have spoken to the National Institute of Environmental Health Sciences, NIEHS, and they are looking at that study as being a potential for a larger study since it was just a pilot study with just 40 middle school children of expanding that to a national study and in partnership with them, we may expand that study. But the first priority is to publish those results and that will happen by the end of this year.

CC: Would it be fair to say that Houston has a higher rate of asthma in children than other large cities in the country?

CB: No, it would not. The rate of asthma has been increasing all over the country and there has not been a definitive cause illuminated yet for that. But it does not look as though, from the evidence that I have seen, that the rate of asthma increase in Houston is any different than it is in Chicago, New York. There seems to have been an increase in asthma incidence all over the country.

CC: And what would you attribute that to?

CB: You know, there has been speculation that it is air pollution which is one of the things like our study is trying to look at. There has been speculation and some scientific information about not exposing kids -- that it is a much cleaner environment today because people stay indoors much more often and therefore, they don't build up immunities as much so that when they go out in the world and are more active, they are more likely to develop asthma. There is the genetic component that maybe we are just more healthy today so asthmatics are living longer, they are having children, they are participating in the population more so it gets passed on more. There are all kinds of theories. I don't think any one has emerged yet as the right answer.

CC: What about to the rest of the world?

CB: To the rest of the world, it is also increasing.

CC: There doesn't seem to be as much asthma in other countries as there is here.

CB: Correct. The rate of asthma, although increasing worldwide, is not increasing at the same rate as it is in the States, for instance, and in the so-called developed world. I don't know the answer for that. I mean, that is the best answer I can give you.

CC: I just wondered what the speculation . . . my own curiosity. So, this one was done locally? Then, there was another one testing the metal hypothesis in 3 cities and I know one of the cities was Spokane but I didn't notice what the other two were. Were any done locally?

CB: No. The metals hypothesis was only done in Spokane. If that says 3 cities there, I think that is wrong.

CC: O.K. The cities around Spokane.

CB: They are pretty small.

CC: And then, there was a VOC exposure in an industry impacted community, that abstract ... I know that VOCs have been well talked about around here. Which ones specifically were being ... I don't know if you know ...

CB: Sure, the Dr. Buckley study. That study is published so I can certainly give you a copy of that report.

CC: Where was that done?

CB: Baltimore. I can give you a copy of that one and then you can get a lot of the details out of that one.

CC: I notice you have another personal exposure study with Dr. Stock in there. The EOHSI.

CB: Yes, that is a RIOPA study.

CC: Is that the heat study?

CB: No, the heat study is not under way. I guess it was off tape we had been talking about that you had just had a meeting with Dr. Stock, and I was just on a conference call with him because we are trying to get in place the contract for the heat study which is the Houston exposure to air toxic study. That is proposed to start probably the end of this week with the formal contract signing.

CC: And what exactly will that do?

CB: That will be a 2 year study with 2 neighborhoods in the Houston area. One, the Manchester area and one as a control group, the Aldine area. Both areas have been statistically examined to be sociodemographically similar yet the Aldine district does not have the industrial, the nearby industrial influence. So, that is why it is the control study. There will be 200 homes in each area that will be evaluated for indoor, outdoor and

personal concentrations of volatile organic compounds. And we will do that over two seasons. That way, you have two winters, two springs, two falls, etc., to be able to compare plus the geographic plus the difference between Manchester and Aldine plus the sociodemographic and gender differences. So, we will be able to then tell what fraction of contribution of each of the volatile organic compounds is coming from industrial contributions, lifestyle choices -- whether people are out washing their cars or they were standing by their running car for long periods of time-- or mobile source emissions. Or things inside their home.

CC: And will this also take into account the increase in various illnesses in those areas?

CB: Yes, we are going to have a self-administered health questionnaire that will be administered to all of the homes at several points during the study. So, they will be able to report linkages that they saw to help effects associated with things they were doing that day or just their general health condition during the day. And then, that information will be linked to the measurement data, to the statistical information from both neighborhoods and we should be able to make some general conclusions about the linkage of exposure and health effects.

