

Camp Lejeune, North Carolina

[Camp Lejeune, North Carolina Home](#)

[Print](#)

Expert Panel Meeting Feb. 17 – 18, 2005 Meeting Transcript Day One

Please Note: Items listed below are archive items

Transcript of the Camp Lejeune Expert Panel Convened on February 17-18, 2005

DAY ONE – FEBRUARY 17, 2005

Dr. Henry Falk: [Welcome to the Camp Lejeune Expert Panel meeting.] We are all here to provide expert science guidance. Maybe, I'll take a moment or two just to tell you a little bit about ATSDR. You'll understand why this is important to us.

ATSDR, as you know is a health agency that was authorized by the Superfund program to work alongside EPA, Department of Defense and others to evaluate health effects at Superfund sites. We've worked at thousands of such sites over the years. The relationships of EPA and Department of Defense and others are very important. It's a very critical part of our work. I view the work of ATSDR as essentially being that of a service agency. We are called upon at these various sites to evaluate people's exposure to chemicals and hazardous substances and think about the health effects are to people like that. So, we try to deliver that service to identify what are the potential exposures; what are the potential health effects.

The difficulties for us, of course, is that this is sometimes not an easy task. I think of some other service agencies, say like the Post Office. It's easy to understand that a letter has to be delivered, goes to that

address. The actual service that's delivered is very easy to define. For us, sometimes exposure is difficult to measure; health effects are sometimes difficult to ascertain. We often deal with sites with many different chemicals with exposures that occurred decades ago, with chemicals that are not so well understood. So, we don't always know what those chemicals do. It's a very important task, but it sometimes requires a lot of good scientific thinking.

So, it's our hope that in this situation, Camp Lejeune, that the panel members can actually look at this situation, where we currently are, and provide really good guidance for us, input on what they see are the potential roads ahead for us. I should say also that it's very important for all of us that the guidance be as good as possible. We really look forward to that. Also, please recognize that we want to make sure that the guidance is not just theoretical, but actually is feasible and practical. Don't come up just with good ideas, but which are difficult to carry out and raise expectations. We want as much as possible to get the very best input and input that we can carry forward.

We count on your wisdom and good advice and deliberations. We very much appreciate the time that you all have put into this and your willingness to be here. Want to thank the members of the public and others who are here today. You traveled from some distance to be part of this and to assist in the public comment period, provide the panel members with their thoughts and we appreciate that. Again, we very much look forward to the recommendations that will come out of these deliberations. We hope that this will really truly assist us going forward at this site. So, thank you very much to the panel members. Thank you very much to the members of the audience.

I'll next introduce Tom Sinks. Tom is the Acting Deputy Director for ATSDR and NCEH at CDC. Tom will also, starting in two weeks, be the Acting Director for the ATSDR/NCEH programs. I'd like Tom to come up next. Thank you.

Dr. Tom Sinks: Thanks Henry. Now that I'm getting older if somebody hands me something to read I actually have to take off these glasses and kind of do this or something. Very awkward for somebody's who's had 20/20 vision all their lives.

Welcome all of you. Just so everybody in the room knows who is here, I thought I'd put some context into this. I believe we have members from the Department of Defense, from the public. There're some congressional staffers out here. We also understand there are a couple of people, at least, who represent the media who have signed up. Everything is going to be on the record. We should keep that in mind. This is a public meeting.

Secondly, just to reemphasize something Henry said. The credibility of the work we do has a lot to do with our integrity. Our willingness to be open to listen to both compliments and criticisms. I think why we're here today is somewhat reflective of that. We have gotten a lot of public comments to us about why are we doing a certain study. Why have we limited that study? Are there opportunities to maybe do more? Rather than us just continuing to respond with a particular, 'this is why we're doing it,' we thought we'd

open up this question to a panel and put this to the panel. That's really the purpose of this today. I also want to emphasize that we will take seriously the recommendations of the panel and consider them in any next steps.

I want to introduce Chris Stallard. He has an important job, he's our facilitator. He's going to be our referee. I hope you have a whistle, 'cause you don't have a striped shirt. Okay, he has a clock. So, he's our facilitator, primarily for the public comment period. We have a number of members from our Office of Science, who have put this together, Drue Barrett. Stand up, Drue, in the . . . you get that from Vietnam? In the silk suit. Drue is the Acting Associate Director of Science for NCEH/ATSDR. Athena Gemella, who did the work along with Drue. Athena's back there. Marie Murray. Marie, you can stand up. Marie is going to be our note keeper. She does a lot of these meetings for us. She does an excellent job. David Williamson, your key player. David is our Division Director, with the Division of Health Studies. I wanted to introduce him. That's the Division where this epidemiology is taking place. I'm going to introduce Ken Cantor and pass it over to Ken. Ken is, . . . I'm trying to see your title.

Dr. Kenneth Cantor: Senior investigator.

Dr. Sinks: Senior Investigator. Perfect. He's our Senior Investigator at the Division of Cancer Epidemiology and Genetics at the National Cancer Institute. Ken is a well known expert in epidemiology. He and I have interacted over a number of issues over the years. I'm going to let you introduce the panel, and I'm going to turn it over to you.

Dr. Cantor: I'll introduce myself very briefly. Give you a very brief rundown of my background. Then turn it over to each of the panel members who will do likewise. Again, my name is Ken Cantor. I'm the Senior Epidemiologist in the Occupational and Environmental Epidemiology branch within the National Cancer Institute, basically in Bethesda, Maryland. I've been active in Environmental Epidemiology for all of my career, in fact, for thirty years or so. I've done a lot of work with drinking water contaminants. My particular expertise happens to be disinfection by products and arsenic, though I have done some work in these other areas. I'll turn it over to Paul Visintainer, who will introduce himself.

Dr. Paul Visintainer: I'm Paul Visintainer. I'm the Director of Health Quantitative Sciences at the School of Public Health at New York Medical College. My specialty is epidemiologic methods, biostatistics, data analysis, perinatal epidemiology, and behavioral epidemiology.

Dr. Cantor: Dr. Lynch

Dr. Courtney Lynch: My name is Courtney Lynch. I'm a Reproductive Epidemiologist in the Epidemiology branch of the National Institute of Child Health and Human Development, also in Bethesda, Maryland with the NIH. I've done a lot of work looking at reproductive issues; birth outcomes; recently have started working more with effects of environmental exposures, but also have a lot of expertise in epidemiologic methods and how to study these types of things.

Dr. Wanzer Drane: I'm Wanzer Drane. In addition to a Ph.D. in biostatistics, I have formal training in mathematics, mechanical and nuclear engineering. Currently my activities include modeling space/time phenomenon, which includes environmental modeling and other areas of statistical research.

Dr. Cantor: Dr. Selmin

Dr. Ornella Selmin: My name is Ornella Selmin. I'm an Assistant Professor at the University of Arizona. I've been working for almost ten years on the effects of trichloroethylene on cardiac developments and heart defects using animals and in vitro systems.

Dr. Cantor: Dr. Maas.

Dr. Richard Maas: I'm Richard Maas, Professor of Environmental Science at the University of North Carolina, Asheville, also Director of Environmental Quality Institute [EQI] at UNCH [University of North Carolina at Chapel Hill]. Most of my professional career has been in the drinking water field. The EQI is a drinking water research center. We investigate the toxicology of drinking water contaminants.

Dr. Cantor: Dr. Ozonoff.

Dr. David Ozonoff: My name is Dave Ozonoff. I'm a physician. The last 30, 40 years I've been working with community groups on various environmental epidemiology studies, including a fair number on PCE and TCE. I'm also the director of the Superfund basic research program, which looks at Superfund sites and was the former Director of the Boston Environmental Hazard Center for the VA, which looked at Gulf War issues, and I have done some Agent Orange work as well.

Dr. Cantor: Thank you. I'm going to turn it over to Christopher Stallard now

Mr. Christopher Stallard: Good morning, everyone. I'm Christopher. As Tom said, I'm your facilitator for the day. He said, 'referee.' One of the things about being a referee is that you cannot be effective unless everybody understands the same parameters on which we operate. So, I'm going to ask your concurrence on some basic guiding principles to govern our interactions over the next two days together. Number one is we will start on time and end on time. [voices overlapping speaker] We're going to ask that you put your cell phones on silent; that we do not interrupt the deliberations. Sidebars, if you have something to discuss, we would prefer that you take it outside the room; that we do not interrupt the deliberations. One speaker at a time. As Tom said, this is being recorded. Ten minutes for the public comment period. The speakers will have ten minutes. I have a clock here and we're going to be very firm on speaking times. We're going to stick to that ten minutes. I'll probably try to indicate that you have a two minute warning, so that you know to bring your presentation to conclusion. Interruptions and questions. We ask that you please do not interrupt the panel while they're discussing. Save your questions. There will be a question and answer period. The role of the facilitator, as I said, we cannot do this without your concurrence. Is there anything else that you would like to add to this? Or anything? Can we agree that this is how we'll guide our

interactions over the next few days? Is that all right? Okay.

The next most important thing restrooms. Restrooms are . . . go back out the door to the security desk, just past the elevators and turn left through the door and you'll find the rest rooms. Now we're going to have be a little flexible, I understand, we may not have all our presenters here during the time that they are scheduled. We will work within the agenda as it is and be flexible. Any questions? Any questions of the panel? Anything to add to the operating guidelines? Very good. Then, Ms. Gemella, are we prepared for our first speaker at 9:30, which will now be early. Again, if you have public comments to make, we ask that you be here, I would say, a half an hour prior to your presentation.

Ms. Athena Gemella: Mr. James Brown is unfortunately not here, but the other individuals are.

Mr. Stallard: Is Ms. Hilda Rose here and prepared? Good Morning.

Ms. Hilda Rose: My name is Hilda Rose. I'm a parent. We arrived at Camp Lejeune, North Carolina in January of 1984. We could not get into base housing at Tarawa Terrace until a few months later. My son Daniel was born on December 8, 1984. Six weeks before my due date I went into labor. The hospital was not equipped to handle these complications. That's when the medical doctor's at Camp Lejeune decided to transfer me to Camp Smith, Virginia by ambulance to the Naval Hospital. Daniel was born with a heart valve defect. He had to be on Digoxin, an antiarrhythmic medication to prevent his heart from skipping a beat for a whole year. He later on in his life started complaining from pain in his stomach. However, in March of 1985, I became pregnant again. Two months before Nathan was due my husband Jeff got orders to go to Camp Pendleton. So, we left Tarawa Terrace and headed to Camp Pendleton, California. Nathan was born two weeks premature. He had so many problems. I took Nathan to the doctor for his six week check-up, and that's when they discovered that Nathan did not gain weight, but was losing it. He was admitted to the hospital for a high fever and ear infection. That's when they discovered that Nathan had two holes in his kidneys that caused urine to build up and cause an infection. They wanted to operate on him, but because of his age they kept him on antibiotics for a whole year until he was able to handle the complicated surgery. At eleven months, Nathan was admitted to the hospital to fix the urinary reflux on both sides of his kidneys. Even though the surgery closed the holes, Nathan had to stay under the care of a renal doctor up till today. I live in Virginia. Nathan is nineteen years old. I just took him to a urologist and he told me Nathan needs a kidney transplant.

All these problems I experienced as a parent, I never knew what was the cause of these problems that my kids were having. Every time I questioned the doctors for answers at the naval base they would tell me, "Oh, it's probably hereditary." I would look back and none of my family or my husband's family had problems with their kidneys or we had any problems with our hearts skipping a beat. So, that was very confusing for me. When I was stationed in Germany, I was contacted by the ATSDR research group, and they wanted to speak with me because both my kids were conceived on the based, and I was part of the research. I'm so glad they've done this. It gave me answers to the problems my kids had, they're still

having and they will have for the rest of their lives. Thank you.

Mr. Stallard: Ms. Lita Hyland

Ms. Lita Hyland: Good morning, everybody. Thank you for listening to us. The concerned parents of these children unfortunately be born with kidney holes and all the disadvantage that are usually located in a third world country, like the one that I come from. I immigrated to this country looking for the best of the world for my children. Unfortunately, they have the knowledge being respectful to the life of our baby. My daughter was born. My pregnancy was at Lejeune. I moved a couple of weeks before she was born to my mother's house because I was very sick. I could not take care of myself. My husband was constantly in the fields. He decide to bring me back to my mom. My family was in Washington, D.C. She was born and I have very little things to show people what happened to her. This paper, as I explained to the doctors, my daughter was having convulsions. My English was very limited. She was having high fevers. She grew up to have a lot a problems-high blood pressure. She was fourteen years old when she was um. . . tell by the doctors. The doctors told me that she needs a breast reduction. She had extremely big breast for fourteen years old. I wait until she was nineteen to do this. She was having problems with the sleeping, her knees and bleeding noses. That's my oldest daughter. Then, I have my other daughter who was this little baby right here with a red face [shows a photo to the panel]. She was born again at the Naval Hospital. I was not at Lejeune anymore. I was at Fisher Island. As soon as she was born I realized that something was wrong, because I saw her turning blue. Her tongue was swelling and she didn't stop crying from the moment she was born. So I called the nurses and asked the nurses to please bring me a doctor. But she said [the nurse], "You know they just saw your daughter. She was born just a few minutes ago. She's fine. Don't be nervous." I said, "I am nervous." I don't know why my heart was indicating that something was very wrong with my daughter. So I said, "You bring me the doctor. Wake up the Director of the Hospital, if the doctor, you know, is at church right now, or doesn't want to wake up. Just get the Director, because if something happens to my daughter I will blame you straight." She brought the doctor, and that's when they had to run and do the transfusion on my daughter, because something was wrong with her blood.

Now she was two and a half years old, when she had a little tumor on her breast. About three year's ago she developed a disease . . I will say for a very long time, my kids did complain about their stomachs, but I thought they were copying my symptoms, because I did have problems with my stomach. They saw me vomiting and my stomach problems. So I thought, "These kids are picking up my signals." When I took the kids to the doctors, they said that they were fine, but my youngest daughter developed ulcerations out of her body and severe diarrhea and she has Crohn's disease today. I have been . . . I have a letter from the hospital and I am going to read it. I am sorry about my bad English, but I'm very nervous, too. This is a big thing for my family and I want to be my best -okay.

[She reads a letter] ... has been seen in the Gastroenterology Clinic at the National Naval Hospital Center and Walter Reed Medical Center by multiple gastroenterologists, physicians since January 2003. Her condition remains poorly characterized but she has been demonstrated to have varying degrees of

intestinal inflammation over the previous twelve months period. They're doing two colonoscopy procedures and multiple radiological examinations. Currently her diagnosis can be described as Indeterminate Colitis. Indeterminate Inflammatory Bowel disease. Ms. Hyland has had multiple medical therapies without significant appreciable benefit in her somatic complaints, and including chronic abdominal pain, chronic diarrhea, oral ulcerations, multifocal joint pain, fatigue and depression. She continues to require close follow up. An attempt to determine her exact diagnosis presents a unique learning opportunity for the military physicians and might help in the treatment of similar patients in the future.

This was signed by Dr. Cash, by most of the doctors at the Naval hospital, except for one person who was the Director of the hospital. The Admiral denied her the continuation of the Navy designee. My . . . my thing is gonna stop right there. I have a letter right now that says that its Crohn's Disease and is severe. She had two blood transfusions lately. She barely can do things. The only thing that she does is that she wakes up everyday to see Oprah Winfrey. I am very thankful for it. It makes her happy to see her everyday. Everything have (inaudible). Today the General Surgeon of the Navy denied her because he was the Director of the Hospital before and denied her. He denied her again for the continuation of medicine. The Social Security have denied her, and Dr. Cash has been making a special letter for her, so that they can pay attention to her. She's only twenty-three. She sleep most of the time. She barely can keep any food. My son have a learning disability. He barely can write. He have ADD. He have everything. How is this happen our kids, I don't know, but I know one thing, this is America the greatest country on earth. I came here. I changed my citizenship because I want to help my husband in everything that he does. I support the Marines, but I never sign for my kids to be drafted when they were in my womb, never. I think they have to have all kind of considerations for our children. They did their duty before they was even born. My kids are my heroes, next to my husband. He didn't do anything wrong but serve his country with all the love. Before I got married he told me my duty and my love is for the Marine Corps and my country and you are the third one. Then, probably that, he never ever have a doubt, and we had also the second place of his life, but it was two things that was important to serve this country. And I hope that someone there is going to serve us with what we deserve. We don't have to have kid's sick.

Thank you very much for listening to us.

Mr. Stallard: (inaudible) ... you had some things to share with the panel?

Ms. Hyland: This is when my daughter was waking up, look at that [shows a photograph], and they know what happened to our kids. This is a letter from Dr. Cash. (Inaudible) I make a copy (inaudible), and they notified the Admiral. He is the doctor. He had to know what is happening to us and take care of us. This is my daughter's ulcerations.

Mr. Stallard: Thank you Ms. Hyland. Is Mr. Jerome Ensminger here, please?

Mr. Jerome Ensminger: [spoken away from microphone] I have several others I have to present, and I want

to give mine after I give those.

Mr. Stallard: Yes, sir. Mr. Ensminger has asked that he be positioned to later in the program. Is Mr. James Brown here? No. Mr. Jeff Byron?

Mr. Jeff Byron: Thank you. Good morning. I want to thank the panel for being here first and taking the time and also ATSDR for putting this panel together and listening to our concerns. Really, I'm kind of going off the cuff here, I'm going to give a statement of my family's story and then how I feel that it interconnects with what's going on here. I understand that we're here to first off look at possibly doing further studies on children and adults, other than the children that are in utero. So that's our concern today.

My name is Jeff Byron, I'm from Hamilton, Ohio. I served in the Marine Corps honorably from June 1981 to June 1985 on active duty status. I'm here to ensure that the panel is informed of the negative impact of the toxic contamination on the lives the residents of base housing at Lejeune.

The wells were discovered to be contaminated in 1980, yet were not shut down until 1985. The report that this panel submits . . . well you won't be submitting it to the commandant, you'll be submitting it to ATSDR, cannot possibly be complete without the history of those individuals so negatively impacted by the decision of base housing officials to keep the wells open. Your report will directly impact the future of my family and others like mine. Your panel has been tasked with determining whether or not to further study children who were not in utero and adults who were present at base housing. We don't believe that five years is a timely manner to shut those wells, first off, with the type of sampling that was going on and the information that was available at that time even.

I have some documents that I'll present later, not at this time. They show that they were well aware of the exposure levels that we were getting. I actually take a little bit of exception to the letter that I received concerning the residents of base housing where it says that they "may have been exposed". There's no may about it. We were exposed and the documentation proves it. This is my family's story which is similar to others.

After boot camp and air traffic control school I was assigned a permanent duty station at Camp Lejeune Naval Air Station, New River. The air station provides support for Marine Corps Base Camp Lejeune. For the first six months, my family and I, which included my wife and my unborn child, lived off base in Jacksonville, because it there were no quarters at that time. Off base housing was more expensive and it was not an economically sound decision for someone at my pay grade. My first born, Andrea was born June 5th, '82 at Onslow Memorial, while we lived in off-base housing. We were sent to the civilian hospital due to the fact that there were not enough resources for the base naval hospital to handle the amount of pregnancies on base. In August of '82 our family lived at 1247 Butler Drive in the Midway Park Base Housing Complex. Midway Park is directly across from the main gate at Camp Lejeune. At that point, Andrea had her first sick visit to the medical center on October 5th '82. She was seen nineteen times from

October '82 through July 1983. These were all sick related visits. Prior to moving to base housing, she was seen only for well baby check-ups-height, weight, etc. In August of 1983 renovation of Midway Park forced our family to move again to other base housing. We were assigned quarters at 3114 Boganville Drive in Tarawa Terrace Base Housing Complex.

During our stay in this base housing my daughter, Andrea, was seen by doctor's at the naval hospital on Camp Lejeune thirty-seven more times in the following twenty-two months for such illnesses as rashes, urinary tract infections, yeast infections and unexplained fevers. Most of the time the medical personnel did not have an explanation for the cause, even though blood tests that were done showed that cell counts and other criteria for blood analysis were below normal range. During this time my wife and I conceived our second child, Rachel. She was also born at Onslow Memorial Hospital under the Champus program as well for the same reasons. On her newborn profile the box for no abnormalities was not check marked, even though she had a large raised birth mark on her lower back, large meningioma close to her spine. Hospital personnel told us to take Rachel to the naval hospital at six weeks for her well baby check-up. She was born six weeks prior to my discharge from active duty, which ended June 25, 1985. When Rachel was seen at the base hospital the following statement was written into her medical record:

Her head's up and tracking. She's smiling. Reflexes are off. Female with periodontal dimples. She had slow weight gain and large meningioma on her back. She had brachial dimples that were posterolaterally rotated ears. She had ASD (Atrial Septal Defect). Atrial Septal Defects are a group of rare heart defects that are present at birth, congenital. Appears . . . Periodontal dimples and an umbilical hernia at that time. They did find some other problems later as she was developing.

Upon returning to Ohio, Rachel was seen by a pediatrician and underwent chromosome testing, an EKG and an EEG. She had to be fed in an infant seat because of projectile vomiting. She was labeled a failure to thrive baby. Meanwhile, six months after being discharged from the Corps, Andrea, my first born, was diagnosed with aplastic anemia, a rare bone marrow disorder. She was treated at Children's Hospital Medical Center [CHMC] of Cincinnati Ohio. Cincinnati Children's Medical Hospital at the time was the number two hematology department in the country. The head of the hematology department asked us, if we had been exposed to toxic solvents. They asked us for all the names of the cleaning and hygiene products we were using. All the products were ruled out. We were asked this because chemical solvents, as we were told, were known to cause Aplastic Anemia in men in the manufacturing industry. I'm familiar with these chemicals because I'm general manager of an aerospace manufacturing facility, and these were used at that time in the mid-late eighties. As you may know they upped the price of those chemicals so high because they wanted the industry to get out of it, because of the issues with health. Our answer was no. I was an air traffic controller, so there was no reason for me to be around solvents.

She was in the hospital under quarantine for thirty days. She was given blood, platelet transfusions. She was treated at CHMC until she was twelve years old. As a result of this disease, she was not allowed to participate in normal activities, such as sports and gymnastics and so forth. Toxicological profiles, for PCE,

by ATSDR publications indicate that Aplastic Anemia may be a symptom resulting in the exposure to these chemicals. Andrea's aplastic anemia is in remission now, but her doctors have told her there's a fifty percent chance that the disease could return, if she decides to have a family of her own and becomes pregnant, which both of my daughters at this point are expecting children, one in July and one in August. Our largest fear is that we know these chemicals, from your own toxicological profiles to be mutagenic and also carcinogenic. We live in fear of what's to come, even though we don't express that to our children. We don't know what the outcome of this is. My second daughter has been dramatically affected. She's learning disabled, developmentally disabled. They found an arachnoid cyst on her spine that's congenital. She has spina bifida. She has curvature of the spine. She's nineteen years old and has the back of a woman who's eighty who has been toiling her whole life. It's rolled over. None of this is in my family. There are no birth defects other than crooked teeth, losing hair maybe. That's not a defect, but that is, . . . you know . . . Those are the only things that run in my family that I'm aware of. There's no heart problems. She's just been . . . She's had and has now the following medical problems:

She wore leg braces for leg length discrepancy; was hospitalized for urinary tract infections in '87 and '88. She had surgery for ventricle septal defect and submucous cleft palate, because she was born without a pharyngeal flap. She has speech and hearing impairments, requiring therapy from 1987 through 1996, 9 years. Learning disabilities, she's in an individualized learning program. She's developmentally disabled, as I said. She was enrolled in the county school for developmentally disabled/mentally retarded for fine motor skills and speech therapy. She was exempted from passing the Ohio proficiency tests for graduation, even though she did graduate.

She has taken the Ohio Driver's Test, at this time, it was six times, but it took her nine times to pass the written exam, which she has finally done, which is an accomplishment for her and our family. She had to have surgery to remove the meningioma in 1997. As I said she's been diagnosed with curvature of the spine, an arachnoid cyst on her spine was diagnosed in 2001. All the tests confirm that its congenital from birth. She's being tracked by the Mayfield Clinic of Cincinnati at this time. Dental work is ongoing, Rachel has had to have all of her teeth capped as a child, so that they would hopefully prevent any problems with her adult teeth. Last year, I capped twelve teeth for a nineteen year old.

My twin boys who were born a year later. . . Have they even had a cavity yet? I don't think they've even had a cavity. So something obviously went wrong. I believe that if you take the medical records that I have, which I'll present this afternoon to the panel, for my daughter Andrea, who was born two months prior to me moving on to base housing, within like two months of the time I moved on to base housing she had to be seen . . . how many times? . . . fifty-seven, in two years. Six months after I leave the Corps she comes down with a bone marrow disease. It's related to these chemicals. Dr. Falk may be able to shed more information on that because I notice his name is on these publications. If you take their medical records and put them together something happened. I think you'll find that if these other individuals have medical records for the time frame they were at Camp Lejeune, you'd definitely see a pattern. It doesn't just affect the children that are in utero. My daughter was not in utero, my oldest. But she has bone marrow

problems, which hopefully will remain in remission even though she is pregnant at this time, since she's not near the source of exposure. Rachel's life will be totally compromised. . . Thank you . . . from the time she was born to the time she passes away.

We don't know what's in store for the rest of our family, our grandchildren coming up. I don't think that any of these people know. But we appreciate the fact that you're listening to our circumstances and that you're going to consider furthering this study on children and adults. I hope that does mean the adults, too, because it would be unfair, at this point, twenty years later to come back and not take a look at everyone. If the Department of Defense is here Gentlemen, you should consider your actions. Take the responsibility to at least address the 103 children first, and then if this panel decides that there should be further studies that you should address that to. That's directly to the Commandant of the Marine Corps. Thank you.

Mr. Stallard: Is Mr. James Brown here? Still not. . . This would be your time to speak. [voices away from microphone] Mr. Ensminger will speak on behalf of Ms. Rhodes. Correct?