CC: I am sure you are familiar with Dina Cappiello's big article, "In Harm's Way." Everybody in Houston is ... where they collected data to indicate that there is a direct link to an increase in cancer and certainly in the neighborhoods near industrial, Manchester being one of them and I think Galena Park was one. Although studies haven't been done, what are your feelings on that?

CB: I am not sure I understand your question.

CC: Well, your opinion, I guess, because scientific data has not really been done, you know, it takes a long time to ... the effects of certain carcinogens take 20 to 30 years to show effects so I am just trying to get a feel of they talk about the increase of cancer in certain neighborhoods that are close to industry. The industry has been there since the 1940s, the 1950s - a long time. I am just wondering what the position is of a lot of different organizations that deal with scientific data.

CB: Positions on her article?

CC: On the link between ... can you link an increasing cancer with being near the industry?

CB: Of course, my organization does not study the link to cancer, as we talked about. We are focused on the short-term health effects. So, I will limit my comments to the short-term health effects.

CC: O.K., do you have a personal opinion on that?

CB: On, what? The short-term health effects?

CC: On the link to long-term effects.

CB: I think it is an area that deserves more study, and I think by publicizing an issue like that, using, I think, publicly available data and some monitoring techniques ... actually, she used our monitoring techniques, she used the badges to ... she used them in a different application than we certify them for. She used them for ambient measuring and we use them for personal measuring, so there is a little difference there but by publicizing that issue, I think that was important for drawing attention to and potentially drawing research dollars to that area.

CC: Well, it has been suggested like M.D. Anderson and Baylor and a lot ofthe large hospitals that treat different types of cancers are funded by the oil companies, therefore, studies are not done.

CB: I have never seen that.

CC: I have talked to citizen activists who have suggested that and not a particular organization _____. And, of course, we know that there haven't been any published studies, so whether or not research is ongoing . . . but would it be difficult to go back from when the plants were originally started because they were back in the 1940s, were they not?

CB: Oh, sometimes even earlier than that. Some of the plants were here even in the early 1930s and mid 1930s when oil and chemicals were starting to be a significant part of our lives.

CC: And there was no control?

CB: Oh, I wouldn't say there was no control, I would say that there was a lot less control from an environmental standpoint than . . . and the purpose at that point was production of these life changing chemicals and fuels. The purpose wasn't then to avoid impact on the environment. We simply had a different purpose at that time. As societies, I think, mature, we tend to understand more the impacts that our technologies and things have on those that are around us and we modify our approaches that way.

CC: Did the companies on your board believe that they could get their emissions down lower or did they even discuss that?

CB: I think the companies work towards complying with regulations and they work towards having their emissions as low as possible on a voluntary basis because they don't

see higher emissions as a goal. They see lower emissions as a goal because it helps them with their regulatory compliance as well as their position in the community.

CC: And who makes the regulation standards?

CB: I would say, in our state, of course it is TCQ and NEPA, of course, has some influence on that but there are also, in our region, there is Harris County pollution control and the City of Houston, they all have a say in a participatory way for those regulations.

CC: I understand that they are reevaluating the ESLs currently.

CB: Yes.

CC: And how long does it take to usually do that?

CB: To reevaluate the ESLs?

CC: Well, I am sure from my bio, you probably saw that I serve with several members from other expert groups as on the review panel for the TCEQ ESLs. So, yes, I was one of 7 people that they chose that last year provided them with a list of recommendations of which ESLs they should review, when they should review, etc. And our recommendations, which are available on TCEQ's website now, basically said that they should concentrate on the ones that are most toxic first -- you know, benzene, butadiene, diesel particulate -- those kinds of pollutants. And that is exactly what they are doing. They are focusing on revising their ESLs based on scientific literature for those high priority compounds first.