Mr. Ensminger: Yes. This is the testimony of Ms. Coley Rhodes. She's from Jacksonville, North Carolina.

Because of my job teaching high school chorus and obligations to a music festival made many months prior to this meeting, I could not be here in person. I wanted to make a video of my request, so you could put a face with this testimony, but I did not want to take up any unnecessary time with logistics.

I was employed by the Camp Lejeune Dependent School System, July 1973 until June of 1986. I taught at Delelio Elementary School aboard the air station from January 1973 until July 1980. I then transferred as a music teacher to Tarawa Terrace Elementary School in August of 1980 and worked there until June 1986. In May of 1984 I became pregnant and found out that I was carrying twins. I continued teaching until school was out for the summer in June of 1984 and resumed my classes in August of 1984. I went on maternity leave in January of 1985. In January I went into premature labor and the twins were born on January 25th, 1985. I was hospitalized in Onslow Memorial Hospital in Jacksonville, North Carolina. After their birth, it was discovered that they both had heart defects. Heart defects are not a factor in my family history.

Elizabeth, being my first born, was immediately transferred to Duke Medical Center in Durham. While there, with all their medical knowledge, they could not save her, and she died on February 18, 1985. Rebecca being my second born was able to come home with me for a while. She had special monitors and medicine that had to be administered daily. She required constant supervision. She had several major surgeries at Duke in her short life span. She finally died on April 18, 1985.

Over the years, I have questioned myself for the reason this happened and have had such anguish in my heart by missing my daughters. There is not a day that goes by that I don't think of them and wonder what their lives would have been, had they lived. The hurt never stops. The pain never diminishes. You just learn to live with it on a daily basis. It wasn't until recently that I found out about the contamination on board

Camp Lejeune, specifically in their water, which I drank daily unsuspectingly, while employed at Tarawa Terrace Elementary School.

After reading information concerning chemical contamination, I know within my heart of hearts that this was the very reason I will never see my girls graduate from high school, college or have children of their own. That is why I will never hold them in my arms again. It is my firm belief that the chemical contamination killed my two girls. On July 17th, 2003, I read an article in the Jacksonville Daily News, our local newspaper. The front page story was about a survey showing links to defects and cancer caused by contaminated water at Lejeune. As soon as I read the newspaper, I knew somehow this was the reason for the death of my twins. I called ATSDR, their number listed in the newspaper for information.

On July 21st, 2003 at 10 am I talked with Debra Dunlap. I briefly informed her of my situation and questioned her extensively about the survey that was mentioned in the article. I requested a survey and stressed the importance of the matter. She advised me to follow the study that she indicated would take about eighteen months. She also gave me a number to a Website hotline to call and that was the one for the Marine Corps.

At 2 pm July 21st, 2003, I called this number and spoke with Gunnery Sergeant Hanson. I requested a survey from him as well, after relating my situation. Gunnery Sergeant Hanson told me that they (ATSDR) make the decisions on who will get the surveys. I received some information from the United States Department of Health and Human Services on July 26th, 2003. The information was a toxicological profile for trichloroethylene and a toxicological profile for tetrachlorethylene; Public Health Assessment and a page entitled Frequently Asked Questions. I have never received a survey or been contacted by anyone concerning this. I left my name, address, phone number and a brief synopsis of my situation with everyone with whom I spoke. I also made a plea to keep me informed and send me any information. I am very upset that I have not received a survey or any other correspondence.

I hope this letter will help you understand my situation to some degree. Losing children is the most horrible thing in life. When it happens to you, it is something you never get over. I want to emphasize with this letter today, which happens to be the twentieth anniversary of the death of one of my twins, which would be tomorrow, Elizabeth, the importance of being included in this study. I worked on the base for many years, teaching music to many children in what I thought was a safe environment. I conceived and gave birth to two healthy daughters in 1997 and again in 1980, while teaching across town at the Marine Corps Air Station. I transferred in 1980 to Tarawa Terrace School just a few feet from the contaminated wells, became pregnant with my twins and lost them due to severe heart defects. The care they received after their birth was from some of the best doctors at Duke Medical Center. Dr. Anderson, who is the Chief of Pediatric Cardiology, performed the surgeries that were required.

My twins were diagnosed with congenital heart defects, major cardiac defects, arterial ventricular canal defects and chromosome damage. These are the very developmental effects of trichloroethylene on the

heart, stated in the profile reports. I have never been given the opportunity to fill out a survey and never been given the acknowledgement of inclusion into this study. I am asking for your immediate attention to this situation, an opportunity to fill out the survey and for an acknowledgement of my inclusion into this study. I am asking for your assistance in finding truthful answers to the effect of these toxic substances on my babies due to my drinking this contaminated water. Thank you. Coley Hunt Rhodes.

That is one of the arguments that all of us have been fighting since the beginning of this thing. We found out what the studies did and didn't include. ATSDR said they weren't including any of the in utero children born to anyone that did not live aboard the base. What's the difference? These civilian employees worked there five days a week, exposed to this crap. They need to be included into this. How much does this stuff take? How much of this stuff does it take to a fetus to harm it? There were hundreds, if not thousands of civilian employee women aboard that base. Thank you.

Mr. Stallard: Thank you Mr. Ensminger, for speaking on behalf of Ms. Coley Hunt Rhodes. Mr. Ensminger you are still speaking on behalf of others, is that correct?

Mr. Ensminger: Dr. Michael Gros. This is the statement of Michael L. Gros, M.D. He's from Spring, Texas. February 13th, 2005.

Dear sirs, ladies. This letter is in reply to the panel's request for statements from those affected by Camp Lejeune's water contamination problem.

My family and I lived on base at H-57 M.O.Q. from July 1980 to July of 1983. This housing area, next to the old naval hospital was my family's residence seven days a week for three years. My wife, Janie, and I chose to live there, trusting in the security and safety of base housing. I practice as an obstetrician/gynecologist at the adjacent hospital, until the new hospital was finished shortly before my departure from active duty as a Lieutenant Commander in the Medical Corps of the United States Navy Reserve in 1983.

I had extensive exposure to the ground water. I showered at least twice daily, drank extra water to avoid recurrent kidney stones, swam at the indoor pool down the road from my quarters and scrubbed for many surgeries and deliveries. Needless to say my young family did much of the same. Their baby formula and Kool-Aid were mixed with the same contaminated water from the Hadnot Point Water System for three entire years. Our water was later estimated to contain 1400 ppb TCE, along with other volatile organic compounds. This level of TCE is approximately four times the level which poisoned the water in Woburn, Massachusetts. This is the incident made famous by the movie 'A Civil Action.'

Ironically while living there, we regarded Camp Lejeune as an idyllic place to rear our two young sons. My younger son, Tom was conceived while we lived there and was delivered at the old hospital. If not for his birth there, we would have never found out about this entire disaster.

After leaving Camp Lejeune in 1983, I settled and practiced as a civilian solo OB/GYN in Houston, Texas. In

1994, my blood tests started to show subtle abnormalities. In the summer of 1997, my family was thrown into complete turmoil when I was formally diagnosed with non-Hodgkin's lymphoma (Mycosis fungoides). It ruined my older son Andy's high school graduation time and sent us scrambling for second opinions for some sort of a prognosis.

I was the sole bread winner of the family, sole owner and revenue producer in my medical practice and was faced with sending two sons to college, in addition to providing for all of my own living expenses. My cancer was incurable except through a bone marrow transplant. We attempted several ineffective temporizing treatments recommended by our doctors at M.D. Anderson Cancer Center in an effort to forestall the inevitable.

Out of the blue, between seeing patients in November of 1999, I was asked to take a phone call from Dr. Marie Sochia who was doing a look back study on children born at Camp Lejeune. It was only then that I learned that our ground water had been contaminated. I was happy to report that my son Tom seemed to be well, but I was shocked to find that aside from expressing sympathy about my cancer no plans were in the works to study the health outcomes of the adults like me who lived at Camp Lejeune. This disregard for adults exposed continues to trouble me to this day.

In May of 2002, my disease had inexorably progressed to the point where it had displaced 50% of my bone marrow, making me dangerously immune deficient and unable to see sick patients. I had no choice but to suspend my practice and go into reverse isolation at M.D. Anderson for twenty-six days to receive a bone marrow transplant from my son Tom. I had to fund this expensive procedure with my own resources since the Veteran's Administration refused my request to fund my transplant. I was not aware at that time that I would never be able to practice my profession again, due to the subsequent unpredictable and unwelcome side effects of the transplant itself.

While I was thankfully in remission from my original disease, I now had a new chronic disease called graft-vs.-host disease. This arises from the inherent mismatch of DNA between me and my son. In short, my new bone marrow had cleared the cancer cells and now set about destroying my body, the host.

The past two years have been spent in an intensive outpatient treatment costing approximately \$50,000 per month. I soon will exceed the lifetime limit on my private health insurance policy. I continue to suffer damage to my connective tissue, my liver, skin, eyes, nervous tissue, and the cumulative joint damage brought about by several courses of high dose steroids. I go for treatment two days out of the week. I am chronically weak, anemic, and am subject to infections as a result of the medications needed to control the graft-vs. host problems. I was forced to sell my practice at a huge financial loss.

During all this time, my loving family has suffered great emotional trauma. They continue to fear for their future health and the potential genetic damage to their offspring. We have learned to enjoy each day in a special way, but we certainly cannot plan for much of the future. We live in fear of bankruptcy and death on a daily basis.

In summary, I present my case as an example of how this water contamination can affect people's lives. I feel like my family and many others were unwitting subjects in some sort of cruel experiment where no attempt is being made to find out the horrible effects which have occurred to the people like me. There are probably hundreds of other stories similar to mine which remain to be told, if only the people involved knew what happened at Camp Lejeune.

Since reading the preamble for the ATSDR health assessment of 1997, I take strong exception to the way in which the plight of adults, such as myself, were summarily ignored in one or two paragraphs without any identifiable peer review or documentation. At the same time, the very limited study undertaken of the in utero exposures was flawed by reliance on inaccurate water supply information provided by the Marine Corps, and fails to account for a large number of infants born on Camp Lejeune, which is the military's private medical insurance, at Oslow County Hospital.

I do not purport to be an epidemiologist, but I do have some basic medical and scientific training. My informal discussions of this matter with various experts in epidemiology and toxicology reveal their similar skepticism about the assumption that adults were not affected by the levels of TCE and other toxic compounds found in the water supply at Camp Lejeune before 1985.

I think a formal independent review of the data, assumptions and methodology employed in the original studies by ATSDR is long overdue. Hopefully, after twenty years of shameful delays, we can finally get on track and do the right thing for our volunteer service personnel and their families.

All individuals exposed for significant time periods need to be studied in a retrospective fashion for possible adverse effects. I am convinced that our government has the resources and the access to the data to make this possible. Sincerely, Michael L. Gros, M.D.

Mr. Stallard: Thank you Mr. Ensminger on behalf of Dr. Michael Gros. Mr. Ensminger, I see that you are also here to speak on behalf of Mr. Thomas Townsend. Is that correct?

Mr. Ensminger: Yeah. Can I have a break?

Mr. Stallard: I think that would be perfect.

[laughter]

Mr. Stallard: I have approximately 10:10 right now. We will back in fifteen minutes. We will take a break if that's all right. Right now. So be back please at 10:25.

[Whereupon, the meeting adjourned for a break]

Mr. Stallard: Ladies and Gentlemen we'll be resuming in just a few moments.

Dr. David Williamson: Well, good morning. We're going to go ahead and resume with the next part of our expert panel meeting today. I'd like to join Dr. Falk and Dr. Sinks in welcoming each of you here to Atlanta and to our expert panel meeting on the Camp Lejeune study and other activities. The purpose of this session is for us in the Division of Health Studies at ATSDR to give a presentation to the expert panel to update them on some of our most recent activities dealing with the epidemiologic health study that's currently ongoing. But, I would like to take just a second to make a comment. I have worked at the Centers for Disease Control and Prevention for about fifteen years before I joined ATSDR about three and a half years ago. I had heard an awful lot about ATSDR and the commitment that ATSDR has to communities. When I worked at CDC, I worked a lot with state and local partners. I worked also with communities, but mainly with the public health officials of communities. That changes at ATSDR. One of the things that I'm very proud to say is that there is a very strong commitment of ATSDR for the scientists who are at ATSDR and for everybody at ATSDR to work with the communities to actually go out into the communities, put names and faces together and really try to gain the trust of the communities. To let them know that our job is to help the communities as best we can. One of the things that I think is unique to ATSDR is that we do have specific. . . not that we have specific authorities and responsibilities, because all agencies have those, but I think one of the things that makes ATSDR unique is the commitment of its' individuals. Our scientists, who you are going to meet in a few minutes, are very, very committed to you, to the communities of Camp Lejeune and the other communities that we work with and are so committed that even, if there are things that we can do that are outside our responsibilities and authorities, we will do everything we can to try to help you and the communities. That's a commitment that you have from ATSDR, and you certainly have that from our division, the Division of Health Studies.

Now let me introduce Perri Ruckart. Perri is an epidemiologist in the Division of Health Studies and she is the Principal Investigator for this epidemiologic study that the panel and you are going to hear a little bit about, right now. I think Perry's going to introduce the rest of the team. Or at least significant members of the team, because we have a lot of people working on the Camp Lejeune activities and on this health study. Some of the significant ones are here. It's my understanding that they will be here throughout the next couple of days in order to be resources for the panel, should you have questions, technical questions. Then we'll be happy to be here and try to answeranswer those and be available as a resource. So Perri with that, I'm going to turn it over to you and again thank everybody for being here. If there's anything that we can do in the Division of Health Studies doesn't hesitate to ask us.

Dr. Perri Ruckart: Good Morning. I'm going to be giving a summary of the ATSDR Activities at U.S. Marine Corps (USMC) Base, Camp Lejeune. Can everyone hear me? As David said, I'm Perri Ruckart, Principal Investigator. I wanted to introduce the other members of the Camp Lejeune Team for the current study: Frank Bove, Shannon Rossiter, and Morris Maslia.

Base operations at Camp Lejeune began in the 1940s. Currently, the base is home to a population of 150,000. According to the 1990 census almost two-thirds of active military personnel and their dependents are under age twenty-five. So, it's a relatively young population living on the base. In 1980 the census

showed a similar age distribution. Because this is a military base there's been considerable in and out migration from the base. Camp Lejeune Naval Hospital staff estimated that one-third of mothers receiving pre-natal care at the naval hospital during the 1970s and '80s were transferred from the base before delivery. The average duration for on base housing is about two years. Fifteen different base housing areas were available for enlisted personnel, officers and their families. Three distinct water distribution systems served these housing areas. I'm going to show you them on the map. . . . Sorry . . . At the upper central part of the map is Tarawa Terrace. It was constructed in 1954, below that is Holcomb Boulevard. It was constructed in 1972 and below that is Hadnot Point which was constructed in the 1940s.

Among these three water distribution systems during the 1970s and '80s drinking water was extracted from over a hundred wells, treated at eight treatment plants and distributed through a network of distribution pipes. We think that each of these three systems operated independently. Underground storage tanks were installed at Hadnot Point in the 1940s and '50s and were used to store waste degreasing solvents. In 1954, ABC One Hour Cleaners began operations near the base. In 1958, a supply well for Tarawa Terrace was installed near the septic tank system of the dry cleaners. In January 1985, a fuel pump broke at Holcomb Boulevard causing Hadnot Point to temporarily supply water to Holcomb Boulevard, for a twelve day period while repairs were being made. Contamination of Hadnot Point and Tarawa Terrace drinking systems was intermittent because each system had more wells than necessary to supply water on any given day. Wells were rotated in and out of service. Therefore, contamination levels in the drinking water distribution depended on the wells being used at a particular time. It is believed that water from each system, water from all wells in use was mixed before treatment and distribution.

There was no sampling prior to the 1980s. However, VOCs were detected at Hadnot Point and Tarawa Terrace Wells during a sampling program in 1980 into 1985. TCE, PCE, benzene and DCE were found at the levels that I will show on the next slide. Contamination of the wells likely began many years before detection, and could have started as early as the 1950s. The possible sources of contamination include, for Hadnot Point, leaking underground storage tanks, spills and other waste disposal practices. In Tarawa Terrace, the contamination was mainly PCE from the dry cleaners. The contaminated wells were shut down by February 1985.

The base began sampling Hadnot Point in 1980 for Trihalomethanes (THM). The analysis showed VOCs other than THMs. Samples taken in 1981 also noted the presence of VOCs other than THMs. In 1982, the base began using a different lab to analyze the samples. This lab also noted interference with identified VOCs. Reanalysis of the samples collected in 1982 and additional samples collected during 1983 to 1985 found the levels of the chemicals found in the tables. There were no water quality standards for these VOCs in 1982, so no actions were taken. However, all contaminated wells were shut down by February 1985. Camp Lejeune and ABC Cleaners were listed on the EPA national list for Superfund sites in 1989.

ATSDR is required by law to conduct a public health assessment, which we call a PHA, at each Superfund site. The aim of the PHA is to determine whether the population residing around a particular site is

exposed to toxic substances and to assess whether any adverse health effects resulted from the exposure. ATSDR published a PHA for Camp Lejeune in final format in 1997. The PHA determined that VOC exposure in drinking water at Camp Lejeune was substantially lower than the levels of concern in animal studies and also lower than the levels seen in workplace studies. Therefore, ATSDR concluded that the cancer and non-cancer health effects were unlikely in adults exposed to VOC contaminated water at Camp Lejeune, based on worst case scenarios.

I wanted to point out something about the column on this table called Exposure Time Frame. We don't have any data to confirm contamination prior to the 1980s. That's why that time period is listed as unknown about exposure; however, the dry cleaners began operations in 1954 and underground storage tanks were installed in 1940s and 1950s.

Because of the limited information in the scientific literature on how these chemicals might affect a fetus or a child, the PHA recommended that an epidemiologic study be conducted to evaluate whether in utero exposure to chlorinated solvents in drinking water at Camp Lejeune was associated with a higher risk of having an adverse birth outcome or childhood cancer. As a first step in following up the PHA recommendation, ATSDR utilized available databases to evaluate whether associations existed between potential maternal exposure to drinking water contaminants on base at Camp Lejeune and pre-term birth, small for gestational age (known as SGA), and mean birth weight deficit. Preterm birth was defined as less than thirty-seven weeks gestational age and SGA was defined as less than a tenth percentile weight by gestational week using the published specific norms for whites in California. We chose 1968 as the starting point for the study, because this is the year birth certificates became electronic in North Carolina. We attained birth certificate information on 12,493 singleton live births at the base, during the period 1968 to 1985. Base housing records provided dates of occupancy, which were used to estimate the dates during pregnancy that the mother resided in a base housing unit.

The study estimated that 6,117 births occurred to moms exposed to PCE from residing at Tarawa Terrace for at least one week. Thirty-one births occurred to mothers exposed to PCE from residing at Hadnot Point for at least one week and fourteen births occurred to mothers exposed to PCE from residing at Holcomb Boulevard when that water system was briefly supplied by Hadnot Point. Half of the births in the study were not served by Tarawa Terrace or Hadnot Point water and were therefore considered unexposed at the time. However, new information shows that some of these births may also have been exposed to contaminated drinking water. The study identified eight-three fetal deaths. This was likely an under-ascertainment and the cause of death was missing for most. Therefore, there is insufficient data available to study fetal death.

The study concluded that there was an elevated risk for SGA among male infants exposed to Hadnot Point water which was primarily contaminated with TCE. It also concluded there was an elevated risk of SGA among infants born to mothers greater than 35 years of age and among mothers with two or more prior fetal losses exposed to Tarawa Terrace water, which was primarily contaminated with PCE. There was no

elevated risk found for females.

Because the 1998 study relied on birth certificate information, it could not evaluate birth defects or childhood cancer. The current study will do this using a case control design. This is a multi-step process. The first step consisted of reviewing toxicologic and epidemiologic literature to narrow the focus of the specific birth defects and childhood cancers that might be associated with drinking water contaminants detected at Camp Lejeune. This slide shows the outcome selected for further study based mainly on evidence from PCE studies at VOC contaminated drinking water.

The second step was to conduct a telephone survey to identify the potential cases of the selected adverse childhood outcomes among births occurring to mothers residing on bases at any time during their pregnancy from 1968 to 1985. The objective of the survey was to determine whether an epi study of the selected adverse outcomes was feasible. This slide shows the questions that needed to be addressed by the survey before we could proceed.

The survey began in September 1999 and concluded in January 2002. The survey included births on base and births that occurred after the mothers were transferred off base. It is estimated that 3,500 to 4,500 mothers were transferred off base for delivery. It's estimated that 16,000 to 17,000 births occurred where the mother was pregnant at any time while living on base from 1968 to 1985. We surveyed the parents of 12,598 eligible children. This was a labor intensive effort and we used several means to identify this population, such as Marine databases, the media, and referrals from other people who were part of the survey. The survey was necessary because data from the North Carolina Cancer and Birth Defects Registries were not available prior to 1985. Also, a high number of mothers were transferred off-base before delivery and did not give birth in North Carolina. Sufficient numbers of neural tube defects, oral clefts and childhood leukemias were reported in the survey. A total of ninety-nine cases were reported. Thirty-five neural tube defects, forty-two oral cleft defects and twenty-two childhood leukemias.

The third step is verification of the reported cases. To date, medical records have been obtained for sixty percent of ninety-nine reported cases. Twenty reported cases were confirmed as either not having the condition of interest or were ineligible. So that leaves us with seventy-nine remaining cases, who were either confirmed or pending. We use pending to mean that we are still trying to obtain the medical records to confirm that the child has the condition of interest. Out of these seventy-nine we have fifteen neural tube defects confirmed as having that condition and thirteen are still pending. We have twenty cases that are confirmed as having oral clefts and sixteen are still pending for oral clefts. Twelve children confirmed as having childhood leukemia and three are still pending. We randomly selected 818 controls from the original survey population of children who did not have the condition of interest. Controls were over sampled to insure an approximate ten to one ratio of controls to cases. This is not a matched sample.

Mr. Byron: Can you explain that? We are not medical people.

Dr. Ruckart: Are we taking questions from the panel?

Mr. Stallard: Yes, please hold questions.

Dr. Ruckart: Detailed interviews will be administered beginning in March 2005 to parents of the cases and controls to obtain information on maternal water consumption habits, residential history and maternal and paternal risk factors. We will attempt to interview all confirmed and pending cases and controls. Case verification will continue until interviewing is completed. We anticipate a ninety percent participation rate based on previous contact with this population and their interest in this study.

There is a lack of historical contaminant specific data at Camp Lejeune. This requires a modeling approach. To provide a quantitative estimate of exposure, a historical exposure reconstruction approach will be taken consisting of modeling ground water flow and present day water distribution systems at Camp Lejeune and extrapolating backwards in time. This is a similar approach as was taken in the Dover Township, New Jersey childhood cancer study. The water modeling component needs to address the following questions shown on the slide. ...The goals of the water modeling component are to determine when contamination arrived at the wells and the spatial and temporal distribution of contaminants by housing location.

I'd like to conclude with a project timeline. We anticipate the study will be completed by the end of 2007. Then, the findings can be disseminated to the public.

Mr. Stallard: Thank you Perri. That concludes our presentation. This is a period of time now for the panel to ask the presenters and the team members any questions pertaining to the presentation.

Dr. Cantor: So we have the full team that's mentioned here is seated? I think it is Dr. Bove, Ms. Rossiter, and Mr. Maslia. Is there a panel member who would like to start the questioning?

Dr. Ozonoff: Well, before we do that, maybe I could just cede my question to Mr. Byron. Maybe he can have his question answered.

Mr. Byron: Thank you. I just didn't understand one page, wanted clarification.

Mr. Stallard: The question was about selecting controls?

Dr. Ozonoff: It was a good question about what does it mean for this not to be a matched sample.

Dr. Ruckart: Not to be a matched sample on how we're selecting controls or

Dr. Ozonoff: Matched control set. Right.

Dr. Ruckart: For case control study we have identified the cases that have the conditions of interest and then from our surveyed population we also identify children who do not have those conditions. Then we look and see who was exposed. Then we can say, if there is more risk, people are cases or not. So you have to have some children that they're being compared to, those are the controls. They're drawn from

the same survey population, but as I mentioned, they do not have the conditions of interest. So, we can see if exposure to the contaminated drinking water is an influence and a factor. We've selected more controls than cases to make sure that we have enough power to actually find something and we're not matching. Meaning, sometimes studies will try to make sure that the keys and controls are somewhat similar to sex or gender, or grades or things like that. We're not doing that in this case. We'll be able to handle anything like that when we analyze it.

Mr. Stallard: Dr. Drane.

Dr. Drane: Yes. I want to know why you left out cancer in children, or did you not leave it out?

Dr. Ruckart: No. The conditions that we are going to be including are neural tube defects, oral clefts and childhood leukemias.

Dr. Drane: Childhood leukemia, but no other cancer?

Dr. Ruckart: We did initially hope to include non-Hodgkin's lymphoma and the survey identified or reported seven cases of non-Hodgkin's lymphoma, but of those seven, three were either ineligible or confirmed as not having non-Hodgkin's lymphoma. That left us with four, of the four non-Hodgkin's lymphoma. Two were confirmed as having non-Hodgkin's lymphoma and the other two were still in the pending category. That only left us with four, which was not enough to further study that outcome. We had to not include that.

Dr. Ozonoff: Could I just follow up on that? I know Courtney has a question, too, but, did you consider just doing blood cancers and that would allow you to include some non-Hodgkin, whatever non-Hodgkin's lymphomas you were able to confirm?

Female voice: You'll have to go to a microphone.

Mr. Stallard: This one would work.

Dr. Bove: It was decided to look at childhood leukemias and non-Hodgkin's lymphomas based on . . . first of all the New Jersey study, which looked at seventy-five towns in northern New Jersey and found associations between TCE and childhood leukemia, also adult, non-Hodgkin's lymphoma for TCE and PCE. So that was sort of the basis for why we decided to even look at non-Hodgkin's lymphoma, even though there are no studies that look at childhood non-Hodgkin's lymphoma for TCE or PCE, as far as I know, as Perri just said. We only found really two confirmed and two possible. So, we decided to abandon that part of the study.

Dr. Ozonoff: Well, I . . . My question is why not throw them in with hematopoietic cancers in children.

Dr. Bove: You mean combine them. Well, we could do that. We could still see, if we can confirm those

other two pending cases. We could do that, so that if they are confirmed we'll have four and link them with the other. We would basically just link them, because I don't know how much information we've gotten from medical records to determine cell type, although most of the children the all will be B-cell.

Dr. Ozonoff: Yeah, I mean, they're all coming from a common progenitive stem cell. Depending upon where TCE or PCE waxed at, in the development for those cells it could turn out to be a solid tumor or a blood tumor. I worry sometimes that we slice the bologna so thin, that by the time you look at all the cell types you never get any answers.

[Applause]

Dr. Bove: Well, yeah, well, given that we don't have that many childhood leukemias either that are confirmed. We could do that.

Dr. Visintainer: I was wondering about the heart defects. I assume you didn't find sufficient numbers, is that why they're not included?

Dr. Ruckart: Yes, we felt that those were likely to be unascertained. We did not get enough to study that further.

Dr. Bove: Basically, we found about a third of what we expect, based upon the metropolitan Atlanta congenital birth defects registry. The problem here is that a lot of these heart conditions are detected by a surveillance system. Certainly surveillance systems that go off to two years and, uh, confirmed cases as they go. Survey, I would say is one of the worst ways to get at birth defects, but unfortunately that was the only way in this situation. Because there was no population based birth defect registry and birth certificates will miss them as well. Actually, birth certificates do not evaluate to that fine a detail, even a current birth certificate, let alone birth certificates in the past. So we found about a third of what would be expected. We felt that we were obviously under-ascertaining. So it wasn't worth continuing. That's unfortunate because there is a Tucson study that was not very well done. It would be nice to revisit that. I didn't see heart defects in my study in New Jersey associated with TCE or PCE, but Tucson did. At Woburn there were too few birth defects in general to even look at. They didn't find an association there either. It was I think, again, a problem of small numbers. It would be nice to evaluate it, but there'd have to be another study.

Dr. Visintainer: But the heart defect information coming back from the survey was low . . . that's what you're saying was below, was one third of what you expected?

Dr. Bove: Right. The conotruncal heart defects which were listed, the Tucson study . . . It's not clear what heart defects are included in that study. They were confirmed by echocardiogram or some other method. So, we figure they're the severe heart defects, but there was never in the article itself a description of what heart defects were included. In my study, I had a longer list than conotruncal heart defects, but there again, they were more severe ones. We didn't include PDAs. We looked at VSDs separately and so on. But

in general, we were either going to under-ascertain them. So that's why we're not studying them.

Dr. Cantor: Just to follow up on that, I wonder if it would be possible to go back to the investigators in the Tucson study to get them to differentiate the heart defects they did see. So the ones that were more likely to appear as a self report in your survey could be separately identified there.

Dr. Bove: There are a whole lot of problems with the Tucson study. I'm the only one . . . I'm not the only one, there are a lot of researchers missing because of the problems, trying to understand the study. I actually think you can get something out of it. Again, I looked at severe heart defects in New Jersey and TCE. They didn't have these kinds of levels. I'm not sure what the levels were in Tucson. I can't remember them off the top of my head, but they were higher than in New Jersey, for sure.

Again, I just think that no matter what we do here, we're not going to ascertain the full. The better approach would be to find another population exposed to TCE or PCE where there's a birth defect registry. I think that's really where the better science will occur, with a surveillance system ascertaining the birth defects.

Mr. Stallard: Dr. Lynch.

Dr. Lynch: Actually, I'm curious. I share some of the questions that have been raised about how the various birth defects and outcomes were selected. For instance in the July 2, '03 progress report, there's one list of outcomes of interest and that doesn't seem to agree with the list that Dr. Ruckart presented. Like for instance, anencephaly. I'm assuming you probably didn't find enough. . .

Dr. Bove: No, no. Anencephaly is neural tube defect.

Dr. Lynch: Oh, yeah.

[voices overlap]

Dr. Lynch: Okay. It's considered under NTD. Okay.

Dr. Bove: We also don't point out any choanal atresia, by the way. That was why we're not...

Dr. Lynch: Okay. That's why.

Dr. Bove: Probably we didn't expect any either; it's a small population.

Dr. Lynch: So, my question is basically did you it sounds like you used a combination of . . . You looked at . . . You (up – phonetic) your areas set out to look at things that have been shown previously in the literature to have an effect, and then basically looked at the data to see what was collected to see, if there would be enough power to even look at these things. I would definitely share Dr. Ozonoff's suggestion of going back and looking at that list and trying to do some reasonable groupings, because I think you might be

able to get some reasonable answers doing some groupings.

And my other question is related to the birth certificates. So you estimate the 16,000 to 17,000 births occurred during that time. You found . . . was it correct you found 12,598 birth certificates.

Dr. Bove: No. It's twelve thousand. . .

Dr. Ruckart: Well, it depends if you're talking about the 1998 study or our current study. The 1998 study relied only on birth certificates in North Carolina, births occurring on the base. That was 12,493. Our current study was also open to births that occurred after the mothers were transferred from the base. Our estimate is that that total population is 16,000 to 17,000 using the 12,493 that occurred on the base, plus the estimated 3,500 to 4,500 that occurred off base. So that's how we get a total of between 16,000 to 17,000. Of those we, as part of the survey, interviewed 12,598. That's why we say the range 74 to 80 pending.

Dr. Bove: Remember though that that 3,000 to 4,000, we really don't know.

Dr. Lynch: Right.

Dr. Bove: It was based on hearsay at the hospital, how many women had their prenatal care at that hospital and then were transferred off base including delivery. So we don't really know.

Dr. Lynch: I guess what I'm asking about is the participation rate . . . of that 74 to 80 percent participation rate, what portion of the people who were not surveyed could you not find, versus those who refused to participate? We're you able to kind of figure out who you were not able to find, because from public comments this morning it sounds like there were some people who were not contacted.

Dr. Bove: We have the percentage of participation of those we know were born at the base, and that was, what, about eighty percent? I don't remember exactly. Something of that sort. So, it's about eighty percent of those we know were born in Onslow County; that also lived at base housing at the time of delivery, was what the requirement was. There are other births that occurred in Onslow County some to Marine families, but they were living off-base at the time of delivery. So they weren't included in the 1998 study. So this 12,490 some, where the mother delivered in a residence that was on base, housing. Of that I think we were able to interview up to about eighty percent. I don't have the figures right in front of me.

Dr. Cantor: That's because the other group you were not able to find.

Dr. Bove: Then there's thirty-five to forty-five hundred we're not sure, based on what the hospital says the percent the hospital says take their prenatal, get transferred before delivery and then give birth, who knows where. Okay. So that's where this figure varies.

Dr. Cantor: Okay, I see.

Dr. Bove: So what we do know. . . What we did was we looked at all the births in Onslow County. We were able to do that because by '68 they were computerized at the county level. Okay. We then hand searched through that to get the street address that wasn't computerized. We then matched that to the housing records, which was also not computerized, around some 70, 80,000. . . I can't remember how many boxes, and then matched, based on the father's name and the mother's street address. Of those matched, we got 12,493 for that study of small for gestational age. There were a lot of people who were waiting for housing on base during the study period. There was a waiting list to get on base housing. That's our understanding anyway. So that explains some of the discrepancy between the amount of births occurring in the county during that period and the amount in the 1998 study.

Dr. Ruckart: That's because the births that occurred to the people who did not live on base at any time couldn't be included.

Dr. Bove: It's confusing but....

Dr. Cantor: The birth stuff that you do know about do you have reasons for the twenty percent that you were not able to interview?

Dr. Bove: It was an incredible effort to try to locate and then contact these people. We were able to get Social Security numbers on some, from the hospital. We also used the manpower database that the Marines had to get Social Security numbers, but there was a large number that we couldn't get Social Security numbers. Then we would send the Social Security number to the Lexus Nexis. They would give us the contact information, we would contact them. But there were a lot of people we could not get Social Security numbers from and we had to rely on other methods. We looked at the Marine Association. We looked at the Marines themselves to link with their records. We used the media. The Marines sent memos to news sites and so on. We got referrals from the people we interviewed to give it . . . those in particular for people who were born off base. So there were various methods we used. I think part of the problem is not being able to locate them and then there were some refusals.

Dr. Cantor: Obviously, the only major concern scientifically is that, if any of the refusals or the proportion of the refusals were based on the fact that they didn't want to deal with this issue. . . that it was too difficult for them to deal with. So, did you have a response to that? Or you don't know at this point?

Dr. Ruckart: Of the ninety-nine cases, there are twenty that were either confirmed did not have any condition of interest or ineligible and that does include a few refusal. . . people who refused to provide documentation. Now, we don't know if that would actually turn out to be a confirmed case or not. But there are a very small percentage of those who refusing to provide the records.

Dr. Bove: Keep in mind that a large percentage, we're not sure how many, were unexposed. In the 1998 study, Nancy Sonnenfeld did the study. That study estimated that 5,000 some births were unexposed, okay, based on information we had at the time from the military. Since then we learned that the

information was somewhat erroneous, that, in fact, more births probably were exposed. So, we're waiting for the water modeling effort to determine that. It could have been four or five years, for example, where exposures to TCE could have occurred to quite a sizable number of births. In Nancy's study, in the 1998 study, there was probably a good deal of exposure misclassification probably non-differential. There are still quite a number of births that were not exposed to either TCE or PCE. I don't think that the refusal rate is related to that. I don't think it's related . . . I think people were contacted wanted to tell us about other health problems they had. You could say it might be related to that, but it's hard to say. But I don't think it was related to exposure, at least.

Dr. Ruckart: One thing I want to add. We are going through the process now of verifying our pending cases. We haven't closed out anymore of those one way or the other, but anecdotally, it seemed that some of those may also turn out to be confirmed as not having the condition of interest. It's very hard to get confirmation of our cases, of reported cases, difficult.

Dr. Visintainer: Just for my own clarification, I just want to verify that the survey includes mothers who had a residence on base from 1968 to endpoint who gave birth, even though they may never have contacted medical personnel on base. Everything is off-base, right? We've heard some testimony this morning that through Champus, or something, that all medical care may have been taken off-base.

Dr. Bove: If they were born in the county. . .

Dr. Visintainer: If they were born in the county and claimed residence on base they would have been in the survey?

Dr. Ruckart: Yes, because . .

Dr. Visintainer: Regardless of where they got their medical care.

Dr. Ruckart: Yes, because we're including . . . the requirement is that the mother lived on base at any time during her pregnancy between 1968 and 1985, but they could have delivered off-base. That is where we don't have records of the birth, that the referral service could be used. They would call us and then we would get the birth certificate, then we would have confirmation from the housing records they lived on base. They could be included.

Dr. Bove: Of course, there could be data entry errors.

Dr. Ozonoff: This includes civilian employees, too?

Dr. Bove: What?

Dr. Ozonoff: Does this include civilian employees on the base?

Dr. Bove: No. They had to reside in base housing. The mothers had to reside in base housing or their father had to reside in base housing.

Dr. Ozonoff: So the testimony that we heard this morning, of a woman who was not contacted because she taught at the school. She would not be included, is that right?

Dr. Bove: Right. Unless she lived in base housing.

Dr. Ozonoff: Unless she lived on base housing.

Dr. Bove: That was the, that was [inaudible].

Dr. Cantor: I wanted to carry on the theme that you raised in terms of the ascertainment of the cardiac anomalies. I assumed you've checked the rates of leukemia and other conditions that you found by now, and how do these stack up with the expectation based on local or national registries. The question is how well are you doing in ascertaining cases overall?

Dr. Bove: Well, we still have to verify. If we just went on what we had reported we're doing quite well with neural tube defects and childhood leukemia, oral clefts, above expected, but we haven't confirmed them all. Also, some of them were unexposed.

[voices overlapped]

So, regardless of exposure, from the self reports we're doing higher than expected for those conditions based on surveillance systems, right, based on surveillance systems we're doing better.

Dr. Cantor: And the leukemias?

Dr. Bove: Yeah. Not Hodgkin's lymphomas, you know, right, right, I can't say.

[voices overlap]

Dr. Ozonoff: I'd like to ask Dr. Ruckart some questions about the Achilles heel of all studies like this, which is exposure. You said that these systems . . . you don't believe that . . . I wrote it down. . . you believe that they were operated independently. Does that mean they are not connected at all?

Dr. Ruckart: I'd like to have Mr. Maslia, the Project Officer for the water modeling study, to come and answer any questions about the exposure part.

[Voices away from mike]

Mr. Morris Maslia: Let me introduce myself. I'm Morris Maslia. I'm a research environmental engineer with the Division of Health Assessment and Consultation, here at ATSDR. I am the Project Officer in charge of . .

. what we're terming the water modeling. The question, just to repeat to make sure I understood it. You want to know about the operations of the systems and whether they were operated independently.

Dr. Ozonoff: Well, my first question is, are they connected?

Mr. Maslia: It depends on what point in time you're talking about. They have been. I don't have a map here, but there are interconnection valves, that allow the systems to be connected to each other for emergency purposes only. So, for example, I don't know how familiar anyone is that's not been on base, but there's a pipeline that goes. . . . a couple of pipelines, that go from Hadnot Point, which is the southernmost area we're considering, up to Holcomb Boulevard, which is the central area. There are two locations, four valves that must be opened to get to each other. At the present time, and for the foreseeable past, they have been closed.

We have sat down for hours on end, and I have this in writing on Marine Corps stationary, specifically asking that question. The answers we have been given is that they were opened only for a couple of hours for emergency purposes only. We have spent a lot of time on that issue because that has a direct determination on how, for present day field testing as well as for historical reconstruction purposes, we would model the system or systems together or separately. When one water treatment plant is either brought on line or replaces another one, they didn't necessarily open up and interconnect the systems. They may have built another pie [phonetic] plot. This is the case with Tarawa Terrace. When they had to shut down . . . they shut down the wells in '85. They shut down the treatment plant in '87. So presently Tarawa Terrace, which is the northernmost of the area, has an underground reservoir. That reservoir is treated water. That water is treated at Holcomb Boulevard. A pipeline directly pipes it over into the Tarawa Terrace underground storage tank. Then depending on demand conditions at Tarawa Terrace, not Holcomb Boulevard, that water is then distributed to Tarawa Terrace, Camp Johnson, Ox Trailer Park and those areas.

Dr. Ozonoff: So, if I understand what you're saying, they are physically interconnected, but you don't believe they were hydraulically interconnected, because there are valves that prevent that.

Mr. Maslia: Yes, that is correct. That is, in fact, an issue that . . as I said . . We've had numerous discussions. I believe the last time was in August, ...this September. Then, I raised the issue again in a letter in October and received . . . stated our understanding that the systems were for epidemiologic purposes and for hydraulic modeling purposes considered closed. . the bounds closed, operated separately. That was confirmed in a letter back from the Marine Corps that that is the way the systems were operated.

In the modeling we are doing, we've been asked to provide monthly estimates of average operations. So that means we are not going to model, if there was a pipe break. That's an instantaneous occurrence and a rare event easily fixed within a few hours or a day at the most. That is far beyond the expectation of any modeling that can be done because of the lack of operational data. So we are modeling on average monthly basis of conditions. We are considering it at this point in time. . . I need to qualify it a bit. . . Our

understanding is that there are three separate systems, . . . that has tripled our effort by the way, because now we have to develop three separate water distribution system models for that. At this point in time that's where we stand.

Dr. Ozonoff: So the validity of your modeling is really dependent upon the validity of those statements of the Marine Corps about those connections.

Mr. Maslia: I wouldn't use the term validity. What I would use is the models are being calibrated and history matched to those conditions. If information comes forth in further discussions or documents that tells us "no, they were interconnected," or it's hypothesized that we may wish to look at what exposure might look like, the models can be interconnected.

Dr. Ozonoff: Let me break the ice here and ask a really stupid question . . . I think it'll be the first one of the day. [laughter] I'm out of my field here, but . . . wouldn't it be possible to model the whole system, all three of these systems, as one system. Then involve the valve closures as one of the conditions?

Mr. Maslia: You have to model the hydraulics, not necessarily just the physical plant. The physical plant, we have it now. We have all the pipelines and we have all the valves. We've just segmented it off. What the issue is, is that each water treatment plant . . . and let's go back historically, at some point in time there may have been three, then switched to two. The way the water is distributed based on demand, if you have demand at Holcomb Boulevard, that Hadnot Point is not going to turn on, just because there's demand at Holcomb Boulevard. It's operated hydraulically separately, so it would not matter if we had all three connected, you would not see really anything of significance or really any sensitivity in the other systems if something's occurring at one location because of the hydraulics. So that really from trying to meet the schedule, rather than considering a couple of thousand pipe segments, you're now considering ten or fifteen thousand pipe segments with only really about five of them remained to what you're looking at.

Dr. Ozonoff: Given the assumptions that you're making I can understand exactly what your saying, but what if it turns out that there were interconnections there?

Mr. Maslia: That's what I'm saying is we have not eliminated the pipes from the model. They're just segmented and we can say easily from the standpoint of computer input and all that, it's not an issue to connect them back up. It's not an issue to run sensitivity analysis with them connected up. But what you want is, again . . . a computer model is, those who are dealing in the air, is really a black box representation for the real world. So, then if I run the model and I get an answer, how do I compare it with real world situation, which may not have occurred, or may have occurred one day that I have no measurements for. I then open up another can of worms or Pandora's Box of what's the uncertainty or variability in that. So it can be done. . . to answer your question it can be done. We have no problem doing it from the pure mechanics of doing it, but it's how we're tailoring the study to address certain epidemiologic issues.

Dr. Ozonoff: Is this a dynamic model? Are you taking into account changes in demand?

Mr. Maslia: Absolutely. Let me just answer that . . . but before I do that, if I can, if we can go up to the panel here. So I'll answer whatever question you have, but I would like to inform you there is a separate expert peer panel that will be meeting at the end of March for two days, and it will go into, I assure you, into every nut and bolt of the modeling and the hydraulics. So, if we go down the road, I can go as far as you want to, but . . .

Dr. Ozonoff: Or we can ask them epidemiological questions. [laughter]

Mr. Maslia: The models are dynamic from the standpoint is that we will retrieve. . . . We don't yet have historical information on not only populations, but also the physical configuration. For example, when the Hadnot Point water treatment plant came online, you've got to reconfigure the model to do that. When the wells shut down at Tarawa Terrace, when the treatment plant . . . and that is why from a standpoint, as Perri said, we're looking at two things, the ground water when the wells first became contaminated. Then from the contamination, how it was distributed. That is what complicates this far more than the Dover Township study. We have to take all of that into consideration and the models are being worked on from that standpoint, so that we can historically month by month, from '68, . . . for groundwater prior to that, but from the exposure standpoint of the distribution system, from '68 through '85, month by month. If the system changes, if demand changed, we have to key that into the model. Then, of course, check the results for liability.

Dr. Drane: Do you have in your model the depths of the wells? The diameter of the hole before the hole is closed and the point goes deeper? Things like this?

Mr. Maslia: Basically you're speaking about the groundwater model.

Dr. Drane: I'm thinking about the way the wells are actually constructed. I used to put down pumps and we would dig a hole thirty feet . . .

Mr. Maslia: We are not going into that detail. We do have how deep they are. We have a groundwater model at this point . . . actually it's a groundwater and a transport model that is calibrated from '74 through '94. That model has nine layers and it captures, we've gone through every record we could get our hand on, consulting reports, underground storage tank investigations, U.S. Geological Survey investigations. We have all those wells in the model at the appropriate depths. We've got part of our report as a well construction table. It will list those.

Dr. Drane: My point is the following. You can have subterranean water being transported to the point of the pipe underground or you can have it transported to the annulus around the upper pipe, then it will go straight down to the point and back again and it doesn't have to be transported except near the surface.

Mr. Maslia: That won't be handled by ground water flow models that basically look at uniform non-

turbulent flow. You have to look at computational fluid dynamics for that specific well, and in doing the fate and transport modeling on an aerial base, all the codes I'm familiar with, basically you input how much you think, where the well, the depth of the well, and how much it was pumping, if operational. If you actually want to look at the movement of the fluid around the annulus you'll have to go on a well-by-well single well, and get into computational fluid dynamics.

Dr. Drane: Let me suggest to your engineers that the annulus, is much more important than an annular flow within a very deep stratum of soil. If you're digging a well for a town, you don't go thirty feet deep. You might go three hundred feet, or six hundred or eight hundred trying to hit an aquifer that will give you relatively pure water. Your surface simply doesn't go down that deep as a matter of course. It takes a long time for aquifers like this to be affected by the local ground water. The annulus around the pipe that penetrates the surface is probably the most important part of the contamination. I would like to put that out as a challenge to your modeling and to your engineers.

Mr. Maslia: So noted.

Dr. Maas: Well, as we suspected with a lot of toxicologists, epidemiologists here, we have a lot of ideas about how these kinds of studies should be done, but I think we need to back up for just a little bit because this panel has been charged with determining whether additional studies are needed. What the form of those it might take. In order for us to do that, we have to have a better idea of what the purpose of these studies are. I already think . . . I've already heard enough in this room today to know that there are a number of different outlooks and opinions on what the purpose of what this whole exercise is. I certainly know that ATSDR is looking for some help to be able to fine tune what they think they've already done a pretty good job of developing a study design. We heard in testimony this morning that at least one of the testimonies is obviously looking at the long term purpose of this to be able to provide financial help for medical problems that are happening. Whenever you're designing any kind of study, one of the things that really kind of propels that is, what is the purpose of that study and what are we ultimately trying to do. And I don't think that anybody on this panel, I don't think we've been given any guidance up 'til now, on what the ultimate purpose of our efforts are. Again, I think that ATSDR is only one opinion on this, but this seems like a time to maybe hear, are you all be able to articulate that for us, at least in your opinion, which may not be all of our opinions, of exactly what the long term purposes or uses of any designs or recommendations we might make?

Mr. Maslia: I'm not quite sure who should respond to this.

[voice overlap]

Dr. Bove: The question is . . . can you succinctly state the question?

Dr. Maas: Maybe an analogy will help you. If somebody runs a red light and there's an accident and people get hurt and there's damage done, at one level a police officer comes out and tries to determine

who's at fault and the insurance companies get involved, and they try to figure out exactly what the damages are to the vehicles. But it seems like maybe that part already that the police inspector already left. We've shown up here at the scene of the accident and there's nothing there but a note saying, "Would you all try and determine if additional studies need to be done."

Well, what additional studies [applause] clearly need to be done is a function of what we're trying to get out of this? If we're trying to determine who responsible parties are, that's one kind of study. If you're trying to determine who all might be eligible for help and financial assistance, as we've heard in the testimony this morning, that's another kind of study that you would do. If you're trying to prevent this from happening in the future, you might do an entirely different kinds of studies. You might be looking at different kinds of asphaltting, you might use on that highway to prevent that. You might look at different kinds of tire treads we might use. So, it seems to me that the whole direction of where we're going has to be kind of operated by having for us, our panel to have a little more context of what the purpose is of what we're doing.

Dr. Bove: There are a couple of purposes, different purposes. The first one, the one that we were focused on was etiologic research. When we look at health assessments that we get from our other division, we look to see if there are exposures that are pretty well documented from which we could do an etiologic study. Just like any other epidemiologist, we're looking for the best population to study, ones that are exposed, ones that we can ascertain the outcomes from, and so on, in order to further the scientific literature, to prevent disease in the future and so on. So that's the first purpose, its etiologic purpose.

Another purpose could be and probably an interest of the Marines who lived there is, documentation, verifi . . . not verification, vindication that they did have health problems, that this exposure caused health problems. Documentation of all those health problems for the purposes maybe of compensation or whatever, or just to know, yes, my disease was caused by this exposure. That is a different purpose. That's not looking for the best population to do an etiologic study; that's looking at a particular population that was exposed and trying to . . . the people want vindication that their health problems were caused by that exposure. So that's a different purpose.

For compensation purposes, I don't know the legal area. . . I'm not sure what kind of study would be appropriate for the legal setting, but it could be some mixture of the two. So there are different purposes.

What our purpose was, was the first one, etiologic purpose. Which was, here was a population that we've been doing . . . ATSDR has done a lot of studies in the past where we looked at proximity to a Superfund site. We still do those studies. Here is a population where we had exposure. It's not usual that we have a large, relatively large group, like this, with documented exposure. So we were very interested in doing something here.

From the Health Assessment, we were steered toward childhood diseases-birth defects, childhood leukemia. We thought those were the most sensitive populations for these exposures. There is a very small,

but hopefully it will grow, literature looking at these influences and finding some associations that needed to be followed up. So that's the direction we were taking. With birth certificates, you can look at small for gestational age, that seemed the obvious first step and that's what we did. We did that study. There have been some flaws, because of information on the water system that we didn't have at the time, so that we will revisit.

To move towards these end points we're looking at now, we had to use a survey which is probably the best way to get at. So here, we're making concessions already, in terms of ascertaining the diseases and the difficulty of doing that by survey versus surveillance system, which we would have preferred to use. But beyond that to look at other diseases, it becomes more difficult from the etiologic perspective to study this population. It scatters to the wind. That gets occupational exposures soon after they leave the base either militarily or non-military industries. Trying to figure out how you would study adult cancers, for example, or adult diseases or to look at other diseases, like developmental disorders which there are no surveillance systems for autism, let's say, or for ADHD and so on. So, these are kinds of concerns we've heard, at least anecdotally, from people. One is to study other cancers. They want to study developmental disorders, a whole host of other diseases that might be related to solvent exposure.