CC: Why are the ESLs in Texas different than in other parts of the country?

CB: My understanding is that every region has the ability to set their own regulatory framework based on how their population and economies and political situations work. And Texas has chosen, which I think is a very scientific approach because it allows quick

revision of standards - not really standards - guidelines . . . quick revision of guidelines based on scientific information, avoiding a lengthy public hearing and regulatory process that other states have. When other states set a rule, it is a bright line standard, and if there is information that would either say that that standard should be higher or lower, it takes many, many years to go through the statutory and regulatory process to have a change. With TECQ's process, if there is new scientific information on benzene or butadiene that is published in Environmental Science and Technology or any one of the respected journals, they can change it like that, in a snap. And I think that flexibility is a very unique and good feature ofthe ESLs because, as I think I mentioned before, the purpose of all air quality regulation is to protect the public health and welfare. But sometimes timeliness in that protection is important. So, as new data comes out, Texas and its ESLs can modify those immediately.

CC: So basically, they don't have to wait 10 years?

CB: Correct.

CC: Interesting.

CB: Now, the other side of that argument that is often made by environmentalists and public citizens is it is not a standard then that brings down the force of law of a violator, a public organization of a private industry. However, when confronted with you are above an ESL, TCEQ has several administrative and regulatory tools that they can use that bring the force of law causing a public nuisance, causing an air pollution health effect. They have general rules that they can link to these but then encourage compliance. CC:

Are there fines associated with . . .

CB: Sure. With those causing an air pollution incident- those rules, etc. And from what I have seen, they routinely apply them.

CC: And are they large enough to really get them to take notice?

CB: I don't think I have enough visibility on what the amount of the funds are but I do have some visibility on the reactions of industry and industry has reacted and complied, so I would say yes, by default, they must be because they got a reaction, they got industry to lower emissions.

CC: And does ESL have a set time that they relook at their standards or is it when somebody brings up a problem?

CB: It can be done either way. It can be done routinely or it can be done when there is evidence to the contrary. And two pieces of evidence that they use are monitoring data, when there is monitoring data in the area that is either above the ESL or very close to an ESL. That causes TCEQ to look at that area much differently. Or any time a facility, a commercial facility, or any facility that is required to applied for a permit, they must provide modeling data about what their new emissions are going to do in the future and compare that to the ESLs. When they do that, the toxicology section at TCEQ reviews that information prior to granting that operation, a permit to do what they said -- increase their emissions, change their operation or whatever. If the ESL is approached or exceeded, then TCEQ, as part of the permit restricts the operation of that facility so that the ESL is not exceeded. So, it is a very good feedback control mechanism. And now , the grandfathered sources are gone. We used to have a concern, there was a public concern that there were sources that were not covered by regulations because they were old facilities and they were built before the regulations. And that was what _____

That doesn't exist anymore. That has been removed by the Texas legislature. So, you don't have that problem.

CC: So, everything has to be in compliance?

CB: Correct.

CC: And do you know whether or not the ground leaks are studied a lot?

CB: Oh, they are studied intensively and new permits always include on facilities that have those pieces of equipment, inspection and maintenance of those. And the level for leak detection has been consistently decreasing. So, instead of looking at just big leagues, they have been looking at successfully smaller and smaller leaks. And new technologies like the FUR camera which you may or not have heard of it. Infrared allows them to see those kinds . . . and there has never been a more profound change in the industry of identifying leaks to when you can see something because before, they had no way of knowing that they were even there.

CC: You called it a Fleer camera?

CB: Yes. The hawk. FUR the technology. Forward looking infrared is what that stands for. Hawk is one of the companies that has distributed it.

CC: I guess it is like night goggles?

CB: Yes, except for chemicals because each chemical has a different spectra so you can set it to what is being emitted. But yes, there are a bunch being emitted.

Tape #2

CC: We were talking about the new technology to detect leaks. How long has this technology been out? Is this very recent?

CB: It is very recent. I am estimating but I think it has been the past 2 or 3 years that it has just become available. As I understand it, it was a military technology that was adapted. So, it wasn't really available from the military until the military released it.

CC: I am sure it is not cheap.

CB: No, I don't believe it is either.

CC: But then, I am sure having leaks is more expensive.

CB: That's right. None of the companies that I know of want to have leaks because that is not only a compliance issue for them but it is also a product issue. They would rather keep the product to themselves.

CC: To sell it _____

CB: That's right. It is like you at your home. If your water faucet is leaking, you can see it - you have a tendency to try to fix it as quick as possible because you are paying that water bill.

CC: That is true and when it comes, it is a doozy.

CB: That's right.

CC: I noticed, when I pulled up some information on Mickey Leland, they also have stuff from the Houston/Galveston corridor, GASP recommendations. Is this specifically gas recommendations or is this from Mickey Leland…

CB: No, I believe those are gas recommendations. Things that are on our web site are our official recommendations. We don't post individual organizations, be they our member companies, the EPA or organizations that support us, or environmental organizations. I mean, for instance, the Houston endowment provides us some support but we don't post their recommendations on our web site either.

CC: There are many environmental groups in Houston-- Mothers for Clean Air, GASP, the Bucket Brigade -- and they all seem to be working on a different issue. Do they ever collaborate with Mickey Leland to . . .

CB: Well, that has been one of our goals - not just the environmentalist organizations but all organizations. One of the things that I found last year in preparing for our Air Toxics workshop . . . we put on an annual Air Toxics workshop and last year in October of2005, we felt that we would take our mission, which is to provide collaboration among business groups, regulatory groups, public citizen groups and academia and use the Air Toxics workshop as a model of that. Try to bring the environmental groups together with the state regulatory groups, the federal regulatory groups, industry groups - be they trade organizations or individual industry - and share all of that research. I thought we would have, like we do in this game often, there are the same 50 people, you know? We ended up with 180 registrants for that workshop. We actually had to close registration. And I discovered that there were 25 additional air quality research groups in the Southeast Texas area doing air quality research that I had no idea were even doing that after me being in the business for 20 years. So, I think your question started with is there a need for additional collaboration and cooperation on the research as well as a publication of who is doing what and what are the results? Absolutely. And as a result of that, we are going to do another Air Toxics workshop where we take it that next step. It is going to be in May 2007 where these groups, all the groups that were represented at the Air Toxics workshop I will then take the next step and publish a lot of their research and we hope to come to some common goals about what is a good research plan, strategic research plan, for this region and have the big groups- EPA, TCEQ, us, other organizations that have

research dollars and in a prioritized fashion, go down that list and say, O.K., this is a big one - maybe EPA and TCEQ, you guys need to do that one; this is a middle-sized one but a high priority, maybe the Mickey Leland Center can do that one, and start implementing the recommendations from all those groups to get the information, start the studies and put an infrastructure in place for collaboration and cooperation so that this high priority work gets funded, gets executed and published so that we can all share in it.

CC: It is interesting that I found that a lot of groups are tunnel visioning on specifics like benzene.

CB: Correct.

CC: Particulates, ozone. I mean, would they not be more effective if they all kind of collaborated and worked together?

CB: That is my view, and we did, to use the vernacular, "put our money where our mouth is," as part of an effort that the Center supported. From 2002 through today, we have what is called the Strategic Health Effects Review Panel which is to do something similar to what the mayor's panel did except instead of just putting together information that had been previously developed, the charge to the Strategic Health Review Panel, which was composed, again, of academic members, industry members, public citizen members and regulatory members, was to say, what is the high priority research needed in this region, who can do it, who has the capability, and what infrastructure and funding among the major universities and research organizations is necessary to coalesce that together to do that work? That was partially funded by the Houston Endowment, and I will give you a copy of that document because I actually brought it with me. But it provides recommendations on the research that should be done, the infrastructure that

needs to be in place at the universities to do it, the staffing that needs to happen and the funding that should come from either federal sources or state sources or local sources so that we can actually get some answers to these questions and know what to do. My panel doesn't like when I refer to it this way because it is not quite as scientific but I refer to it as a roadmap of what we need to do and not only grounds us in what we have done so we don't duplicate those things but to use what we've already done, publicize it, use it, but let's have a road map to fill those gaps and go forward.