Dr. Maas: Let me ask you something to follow up then. I think we do have a pretty good idea of what you are doing.

Dr. Bove: Have I answered your question so far?

Dr. Maas: Yeah. You're also talking about what you are doing. I think we have a pretty good sense of that, but . . . In terms of getting that information and trying to determine that underlying etiology . . . you all work on all kinds of Superfund cases. I guess that one thing that we're wondering; is there a difference in the process by which you are able to access and get that information? Is it different for a military base site than it is for just a private Superfund site? Is there anything that we should be looking at ...?

Dr. Bove: In a Superfund situation, the community is at least a little more stable than this one. As I said, we think the average stay on the base for most people was less than two years and then they're off. In a community exposed to a Superfund site that's not going to be the case. That's not going to be the case for occupational cohort either. It's more difficult to study a situation like this, where people are scattered all over the country. Studies have been done in the past, for example Agent Orange, and the Gulf Syndrome. With Agent Orange, at least, the birth defects, the idea of what was done there was to look at a population where there was a good surveillance system and do a case control sample and find out how many people in that population actually served in Vietnam and were exposed to Agent Orange. One approach is to find some area where ex-Marines tend to live and focus on those areas and do a case control sample and look at particular disease, mostly cancers I'm talking about here, I guess. That's an approach that could be taken. I just don't think that this is the best population to study given the difficulties of the population itself, whereas an occupational cohort would be more ideal situation.

Dr. Maas: I couldn't agree more. It's an extremely challenging situation that we've got compared to looking at most cohorts. I guess my question is, is that it really seems that a lot of your success is coming down to the accessibility of records, both in terms of exposure and outcomes. I'm just wondering if there's any particular challenges that you face dealing with military records. Have you been able to have complete access to all them and how does that compare to a civilian site?

Dr. Ruckart: The Marines have been very cooperative in providing us access to the records. We have, as Frank mentioned, the housing information from 90,000 records, from which we've been able to confirm that mothers who gave birth during that time period lived on the base. As part of the study, we're going to be interviewing the mothers of the case control children to obtain additional information on risk factors and also just verify their residential history. This study is different from most because we're undertaking the water modeling effort, which most studies don't get this very high level effort to confirm the exposure. One thing I did want to add to before, when you were asking about the purpose of our study. This is not really a purpose, but it's going to be an outcome. We're hoping to provide on our Website a place where former Marines and people who lived at Camp Lejeune could see what level of contamination they were exposed to, based on where they lived. It's not a purpose but it's going to come from the study.

Dr. Maas: I did want to ask one related question for Mr. Maslia. One of the things that struck me in the presentation, we waited, I guess, a long time, I guess, to be fair to see this kind of study being done and we certainly want to do it right now, but on the other hand, we certainly want it to be done in a timely fashion, even though it may be undertaken somewhat belatedly. One of the things that jumped out at me right away was that you've got an expert panel meeting next month to do a very critical part of this, which is to try and understand the ground water modeling, get a better idea of just what the average concentration of TCE and PCE that people were actually exposed to and how many were exposed and understand the dynamics of that. Certainly, you've had that data for a long time and have had a chance to model it. One of the things I had noticed is that you've got this panel meeting in March and then after that you've got all of the rest of 2005 to be dealing with that data. So one thing that struck me on the timeline of this study of your study not being completed until 2007. If I read that right, it looked like all of 2006 was going to be spent with basically just working over and massaging that modeling data to come up with the exposure. Now, it sounds to me like almost two years that you're going to do that. Right off the top of my head that seems kind of lengthy. I'm just wondering if you can explain that a little bit more to us.

Mr. Maslia: I'd be happy to explain. Several issues in there, so, just jump in. I'll explain it from my focus, point of view, which is the modeling. Let me start off by saying we were approached, my group, and said, "It looks like what you did in Dover Township might be applicable to the case here at Camp Lejeune." On the surface, it does. The complicating issue, and I'll just name one, and be happy to go into other details if pressed, for example in an urban area, or a non-military area, they may send out quarterly billing records, or monthly billing records. That means your house, my house and everybody else's house has a water meter on it. So, I know exactly when you get up in the morning, when you go to work, by looking at your

water use, when you're cooking dinner and so on. On military bases, not just Camp Lejeune, but all military bases, they do not charge for water. At present, and for I don't know how long in the past, but definitely for the study period, they had exactly two meters on the base. One is the plant production. In this case there was a meter at each, Hadnot Point, Holcomb Boulevard and Tarawa Terrace, using the pipe hydraulics to meter it, then the steam plant. Other than that, there are no meters. That means I cannot allocate just using whatever data is available say in plant production on an individual basis. On the other hand, from the epidemiologic part of the study and like we did in Dover Township, I'm asked to get down to at least the street level, if not the house. That means that information is missing. It's not a matter of the Marine Corps not giving it to us. It is not available, period.

What we have done, and this will hopefully address your question about the length of the study . . . that means we have to look at hopefully, since we don't have any information in the past, we now have to look at what's available present day. In New Jersey, that worked out quite well. Again, even today, there are no meters any place, except for those two places. In fact, there's only one pressure gauge per location and it's at the treatment plant. So we go out and we spent, since last March, doing field studies. We have another one planned for this coming summer. The Marine Corps with their funds have installed, will be installing, and we're in the process of calibrating them, sixteen system-wide flow meters. That is so we can get, for example, different housing areas a per capita rate of how much people are drinking, when they're drinking it, when is the maximum water use? So, we can determine, for example, the Marine Corps base . . . if you stayed on base anytime, we'll know that a lot activity takes place a four in the morning, as opposed to civilian areas, which may be a six to eight. That prevents us from going to national databases, which we do have and say "let's use a standard diurnal curve." We can't, because military life is different than civilian life. So we're waiting for that information. We have to gather that information. We'd like to get six months to a year of that information.

At the same time, while that is being installed, while we're doing that, we're doing other activities. We're calibrating the ground water models. We are getting all the pieces of information, how the pumps worked. How the water goes into the storage tanks. How it's released. This is all information that it's not a matter of access to it. It's a matter of it was not available period, present day or historically for us to use. So, unlike when we first began speaking about this two and a half or three years ago, I guess, the Marine Corps, ATSDR, everybody involved thought databases and data sources would be available for this type of information, so it would be a matter of just aggregating the data. As it's turned out, and we've had long discussions with the Marine Corps, they have been very forthcoming with help budget-wise and otherwise, have realized, we have actually had to make the databases up. When I say making the databases up, I mean go out in the field and gather them before we even start looking at anything. So, you're looking at a two year effort, as what it's turned out to be, that was not ever put into the original estimate of the timeline. I hope that answers your question.

Dr. Maas: That is helpful. I don't envy your position of being in the position of being the bottleneck for a long time on this study.

Dr. Ozonoff: I've been trying to figure out how to ask a . . . sometimes I wind up being the person who puts the rotten fish on the dinner table. So first, let me say some nice things about ATSDR, 'cause I'm going to pop one off here. [laughter] Right. I'm on record so many times, . . . You do have a tremendously difficult job. I've worked with ATSDR. I knew the former administrator. I know the current administrator, and I have very high opinions of them. Frank, you and I have known each other for a long time. All I can say is, this is nothing about your colleagues whom I don't know, but I do know you, the people at Camp Lejeune are lucky to have you involved in this, because you are one of the really good people who does this stuff. So let me preface it by saying that.

Let's face it; underlying this is sort of an issue of trust. Although ATSDR has a long record of saying great things about how they're working for their community, there's been a very rocky history here, goes back years and years. It's often not at the level of headquarters. It's what goes on in the field often. Part of that is because people out in the field are asked to almost impossible jobs. You've got a couple of people who maybe just got a degree in earth science somewhere, and now they're asked to do epidemiology and toxicology and so on, on all these sites. It really is impossible. Whatever the objectives here might be, I think you're going to have to try to satisfy both multiple objectives, you're also going to have to try to figure out what to do about the trust issue.

I would say . . . I don't know if I have any wise words about this, but it will almost certainly mean, in my view, that you're going to have to do some things that, if you were doing a strictly scientific study, you wouldn't do it that way, because you're not doing a strictly scientific study. There are other objectives here that are important. There needs to be some way to take that into account without at the same time making it impossible for you to gather useful scientific information. Maybe as the next day and a half goes on, we can talk about this more, but I would suggest that one way to do this would be to open up the process more and allow some participation by people at Lejeune in some meaningful way.

So, let's take the adult cancer issue for a moment. I will tell you that when I read the 1997 assessment, it was probably at a time that was shortly after when we had a cooperative agreement with the Federal Facilities branch, so I was a little chagrined. I was frankly amazed about the statements about adult cancers and the way they were dismissed. In fact one of our papers was cited there, because we had shown in a series of studies that there are cancer problems associated with these exposures. To say that you don't expect them was just, in my view, was not a good way to generate trust, certainly didn't generate my trust.

So, let's take that issue, I understand that this is going to be a difficult thing to study. One way to deal with that is, . . . first of all, I don't think anybody expects you to do anything but the best that you can do. So, nobody's expecting you to do the impossible, but by having a sort of a real partnership with the affected folks you can get two things. You can get, on the one hand, buy-in and understanding of all the difficulties involved, which I think will help the trust issue a lot. At the same time you can get the benefit of the tremendous amount of raw brain power that there is out there in the community. We know from our study

that . . I didn't mention this when I introduced myself, but I was a plaintiff witness in the Woburn case. I'm sorry to say that some of the stories I've heard this morning, the testimony I've heard this morning was very reminiscent of stories that in talking to the Woburn families, which was absolutely just heart wrenching. You never get used to hearing it. When we worked with them, they had some really good ideas that we hadn't thought of because they know their community and they know their lives. You can take advantage of that. It can make the study better. Maybe you can do some things that you thought you couldn't do. I guess that's my suggestion for this morning's segment.

Dr. Bove: Let me say a few things. I'm going to speak a little for myself, too, not for the agency. There's a lot of controversy about TCE and PCE in my agency. I've taken certain stances, others in the agency have taken others. So, there's a lot of dispute. Some of us feel comfortable with statements such as the ones in the Public Health Assessment. Some of us do not. We've had those internal discussions, sometimes they actually get out in the open, sometimes in a flurry of email. This issue is not settled within the agency as it's not settled with EPA or anywhere else. So, that's the first thing.

The issue here. . in the past ATSDR has worked with communities and the representatives in developing the research. For example, I can name a couple of them, cluster investigations we've certainly done it, Brick Township. The research there was altered by, and totally changed by the input from the community. At Tom's River, which was an etiologic study there was input from the get go. At Otis Air Force base, which you're familiar with, David, we also worked with activists there and brought in scientists who all sides trusted to go forward with the research. They were constantly giving input to those researchers. We've done this in the past. I think the problem in this situation might have been that the . . . it was hard to define the community. It was all over the country. We're more comfortable dealing with communities that around toxic waste sites for example, Tom's River. So, it wasn't done in this case, and I think that was unfortunate. I really do. There was some discussion about it, but I think that was probably the reason behind it, that there wasn't an identified community that could be easily brought in. I think that we're looking forward to your recommendations on that score. If you want to recommend how we should proceed in the future, we look forward to those recommendations.

Also, we look forward to your recommendations about future studies. I'm well aware of the studies that were done at Cape Cod looking at PCE in adult cancers. I also worked on one in New Jersey looking at adult cancers. So I don't think the verdict is out on the effects on adults. I just would like to have some ideas as to how we would do a credible study given the kind of population we're facing. We have good, this time around, we have good exposure information, relatively speaking, what you get in environmental epidemiologies, it's not like an occupational thing, but it's pretty darn good.

The issue here now is being able to ascertain these end points, being able to identify and follow the cohort, the cohort that scattered to the winds. If you have some ideas on that, we're looking forward to them. I threw out one earlier, maybe the model of what was done with Agent Orange, at least with birth defects, looking a particular area, where the data is good on the outcome and doing a case control

sample. Of course, there the exposure prevalence has to be pretty good. So you have various areas where there are Marines, ex-Marines. That's one idea. Or the other option is to try to reconstruct that cohort, and follow them. We tried to impress on you some of the difficulties of just identifying and contacting mothers, parents of children. That was a big effort. It would be an even bigger effort now for adults.

Dr. Ruckart: Wanted to follow up on something Frank said about the difficulty of getting the community together in one place, because they're no longer living at Camp Lejeune. We do have some avenues to interact with the community. We have a Website dedicated to Camp Lejeune. We also have an email box and a phone line dedicated to Camp Lejeune, and we interact with the people who send us emails and phone calls on a regular basis. So, we do try to provide that service to the community.

Mr. Maslia: Thank you. If I might further comment, I know Dr. Maas mentioned it about our water modeling expert panel, but as this also addresses the issue of community involvement and others. I don't know how this panel, the criteria for selecting this particular panel, but on our panel, we specifically spent a great deal of effort in trying to get as broad of a representation from different points of view. We've got an epidemiologist, toxicologist who does a lot of work with community groups at waste sites. We've got a representative, a consultant for the Marine Corps. We've got people in academia, people in private industry, that may consult for private industry as well. So we have, we may not have the localized community like we did in Tom's River, but we have tried. We have spent the better part of two and a half or three months trying to put people on this that could give us as broad enough diverse opinion so if they feel as . . . as Dr. Ozonoff may have brought up, whether we should consider interconnections or not, or whether we should look at other methods or methodologies. What we're doing that we will take those into account. We did that in Tom's River, that did change the course and direction that we took. I just wanted to assure you that that . . . though we don't have a localized community, community group diversely spread apart. We're trying as best as we can to somewhat compensate, or incorporate all points of view in what we're doing.

Dr. Cantor: Thank you. I see it's a few minutes after twelve and our schedule calls for a break now. We will reconvene at one-thirty. At which time. . . Christopher did you have some more to add . . .

[Muffled, off-mike]

During the public comment period this afternoon, you mean? You mean right now? I think we're open to that. The proposal is that . . . you want to go ahead and make that more formal.

Mr. Stallard: What I'd like to propose is that when we return from lunch, which will be in an hour and a half from when we release you, that we'll do a facilitated process. I will ask you to tell me the issues that you have, that you wish to have addressed by the panel that came up relevant to the presentation from ATSDR. Okay? I think that will help inform their deliberations. Is that agreed? Okay. There is a shuttle for those of you who would like to take lunch at the Marriott around the corner they have a delightful buffet, frankly. The shuttle will take you there and bring you back. For those of you who want to wander out on

your own, just around the corner toward the highway is a Lone Star and few other fast food type places. It is by my watch, five after. Let's call it ten after. So, be back in an hour and a half. That would be what time? 1:40, 1:40. 13:40. Thank you very much.

You may leave things in this room. It's a secure facility.

[Whereupon, those assembled adjourned for lunch, reconvening thereafter.]

Mr. Stallard: Thank you all for being prompt and living up to the guidelines we all agreed to. I have some water. If anybody would like water there's plenty of it. Okay. Let me just explain a few things that have developed in the meantime. I received documents this morning and we want to acknowledge those as exhibits for the panel to review and consider. If you have something that you either want to leave with us, or have us make a copy of that you think is pertinent and relevant, this table is where you will put your exhibits. Okay?

Now, what I would like to do is take approximately fifteen minutes for you to use this opportunity to identify issues or concerns you have that you would like for the panel to consider relative to the presentation that you heard this morning, primarily. Okay? Yes, did you have a question? This is how it's going to work. I'm going to hand you the mike, or actually Athena is. I would like you, since I'm going to write it down here, so that the panel and you all know the topics, and it's not buried in the transcripts. I need you to keep your comments fairly succinct. In other words, what's the headline? For instance, you and I discussed something prior to the break. If you have an issue with the veracity of the military cooperation, that's the issue. Or whatever. Fair? Understood? Okay.

Who would like to speak?

Ms. Terry Dyer: I have two things that I want to ask about. One is the, number one, cooperation with the Marine Corps, the notification to the different victims, specifically I can see civilians that had children with birth defects that were not contacted.

Mr. Stallard: Cooperation with the Marine Corps. That captures your thought?

Ms. Dyer: Yes.

Mr. Stallard: Lack of cooperation.

Ms. Dyer: Lack of. . . Yes.

Ms. Marie Murray: Your name, please?

Ms. Dyer: I'm sorry, Terry Dyer.

Mr. Stallard: Thank you, and notification

Ms. Dyer: Notification. They were stating that it went out in different areas. That's just not true. So I want them to elaborate on that. The reason I say is that I just did an article in the Jacksonville Daily News, and I've had twenty calls this week from people who live in that area that never heard of it.

Mr. Stallard: Okay, so the notification process. What. . .

Ms. Dyer: What happened to them, that there was an incident at Lejeune that there was an incident that happened at Lejeune. That the water was contaminated that they drank.

Mr. Stallard: Okay, so, the notification process to the constituents, the people affected.

Ms. Dyer: That lived there.

Mr. Stallard: Thank you, Terry. I have that as notification process to the potential home dwellers, people who lived there. Does that capture it?

Ms. Dyer: Yes.

Mr. Stallard: Okay, thank you. Can everybody hear me in the back?

Mr. Ensminger: I'd like to know how, whoever it was at ATSDR arbitrarily left out civilian employees on the base, especially women civilian employees of childbearing age. Why did you have to live on base?

Mr. Stallard: Okay, so I have the decision process that left out

Mr. Ensminger: Civilian employees from the study. On that same token, any adult. Marine, sailors or civilians.

Mr. Stallard: The decision process that left out civilians employees from the study and any other adults. Does that capture it to your satisfaction?

Mr. Ensminger: Yes.

Mr. Stallard: Okay, anything else?

Mr. Ensminger: Well, there's one other thing. ATSDR's Public Health Assessment, Final Public Health Assessment, dated 4 August 1997 stated that it was unknown whether or not these contaminants harmed children. The only study that we have seen to date has been on children in utero. What about our other children? I had a seven month old child, when I moved into housing, who is now thirty-one. Why haven't the children that lived there when they were little growing up developing, why haven't they been included in any study?

Mr. Stallard: The ATSDR Public Health Assessment did not include living children in the study/. That

captures it? Thank you.

Mr. Byron: Yes I'd like to know from ATSDR why when Camp Lejeune was identified as a national priority in 1989 it took eleven more years to notify the individuals that lived there, particularly those in utero. That's eleven years.

[Mr. Stallard is off-mike for all the following until noted. Difficult to follow.]

Mr. Stallard: Thank you. The 1989...; why did it take eleven years to notify impacted, potentially affected people.

(Male): Name?

Mr. Byron: Jeff Byron.

Mr. Stallard: Yes, ma'am.

Ms. Karen Strand: Would it help perhaps the utero study and a further future study on those young children and adults to consider the fact that, going back to civilians. . and I'm just doing that because they weren't included. Many of them that we know personally, including ourselves, we lived there fifteen years. They lived there an extended period of time. You were talking about how everybody was coming and going, but the civilians back then, not now, but back then, lived on base. They lived in Tarawa Terrace, all of them, teachers, principals. They all lived there for extended periods of time. A lot of women that we know did become pregnant, have children, during that period of time, as well as having young children like we were. Also, you were discussing the fact of a community, a lot of former Marines and civilians stayed in the area, Jacksonville, Richlands, Wilmington, all in that vicinity, Swansboro and, of course, a lot of us don't even know that they were contaminated, but I'm just thinking of further studies.

Mr. Stallard: I got the first part; civilians lived on base but yet were not included in the study. And the secondary part was. . .

Strand: Just that so many of them live in the area now, even. You were talking about them being spread all over the country. A lot of them still do live in the area.

Mr. Stallard: So the question then is . . . have those who still. .

Ms. Strand: Would that be an advantage for future studies, to further the study by extending it?

Ms. Murray: Name please?

Ms. Strand: Oh I'm sorry, I thought I gave it. Karen Strand.

Mr. Stallard: Okay, Ms. Strand, I have that as, have those who have continued to live in the vicinity been

included in the study? Should they be in future studies? Thank you. Did that cover your thoughts?

Ms. Hilda Rose: Hello my name is Hilda Rose and I'm not going to be here tomorrow, so I just want to make sure I get this across to the panel. I would like the panel to recommend to ATSDR to focus on other cases in their study, such as kids with health problems and renal problems. So, do not exclude these kids, please. My next recommendation to the panel is please, ask ATSDR to shorten the time that we have to wait until the study is complete, because that's a long time. We waited twenty years to come to this point. Now we have to wait two more years to find out what's going on? Thank you.

Mr. Stallard: Thank you Hilda, I have that as recommend to ATSDR to consider the children with heart and renal problems in future studies? Please shorten the time for the study to be completed. Thank you.

Ms. Denita McCall: I don't know if. . I'm not sure if this is covered, I believe a nation-wide press conference to alert everybody that came and went on that base to be alerted to the fact that they were contaminated. There are a lot of people, I'm positive that do not know what happened that are quite possibly sick. There has not been any kind of media attention given to this problem. I think some kind of a press conference to alert people and have them contact ATSDR to have them included. There are children and adults. So your data for all your research can be more accurate.

Mr. Stallard: I have that as recommending national alert to identify all those who may have been affected, a media campaign to include children and adults. Does that capture your thought? Thank you.

Mr. Byron: Jeff Byron again. I have a couple more questions. Could they conduct a follow up survey on those individuals who have come down with cancer since age nineteen that were in utero? That were exposed while in utero.

Mr. Stallard: Conduct a follow up study with those . . .

Mr. Byron: Children who were in utero, who come down cancer past the age of nineteen.

Mr. Stallard: In other words, keep following . . .

Mr. Byron: Keep following them. I did ask a couple of panel members why weren't the children that were under seven months term included. One last thing . . .

Mr. Stallard: Hold up a second. Why weren't the children under seven months...

Mr. Byron: Under seven months term included in the survey? Sorry, but one last ...

Mr. Stallard: No, please.

Mr. Byron: I would like to see those individuals that conducted the phone survey or suggest that they come before the panel. They don't have to do it in front of me or the individuals here. So that the panel

members may ask, what other family members other than those who were in utero at the time are also suffering? What percentage is that? They should be able to shed some light into these other families' conditions, other family members, other than the kids that were being studied now.

Mr. Stallard: Help me get a headline. Let's see. How would you say it, Jerry?

Mr. Byron: Just about the same thing I said about the children, the children who weren't born there; the children were exposed other than in utero.

Mr. Stallard: right, but my question to Mr. Byron, though, it something about who conducted the interview...

Mr. Byron: Right, Marie Socha or any others who conducted the survey.

Mr. Stallard: Those who conducted the telephone survey . . .

Mr. Byron: . . . Be brought before the panel so the panel can ask them questions concerning other family member's health history.

Mr. Stallard: Let me see if I've got this. Those who conducted the telephone survey should come before the panel to address concerns of other living children affected. . .

Mr. Byron: And adults.

Mr. Stallard: And adults.

Mr. Byron: All the family members. I think they could shed light for the panel.

Mr. Stallard: Thank you.

Ms. Dyer: I don't know how much this will help you as far as this question, but the people that I have spoken to that the panel called and asked questions. They asked things like. . . They would just answer say, "You lived at Camp Lejeune." Give the address and say, "Is the child that was born at Camp Lejeune dead?" Then they did not ask any other questions about any of the children that were living in the home that had been living there at the time. I've had that said to me on several different occasions that's how they were asked.

Mr. Stallard: I'm going to capture that issue, but it's the issue of the telephone etiquette.

Ms. Dyer: The surveyors didn't ask about the other children, because that wasn't what they were asked to ask. So I don't think you're going to get anything from those people, because they were specifically asking about if there were any children . . . is your child dead? They didn't say do you have any other children? So they didn't go in depth.

Mr. Stallard: So the issue for the panel could possibly be to look at the questionnaire protocol.

Ms. Dyer: Absolutely.

Dr. Visintainer: I think what you're asking is that you want to know what the prevalence of any health condition for any family member who had a family that's been designated as exposed. You want the whole family assessed.

Ms. Dyer: We want that, but when the ATSDR was doing their phone survey . . .

Dr. Visintainer: They focused right on birth outcomes data and not on other members of the family...

[voices overlapping]

Ms. Dyer: They did not. That's right, because that's not what they were asked to focus on.

Dr. Visintainer: Put down prevalence study of health conditions among all family members. That's right.

Mr. Stallard: Thank you for the clarity.

Ms. Paula Orellana: I'm Paula Orellana. They had said about the possible study where they would ask the mothers about the water consumption that they had at the time when they were pregnant or gave birth. What if the mother is dead and the father is dead? Who would you call? Would the family still be included, if they did do that study, since the parents have passed away?

Mr. Stallard: How do you account for the children that were potentially impacted if parents were deceased at the time of the survey? Is that the question?

Ms. Orellana: Yeah.

Mr. Stallard: Thank you.

Thank you very much. I think that what we will now do is, this is the time that you have to deliberate. I can post these on the wall.

Male Voice: At least turn it around . . .

Mr. Stallard: Can we get some tape? This is the time for the panel now to deliberate. We ask you, again to, hold your questions. Write the questions down. We have more opportunities to address those questions.

Dr. Cantor: Before I open up the questioning of the other panel members I have a request to ATSDR to provide to us a copy of the questionnaire that was used for the telephone survey. That would answer a lot of questions and it would also so give us some guidance to perhaps where we should go next with this. So with that, I assume we can get that fairly rapidly, maybe even this afternoon. With that, I'll open it up to

other panel members to give comments, questions, of the ATSDR folks who are here.

Dr. Ozonoff: I have a comment. The idea that the civilians on the base might be a much more stable and less transient population is a really good point, and suggests that maybe an opportunity was missed in not studying them. I take that as a good question. I just wonder what the answer is.

[Voices too low to catch, off-mike]

One of the suggestions was that the civilian employees of the base actually might be an ideal population to study, because they were in fact less transient than the military population. Maybe an opportunity was missed and maybe not. Maybe there was a good explanation for it. I just was wondering.