CC: Is there a liaison between the group here and those who actually implement regulatory government standards?

CB: Yes, and I want to be careful in describing it to you because it is not a liaison in the fact that it is formal and there is a direct influence that those comments or recommendations will always be taken by the regulatory bodies but, with that being said, there is a liaison in that the Center has a direct contact continually with the TCEQ, and they consider us . . . I mean, they are going to be a funder of the heats project, for instance. They recognize that they need good scientific data to make solid regulatory decisions, so we jointly look at our strategic plans and see where there is an overlap and then we will put in some funding, the Lehman Center will put in some funding and TCEQ will put in some funding. We do the same with EPA, so we understand what their research needs are, we understand what the regulatory needs are, and look at common overlaps and then we will make an investment and they will make an investment. We also look at, in our strategic plan, what industry wants to know about their compounds that are emitted and so on, and they provide that information. And all of that goes into our strategic research plan and we fund those studies, and then we provide the

information to all of those groups. That is at the very foundation - that our information is publicly available. So, it doesn't matter whether the study originated from the industry side or the regulatory side or internally from our staff ideas. Once that study is executed, it is publicly available and it has been critiqued through our scientific advisory panel and guided by our scientists that have no interest in the absolute outcome of that study because they are separate and distinct from the researchers that are on it. So, it has been guided through that process and it is completely objective. And that is our goal.

CC: So like, for example, in the mayor's study, they have identified certain elements that they want to work on and that is something that they need to take up with the particular industry within their boundaries?

CB: Correct, and the way that might work is that those industries might then say, oh well, we don't have that information, so we need a research study to do that. And then, they might come to us or they might go to TCEQ or they might put together their own work and go forward. My recommendation is because our organization includes all those perspectives, the credibility quotient, if I can use that word, is higher when you have all parties involved and the work is transparent than it is if one body goes off and does the work by themselves and presents a result.

CC: I think Houston is probably different since we manufacture butadiene.

CB: And ship it. I mean, there are several areas in the country that do. I mean, New Jersey does and Los Angeles does and Chicago has some but you are right, there is a large component of butadiene production here.

CC: And I guess we don't have any control over the ships that come off the Ship Channel.

CB: That is a federal regulatory . . .

CC: Oh, that goes into federal?

CB: Yes. It is not true that they are unregulated. It is true that they are not regulated by the TCEQ. That is different.

CC: But they are under . . .

CB: Oh, sure.

CC: . . . our government, even if they are a foreign government?

CB: Oh, absolutely. Absolutely. It is routine for, and I didn't learn this from the Port of Houston - I learned this when I was working in Santa Barbara, California and Los Angeles, California, but ships that routinely come in to U.S. waters have to adapt to the regulations. That is why when the do things like hoteling, which is sitting at a port, they will convert fuels to be lower emitting fuels than when they are way out in the ocean and that is by regulation.

CC: I realize that terrorism isn't exactly on your mission statement, however, with the world we live in today after 911, homeland security, there has also been a lot oftalk of the Houston Ship Channel being targeted for a terrorist attack and it is very easy to see why, are the industries or anybody discussing this or is this something that is in the forefront?

CB: I think, as you said, it is outside of my mission and it is also outside of my knowledge -- anything beyond what is publicly available in newspapers or anything. I just have that level of knowledge which is what I read in the newspapers that they are working on.