Dr. Barrett: When Frank gets back we will address the question.

Dr. Drane: May I ask a question? The civilian population, does this include families as well, or simply the civilians who worked on the base? In which case, if it was the civilians that worked on the base we've got to measure the adult population and how it's affected as opposed to the babies.

Dr. Ozonoff: I actually don't know the size of any of these things. I don't know how many of the civilian population lived on the base. How big that population is . . . or how big, including their families.

[Voices overlapping]

Ms. Dyer: Do you want us to answer these questions?

Dr. Cantor: Dr. Bove has stepped back in, so he's in the hot seat.

Dr. Bove: There's been a couple of questions, let me see if I can go through them. The 1987 study, 1997 study looked at, as I said earlier, births in Onslow County to mothers whose street address on the birth certificate indicated that they lived on base housing. We matched them with housing records. So whoever lived on based housing at the time of delivery were included in that study

(Male): Whether they were military or civilian, is that right?

Dr. Bove: We looked at the street address and matched it to the housing records to see, if those street addresses matched actual housing in those particular areas, because there were some discrepancies, as you well know with the birth certificate data. We've used that as the basis of the survey as well, because we had that group. The other group was people who were pregnant on base, but transferred also, was a more nebulous group. The way we can go into detail on how we did the surveys. I might as well go over some of that stuff with you, so you know. We can give you a copy of the survey instrument too.

First thing we did was, we had the names of the parents from the birth certificate, at least for those who were born in the county. We were able to get the Social Security number for some of them through the

medical records at the base hospital, if the birth occurred there. We also used the Defense Manpower database, as well, to get names . . . I mean addresses. We didn't have Social Security numbers for those people, so we had to go to that database. For those that we couldn't get current addresses from either of those two routes, we then used other record systems on base. We let the Marines do that for us, because there were privacy issues. We also looked at the membership directory of the Marine Corps Association. Then there was this extensive effort done by the Marine Corps to use the media, use all the organizations that are available to the Marines, newsletters, newspapers, and so on. To put information in those various media sources, to get the word out that that the study was being done; they should contact ATSDR. There were also press releases. CNN covered the study/the survey and so on. So there were various attempts to get the word out, to get people to contact us so that we could do the survey that you need to know. Whether it was good enough, we can debate that. At least that was done, so you know that there was an effort done there.

Now, that effort was not something that we normally do with a Public Health Assessment. That effort was done because we were doing a survey. My other division can correct me, if I'm wrong, but we don't normally go about notifying especially a community like this that scatters. Am I correct? In this case we would have left it up to the Marines to do that, if we weren't doing a survey. 'Cause that's not something we normally do. I don't know if we have the capability of doing it. If it's a community around a toxic waste site, that's a different story, because we're in the community, oftentimes, we set up, if it's a controversial site, we set up an assistance panel. So the word gets out. We have public hearings and availability sessions and so on. But for this group, where would you have an availability session? If you have it on base, well most of those people aren't there anymore, who were exposed. We didn't have a mechanism, that we normally use, to do that. So we're relying on the Marines to get the word out to their own folk about that. That's why it took so long for people to get notified. They might not have gotten notified, if we had stopped at the 1997 study, because we didn't notify anybody; we didn't need to, to do that study.

The survey was very limited. It was a fifteen-minute survey and the focus was on those endpoints. and was on the child who was in utero during that period. So, it wasn't on other children. It wasn't on adults. It was simply on that. Questions were very limited to that. Basically, "Does your child have a birth defect or childhood cancer?" We had a list of those defects, if they needed to hear that list, but it was also . . . it was open ended so they could add anything they wanted. We got a lot of, if I can remember right, we got a lot of hip-clicks. We got some scoliosis; we got a bunch of stuff because we were asking for neural tube defects. We got a lot of stuff that had something to do with spinal problems and so on for that child, anecdotal, not systematic. I don't even know if it's computerized, but in the hard copy, some of the anecdotal information is probably written down.

We also got anecdotal information from people who contacted us and talked to a particular researcher who was working on the project at the time. People would call her and talk about their health problems, as well as the problems of their children. So we had anecdotal information, again, not systematically captured.

I don't even know if any of that is captured, the anecdotal information. But again, the survey itself was part of this case control study, it wasn't something separate, stand alone or anything of the sort. It was simply to figure out if we could ascertain these particular end points.

Why did we choose these particular end points? There was some evidence, not a whole lot, if you look at the evidence that was out there for TCE in birth defects . . . okay, what do we have. . . we have the New Jersey study with the seventy-five towns that I did. We have the Tucson study, right. We have the Woburn study. The Woburn study's never been published. The Woburn study had five years of birth defect data. Unfortunately, that's it. It had such small numbers that they couldn't look at neural tube defects. They had two neural tube defects, exposed, one unexposed. Two oral clefts exposed, one unexposed, with odds ratio of two, roughly. But what do you do with that? It's not evidence against it obviously, but it's certainly not strong evidence for it. Nevertheless, because I also saw an association between TCE, oral clefts and NTD, that was enough for us to put that on our list. To say that it's unknown about childhood diseases that is certainly true for ADHD, autism, mental retardation, you name it, cerebral palsy. But even for these birth defects we have one or two studies and that's it. But we thought that at least that there were one or two studies it was worth following up.

So, this was our thinking process; is that there's one or two studies that might have indicated something we use this study to follow up, to add to that evidence. Not to break new ground, to basically go on a fishing expedition, but to focus on those end points where there is a tiny bit of evidence and we need to bolster that evidence. So that's the strategy for good or bad reasons, whatever. That's basically our thinking on that.

Let me look at some of the other comments. Maybe . . . uh,

[Voices in background]

One other thing about the timing, the timeline. We've been asked to shorten it, but because of the effort on the water side, that's really the side that lengthens this out. [Technician noises changing tape muffle this section] . . . more in depth, but we do need at least six months of data from those sixteen flow meters that were installed. They're still not totally calibrated and running the way they should be. We need six months of that data. Field tests won't happen until late in the summer. We want to do field tests at roughly around peak demand. Peak demand is in July, late June-July, maybe stretching into late July, early August. It takes time for these things to get done on base. It makes it hard for the modeling effort. All the time really is in the modeling effort. The actual interviews will be done by the end of this year. We can certainly analyze that data real quick. The main problem in the timing . . .

Dr. Drane: Are you going to continue to use Marines to get data for you? I think this is a big mistake.

Dr. Bove: Well, well, . . . no. . . no. You need their cooperation.

Dr. Drane: Yes, I know.

Dr. Bove: You can't . . . We couldn't install flow meters without their cooperation.

Dr. Drane: But you can get the personnel folders of the recruits in spite of the cry of privacy. You can get permission for that.

Dr. Bove: To do what? I'm sorry.

Dr. Drane: Just saying that the Marines went into the, what amounts to the personnel records gets you certain information, because of privacy. Well, I'm saying that this is a mistake. I'm also saying that you can get in there yourself and look at those folders. The Marines can't fence you out.

Dr. Bove: Okay, in order . . . We did allow them to do the matching for us. I don't think that's a major problem. Actually, what probably will be a bigger problem . . . this is something that I don't know that much about, 'cause I wasn't involved in that part of it, but the Marines . . . there is a database that the Defense Department has, where there are Social Security numbers on the Marines. There's not, as far as I know, information about where they were in terms of housing in that database. So, you need another database to link them and how you would adjudicate common names, I don't know. We weren't allowed to have access to the Defense Department's database.

What I understand, and this is for future studies, because the survey is done. This study is moving on. So, if we're talking about future studies, maybe it would be interesting to find out what databases we could get access to, what's available and how hard it would be to link records up. A lot of this stuff is hand, is hard copy. The housing records are not computerized, but that could be done, I would imagine. Up until the end of the Vietnam War, the idea of the Marines was some kind of ID that had nothing to do with the Social Security number. That changed sometime after that. There is possible ways I guess to identify Marines, if you wanted to do some kind of follow up. This would be a whole new effort to look at the feasibility of doing that. Where the money would come, the effort, I don't know. That's something that could be explored.

For the current study, we have what we have. We need to verify those cases that we have and move forward. I don't think this is a problem at this point.

Dr. Cantor: Dr. Ozonoff.

Dr. Ozonoff: Let me apologize in advance for putting you on the spot which is what I'm going to do in a minute, Frank. We've known each other a long time, so you'll forgive me, I'm sure.

I'm curious about your personal opinion.

[laughter]

Dr. Bove: Oh, now. . . .

Dr. Ozonoff: Do you think that any of these studies ever would have been done if there hadn't been a vocal, well organized group of people demanding it?

Dr. Bove: The 1997 study would have been done.

Dr. Ozonoff: That was not a study, though it was a Public Health Assessment.

Dr. Bove: No, no, no, no, no, no. The 1998 study. I get the dates . . . Nancy Sonnenfeld's study was something I wanted done. Nancy wanted done. The Marines weren't excited about it. If you're asking my own personal opinion. . . because we are always looking for exposed populations to study and here was a population to study and here were some end points that we thought we could study rather easily, and we did. Woburn study found some indication of small for gestational age and TCE/PCE. My study did not. So here was a chance to look at a new group and see what we could see. We did have, as has been pointed out, I'm sure there are flaws in that study that we hope to revisit and redo. So, that study would have been done.

I think the next study would have been too. I think that precisely because we want to follow up these previous studies and we rarely have a situation where we have good exposure information or the potential for it, large enough people to study. Oftentimes, we have a small community in and around a Superfund site; we're not sure about exposures and not a large population. So here we had 12,000 births. It's not terrific. I had 80,000 in New Jersey and I still had a small number, when we started to look at neural tube defects. We had 56 roughly to look at, total. So that's why these studies were done. That's not to say that . . . studies often get done in my industry because of public pressure. In this situation that wasn't the case. We were going to do these. We were interested in doing these anyway. That's my personal view.

Dr. Ozonoff: I appreciate the answer . . .

Dr. Bove: Future studies may have a bearing on . . .

Mr. Stallard: Dr. Maas

Dr. Maas: Question for clarification. I guess maybe this is something that I missed the first time around, maybe I still don't understand this correctly, but from one of the comments from the audience here, am I to understand that your current study only includes those children that were born on base that were more seven months. . . . where the mother was more than seven months pregnant?

Dr. Bove: When you do a birth certificate study like the 1998 study was, you have a cut off on gestational age, because you think that the data's not reliable before twenty weeks gestation. That even is a pretty . . . Most of the time we actually make the cutoff much higher because the data then is suspect. Twenty weeks gestation is a very short gestation. The question would be whether that child actually was born alive or not

or would be considered a live birth defect at that point. This has to do with how states do their vital records. Sometimes they'll do a fetal death certificate instead of a birth certificate. It really depends on the state. So, when we do these studies, especially when we're looking at birth weight, we make a cutoff at twenty weeks gestation.

Dr. Maas: Okay, I get it. I understand.

Dr. Bove: We could also make a cut off at 50 weeks gestation. Sometimes we . . .

Dr. Maas: Right, sure. So in your study that includes looking at, in your current study looks at birth defects from children that were . . . who's family lived on based at the time then, do you include all the children who were in vitro at least part of the time, that they were in vitro they were on base?

Dr. Bove: Yes, that was the goal of the survey was to see, if we could find those people who delivered elsewhere, because we knew who delivered in the county that we had. We didn't know who delivered elsewhere. The twenty weeks gestational age is coming from that previous study.

Dr. Maas: Thanks.

Dr. Visintainer: If I understood correctly the presentation, actually in some of the letters that the information that the exposure assessment from 1998 study was incorrect. Right? Can you talk about the circumstances about that and how that information came back to you? Is there going to be a re-analysis?

Dr. Bove: Yes. I did work with Nancy very closely on that study. This was the information that we had at the time, that between that . . . actually, there was a gap there. I'm not sure what the thinking was because Nancy did the study, but there was a period between 1968 and '72 when the housing served by the Holcomb Boulevard water system was served by Hadnot Point. We found that out later. I'm not sure what we . . . I don't think we knew, what water system served that period of time at the time we were doing the study.

Dr. Visintainer: How did you find it out?

Dr. Bove: How did we find it out? I think . . . I'm not sure I exactly remember how we found it out. It was put on the Marines' Website for Camp Lejeune. So that was one way. I'm not sure if we found it out before that or not. Mr. Maslia may have found it out before that, but it was way after the study was completed, okay, and published for that matter. It was published both as an ATSDR report and in the American Journal of Epi . . . Epidemiology article. So it was after that. We're talking here . . . I did some back of the envelope calculations. We're talking about five years roughly. Those births were considered unexposed in Nancy's study. There were about 5600 or so. You can figure maybe about 1600, if you add in the ones that we knew were exposed to TCE because they were being served by the Hadnot Point system throughout the one housing area. You have roughly about 1600. So, there is considerable exposure misclassification. The

findings in that study were that the odds ratio for PCE was 1.2, but when you looked at sub group analysis, you found much higher odds ratios for women over thirty-five with previous fetal losses. For TCE with 31 exposed, we still got an odds ratio of 1.5 so there was some indication there too. That part of the study was not published in the peer review journal. It was just published in our report. Again, both parts of that study need to be revisited and will be once we get Mr. Maslia's data.

Dr. Visintainer: So who supplied, where do you get the information on the water configuration?

Dr. Bove: Well, we got it from the Public Health Assessment. The Public Health Assessment often relies on the party, responsible party.

Dr. Visintainer: So, in this case, the Marines Corps?

Dr. Bove: Marine Corps. Yeah. That's often what happens.

[voices in background]

Dr. Visintainer: And they didn't clarify with you directly? It sort of like it happens . . .

Mr. Maslia: Let me just re-visit that a little. I was at ATSDR but not involved with the Health Assessment, but where we obtain our information now, at this point in time is. . I go directly to the utility folks and ask them. Many of them, or some of them, have been only one gentlemen in particular for thirty some odd years, since the seventies. We will walk out and say, "Was this pipe here, and was this pipe connected there?" So we directly go to the utility folks who are civilian employees and ask them. That is how, for example, we have found about some leaking underground storage tanks that have previously been undocumented.

Dr. Visintainer: But the Marine Corps didn't notify you directly? That the water configuration was wrong for the 1997 figures . . . It sounds like you stumbled upon that information.

Dr. Bove: Well let's put it this way. We did send the study to them before it was published for them to comment on. We didn't hear anything about the exposure assessment as far as I know. So, again, but, but we will be able to do a better job anyway with this data. So I think that . . .

Dr. Visintainer: I'm not going to be that concerned about the study as much. The study is going to be reanalyzed. I'm more concerned the communication that is coming back.

Mr. Maslia: Our process, and I think that's what you're asking about, if I can read in between the lines, is what is the process by which we obtain information that we may need and how do we verify it once we have obtain it. The process is we go really to external sources whether they had consulting reports or whatever, to look at that information. We may go back, and I've got letters to show that, and ask them specific elements. One for example is when did Holcomb Boulevard come on line? Okay. We know it's '72. We know Hadnot Point was the original water supplier on base. That means from '68 to '72 something had

to supply water and . . . So, we'll pose a series of questions officially through our liaisons on base to get some answers to those. We're then free . . . or I've been freed then to go and ask any of the utility people or for that matter anybody I want to verify that.

Dr. Visintainer: You're able to validate that it came on line in 1972. But you weren't originally notified by the Marine Corps that that was the case.

Mr. Maslia: I was not.

Dr. Visintainer: I'm still trying to find out how did you find out [inaudible, voices overlapping]. .

Dr. Bove: That's how I found out.

Dr. Visintainer: . . . except knowing on this Website that said it came on line in 1972.

Dr. Bove: To tell you the truth, Jerry Ensminger called me up and said have you looked at the Website lately. I said no. I'm not in the habit of looking at the Marine Corps Website. That's how I found out about it. Jerry pointed it out to me.

Mr. Maslia: There's also a Website that I've used the . . . what is it?

Voices in background: The Few, The Proud, The Forgotten.

Mr. Maslia: For the groundwater stuff that we're doing we have found some very useful information from that Website [The Few, The Proud, The Forgotten; www.tftptf.com].

Dr. Visintainer: One other quick question. When you were talking about the connectedness or the inter-connectedness of the systems, and that they're viewed as fairly independent. That there are these physical valves that link the systems, but they're only used for emergency situations. You got this letter back saying that's all they're used for. Is there any documentation about how frequently those valves were opened up, for what length of time and when they were . . . how long they were left open?

Mr. Maslia: The information I was given and this is speaking directly to the now the present Chief Operator who's an assistant to the Chief Operator of the utilities system, is for only hours at a time.

Dr. Visintainer: Okay, during that 1968 to '72 period?

[voices overlapping]

Mr. Maslia: Or his words were, and I'll quote it "at any time."

Dr. Visintainer: Do they document when it's opened up?

Mr. Maslia: I don't believe so, but again to . . . I think I see where you're going with the question . . . and

going back to a question that was asked before, that's not an issue to test that hypothesis or scenario on a model once we have a calibrated model that we have faith in. We can test that out and see. The system has . . . Water has to flow a certain way. So, that's not beyond the point of testing that out. We can do that. That, later on, may be an issue for our particular panel to raise or to have us look at.

Dr. Visintainer: But we do have to rely on information that they supply. They ran the system. A lot of it isn't documented.

[voices overlap]

Mr. Maslia: Same thing in Tom's River. They'll have sticky notes, "Run this well for six hours, first, then turn this well on." So, if you find the guy that puts the sticky note on there, you're in business. If you don't, it's not documented.

Dr. Visintainer: Right.

Dr. Bove: Let me answer one other question that was raised earlier. . . in my notes . . . what happens in our study, the current study, if those parents are dead. What happens is that there in and out. We're in the initial run through, because we at least have housing information on the child. So we know based on that information and can use that in the initial analysis, but we couldn't adjust for particular potential confounders that we're going to be getting from the interview. We can't look at consumption of water was done. There are certain analyses that won't be done with those. We could do, and will do, analysis including them in for the parts where we have the information to do that.

Dr. Cantor: But if you include them in, you make some assumption as to their health status after birth, is that right?

Dr. Bove: No. . . , no, no. We know they were a case, or a, uh . . .

Dr. Cantor: From the birth certificates...

Dr. Bove: Well, no from the survey, too, we validated them. During the interview we're going to be asking a whole host of questions on various risk factors for childhood leukemia or the birth defects, neural tube defects, and oral clefts and we're also asking water consumption questions, occupation of the father, occupation of the mother, so on and so forth. We'll be asking a whole bunch of questions. For those analyses obviously we won't have that information for those cases or controls, where both parents are dead. We do have housing records. We're going to verify that information through the interview. We're going to make sure that what was on the housing records corresponds to what happened really. The father may have lived on base, the mother may have lived with her mother or parents or whatever. We want to be sure where they lived during the time of the pregnancy. So, for those we don't interview, we'll have to use the housing records for that information. Does that? . . . All right?

Dr. Cantor: Dr. Ozonoff had a question.

Dr. Ozonoff: Want to go back to a remark Dr. Maas made this morning about the purpose of doing the studies, because I think it really is pertinent to your response made just a few minutes ago about why you did the study, which I found actually very helpful. It explains some things to me, because if you had done those studies in '98 and following that for the purpose of responding to community concerns, then you didn't do the right one, obviously, or we wouldn't be here today; but if you did it to follow up on a scientific question, which you did, then some of the decisions you made make a lot of sense to me as someone who also does studies like this. For example, when we do studies we often don't pay attention when people move away, 'because it's too hard to do and we're asking a different kind of question. Frequently, if a community becomes involved, one of the first things they want to know is "I know three of my neighbors moved away and now they've got cancer." So, that's helpful to understand actually why some decisions were made, the way they were made.

It brings up the question, now you're in a different setting, right? You've got . . . there's a considerable amount of community concern and then there are . . . that means there are a whole bunch of other questions that have to be answered. That's going to affect the design of whatever you do from now on. Clearly, you're taking that into account or we wouldn't be here today. This is part of that process of trying to figure that out, I suppose, maybe, I'm wrong about that.

Dr. Bove: Hopefully you were given a history of why you were . . .

Dr. Ozonoff: Well. . .Sort of, yeah. There's official histories and then there's real histories, too.

Dr. Bove: No, no. The official history is probably the real history. I have no doubt. The current study is not going to change other than your suggestion this morning of adding the non-Hodgkin's lymphoma cases back in and other suggestions that have to do with additional simulations, but other than that, the study's going to go on its own. The question is what future research . . .

Dr. Ozonoff: Yeah.

Dr. Bove: My own opinion is that any research that gets done should have the participation of the people being researched, full participation from the beginning on. I'm hoping that we do that. That will determine what the next steps are. Of course, we have to work with the Marine Corps 'cause that's the funding source for these activities. We also have to see what kind of capabilities we have internally as well, but for future studies . . . You're right.

Dr. Ozonoff: I understood you actually, that part . .

Male Voice: Yes.

Dr. Lynch: I just have a question that's related to one of the comments that was made earlier about

concern about taking two years to get the water modeling done and get the final study done. Have you given some thought . . . well, it's actually not related to that, I understand where you're coming from there, but have you given some thought to potentially using some of the data that you already have and looking at it, . . . what I see as a more concise way of looking at birth defects, by classifying women by trimester of exposure? So looking at their housing records and saying, "this one was exposed at first trimester versus exposure in the third trimester," and could maybe be doing that while you're waiting for the more detailed modeling to be completed. I just wonder if you've given any thought to that and so . . .

Dr. Bove: Actually Nancy's study did look at trimesters. I don't think that it made any difference for small for gestational age and that's because . . . we're not sure when the important period of time is for small for gestational age. You can make an argument for any trimester. I've seen actually data where it seems to be similar, no matter what trimester. On the other hand for neural tube defects and oral clefts, we know exactly when to look. But I would want to wait until we had the water data in hand. What's the purpose if . . . we've waited this . . . the other side of the argument is . . . you waited this long, why not wait a year or two when we have real credible data that we can hang our hat on in the analysis.

Dr. Lynch: But that's interesting what you bring up about Dr. Sonnenfeld's study then because in looking at it. . . . So that's your interpretation that it was looking at trimesters? It looked to me more it was simply weeks of residence in the housing as opposed to trimesters.

Dr. Bove: I know what she did because she would come into my office everyday and with a new output. She looked at every possible thing you can imagine. It was her dissertation, so you can imagine. She did look at all those. It didn't change anything so what she reported was what she reported, but she looked at every trimester.

Dr. Lynch: The other thing... I just wanted to comment, really, since we're talking about it, since it seems like there will possibly be some reanalysis of these data. I would like to strongly suggest that future models you really leave prior reproductive history out of the model. There's a lot of work being done right now by people at the National Institutes of Health, a couple of papers are going to be coming out soon showing that you should not be putting prior reproductive history in the model because . . . I think that actually in Dr. Sonnenfeld's paper she indicated that her interpretation of this finding of an increased risk to women with two plus prior fetal losses was that it was an indication of a susceptibility, well it could also be look at as just as more exposure. So by putting that in the model you would be taking potentially away the effect of TCE or PCE, you possibly would not be able to see it.

Further, we have done a lot of simulations at NIH about this. We've actually shown that if you put prior history in the model as a confounder, or effect modifier, it actually leads a number of the other variables in the model to become unstable. So, I would just really suggest maybe looking at the model without prior reproductive history or possibly . . . I don't know if they're getting situations like this in consulting most of the folks only lived in base housing for two years, but looking at each pregnancy as an independent

observation, controlling for the dependence using GEE or something.

Dr. Ozonoff: Good. I'd also like to ask about the speed with which this can be done. Again, I understand that there are certain irreducible minimum having to do with the exposure issue, but it sounds like that the data analysis will be underway before the end of the year. Is that right?

Dr. Bove: We should have all the interview data completed and cleaned up certainly by . . . a year from now.

Dr. Ozonoff: Okay, here's a suggestion, especially since you've come out and paid for a participatory research here. That you don't wait until the study is all over to tell people what it's all about, that you have periodic updatings and maybe there's a core group of people who are especially concerned could be brought in and could look over your shoulders as these results are coming out, maybe give you some good feedback on what else to do in terms of analysis. That way you don't have to wait until it's all over.

[applause]

Dr. Bove: That mechanism needs to . . is not established right now. So that would need to be established.

Mr. Stallard: Are there any other comments from the panel right now on these questions? Have we covered most or . . . have we covered all the issues that were brought up? Are there any outstanding that we should consider at this time?

Dr. Cantor: There's actually a question that I have. It's kind of subtle, it maybe kind of goes to the ethical or perhaps even legal responsibilities. That is the word notification has been used. My reading of what the research is doing or what ATSDR is doing is not notification by any means, and the notification is kind of an accidental byproduct let's say or side issue to finding who would be eligible to be in the study. Can we just have some clarification on that? Because I think there's a misunderstanding of this. I'm not going to weigh in on whether I think notification is ethical or not. Now, if certainly a utility, water utility goes over the MCL of any component they are required by law to notify the recipients of that drinking water. So that is certainly current rules, current regulation under the Environmental Protection Agency Clean Drinking Water Act, but here we're dealing with retrospective situation.

Mr. Stallard: Dr. Bove, do you have a comment on this?

Dr. Bove: Yeah. I wouldn't use the term notification. What we do was try to contact . . . locate and contact those who we felt would be eligible for the study. That's a totally different situation entirely from notifying everyone at the base at the time who might have been exposed, which was not our purpose at all. So, that still needs to be done, okay, in a systematic fashion. I don't think it's been done. What we were trying to do was simply, again, to identify those births that would be eligible for our study. That's all we did. Really, it was that narrowly focused.

Dr. Ozonoff: I'm trying to figure out how to say this, too, again . . . I don't know why I keep asking questions that weren't offered by our group. Recently my university had a problem with laboratory workers who got infected while working on a biowarfare agent, tularemia. To say that my university was not completely forthcoming [laughter] about this might be an understatement. The reason I'm prefacing it with that story is, this is not about the Marine Corps, this is about how institutions act when they may have screwed up. There seems to be a little bit of a problem here, because you're depending upon for funding and for information the responsible party. Also, you both have the same boss, ultimately. So, if the federal government investigated another part of the federal government acting like an institution, etc. So, where am I going with this? I have no idea, but it does seem to present some problems.