CC: And all the different people on the boards and stuff like that, has it been a topic of discussion?

CB: No, I think rightly so. There are things that should be kept confidential and that is probably one of them.

CC: I am just talking about the actual field, not what they can do.

CB: Yes, I think I can easily confirm that they are concerned and working on it.

CC: So, in other words, it is not something that has just lay dormant?

CB: No, I think they are and have always been very concerned.

CC: We don't have a need to know as they would say in _____

CB: Right. Even prior to 911, there was always concern about protecting the facilities, not from terrorism but just we don't want people - well, crazies or you just don't want people wandering from the Ship Channel onto your property that is making gasoline or propylene or something, and wandering around your equipment. So, that is why they put fences and have security guards.

CC: Or you don't want them wandering in your backyard or crawling into your pool and drowning.

CB: Absolutely.

CC: A liability. I understand that perfectly. Who decides who gets to be on your list of directors and corporations?

CB: As I said, we were created by the 1990 Clean Air Act amendment, so there is enabling legislation and the qualifications for each one of our board members, is listed in there which has requirements for their discipline- it has to be either an epidemiology, toxicology or public health- so they have to have a background in all of that. We have to

be nationally balanced because we are a national center so we have to have representatives as much as we can from across the nation. We must be gender balanced as much as we can, so men and women. And we have to meet our charter of having representation from government, academia and business and industry. So, all of that goes into recommendations that the existing board, NSAP, recommend members, the staff and me make recommendations based on the needs of our strategic research plan for areas of expertise that we might need. Sometimes we need more biostatisticians to help us on review. Sometimes we need more toxicologists. So, we will make those kinds of recommendations. All of those go into the respective offices of appointments because they are appointed 3 each by the speaker of the House of Representatives, the Senate majority leader and the president ofthe United States, and sometimes they pick from the lists that we give it and sometimes they pick somebody else. And then, they have 6 year appointments to our boards and we work with those people.

CC: And then, what about the corporate supporters or the other _____?

CB: Oh, all of them come through that process. There is no distinction.

CC: It is not like one of the BP can come and say, "I want to be one of your big supporters?"

CB: Absolutely not. They all have to come through the absolute same process and at the core of it is balance. You won't see 9 members of our board all from government or 9 members all from industry or 9 members all from academia. As close as we can, it will be 3, 3 and 3, and the leadership of our boards is determined by the individual boards, SAP or whatever, but the perspective in the leadership rotates. So, one period, a chair

will be from the government side, one term, the chair will be from the industry side, one term. The chair is mostly an honorary and administrative position ...

CC: Sort of check and balances.

CB: Exactly.

CC: And then funding I know is not for profit. Does funding come through the government or the project donations that people want to give go through government channels?

CB: We are a 501(c)(3) and 90% of our funding comes from our annual Congressional appropriation so every year, I have to testify on what we are going to do with the money in front of Congress and what our results are previously and Congress gives us an annual appropriation or not, and our other contributors make up the rest. So, the majority of our funding really is just like what EPA gets or NIEHS or any of those organizations - come from taxpayer dollars. At this point, there is a small minority of money that comes from private organizations.

CC: So, it is not like Exxon can come and say, well, we want this particular study done and funded?

CB: They certainly can say that but that would not happen because every study of ours has to go through the review of our scientific advisory panel, the review of our board which is made up by all that balance. There is never control of a study by any one group.

CC: So, that keeps the checks and balances.

CB: Yes, and that is a fundamental principle that we operate on.

CC: So, those rumors were wrong.

CB: Oh, there were rumors?

CC: No. Well, I really want to thank you very much for agreeing to this interview. It has been very illuminating. Do you have anything to add?

CB: I do have a couple of questions. I think when we exchanged emails and when we talked about the purpose of the interview, I thought it was Houston history and it seems like we spent much more time talking about perspectives and current issues than we did talking about history.