Dr. Bove: When you do an occupational study you have to rely on the data that's available from the plant.

Dr. Ozonoff: Yes, sometimes you do.

Dr. Bove: Let's put it this way, what, with the decisions we made, in terms of what studies we wanted to do, were our decisions. I have to say that. We, personally, we did have some disagreements with the Marine Corps and the Navy. There were disputes about whether the Woburn study was meant something or not, my study meant something or not and so on. So, in order to do these studies there were debates between the agencies. It wasn't . . . but these were our decisions and we stuck with them. But we do have to rely on the Marine, on the base for information. There's no other way to, to . . . you know, we can do our field tests and so on, but they have vital information, without it we can't . . . we couldn't find all the people we did find without their help in the locating effort too. So what are you going to do? But that doesn't, I mean, if I had control over this situation I would try to find every Marine who lived there and to notify them that if I had . . . if I was chief.

Mr. Stallard: I have a question of clarification myself. When you responded you said that you had to go to the civilian utility people. Are these civilian employees of the Department of Defense operating, engineering and facilities within the camp or are these civilian civilians, I mean outside of the military structure?

Dr. Cantor: The answer is, there are two chains of command and the environmental management and utility works. My understanding on base they all report to one person who's the chief civilian reporting to the Base Commander, Commanding General. So, from that chief civilian they are civilian employees. They're not, . . . my understanding is they are not military contractors come in. They are just as we would be civilian employees of the federal government but they answer to the . . . depending if they are on the environmental management division with our liaison or the utility side, which is the water people, plumbers, electricians, that they ultimately answer to the chief civilian who reports to the Commanding General of the base.

Mr. Stallard: In terms of the questions asked and those issues. We have touched upon them. There are two still outstanding that relate to inclusion of civilians in the study, if you wish to ask that question . . .

Dr. Cantor: So the two questions are, people who were living off base who may have spent time, especially women of childbearing age, and . . . what is the other question?

Mr. Stallard: Decision process that left out civilian employees from the study and any other adults, children and adults.

Dr. Cantor: So there's the issue of why were there not maybe other end points and children who were the older siblings let's say of these people not included? I was just wondering whether this was a matter of feasibility, a first trial, or whether there was some thought that maybe this would be something in the future?

Dr. Bove: I think we wanted to see what would happen with this study and see what we would do in the future. Although, I can't say that we would do anything in the future. I can't say . . . Other children exposed after birth could have been looked at for childhood leukemia. What I've seen in the literature is that it's in utero exposure that seems to be more related . . . environmental exposures in utero that seem to be more related to childhood leukemia based on the clusters, what's going on in England and in our own work, either funded Tom's River, Woburn, or elsewhere. So, that's why we focused on in utero exposures; why we focused on just those who lived in base housing; because we could then be sure that they were exposed. We could have included others, but at least with those, we had some basis. We had housing records, we had information from the birth certificate. We thought that would be a sizable enough group to study. We would have enough power based just on that population. That does not mean that other people we didn't think were exposed or not. It just meant that this was . . . we could study this group, hopefully thoroughly.

Dr. Cantor: Do you know if base employment records of civilians living outside of the base are available?

[voices overlapping]

Dr. Bove: I don't know.

Dr. Cantor: You haven't asked that question yet.

Dr. Bove: So, I don't know, that would be something to look at. Again, these are ideas for future studies that could be worked with the community on.

Dr. Ozonoff: But some civilian employee offspring were studied, right? If I understood what you said before?

Dr. Bove: I'm making a distinction between . . .

Dr. Ozonoff: Civilian employees who lived on the base . . .

Dr. Bove: and those who lived . . . If you lived in base housing on . . . yeah, I went through that [inaudible] birth certificate, you know, they're in. Far as I know, that's how we did it.

Dr. Cantor: A thought that's going through my mind and this is kind of Epidemiology 101 for those listening who may not understand why we are focusing so heavily on this exposure issue. Why is that a crucial element of any study such as this? I was wondering if one of the other panel members, . . . I'll be happy to do it, to explain this.

The basic measure that comes out of any study like this is something generically called a relative risk. A relative risk, let's say if it is 2.0 would mean that there is twice the rate of disease or death or whatever it be that we're measuring in the exposed people relative to the unexposed people. If you are not very good and careful and precise in assigning the correct exposure to the persons in your study, you may, what we call, misclassify-you've heard that word spread around a few times-misclassify some of the people who are truly unexposed as being exposed, and the reverse, some of the people who are really exposed, we call unexposed. That's apparently what happened to part of the population in the published study that Dr. Bove was [inaudible]. And, and, not 100% of the time, but 99.5% of the time, the effect of that will be to make our observed relative risk lower than the real relative risk.

So, let's say in the case I posed that there was a two fold risk, relative risk is 2.0. We may observe something like 1.5 or if misclassifications is really bad, 1.2 or 1.3. We may call in that latter case that there is no connection because it's so close to 1.0, which would truly be no connection. That we wouldn't say there's anything going on here, whereas if we had done it correctly we would say it's 2.0 and we have a lot of concern. So that's kind of the basis of . . . Dr. Ozonoff earlier on said "Exposure assessment is the Achilles heel of environmental epidemiology studies." This is absolutely true. Just wanted to give you that background, to give you some appreciation for why we think this is such an important part of the study.

Mr. Stallard: So if we have no further questions for these folks, they may resume their seats, you may continue with your deliberations.

Dr. Cantor: So, I would just like to open up the floor for further comment for the panel as to. . Maybe this is the time to open up our discussion more broadly and talk about what we feel would be first of all an expansion of the ongoing work. We'll call it a new study for Dr. Bove's satisfaction, but who else might be included in similar types of study. I think we could also then maybe start talking about other end points that are not included in the current study that perhaps should be considered in the future.

Dr. Visintainer: Actually, if I could just make a comment. Just to reiterate your comments on communicating scientific results. I think what I see underlying a lot of this is that there hasn't been sufficient communication. Oftentimes the communication is so filled with scientific jargon as to mean nothing to those people who we're trying to communicate with. That's something that I think scientists are very good at. I think we're all very good at not communicating our results very well, except to other people in the club. One of the things that is very important is as studies are designed that we identify limitations to them.

The best people who know what those limitations are are the researchers at ATSDR. They're the ones who are living this data everyday.

You have to recognize that any study that's conducted may find nothing, but we have a saying that says that the absence of evidence is not evidence of an absence. I think it's important in communicating these results to the lay public that we also communicate our faith in our ability of this tool, this epidemiologic tool to detect something. If one part of that data, one part of this chain is no good, then the whole study sometimes will collapse on itself. I don't think we're very good at communicating that. I think that's part of what we should start doing.

Dr. Ozonoff: I'd actually like to address the communication issue as well, but from a slightly different point of view. First of all, I agree completely with what you said. Part of the problem, however, is that when we communicate with each other using scientific language, we're using a language that is very restricted and only actually pertains to it a tiny slice of the world, the slice of the world that we know how to deal with. Going back to the question, the purpose of doing these studies, if the study is to somehow address pressing concerns that the community has, our little slice of the world might not be big enough. Right? The language we use might not be big enough. To use sort of a crude example, it's sort of like the man who goes to the emergency room with a broken leg and they say, we don't have orthopedic surgeon here, but we'd be glad to give you a rectal exam."

I sometimes feel that's what . . . communities come to us with hard, difficult questions, and we can't answer those questions. So we give them a rectal exam, which makes sense if that's what you know how to do, and that's what you know how to talk about. Maybe that's what's indicated in a certain circumstance, but rarely, I would say. So, if we're going to figure out . . . and I guess one of the things the panel needs to talk about is our charge here, but if our charge is to advise ATSDR on what might be done in the future we have to take the important question of the purpose of this into account, especially the question of how to satisfy pressing concerns posed by the community, if that's one of the objectives here, in a way that's scientifically responsible and meaningful.

So, you don't want to just satisfy . . . give somebody an answer, just for the sake of giving them the answer. You want it to have some substance to it. Something they can rely on, but at the same time, you don't want to just give them a rectal exam. You want to give them the answer that they're seeking or the best that you can do anyway. I've worked with a lot of communities over the years. They're . . . I was going to say almost never, but in my experience, never unreasonable in asking people to do the impossible, but what they do actually want researchers to do is the best that they can do. So, that's what I would think might be part of our charge, is to try and figure out, what's the best we can do towards answering important questions that they have, understanding the important questions that scientists have, which is why some of the other studies were being done or would probably get done anyway.

[Tape change]

Mr. Stallard: Comments or responses.

Dr. Maas: Well I certainly agree 100% with what you just said and I think all of us [coughing obscures voices] as to what our purpose is here. I think that timing with the last few hours we've spent on this is probably helping all of us get our arms around this whole situation better. I'd like to take a one minute shot at trying to summarize where we might be at right now.

We have the study that ATSDR is doing now. Our charge is to see what additional studies might be needed. When we look at the study that they're doing now, we see that what they've done. They've tried from a scientific standpoint say, "Well where do we . . . given our constraints of data collection, in terms of both exposure and in terms of tracking people down and seeing what health effects are out there. . . where do we have the best chance of actually being able to see something?" That's a reasonable approach. Then, they said, "Let's put all of our efforts into that and let's not put any efforts into any other things, like adult cancer responses, birth defects, or children that were already born." The whole list that we've heard here today. "Because we can't do as good a job with those as we can, if we pick this one to implement. So let's pick the one we have the best shot at doing some good." I can see where that approach has a lot of logic to it.

I think we all probably also agree that while it would be an ideal world, nice to be able to do a complete study of all these other outcomes, that's probably not feasible from an information gathering standpoint, from a biostatistical analysis standpoint or from a financial standpoint. But it seems to me that this doesn't have to be an all or nothing type of situation. It seems to me that what we could indeed be looking at saying, "Why don't we look at some additional things that we could do a pretty good job at. and then the other outcomes, the other risks, the other indicators here that we know are out there-there were risks from drinking this water-perhaps we can do," just as Dave said, as good a job as we can within the constraints that you might have. In other words that seems a better approach than doing nothing.

Certainly we could spend our next day giving advice to ATSDR of using our combined expertise of how they might do the best job that they reasonably can with looking at some of these adult cancer statistics and risks, some of the other childhood birth defects risks, realizing that when you come out with that report it may not be as quantitative and unequivocal as you would like. But we can still, we know enough in this field to be able to put error bars around that and to do a study that at least gives us a best guess, an approximation, of those kinds of other end point risks. It seems like it might be where we could do the most good here in the next day of helping them and guiding them and giving them suggestions on how they might do that.

Dr. Cantor: So you're suggesting that we start to enumerate, think about the other outcomes that might be doable, that might be feasible, that could be looked at, that there is some biologic rationale for, I assume, that's underlying . . . that there might be some biologic rationale for, uh, that we could start considering. Is that what you're saying?

Dr. Maas: Exactly. I think step one for what I'm suggesting, is to develop a list of other areas of study that we might want to do. And step two, would be to consider each one of those and pool our thinking to come up with some guidelines of how you might do the best job you could on each one of those. Probably it will evolve in the process of doing that where maybe . . . Well, at least what I would hope we would come to is some kind of sense of the quality of information we might get in each one of those areas. So that maybe we could even hopefully give ATSDR some recommendations for priorities for our suggestions.

Dr. Drane: I'd like to second that and let me give you two examples of broadening without getting too wide. One is a measurement of the breakdown of the immune system as the number of trips to the hospital. If you took a child who repeatedly has to be taken to see the doctor, something's going on, even if he might not have a, uh, leukemia, but if he's ill and takes a lot of trips to the hospital, he's still ill, then definitely that's a negative piece of information. Spontaneous abortion has not been mentioned, but we have mentioned those that have been after twenty-seven weeks. Spontaneous abortion can be a reflection of either an outside insult or a metabolic disorder or hormonal disorder that the prospective mother brought to the fetus. So I would not overlook either one of those. In our deliberations I'd like to put these in as a possibility to talk about.

Dr. Cantor: So immune system effects... However we measure it

[voices overlap]

Male Voice: Well, I'm saying. . .However we measure it. That's right.

Male Voice: Immune systems effects. Spontaneous abortion.

Dr. Selmin: I would like to suggest also, to broaden the type of heart defects that were looked at, because from what we heard there were some particular heart defects that were narrowed down, but the list can be broadened significantly.

Male Voice: Then maybe we'll hold off a detailed discussion of any of these . . .

Dr. Drane: I think that's, uh, a better . . .

Male Voice: . . . to kind of get the list together.

Dr. Ozonoff: Well, if you're going to add things to the list I would add autoimmune diseases, of various kinds, of which Crohn's could be considered an autoimmune phenomenon anyway, and lupus and various connective tissue diseases, which have all been mentioned with these solvents. If I step back for a minute and put myself in ATSDR's place, this gives me the willies a little bit because . . . let's take the adult cancers which I feel strongly about. I actually consider the Public Health Assessment dismissal of them in 1997 as nothing short of a scandal given the knowledge that was available at that time. Having said that, then if

you ask me what am I going to do about that, that's harder. Although you just want to make a list now, one of the thing's I'm thinking about not only with the list, but with the details about what to do and the items on the list is that this is where the community could be really helpful.

So, let's take adult cancers. One of the issues is how are you going to find all these people that are scattered all over? We've heard about that. I don't have any magic answers to that, but maybe the people who are, who worked there, who know how they can be reached and how can reach other people could be helpful there. So, it's need to be a way to sort of have suggestions and then to hook in the brain power that exists in the community to help solve some of these problems 'cause I think that our experience is going to . . . really good ideas to make some of these things work come from there.

Dr. Visintainer: Yeah. I actually think some of the adult cancers, we look at 1968, that's when the birth records were computerized, so if I was to start taking that exposure, if I'm reading this correctly, was probably in the 50's, because of the waste water. I guess the civilian population . . I was in the Air Force in Biloxi, Mississippi. I bet those people have been there for generations. I would probably start with the local community working at the base and following those people. That would bring in the civilian population. I think cancer is a hard end point and even mortality-cause of death-which might be with the national death index might be a follow up a little bit more objective . . .

Dr. Maas: We can get into the details or we can get into some . . there are resources out there. I'd like to follow up on that too, because the adult cancer rates, lifetime cancer risks from ingesting of carcinogens in drinking water is probably the sub-field of all this that I'm most experienced about, and know the most about. I certainly agree, when I first read the 1997 reports, and just the out of hand dismissal "there is no risk," I found offensive and bad science, bad interpretation of what might have been reasonable science.

So, I really think that that one at least is a fairly low hanging fruit, in my opinion because we can go at it from two perspectives. One is we have IRIS numbers that predict what the lifetime cancer rate is per part per billion ingested and what the cancer risk is. And we have, short of these water system studies, we have a pretty good estimate, probably within a factor of two, anyway, of what the average concentration that people were actually drinking. We have a pretty good estimate of what the average span of time people were drinking it. We have a pretty good estimate of how many people drank it. Interestingly you can take all that data and basically add 1 plus 1 plus 1, plus 1 and in five minutes you can come up with at least a ballpark estimate of how many cancer cases have been caused by twenty years of this many people drinking this part per billion of a carcinogen.

Interestingly enough, while my wife was driving on the way down here yesterday, I pulled out and did on the back of an envelope, I spent about three minutes and I did those calculations. And I came out, for each of the TCE and PCE, a calculation of about sixty extra cancer deaths per million for each of the TCE and PCE. It was interesting because then I flipped to the next page of the 1997 report, and sure enough, ATSDR

had come out with an estimate of 55 extra cancer deaths per million. So in five minutes we basically got the exact same number. The difference is they said "well, that's not a health concern." I would say, "Well, we've got a minimum of 120 extra cancer deaths that were caused from adults drinking that water over that period of time. That is a health issue." So it would be very interesting. I think we have an opportunity to go acknowledge that here for the effected people.

Also, it would be very interesting opportunity to take some of the data we're talking about here that could be done and seeing how well the actual number of calculated excess cancers actually compares with we would predict on the basis of the IRIS numbers, So, that seems like it would be a real easy thing. It can be presented in the context that it should be presented, that you were certainly drinking water that had an excess cancer risk, in terms of those two chemicals; on the other hand, you were there for a year. In the other 70 years of your life you were exposed to other carcinogens in other places. While we might have 120 other excess cancers, in that million population there are going to be tens of thousands of people that contracted cancers from other sources too. I think it would be really instructive and appropriate to be able to put that in context also.

Dr. Cantor: So we don't know what the result of this would be of course, but using that to begin with as a scaling. . .

Dr. Maas: Well, I think a comparison of what we would calculate from what we know from a lot of extensive laboratory animal studies. We can predict an approximate risk and then to be able to do the best we can with comparing that. Again, as we all know, there are a lot of problems with that because one thing it doesn't allow for is any kind of synergism. It's all based on animal tests where you are only exposed to one chemical. So, it might be very very interesting and informative, an opportunity to address future situations with TCE and PCE contamination to be able to compare the predicted excess cancer deaths with an estimate. Even if it's only an approximation, it's a whole lot better than what we have right now of it being totally dismissed.

Dr. Cantor: Thank You.

Dr. Visintainer: I just want to underscore in all these studies that we're tossing around, again, this is . . . what may be unwritten is that each conceiving of a study design that would include certain groups of the local community or certain military personnel that were exposed or base housing. Whatever is decided I think the protocols need to be communicated to the public and their input solicited, because we heard some testimony this morning that questions about why someone was excluded from study. I think it's important for them to recognize that this is an entire process, not just a series of single studies that may not capture their input. If they are excluded from study they should know why. They should know the parameters of the study and certainly I hope the community asks questions.

Dr. Cantor: That's an excellent suggestion. I want to add one to the list, but in contrast to your assumption that we know the study design and we know the sub population, I'm just going to throw this out as an end

point, and I'll tell you why. Maybe you'll see very quickly why I don't know quite how this should be done, that is, neurologic effects. The reason I mention this is certainly these chemicals are neurotoxins in height of concentration, but also there was a recent publication, 2003, I believe, a study done at another toxic waste site, Rocky Flats, where for 140-, 150 some-odd folks who had been exposed, and they had very very good exposure information, they were able to show decrements in neurologic function on a number of different tests for people at the most highly exposed level compared to people who were at very low exposed level.

They also showed an interesting, and those people know neurology much better than I will perhaps appreciate this better, but an interesting interaction with alcohol consumption. That was very poorly defined in the paper. They said people either drank alcohol or didn't drink alcohol. That doesn't classify people very well, but at any rate it's an end point that I think is worthy of some consideration if we can think of some study design for a . . . maybe a relatively small number of highly exposed people, even 10, 15, 20 years out.

Dr. Ozonoff: It is actually an end point that makes a lot of sense. So does that alcohol interaction because TCE, PCE, and alcohol are all detoxified. That is, you're body handles them in the same way by the same enzymes, the 2E1. That means that that one enzyme is competing to try to get rid of all three of these things at once, and if you're taking in alcohol, that's essentially adding to the problem. That was a surprising finding actually, the Colorado study.

Dr. Maas: I'd like to add one more to the list that I think would be informative and practical, and probably somewhat easier to do than a lot of what ATSDR has been taking on so far. That would be to particularly and explicitly look at that sub cohort of people that haven't moved in and out of there, or weren't only there for a year. But, to do a separate study on those that had contaminated water that, in fact, either lived or worked there over the long term for fifteen or twenty years during that period. That should be a much easier cohort to study and to be able to track down than if you were mobile.

I also think that we can use the results from that, and that's where you would expect to find higher incidences and what not. If you've got the results from that study that would give you something pretty reliable to be able to extrapolate for those who may be, where there for maybe one-tenth of that time, or one-fifteenth of that time. So, that might be very useful data to extrapolate to some of these other folks that we would have a harder time quantifying their exposure.

Dr. Visintainer: One more. I think this goes back to the cancers. When we have been talking about the cancers, I was thinking about individuals who were exposed being followed over time. What has come up from the public comment is children in utero or children who had, say up to age two, who had this exposure as infants or young children followed over time. So that would probably be from 19 . . . well actually I don't know when you could start . . . I guess from 1968. Not be in utero necessarily, but young children who now are 20, 30, 40 years old, followed forward. Those kinds of outcomes, I don't know,

certainly cancers but maybe all these outcomes could be included in that cohort.

Dr. Drane: I would like to add one more thing for consideration, debate. That's using Paris Island information as a control. Using Paris Island, the other Marine base on the east coast.

(Male): Oh, Paris Island. What are they exposed to?

Other voices: What's going on at Paris Island?

(Male): Basic training.

Dr. Drane: It could be the same thing. It could be, but it couldn't be .

Dr. Maas: Well, we actually have other military bases in eastern North Carolina, too.

Dr. Drane: I didn't want to . . .

Dr. Ozonoff: Can I take two minutes to talk about study design?

Dr. Drane: Sure.

Dr. Ozonoff: We've been talking about study design. It's just occurred to me that, it's probably not clear to you what study design means. So let me give you my version of it, which is not everybody's version, but since I have the microphone, you're out of luck, 'cause you just have to hear it.

First of all, what is it that epidemiologists do. If we're interested in what effect TCE or PCE has on people, the one thing we can't do is an experiment on people. We can't like take this half of the room and give them TCE and PCE and not this half of the room, and then watch to see what happens. So, the best we can do is sort of look around in the world to see, if there's something that's almost like an experiment that's going on and observe it, like a factory where people are exposed to asbestos and compare their health to the people who are not exposed. The process of sort observing natural experiments, arranging the observations that open up a way to give us the most information that interpreting that is . . . that's what study design is all about. What do we observe, how do we arrange it, and how do we get information out of it.

Now, there are three classical study designs in epidemiology. Their technical names are case control, cohort and cross sectional, but what they really correspond to is exactly the kind of questions that you have. So, for example, what are the kinds of questions that communities have when they're exposed to chemicals? Well, if they're exposed to a chemical, one of the first questions they have is, "What's going to happen to me and what's going to happen to my family, if I've been exposed to this chemical?" That's the cohort design in epidemiology. You have people who are exposed and you compare them to people who are not exposed and you see, if there's a difference in those two things. It's like an experiment.

Then, if your kids get sick or you get sick, what's the question that you ask? "Why me? Why did this happen to me?" That's the case control design in epidemiology. You get people who are sick and you get people who aren't sick and you ask what's the difference between them? Is it that the sick people were exposed to TCE and the others weren't, or whatever?

The third kind of study design, called a cross sectional design, also responds naturally to the kinds of questions that are in communities; which is, you might be in a community that's got both sickness and you might have an exposure. One of the questions you ask is, "Are we sicker than our neighbors?" You want to know. You've been at Camp Lejeune, are you sicker than people who are at Paris Island or someplace like that? That's the cross sectional design where you are sort of measuring exposure and sickness all at once and comparing it to these two things.

Now, at the heart of all of these study designs lies a simple procedure, a comparison. A comparison is at the heart of all of these things. What you ideally want in your comparisons is that the two groups that you're comparing have no difference between them at all except for one thing, the one thing you're interested in, which is in this case TCE and PCE exposure. The problem is that nature . . . arranging this natural experiment for you just isn't a very cooperative research assistant. So, nature doesn't make things nice and tidy for you. So, there are lots of differences between the two groups you are comparing. You've got to jump through hoops and figure out ways to select them and observe them in ways to make them as alike as possible, to isolate just the one thing that you're interested in. That's what all this study design stuff is about. It can be very difficult. Because it's messy, sometimes you just don't get a clear cut answer out of it.

I don't know if that's helpful but . . . it's helpful for me to be able to say it.

[laughter]

Dr. Cantor: We're nearing break time. I wonder if Christopher. . . do you have any more comments before we go to a break?

Mr. Stallard: No. I think we can take a break at this point and resume in fifteen minutes which I'm going to say is ten till four. That will be a public comment period. Good. Thank you.

Dr. Cantor: Thank you.

[Upon which, those assembled dispersed for a break and then reconvened.]

Dr. Cantor: All right folks. Take your seats.

[general voices talking; not on panel business]

Mr. Stallard: I'd like to invite Ms. Denita McCall. Welcome and thank you for being here.

Ms. Denita McCall: Thank you very much. I want to thank the panel and ATSDR for coming together. It means the world to me and my friends and my family. Thank you very much.

I'll begin by telling you that right out of boot camp for the Marine Corps, I was stationed at Camp Lejeune, went to school there for my MOS training. I was eighteen years old. I was stationed back at Paris Island. Seventeen years later I was diagnosed with parathyroid cancer. This is my radiation mask. I didn't . . . after listening to everybody talk about including adult cancers today; before I came here I didn't think that anybody would listen, just because of the direction ATSDR has taken with this whole situation. So, I don't even know why I say this.

It's a horrible thing to have your head strapped down to a table and receive radiation, but I had a radical neck dissection and part of my esophagus removed. And, my recurrent managerial nerve was also severed, so, I've had several surgeries to restore my voice. I've got a cortex implant behind my left vocal fold to push it over so that I can make a voice.

Needless to say, it's been a very hard six years, because this just happened to me six years ago. Aside from the cancer, I have a lot of other health problems, but I'm more focused on the one that's potentially going to kill me. I've got some tumors that they're watching on my ovaries. They want to remove them, but I held off having surgery, so that I could come here today.

My oldest son who's twenty, he's also a Marine. He's been diagnosed for the past seven years with some kind of liver disorder, they're not sure what it is. He's been to the children's hospital since he was fourteen and they keep doing ultrasounds on his liver; he's got a high hematocrit and high hemoglobin. They were thinking he had leukemia at one time.

I just want you to know that I don't doubt that water caused my cancer. I don't doubt it for one minute. When I first had surgery at the university, apparently parathyroid cancer is an extremely rare cancer, and mine was even rarer in its presentation. I didn't produce the high calcium in relation to the size of my tumor. My tumor had basically taken over most of my neck, where they had to remove approximately five centimeters of my esophagus all of the lymph nodes in my neck. Subsequently, the surgeon, thankfully, did not give me a laryngectomy, which he made a split decision not to, because he didn't want me to have to talk with one of those voice things, you know, that makes you sound like a robot. So he told me, he knows he left cancer behind. My margins weren't clear. My lymph nodes were positive for cancer.

All of this really to me, these studies being made . . . I don't really understand why we have to take so many years to find out if this made people sick. I know it made me sick. I think there's maybe a lot more sick people. I think we need to find them. There are a lot of people that were at Camp Lejeune with me, and I'd really like to know how they're doing, if anything has happened to them. I can think of at least twenty-five friends that I had at that base that I'm not in contact with right now, that I know for sure that they were drinking that water. I really think it's important that somehow, someday, we contact most

everybody that lived on that base. We were very young. We were eighteen years old, to me that qualifies as a child. I was... I was right out of high school. I don't know. Some of the data from ATSD, that I've read, states that the latency period for cancer would be ten to twenty years, and I got mine about seventeen years later. So, maybe they're getting sick right now and they don't know what's happened to them.

A lot of the doctors at the university thought maybe I was working in a nuclear plant. There was a small cluster of parathyroid cancers up in Oregon, because there's a nuclear plant up there. They got cancer up there, but no I've never lived in Oregon. Did you get radiation for ACME? No, I didn't get radiation, so, I just want to thank you for coming together. I hope you do include adults and try to find out, if anybody else has got any kind of cancer. Just from the Websites that I've visited, from some of the people here started them, there are a lot of people who have cancer. But I need. . . I would like you guys to really get that information, so that we can prove to the Marine Corps. . at this point I don't . . . I'm not eligible for any life insurance or health insurance. I'm not eligible for any service related disability through the V.A. So, basically you know I'm at the mercy of public aid and the V.A. to help me out. It's just . . . It's been a struggle. Sorry, I'm so upset, crying. I just didn't think anybody cared. Thank you very much.

Mr. Stallard: Thank you Ms. McCall. Mr. Kendrick Bolton? All right. Mr. Jerome Ensminger will speak on behalf of Major Thomas Townsend.

Mr. Ensminger: This is the statement of Thomas Townsend. He's a Major in the United States Marine Corps, retired. Memorandum for the record: To the National Centers for Environmental Health/Agency for Toxic Substances and Disease Registry Expert Panel, Camp Lejeune Water Contamination.

Prologue: The following observations are submitted to the panel convened to: 1) explore opportunities for conducting additional health studies of people previously exposed to contaminated drinking water at the United States Marine Corps Base at Camp Lejeune, North Carolina; and 2) provide scientific input on the feasibility and usefulness of conducting these studies. ATSDR is suggesting they, in the spring of 2005, intend to begin a retroactive 1968 to 1985 study entitled, 'Exposed to Volatile Organic Compounds in Drinking Water and Specific Birth Defects and Childhood Cancers-United States Marine Corps Base, Camp Lejeune, North Carolina.' Commendable objectives, but falling far short of the range and depth of scientific inquiry that is needed.

These are some of Major Townsend's observations and comments:

A. The scope of the proposed ATSDR study is far too narrow and restricted in many respects:

1) There is no indication that ATSDR intends to conduct human health studies of the adverse health effects suffered by the then young Marines and sailors exposed tour after tour, to VOC contamination in the base water supply. Over 500,000 active duty personnel were exposed during the ATSDR defined study period, yet ATSDR in its 1997 Public Health Assessment concluded the VOC exposure would not or was not likely to cause adverse effects, health effects, in adults. Knowing that raw supply well water samples prior to 1985 tested in excess of plus or minus 30,000 parts per billion of TCE and PCE combinations, and the

toxicological knowledge of that period, I find that potential health conclusion to be totally unsubstantiated and without merit. ATSDR was mistaken in its analysis of the public health situation, regarding: the active duty cohort, or was encouraged by the Department of Defense/Department of the Navy to downplay the political/financial liability ramifications of such an environmental disaster.

There are literally hundreds of those young warriors that now demonstrate the well-documented or defined effects of massive VOC exposure, yet ATSDR and the military continue to pretend no harm has been done to them. How similar to the Agent Orange controversy. First, total denial by the government; then acceptance of reality, after veteran after veteran turns up at the V.A. hospitals with the known symptoms. These veterans of VOC exposure deserve to be individually notified of their exposure, and if adversely effected with VOC related problems, to be granted gratis medical care by the nation for whom them served.

2) The range of the specific birth defects and childhood cancers to be re-evaluated is far too restrictive and does not adequately reflect the demonstrated range of adverse effects on those children contaminated in utero. A revisit to confirm demonstrated cases of childhood leukemia, non-Hodgkin's lymphoma, spinabifida, neural tube defects, and oral clefts is well warranted. Dr. Henry Falk, then Assistant Administrator at ATSDR, in June of 2003, cited pediatric cardiac defects as an area to be investigated, yet that small but significant cohort, now has vanished from the ATSDR proposed study. From a familial perspective, I find that particular deletion to be most unacceptable. Between tours in Vietnam, my family lost an infant son to in utero VOC contamination in 1967. The Navy autopsy report, and pediatric cardiology studies since then, makes it clear to this father that ATSDR cannot brush off pediatric cardiology deaths and incidents to in utero exposure as one unworthy of further investigation, whether death occurred in 1967 or in 1985.

3) The ATSDR finding of 103 cases of specified childhood cancers and birth defects is farcical. Deaths attributed to cardiac defects are not even included. The number of children born at the United States Naval Hospital at Camp Lejeune, North Carolina between 1968 through 1985 was 33,456, whereas ATSDR and NORC contacted 12,598 for juvenile health assessment data. ATSDR disregarded the births of some plus or minus 16,000 children born at the local civilian hospital during that period; many of these from families that lived on base drank the water and chose civilian delivery. Military families that left prior to delivery were not included. The ATSDR-defined study period was purely arbitrary, 1968 through 1985. It met the North Carolina computer based birth records that went into effect in 1968. Contamination of ground water began long before 1968. I was stationed there in 1955 and witnessed environmental degradation at that time.

4) Families that lived off base and civil service employees were disregarded, even though exposed intermittently to VOCs when utilizing base facilities or while working. When VOC MCLs exceed 1,400 parts per billion, it doesn't take continuous exposure to create adverse consequences. If these families have not been queried, I fail to understand how ATSDR can present a scientifically and confirmable Public Health

Assessment for Camp Lejeune.

B. It is clear that ATSDR in its 1997 Public Health Assessment, and the 1998 Sonnenfeld 'Adverse Pregnancy Outcomes and Small for Gestational Age' study, used incorrect or misleading data as the water distribution systems in terms of exposure and the geographical, demographical aspects, i.e. dependent housing and troop billeting areas. Dr. Sonnenfeld in Table 2, Page 50, of her study asserts persons living at Midway Park, Berkley Manor, Paradise Point, Watkins Village; all served by the Hadnot Point water system were short-term TCE exposed. Hadnot Point water treatment plant from its 1940's construction provided water to all those housing areas, plus the troop areas and Hospital Point; some plus or minus forty years is hardly short term. ATSDR for reasons unknown, believed that the Holcomb Boulevard water treatment plant provided water to all dependent housing and troop areas between 1968 and 1972. Holcomb Boulevard Water Treatment Plant didn't even go on line until August of 1973. This was a major error which skewed the exposure data for the in utero study to totally unreliable and unsupportable conclusions.

ATSDR requested detailed infrastructure data from Marine Corps base in the early 1990's. Today responses from the Marine Corps Base to ATSDR have all disappeared at both ATSDR and at the Marine Corps base. What infrastructure data did the ATSDR utilize to develop its Public Health Assessment/study? Why didn't the peer reviewers note these failures? EPA normally would have completed the infrastructure data discovery. In this instance the Department of Navy and the United States Marine Corps already listed on the National Priority List [Potential Responsible Party] assumed this responsibility. Letting the designated National Priority Listed PRP enter the investigatory stage of the mandated ATSDR Public Health Assessment leads me to question the validity of the data furnished by the Marine Corps base.

Based on some 800 Freedom of Information requests to perhaps twenty federal and state agencies, civilian and military, this officer is convinced that a conspiracy to conceal multiple violations of federal environmental laws has been in place for the past . . .

[Tape change]

. . . twenty years, with the intention of extricating the Department of the Navy and the Marine Corps from their accountability and responsibility for the operation of derelict and deadly water distribution systems at Camp Lejeune, since a time indeterminate. A competent and verifiable ATSDR re-evaluation, with broader range and depth of the Camp Lejeune fiasco, would provide the scientific basis to determine what actually transpired, the extent of the human damages to all human cohorts, and to provide the survivors with an objective and impartial base line from which we the survivors of governmental neglect and denial can attempt to reach closure.

Mr. Ensminger (for himself): Speaking a little bit . . .

Mr. Stallard: On behalf of Major Thomas Townsend, your time is up. I'll give you another ten minutes.

Mr. Ensminger: Oh, okay.

Mr. Stallard: Are you done with his words?

Mr. Ensminger: Yes.

Mr. Stallard: Thank you Mr. Ensminger for speaking on behalf of Mr. Thomas Townsend. Mr. Ensminger now has time allotted for his other presentation. Right?

Mr. Ensminger: I provided each of you with a package of documents. I'd like for you to pick those up. You heard Major Townsend in his statement refer to a conspiracy or a cover up, whatever you want to call it. I'm now going to present to you some documents. I know you're here to look at scientific data, but it's like I told several of you during breaks or at lunch. Scientific studies are like a computer, you put junk in them, you get junk back out of them. These documents that I'm about to cover with you show exactly what transpired at Camp Lejeune, as far as the data gathering, what happened and what didn't happen.

The first document is Enclosure 1. It's dated February 23rd of 1993. It's from Dr. Nancy Sonnenfeld, ATSDR. It's addressed to a Mr. Neal Paul who was, by the way, the main point of contact for ATSDR at Camp Lejeune. "Dear Mr. Paul, I recently spoke with Morris Maslia about obtaining more detailed information about the potential contamination of drinking water data at Marine Corps Base, Camp Lejeune. Mr. Maslia indicated that I should make my request in writing to you." Further down in this letter she asks for very specific infrastructure data concerning the water systems in this letter. She says she's also trying to assess how many people consumed water from which wells and for how long. "I would like a list of all housing areas on the base, the location of these housing areas, the number of people in each housing area and the source of water for that area." This was a question that was brought up earlier. "Finally I would like a rough estimate of the number of people who lived at Lejeune for longer than five years and the number of people who had lived at Lejeune for longer than ten years at the time that the contaminated wells were closed." She goes on in her closing, "Thank you very much for your cooperation in this matter. I look forward to hearing from you or Mr. Maslia. Sincerely, Nancy Sonnenfeld."

Next, we have a document dated March the 5th, 1993. Once again from ATSDR. This one from Stephan S. Aliana, an environmental engineer here at ATSDR, once again addressed to Mr. Neal Paul. "Dear Mr. Paul." He goes on in his letter and he wants information about specific contamination sites at Camp Lejeune. He specifically was asking for remedial investigations and feasibility studies, documents and several other things. As you can see the handwritten notes on the bottom of this thing, which were written on there by Camp Lejeune personnel, it says, "Final reports only. Send two or three final RI/FS."

And another request, this one dated July the 2nd of 1993, and these were ATSDR's questions for Camp Lejeune water department. There are a couple of pages of those. I had one question on there under the Hadnot Point system. It looked as though somebody was starting to question some of the data that they were looking at on these, because somebody asked the question, "Are there two different Hadnot Point

systems, one much smaller than the other?

Next, we have . . uh, I'm sorry. Enclosure 4, Page number 2 is a September 2, 1994 letter. It is from Carol H. Aloisio, from ATSDR, to Yvonne Walker, at the Navy Environmental Health Center. "ATSDR identifies and obtains documents needed for evaluation to develop the Public Health Assessment by discussing the public health issues with the installation and having them send us documents where the information can be found. As you are aware, we have had much difficulty getting the needed documents from Marine Corps Base, Camp Lejeune. We have sent Marine Corps Base, Camp Lejeune, several requests for information and in most cases, the responses were inadequate and no supporting documentation was forwarded." I'd like to direct you down to the next paragraph where ATSDR also states, "For an ATSDR Public Health Assessment to be useful it is important that all pertinent information be provided for evaluation."

Now, I'd like to direct you the last page that I gave you, which is a map. This map was produced by Camp Lejeune, and it says that this is the historical water distribution system data for 1968-1985. This was the map that was provided to ATSDR, when they held their open house at Camp Lejeune. The large purple area you see in the center, which includes Paradise Point Officers Housing, Berkeley Manor, Watkins Village and Midway Park, were all on the Hadnot Point system. They were not . . . from 1968 through 1973 . . . this map is incorrect. ATSDR was led to believe that all of those major housing areas and the troop billeting areas were always on the clean Holcomb Boulevard water system for their entire study period when, in fact, there was four to five years that these housing areas were on the contaminated Hadnot Point system.

Tom Townsend brought this to the Marine Corps' attention in November of 2000. I'd like to take your attention to Enclosure 7. It's an email from a Carl Baker, to whom I believe Mr. Maslia was talking about earlier, who had over thirty years at Camp Lejeune. The subject: Housing Statistics. "Base Plan account lists Holcomb Boulevard plant as completed in August of 1973. Service to Midway Park, Berkeley Manor, Watkins Village, Paradise Point started then and continues today. Tarawa Terrace 1 and 2 were added in 1987."

Tom didn't stop at Camp Lejeune. He went on up to headquarters of the Marine Corps, and got a hold of a lady by the name of Ms. Kelly Drier. She is an environmental engineer that worked at the installations and logistics branch at the headquarters of the Marine Corps. This is Enclosure 5. From Kelly Drier to Neal Paul. Subject: Water Distribution Systems at Camp Lejeune. "Neal, there seems to be a little confusion regarding when each of the water distribution systems at Camp Lejeune were installed and the time frame and area each of them served. It's important to set the record straight. ATSDR published a report in 1998, which assumes that the Holcomb Boulevard water distribution plant has always provided water to the Midway Park, Paradise Point, Berkeley Manor and Watkin Village housing areas. I don't think the Holcomb Boulevard water plant was even built until 1972."

She's in error it was '73. Well, it may have been under construction in '72, but completed by the plant

account records, according to Mr. Baker until '73, which makes this assumption incorrect. "We are also receiving several calls from concerned citizens wanting to know where their water came from. Can you please work with facilities to compose a memo from Camp Lejeune to ATSDR with a copy to CMC and the Navy Environmental Health Center that contains the following information:

All water distribution systems; when each water distribution system was built, which wells are connected to which water distribution system, which wells were contaminated, when and what were the levels? Which wells were closed? What areas each well water distribution system provided housing, administrative, etc.; the number of housing units in each housing area; building numbers for the administrative buildings; the time frame each water distribution provided water to the specific areas. Any other pertinent information about a distribution system. If possible, an easy-to-read table would be a great format to present the information in. I'd like to have the memo signed out by the 1st of December, 2000 at the latest. Please let me know, if you need clarification or are not able to meet the deadline. I really appreciate your assistance. It's important to get this information to ATSDR so they can prepare an accurate report and also update previous studies that may be incorrect." I can honestly tell you, and I have search high and low, and I have talked to Ms. Kelly Drier and I have talked to Mr. Neal Paul. That memorandum was never written.

Enclosure 6 is another email from Ms. Kelly Drier. Again, this time to Rick Raines, who was a subordinate of Neal Paul's. As you can see in this email, she basically repeated her request and this is on March 16th of 2001.

In October of 2003, I was provided a copy of Dr. Sonnenfeld's "Small for Gestational Age and Adverse Pregnancy Outcomes Study." I had never seen a copy of it before. Dr. Bove had done a summary of several different "Small for Gestational Age and Adverse Pregnancy Outcome" studies with infants that were exposed to high THMs or VOCs in utero. When I got to the Camp Lejeune page and looked under Trichlorethylene, it stated that only 31 babies had been exposed long term to Trichloroethylene. I said, "What in the world's going on?" I sent Dr. Bove an email and I said, "This isn't right." I said, "The Marine Corps, even on their own timeline, corrected their timeline, but never notified ATSDR." ATSDR never found out that they had incorrect water system data until October of 1993. We know in writing they didn't have it, by admission of the Marine Corps as late as March of 2001 in writing. This is a copy of the Public Health Assessment dated August of 1997. They didn't even have the right water system data. How could they come up with these conclusions? Where is the science in this?

My daughter was conceived while we lived in base housing. Her name was Janie. When Janie was six years old she was diagnosed with acute lymphocytic leukemia. That child went through hell for two and a half years and everybody that loved her went through hell with her. At least in 1997 when I heard a news report down in Jacksonville, North Carolina, when the Public Health Assessment was published that linked this stuff to childhood cancer, and they said primarily leukemia, I was walking from the kitchen to the living room with a plate of food to watch the news. I dropped my plate.

I did twenty-five years in the Marine Corps, career Marine. I did every thing they ever asked of me. I feel betrayed. These people knew this. Never did I ever get notification from the Marine Corps. Janie was conceived, while her mother and I lived in Tarawa Terrace. I was at the time temporarily assigned to drill instructor school at Paris Island, South Carolina. Janie was exposed to VOCs for the first trimester of her creation. Had I not retired at Camp Lejeune, I'd have never found out about this, because Janie was born at Buford Naval Hospital, South Carolina. I know how I felt when I got that answer. People who have never lost a child to a catastrophic illness don't understand what goes through another man's mind to ask.

When Janie was diagnosed, I was like a madman. I could not get enough information. I wanted to know why. I checked my family history, her mother's family history. There were no other cases of any leukemia. I couldn't understand. I wondered all the way up until August of 1997. How many other people are out there right now looking for an answer? They deserve it. The Marine Corps has a motto. It's 'Semper Fidelis' which means 'Always Faithful'. I'll be damned if I can see them living up to it now. Thank you.

Mr. Stallard: Thank you, Mr. Ensminger.

[Applause]

I seem to have misplaced the list that I had here in front me. Yeah, thank you, but there was an amended list.

Ladies and gentlemen, Ms. Paula Orellana.

Ms. Paula Orellana: Good afternoon. I'd like to start off by saying I'm not going to go into all the details about the water contamination at Camp Lejeune, because I'm sure you have all that information and a lot more. My name is Paula Orellana, I was born at TT2 in 1970. Most of my life I've been sick, be it from a simple thing like an ear infection right up to enlarged liver, kidney dysfunction and brain tumor. My children are ill from ADHD to salivary gland blockages in their mouth that required surgery, test after test being run, tube after tube of blood being taken and still the doctors give the same diagnosis. "We don't know what is causing this."

Let me tell you, I know what is causing all my illnesses. That's the water I drank, I played in, I bathed in and my mother consumed, while I was in utero and I was born at Camp Lejeune. The American public complains about the people on public assistance. I have the medical card through Public Assistance for my children and myself. There's no way I could pay for all the medications we take on a daily basis. In one month's time, just for medication, it would cost me \$1,105.12. I will be receiving another medication next month.

Okay. I would like to show y'all these pictures here. This is my mother laying in a bed in the living room right now, dying. If it would not be for her, right now I would not be here. I was not going to come. She told me that I will go. She had me come out and take these pictures yesterday morning before I left and I

did. She's fifty-nine years old and she's dying in a hospital bed, sitting in the living room of my parent's home. She has a potty chair beside her and a catheter to remove the excess fluid her body has built up, unable to breathe without the help of liquid morphine and a by-pass machine. Day by day, I sit and I watch my mother die. I give thanks to God for the thirty-four years he gave my mother to me, which is longer than Jerry Ensminger or Tom Townsend had with their child that the United States Marine Corps and the Department of the Navy sentenced to death before they had a chance to live. I thank God for the drugs they have my mother on, so she's not suffering.

I cast the officials of the United States Marine Corps and the Navy Department to the deepest, darkest pits of hell for what they've done to me and my family and what they've done to all of us. My mother made me and changed me and took care of me. She did the best she could as a mother. Now I, her child, will do the same for her. The United State Marine Corps and the Navy Department had no just cause in covering up the water contamination at Camp Lejeune, and they have no right to take my mother from me. My biggest fear is that my children will have to bathe me, change me, and watch me die as I am now doing with my mother.

My sister was three years old when we moved to Tarawa Terrace. She wasn't included in the study; there was no questions asked about her. She has had seven miscarriages. She has just had to undergo a complete hysterectomy due to polyfibroid . . . I don't know how to say it. . . cysts on her ovaries that were the size of golf balls on the left; on the right they were about the size of tennis balls. She has facial hair. She had to go see a specialist in Germany when we lived in Africa because of the urinary problems that she had.

And all of us here, whether we were born on base, living on base, or just working on base, we consumed the water, and have been affected by the poisons that were provided free of charge by high ranking officials at Camp Lejeune Military base. I say this because they knew years before the wells were shut down just what they were giving us to drink, and they did nothing about it. If you look over the victim's registry on the Water Survivors website, you can see how all listed, repeat the same illnesses-heart problems, cancers, depression, anxiety, urinary tract infections, reproductive problems, skin problems, thyroid problems. This is just to list a few. And only the children in utero were included in the initial study? How can this be?

That's right. We're talking about the U.S. government. Our men, my father being one, served his country with pride. He held his head high, when received the title of United States Marine. I don't blame the Marines who served to defend our country. I blame the United States Marine Corps and the Navy Department and command who served to destroy our Marines and their families. I ask that you find in favor of another study to include all who lived, were stationed, and who worked at Camp Lejeune through the years at least 1950 through 1985. If you find wrongdoing in what the United States Marine Corps and the Navy Department covered up, I ask that the United States Marine Corps and Navy Department be held accountable for medical costs and continuing care for each and every one affected by the contamination. I

ask for an apology from the United States Marine Corps and the Navy Department, a public apology. Thank you.

[Applause]

Mr. Stallard: Thank you Ms. Orellana. Mrs. Mary Byron.

Mrs. Mary Byron: I can get through this.

I had Andrea when I was twenty-four years old. She was such a beautiful child with curly blond hair and a personality that did not quit. Andrea was not a quitter. She was one of the most determined and courageous young women that I knew. She was my best friend. Her life has been a challenge since she was six months old. Each time we would go to the base hospital, the doctors would always write in her chart that she was happy and hydrated. She loved apple juice. Back in the eighties you would have to make the apple juice form concentrate, which meant that you had to add water. She had so many fevers. So, of course I would give her Tylenol and frequent baths to try and reduce the fever, also again, water.

When she was three years old she was diagnosed with aplastic anemia. Do you know what it's like to sit in a hospital room day after day with your three year old daughter asking you, "Mommy, what's wrong with me. Why am I sick? Why can't I go home with you? Where is Rachel? When will daddy be here? Why does the nurse keep giving me shots and poking me? Why do you have to put that thing on your face?" We had to wear surgical masks because she was in isolation.

Once Andrea was released from children's hospital and able to go home, life was not normal. We could not have visitors because Andrea was in isolation. Jeff and I worked separate shifts to accommodate Andrea's medical needs. She would have to go to the hospital three times a week for blood and platelet transfusions. Each and every time I would pray that the blood was not tainted; at that time tainted blood was not uncommon. Andrea was not allowed to participate in group sports until she was twelve years old. Riding a bike was out of the question. See, Andrea was not part of the study because she was three months old. Now she is pregnant and going to have her own child. I pray each and every night that that baby is going to be healthy, that she doesn't go through what her mother went through. I don't have answers to everything; I don't know who does. I just implore you to consider the children that were not in utero. Thank you.

Mr. Stallard: Thank you Mrs. Byron. I'd like to thank those of the public who have spoken, for their courage and commitment and effort to be here today. We are now going to have a structured panel discussion, question and answer, if we can, for some of those issues we may not have covered in your earlier dialogue. So what I would like to do is ask for you to hand the microphone to those who would like to speak or to present a question to the panel and for you to do so.

Mr. Ensminger: There was some discussion earlier . . . I'm Jerry Ensminger, if you don't know who I am by

now, you were sleeping all day, but...there was some discussion earlier about the feasibility of civilian and military adult personnel studies. This not being a question, but it's something to throw out to you, is that there were high risk populations of people on that base. Yet civilian employees that worked on industrial laundry, where they washed and pressed all of the mess whites that the cooks wore and the table cloths and what not. They washed the coveralls and the grease rags in the shops. These people, by ATSDR's own admission, received two to three times more of these VOC's due to the volatility of the stuff, by breathing, than they did by consuming. These populations aren't included. We had Marines that worked in mess halls, as cooks, that had steam tables to keep the food hot on the serving lines and steam kettles in the galleys to cook with. They had dish washing machines that ran twenty-four/seven. These people worked in a virtual gas chamber. Then not only did they work in that environment, they went back to the barracks and they took a shower. There are populations of people that can be picked out of these groups-Dr. Gros, he was exposed as well. That was one thing that I wanted to cover with you, that there are populations it is feasible to do studies of these people, but you have to let them know.

Ms. Dyer: I realize that in talking about expanding any more studies . . . did you also discuss the possibility of working together with those of us, that the ones that are survivors or the ones lived there? Is there some way, coming from the standpoint of overseeing this website that we have? We're in constant contact with people that feel like they were exposed. They feel like they were affected. They're constantly, either through discussion groups or through the email to us, asking us questions that we can't always answer. We've put ourselves in this position and we feel responsible; whether we are or not, we feel that way. At one time, I did have contact with Marie Socha, and I would email her and I'd ask her something that somebody asked me, but I also recognize at the same time that ATSDR is like most agencies. They're understaffed through no fault of their own, money problems. I realize that as a scientist and a panel your time is valuable. You may not be able to give us time, but is there some way you could take into consideration that there's a lot of people out there with questions, concerns, and misinformation.