CC: Yes, well, it is a history project but it is for future generations to look at the history of what is happening today in Houston. We have had a history of air pollution in this city for I don't know how many years and it is actually getting better, albeit it has taken a lot of work but then it didn't just happen overnight. And so, what my goal is, is to tap into the various community efforts to try and ... what is going to happen with air pollution, the archives will be there for future generations to be able to go back and study. For example, if you are doing a segment on someone's history of their service to their country, you are talking about that timeframe then and it is for future generations to look back into history of that _____. Am I making any sense?

CB: I think I am getting a little clearer. Maybe I just misinterpreted the purpose ...

CC: You know, it is like Katrina- there is no history of Katrina and Rita. It is what happened last year, so if you record what has happened, then you've got that history down for future reference, and if you record all the stuff that has been happening in Houston today with the environment, it is going to give generations - wow, they weren't just sitting back and letting nothing happen, they were really working on this issue and the different things that they could come up with. New monitors. New ways of testing. It gives them an idea of what is going to happen with their own environment.

CB: I guess what I was thinking the interview was more going to be about was how did we get to today over the history and, you know, as much as we have talked about, there has been a large amount of activity today, just as you have just said. People have not just been sitting on their hands. There has been new technology developed. But that is not unique in this past few years. I have been working in this area for 25 years now and it has been a hallmark, I think, of the Houston area versus other areas that I have visited or stayed in for a while; that Houston does more of that than most areas. Imean, the Texas Air Control board before they were the TNRCC and before they were the TCEQ, has a long history of monitoring and regulating air toxics and ozone and criteria _____in Houston for 20 or 30 years. And industry groups have been monitoring and making efforts to do ... and the City of Houston has been active and the Greater Houston Partnership and those other 25 organizations have been doing things - whether there was a regulation or not.

CC: When do you think all of this interest came about?

CB: Oh, I think it has been here since the 1970s. Just at the same time that the original Clean Air Act was passed or prior to, and it was a result of Houston growing to the point where people noticed, wow, there is a lot more traffic, there are a lot more people, there is a lot more industry. How is that affecting me and my health? But see, that is what I really thought we were going to spend a little more time talking about because I think Houston as a region has an untold story of historical progress that has been underappreciated, not only within Houston but also within the nation about, you know, 3 or 4 years ago, there was the popular press about Houston passing Los Angeles due to an incident on the Houston Ship Channel where ozone was higher and so on. Yet today, we

don't see anything in the press about how Houston has better air quality than Los Angeles. We don't see that. We didn't see at the time that even though Los Angeles' ozone concentrations during that year were low, their concentrations of particulate matter and NOX and S02 and air toxics were higher. So, you know, in the press, they were saying Houston is the worst polluted city in the world, well ...

CC: They haven't been to Beijing.

CB: And you are only looking at one pollutant. Ozone. I don't know about you, if I am going to be in an area that has a pollution concern, one pollutant being exposed above the level is better than 4 or 5 because then you've got that mix and you've got health effects, potential health effects associated with all of those. So, I mean, I think I misinterpreted ... I thought we were going to talk more about ...

CC: Well, _____ talk about it because this is interesting. I know when I first saw Houston in 1971, there was a haze over this city that you wouldn't believe and I know when I moved here in 1987, it did not look like that. So, just in that timeframe ...

CB: Yes, due to the efforts of the public, public groups, you know, whether you call them the environmentalist groups or whatever, it is an important stimulus to do things. I think industry groups have done things. I think regulatory groups have done things and I think the University of Texas School of Public Health has been very active in producing some of that groundbreaking research that started things and maybe that doesn't get represented in a historical record or in a clear understanding of everything that is done in this region. And you say talk more about ... and I could but unfortunately, we said from 10 to 11 and I have an appointment at noon that I have to get prepared for. But as you go

through it and talk to your other people on the project if you want to do another one of these, we can schedule it.

CC: I thank you very much for the interview.

CB: You are welcome.