We're told by some, it takes twenty years for tumors maybe the cancer to show up. Then we're told, this can change your DNA and it's passed down three generations. Then, they come and they ask us stuff like this and we're not scientists. We're not experts. So, I guess, if there's any way possible that you could also think of ways to work with us and in that way, so we can help these people and answer their questions. Right now, we really can't. I do refer them to ATSDR. Right now that's about all I can do and maybe that's all I should do.

Ms. Hilda Rose: You were talking earlier, and we missed this in the back, that there are different kinds of studies. What we have been asking, for years and years now, is medical testing for the victims that lived out there. That is something, I know that's a different kind of testing, but that's the testing that, you know, you've got 600 and some people on one Website, and most of them are willing to do that. So you've got a group right there 600 people probably, you know, most likely that are willing to be medically tested. What's the feedback on something like that?

Dr. Ozonoff: Are we engaged in . . . ?

Mr. Stallard: You may be engaged, you can feel free to respond from a research protocol perspective or science, or from your heart, whatever.

Dr. Ozonoff: I have sort of a complicated response to that. First of all, medical monitoring or medical surveillance, or medical testing protocol, is something that we hear about a lot as a request, which is actually a pretty plausible and reasonable to ask for. It's different, usually, than the kinds of studies that we're talking about here, because as I said before at the heart of most epidemiological studies is a comparison. If you don't have a comparison, that is, if you have 600 people that you're just, you're testing, it's not the same thing. It's not to say that it's not a good thing to do or a reasonable thing to do, but it's a different kind of a thing to do. You can of course, depending upon what your objectives are, you could take the results of that and compare it to some normal ranges or something like that, but there's always the difficulty of figuring out what the comparison population should be. Or you could use it as the basis for advising people about their medical care. So, if you're testing them for early detection of cancer or something of that nature, that's essentially doing a service to them so they can use that information to pursue it further.

So, there are a variety of different ways that a medical monitoring or a sort of medical surveillance program could be used. Once you decide on what it is . . . the reason I say it's complicated is because there are issues that are related to this that don't appear on the surface, that people who do this kind of work know about and worry about. For example, most tests have a false positive result, which is, they're sort of screening tests. They say this is a red flag, let's look here. If you screen almost any population, the way the tests are designed, they come up with a fair number of those. They're designed to do that because you don't want to miss something that's important. So first you flag it and then you go and do further tests. A lot of times those further tests are unpleasant and invasive, sometimes have side effects. So, you worry about that.

You also, and I know from talking to people who've been through this process . . . for lots of diseases like cancer, if you triple your risk of getting cancer, that's a pretty bad thing. Nobody wants to have their risk of cancer tripled. But for most cancer and most sites, the risk is still small. So when you triple a small risk, it's still relatively small. I know people who've been through regular biomonitoring programs, sometimes live from year to year between their cancer check ups, that although the chance of them actually having a cancer detected that way, because even if it's tripled it's still small, it colors their entire life. They live from year to year for their cancer check ups, and they say "Shoo, I got through this one." Then they start worrying about the next one.

I've often wondered whether we're really helping people when we do that. There's a simple answer to my questions, which is that everybody's different. And for some people, this is very important information and it sets their mind at ease. For other people, it turns out not to be a good thing. Then finally, there . . . well,

not finally, there's so many issues associated with this; but one of them is that picking up some kinds of cancer early doesn't really help because we don't have good ways to treat the cancer. What you've really done, is you've increased the length of the person's illness. Telling them a year ahead of time that they're sick, but they wind up with the same outcome. Now, there are cancers that, when we pick them up early, it does help people. Those are the ones that you would want to test for.

I'm rambling on a little bit, but the bottom line of what I'm saying is, a medical monitoring program is a reasonable thing to ask for and it may be perfectly appropriate. But it has to be thought through very carefully, because there are things about it that don't appear on the surface until you start having some experience with it. It's also something that's fairly different than the kinds of studies that ATSDR has been talking about.

[Tape change]

You may decide that it's not a good thing to do and that's up to them. But, they might get involved with the Agency for Toxic Substances and Disease Registry, right, a registry, that's part of their mandate. They could do something like that. But I'm glad you mentioned it because it's something to throw into the mix here about the discussion, because we tend to think of studies in a different way than that of monitoring.

Ms. Dyer: Is there a bio . . . umm?

Dr. Ozonoff: Biomonitoring...?

Ms. Dyer: Karen and I were just over in Arizona. There's a woman in California that was there at this panel, and she was talking about testing that they were doing, and it was bio-something or other. They could actually tell different chemicals on your body.

Dr. Ozonoff: Yeah. I was actually . . . there isn't one for TCE and PCE which disappears from your body very rapidly, but what there is . . . I almost mentioned it before. So I'll mention it now. For one kind of cancer, which is kidney cancer, which is related to this, there is a change in the DNA involved in a particular gene, at a particular stretch of the DNA. It's called one of the codons. It's got a number, so you know where it's located, in this gene called the von Hippel-Lindau gene, a tumor suppressor gene. Work in Germany has suggested that alteration of that codon, which is 214 or something like that, is related, strongly related, to evidence of TCE exposure. So all of the ways you might get kidney cancer, TCE, according to people like me being one of them, you can select out that way from all the others by looking at that particular biomarker. Having said that, this is still a research finding. It's only for that one kind of cancer, kidney cancer, insofar as we know. So far. But it is the kind of thing that could possibly be done, and we know something about this particular gene alteration, so it would make some sense.

Ms. Dyer: May I ask one more question for the panel? We're not just exposed to one or two chemicals; we're exposed to a number of chemicals. You know, you can read your blue books that you can get from

the EPA on what trichloroethylene can do or vinyl chloride can do, but when you get a cocktail of chemicals how do you know what it's going to do? I mean, that's why we believe we're a case study unto ourselves. You could take us and learn something here, you know. You say things about, well, we've got this group of people that we've already tested over here, you know like the Woburn people and things like that. Camp Lejeune is a new thing. This hasn't happened too many times before, where you get a cocktail of chemicals. How do you know what mixing these chemicals could do to us? I might not have cancer, but it doesn't mean I don't have a hundred other things. It doesn't mean that I'm not constantly in pain. So that's why we're asking, you know, for health studies for us. It's not, don't get me wrong, cancer's a big thing. It's something that I am worried about every day. We feel like it's a time bomb going off. But, it was a cocktail. It was a lot of chemicals.

Dr. Cantor: There's no response to that question, actually, because if you talk to a toxicologist who deals with rats and mice and tests chemicals, maybe if you really push them, they'll talk about the effects of two, maybe three, chemicals at once. Our knowledge of how a lot of these chemicals interact is really very primitive. We know some things, but each mixture is unique, and I'm sure each day of each mixture, in this case, would have been unique. But it does raise a question that I've actually been wanting to address to ATSDR, especially the exposure assessment of side effects. There is mention in the literature that we have seen about one or two other chemicals. Benzene, I think is mentioned.

Ms. Dyer: Vinyl chloride . . .

Dr. Cantor: Vinyl chloride is mentioned, but it says "not detectable" in the things that I've seen.

[Voices overlap]

Dr. Ozonoff: 1-2 DCE . . .

Dr. Cantor: So the question, well, the question is obvious. What evidence is there for the mention of other chemicals? Do we know what other chemicals were there? Were detected? What chemicals might have been put into the soil that maybe even if they weren't detected, at least there's some inferential supposition that they may have been in the drinking water at some point. Are you starting to look into that? How much evidence is there? Where are you with that aspect of your investigation?

Mr. Maslia: I can answer part of that, because it actually caught us by surprise. As we started looking into, obviously our mandate, our charge, was to look at PCE and then TCE at Hadnot Point and some other areas. As we started going through some of the literature, talking to some of the people on base, one of the things we found out is apparently there was a thirty or fifty thousand gallon fuel spill or loss from a gasoline tank. The common thought was, well, somebody was embezzling the gasoline and selling it off. That person got fired. Turns out that was a leaking underground storage tank. Its BTEX compounds.

Dr. Ozonoff: What compounds, I'm sorry?

Mr. Maslia: BTEX. Benzene, Toluene, Ethyl benzene, and Xylene, the whole cocktail, that is something that we uncovered that was obviously not necessarily related to the PCE from the dry cleaners and all that. We're discussing it. We have mentioned it and discussed that some of our groundwater draft reports that we'll be presenting to our modeling panel. That is also some of the questions we're asking of our panel, is how much further should we go with this, in terms of modeling, in terms of well, whatever. We are aware there are other compounds that, obviously, not just the PCE and TCE that we're now aware that we can map out that are out there. I'll say that's different from when we first started. As far as just the mixture, I'll have the same answer as you do. Whether it's from a toxicological standpoint, or water modeling standpoint, you know, we're doing one chemical as a surrogate, whether it's PCE and TCE, these are obviously different soil properties. But we won't be able to mix them, you know.

Dr. Ozonoff: I'd just like to say something about it too. Because actually, the situation at Lejeune is the common situation. Almost all exposures are to cocktails. The one we're studying up in Cape Cod is the highly unusual one, where it's only PCE, which is why we're studying it. Now, what Ken says about us studying these things one at a time is absolutely correct. I'm going to explain in a second why it is. There is in fact, one paper that I know, at least that I can remember right now, going to back to 1968, that looked at combinations of chemicals, of which PCE was one of them. Most chemicals when you combine them, just add up, they don't synergize. They could either add up, they could synergize, or they could antagonize each other; that is, the two of them together could be less than either one of them separately. The one, not the one, but of the handful of chemicals that seemed to synergize, looking at them two at a time and I think we looked at 20 or 30 of them was, PCE was one of them. So, there is a little bit of evidence that PCE does synergize with other chemicals. That's the only bit of information that I know other than arguing from the fact that PCE and TCE have similar kinds of toxicology.

You might wonder why people don't look at combinations of chemicals. And the answer, actually, when you start to think about it, is pretty simple. If you're a toxicologist . . . let's forget about epidemiology, you can control everything and you're giving chemicals to animals. If you give two chemicals then there are three possibilities. Its chemical A, it's chemical B, or its chemical A and B together. So there are three outcomes that you've got to measure. You've got three chemicals. Now there are seven possibilities. That's only in one dose and one animal and one route of administration. Three chemicals, there's seven possible combinations to do it. Four chemicals, there's now 15 possible combinations to do it. And pretty soon, you're, you know, you can't do it . . . you can't do it, as soon as you get past two chemicals, because you're not just doing it in just one animal. You're doing it in dozens of animals. So now you've got thousands of animals around each one of the different dose combinations and it becomes virtually impossible especially when you don't know what's happening when you only do one chemical at a time which is, you know So it turns out that there's a reason why. But the question that you're asking . . . this is the problem with questions that people from communities ask scientists, which is they're incredibly hard. It's not that they're stupid. It's that they're unbelievably hard. It's the scientists who I suppose you could say are stupid say "That question is too hard for me I'm going to answer the easier question." There's the old story of the

drunk who's looking for his key under the light post. The cop says, "Where did you lose your key?" He said, "Over there." "Well, why are you looking here?" 'Cause that's where the light is." That's exactly what scientists are like. Right. We use the methods that we can and we investigate the questions that we do because that's where the light is. You're asking about the key that's somewhere else.

Dr. Bove: I want to add one thing to all this, and just make a distinction between the two contamination situations. The first one is the Tarawa Terrace situation, where two wells are pretty close to a dry cleaning establishment, and the contaminant is PCE. Where you look at the finished water, you see PCE and every now and then you might see a little bit of TCE and DCE, which are probably degradation products from PCE. So, it's really PCE at Tarawa Terrace. Now, a real difficult situation is Hadnot Point, because we have leaking underground storage tanks, we have spills, the whole 'gimish' of stuff. There you have high levels of TCE, high levels of dichlorethylenes. I don't know if they were anymore delineated than that... But that's what we have. What we have is data on the wells and on the finished water for Hadnot Point and we're going to have to figure out the ground water fate and transport for that. That's going to be the difficult one of the two.

Mr. David Paulin: I just wanted to know where you get the test done on your kidneys?

Dr. Ozonoff: Well, first of all it's for kidney cancer only. I don't know. It's in the literature. There are these scientists in Germany who do it, but it's a genotyping problem. So in principle, lots of molecular biology laboratories could do it, although they need to be able to handle human biological tissue, which not all molecular biologists can do. So I don't know the answer, but I'm sure ATSDR could find out who's doing this; because I'm not the first person to suggest this as a bio-marker for TCE exposure.

Ms. Murray: May I have your name please sir?

Mr. Paulin: David. David Paulin.

Ms. Murray: Thank you.

Ms. Rose: We could spend another day or so talking about what we can do, but if there's no money to continue the study, it's going to stop here. So could we ask the panel to write to our state legislature and ask them, if more funding is possible for the study? Again, you know, if we have more money to spend on the study, we can widen the range of who and the cases that we need to study. Could we ask our state legislatures to pressure the Marine Corps to release documents that we need or to . . . for their cooperation, in order to have a complete study, accurate study that we all can benefit from?

Mr. Stallard: Thank you, Hilda Rose.

Mr. Ensminger: One thing I failed to do and I'd like to do it at this time . . . This lady, Hilda, just reminded me of it. Most people don't know that this panel was put together because of Congressional pressure. I would . . . we are very beholden to both Senators Dole and Jeffords and especially to Congressmen John

Dingle from Michigan and his staff, particularly Mr. Richard Franzen. That's why what's happening here today is happening. I don't know how many of you understand that, or realize that, but these were. . . this was a Congressionally mandated meeting.

Ms. Dyer: If ATSDR is having trouble getting the information that they need because of lack of funds, lack of personnel, and it looks like these studies are going to go on and on and on, are there agencies within the government that can be brought into this, because this is so large?

Dr. Ozonoff: Well the V.A. is sort of an obvious possibility, I think.

Ms. Hyland: [off-mike] They don't have any money.

Dr. Ozonoff: I used to work for the V.A. They may be the most dysfunctional agency I've ever . . .

Ms. Hyland: [off -mike] They won't give me a...

Ms. Dyer: I mean, is there a spokesman here, I don't know, from ATSDR, that can tell us that we're going the right way, or you would be honest enough to say "You need a Congressional hearing? We can't do this. We need to turn this over to a different agency or a private firm to get this done?"

Dr. Bove: We're waiting to see what the panel suggests, and then we can see what we can do and what we can't do. That's the only way I can answer.

Mr. Maslia: I can only relate the mechanism that was used in Dover Township, and tell you it's not the mechanism being used here. In Dover Township, because of the community group of people and their Congressional representatives, ATSDR water modeling had a direct line item appropriation for the Dover Township study. That's a big difference. We get the funds we need right now coming through the Marine Corps, but that's not a line item appropriation. So those are the two differences, if you want to talk about funding, two methods.

Dr. Bove: Let me just say one other thing. For the Brick Township autism cluster investigation, various parts of CDC worked together on that. That's also true of Fallon. At Tom's River it was working with the health department. EPA was involved and was still involved in studying the toxicology of the particular chemical that was found in the water supply. There are ways we can work within CDC. We can bring other Centers into play if necessary. And again, in Tom's River it was EPA and the health department, of course, which actually carried out most of the study. So, these things. . . it really depends on what we're asked to do.

Mr. Byron: Hi, Jeff Byron again. A couple of questions weren't answered for me. One from ATSDR. Why did it take eleven years to contact my family? Two, other answer that wasn't . . . or other question that wasn't answered was, are civilian environmental department people on Camp Lejeune hired by DOD? Yes or No?

Mr. Maslia: I can't answer . . .

Ms. Murray: Microphone.

Mr. Maslia: Maybe the DOD could tell us?

[multiple voices off-mike, inaudible]

Mr. Byron: My next question would be to Senator Dole's office. As far as the 1980 Compensation and Liability Act, if it does not address immediate notification, I think that you should have legislation written to address that. That's only fair to the citizens of this country, especially the veterans and those who support the veterans.

Mr. Stallard: Thank you.

Mr. Byron: And one last question. As far as the water modeling, will that take into account drought conditions through the years?

Mr. Maslia: [off-mike] That's what we intend to do. That's one of the issues . . . [on-mike] Again, one of the issues we will be discussing with our panel in March. Basically, we have annual averages, of course, for the epidemiology we're looking at, or being requested, to provide monthly information, so it's not just dividing by twelve. We have to come up with methods and what are the best methods out there, to come up with individual monthly values for everything. So, we will be addressing monthly values. I don't have that information right now.

Mr. Byron: A quick suggestion would be to go to the local farm bureau. They would be able to give you the amount of water or rain fall.

Mr. Stallard: I just want to again clarify the question specifically you're asking. If the people who worked on the utilities at Camp Lejeune were employed by Department of Defense, the Marine Corps, whatever, they were not external contractors or county type employees. Correct?

Mr. Byron: Right. I would like to know whether or not they worked for DOD, for the specific reason that over the past few years DOD has come to Congress with legislation to request environmental exemption from environmental liability and that directly effects our families. We're concerned, and I can assure you that Jerry Ensminger, myself, Terry, Karen, and those individuals who have been affected by this, will be at Congress to fight any type of legislation that involves limited liability.

Mr. Stallard: Point of clarification. Is there anyone in the audience who can address that specific question at this point relative to the employment status of those who worked . . . No. Okay. Anyone else, from the panel?

Dr. Maas: Yes, I've got a couple of questions based on comments we've heard this afternoon. I guess, Jerry, a couple of them are for you. Some of the documentation that you gave us, and certainly what you

alluded to in your comments, is that there might be a much bigger population on the base that was exposed to contaminated water than what we have been told in these ATSDR documents. That some of the areas that they were talking about that wouldn't have had contaminated water appear, from what you've given us, for at least five years anyway, between '68 and '73, and probably for twenty years, but at least five years after we're starting the data collection for the epidemiological study. It appears that's what you're saying. So I'd just like to clarify if I've got that right. And if that's true, then I'd like to hear some response from ATSDR of how they might respond to that information, that's different than the reports that we've gotten.

Mr. Ensminger: The input . . . The incorrect data that I referred to would not have any bearing on the in utero study. It would not have any bearing on any more numbers. As far as ATSDR is concerned, they've already looked at all the in utero children. It's going to skew the results of what they've already got.

Dr. Maas: I guess that's what I'm getting at. This is what this panel has talked about, is that these kinds of studies are highly sensitive. Almost the worst thing you can do is stick somebody that was really exposed and put them into an unexposed comparison group, because then what happens is, you lose your ability to see relative risk, because your unexposed group is showing levels that are too high. So I'd like to hear what ATSDR has to say about that.

Dr. Bove: We're still discussing whether Holcomb Boulevard was started in '72 or '73. I mentioned earlier that we . . . it's either five or six years depending on when Holcomb Boulevard goes on line. And if it's five years, I figured about 1,600 births were misclassified as unexposed and probably would be put into the TCE-exposed. One of the things . . . by the way, the long term and short term TCE exposure in that study meant . . . the short term exposure meant a week-long period when, in 1985, the Holcomb Boulevard fuel pump broke down, and that housing area was served by Hadnot Point for a week or so period. That's what Nancy meant by short term. She did not know about this five or six year period. Okay. That's why I said, we have to go back and re-evaluate the study, because there is considerable exposure misclassification. We can now look a whole lot better at the TCE-exposed, because now we'll have 1,600 instead of 31 to look at, roughly, I'm just guessing. We intend to do that.

[voices overlapping]

Dr. Maas: That sounds like it's really critical and it may change a lot of the assessments in the '97/'98 report as well.

Dr. Bove: Right. Well, not the '98. . . the '98 study, I would expect that the findings would get much stronger.

Dr. Maas: Another question for Jerry. When you were first reading Major Thomas Townsend's statement, I thought I caught something there in the first very minutes of it, where I heard the number 30,000 parts per billion of TCE. Did I hear that right?

Mr. Ensminger: There were raw water samples that were taken from specific wells that reached in the area of 27,600 parts per billion. That was raw water from the wells themselves, from individual wells.

Dr. Maas: Then, I guess my follow up question back to ATSDR with that is, did you consider that and how do you think might be an appropriate way to consider that piece of information?

Dr. Bove: Well, we are considering it. That's what's important now. What we did in the past needs to change. We are considering it. We're also finding, and Mr. Maslia can back me up on this, is that there may not have been complete mixing of the water. It may have been last in, first out. So, the chart we showed you earlier about finished water and the maximum PCE of 215 may be off. The actual maximum might have been much higher. These are things we're going to work on in the water modeling effort, so, taking this into account now. The past stuff is past.

Mr. Stallard: Thank you. We have about a minute left. Do you have any other questions?

Dr. Drane: I have just one other comment. I just want to ask another question, but to the protocol. Will we have an executive session closed to discuss this?

Mr. Stallard: I believe there will be opportunity this evening for you to discuss the process for tomorrow. Yes. Okay? What I'd like to do in the final moments, since we are going to spend another day and we learn from doing, I'd like your feedback on things that have gone well today, from your perspective and things that, in your perspective, have not gone so well, so that we can see how we're interacting and change accordingly. You can shout it out. What's gone well?

Female Voice: [off-mike] You've been a great facilitator.

Mr. Stallard: Thank you.

[laughter]

Female Voice: Remaining on schedule.

Mr. Stallard: Remaining on schedule. Thank you.

Female Voice: [off-mike] I appreciate being able to ask questions.

Mr. Stallard: Ability to ask questions. Okay.

Ms. Dyer: Not so well. Can I do a not so well?

Mr. Stallard: You may.

Ms. Dyer: Not so well, I feel like we in the beginning, and even towards the later part, got off track in the

why this panel was called to come here. From what we were told in coming, we were told that the panel was being assembled to decide whether or not further studies on children and adults living at Camp Lejeune would be done. That is all that I was ever told that . . . why we were coming. So not so well, I feel like at best what we were brought here to do. I think that we got off topic quite a bit.

Mr. Stallard: Your expectation was that you were specifically, this panel, going to talk about those two things specifically, and they have, plus some. Okay, thank you.

Mr. Ensminger: [off-mike] It would have been very helpful to have had some of the people who know the historical background of this situation here in this meeting room, like Marie Socha, who is still employed by ATSDR, Geannella Churchill, and some of the other people whose names were on some of these documents that I have, that were probably in this building today.

Mr. Stallard: Thank you, I got that.

Female Voice: [inaudible].

Male Voice: [off-mike] They're not in this building.

Mr. Ensminger: [off-mike] Oh, okay.

Mr. Stallard: That's okay.

Dr. Bove: I think that we can answer the question.

Mr. Stallard: There's no question. It's just feedback of what went well from people's perspective and not so well, and you also told me that the coffee was about as thick as a knife.

[laughter]

That would be a not so well, I figure, right?

[voices overlapping]

Female Voice: Order Starbucks tomorrow.

Dr. Ozonoff: I actually like the coffee, but . . . now you know how to evaluate all my other judgments.

[laughter]

Mr. Stallard: Anything else you'd like to add?

Mr. Byron: [off-mike] I'd like to expound on that, because I did request that those individuals be here. Although, I may agree that you could answer some of the questions. I disagree unless you were the actual

person taking the survey, because I don't think that you will hear that my daughter Andrea, who was born three months prior to moving off base. I don't know, if you got that down. I hope you did. I just don't feel that you would have, if you're the director of this program. I think you would have the raw data [inaudible]. So I disagree, I do think that those individuals should be here, whether that's open to the public or not. They should be in front of the panel to answer any of the panel's questions.

Mr. Stallard: Thank you. I got that as, "Put a face on federal people involved in the project."

Ms. Dyer: I appreciate the panel being able to be with us at lunch, not being carted off somewhere, like we weren't supposed to talk to them, you know, or something. Because I just feel like we've been able to maybe say things we've . . . There's a lot of us here that are really shy, that being able to talk with them away from this setting has helped. I'm not one of the ones. I'm not shy at all. I'm not talking about me, but there are others who . . . I just appreciate being able to have that one-on-one with the panel. . .

Mr. Stallard: I have that as informal social interaction with panel members. Does that cover that? Great. Well, we're partying tonight.

[laughter]

Ms. Rose: [off-mike] I think we were very well represented in front of the panel, whether it was adults, parents, civilians, I think they got to hear all of us, which will give you an idea of [inaudible]... we all lived on the base. We all were exposed, drank from that water. So you got to hear every perspective. So, I think that was good.

Mr. Stallard: Hilda, I have that as panel has heard our concerns. Thank you. Anyone else? I think this process helps to do exactly what we talked about earlier and that is to build the trust through open dialogue. So, I thank you for your participation.

Dr. Cantor: I want to thank everybody who came today and presented to us. It certainly opened my eyes and my mind to many of your issues. I hope as many of you as possible will be back here tomorrow. Maybe we'll be on track a little better tomorrow.

Dr. Visintainer: I also want to say, I did expect it, but the presentations were very well organized and informational and that's exactly what we needed.

Mr. Stallard: Thank you all. Just a few logistical things, the shuttle bus for those of you who are staying at the hotel around the corner, will be here in about fifteen minutes. Although it's a beautiful day and a nice walk. We are resuming tomorrow morning 9 o'clock. Have a good evening. Thank you.

Assorted Voices: Thank you.

[The meeting then adjourned at 5:40p.m]

[View Meeting Transcript, Day Two](#)

[Top of Page](#)

Page last reviewed: July 6, 2009



☐ Camp Lejeune

Camp Lejeune Overview and History ☐

Health Effects ☐

Water Modeling ☐

Community Assistance Panel (CAP) and Media ☐

About CDC / ATSDR

Contact Us

800-232-4636



- U.S. Department of Health & Human Services

[Accessibility](#)

[External Links](#)

[Privacy](#)

[Policies](#)

[No Fear Act](#)

[FOIA](#)

[Nondiscrimination](#)

[OIG](#)

[Vulnerability Disclosure Policy](#)

- [USA.gov](#)