PUBLIC HEARING

SYDNEY TAR PONDS AND COKE OVENS SITES

REMEDIATION PROJECT

JOINT REVIEW PANEL

V O L U M E 15

HELD BEFORE: Ms. Lesley Griffiths, MCIP (Chair)
Mr. William H.R. Charles, QC (Member)
Dr. Louis LaPierre, Ph.D (Member)

PLACE HEARD: Sydney, Nova Scotia

DATE HEARD: Monday, May 15, 2006

PRESENTERS: Ms. Debbie Ouellette

Dr. Les Ignasiak

Sierra Club of Canada:
Dr. Fred Lee

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I N D E X O F P R O C E E D I N G S

QUESTIONING

I N D E X O F U N D E R T A K I N G S

--- Upon commencing at 5:01 p.m.

THE CHAIRPERSON: Good evening, ladies and gentlemen. I would like to welcome you all here to the resumption of the hearings.

It is warm in here. And I'm sorry, that's the way it is, because the air that comes in is not -- it's not air conditioning, it's the outside air that is brought to us. So perhaps as the sun goes -- sinks, it will get a little cooler, but we'll -- otherwise, we'll have to cope with this.

Before we begin, we have three presentations this evening.

Ms. Ouellette is our first presenter.

But before we begin that, a few housekeeping items, as usual. And I have a couple of items here.

The first thing is that on Saturday -- I need to make a correction here. On Saturday, the Panel indicated that undertaking 18 had not been submitted. I can now confirm that, in fact, undertaking 18 was submitted by the Sydney Tar Ponds Agency on May the 5th.

Undertaking 18 relates to how much -- how many dollars had been spent to date out of four hundred million dollars ($400 million) total. So, I apologize for that.

The second thing is that to let you know that the Panel has formally requested that Environment Canada return on Wednesday, May the 17th in the morning.

We've asked them to come back because we may have some questions in the areas of contaminant hydrogeology, long-term performance of containment structures, leachate tests and contaminant fluxes.

So, we've asked them to return Wednesday morning. I can't tell you what time. We will be announcing that a bit later on. So, that's an additional session.

Just in case any of you came here at 3:30 this afternoon, which was originally announced as our start up time, our presenter at that time withdrew.

I do apologize if you had a journey here without -- and had to turn around and go back home. So -- but nothing -- it was beyond our control.

And so, now that brings me to seeing if we have any undertakings to be presented.

So, I'll ask first the Tar Ponds Agency. So, Mr. Potter?

MR. POTTER: No undertakings tonight, Madam Chair.

THE CHAIRPERSON: Any other presenters? Do you have -- are there any other undertakings to be

presented?

Well, hearing none, we will now move on to our first presentation of the evening, and it is Ms. Ouellette.

And you have a presentation and a video, I understand.

So, as you are well aware, because you've been here for every session, I think, presenters have 40 minutes, and I will let you know 5 minutes before the time is up.

--- PRESENTATION BY MS. DEBBIE OUELLETTE

MS. OUELLETTE: Thank you very much, Madam Chair.

I just want to say, I had a few changes since I gave you that report there.

Thank you, Madam Chair and Dr. LaPierre and Mr. Charles, for being here today and giving me this opportunity to speak on issues that I know first hand, when shortcuts are taken, what it can do to residents who live in and around the Coke Tar Ponds site.

I'll list a few things in the past and in the present, and then I will talk about Frederick Street.

My concerns today, government promised us our health and safety would be protected in the past and in the present. If this was true, I wouldn't be sitting

here today.

When they disturbed the Cooling Pond on April 27, 2006, people were experiencing headaches and illness up to four days, and didn't know why until they read it in the -- until they read the story, an excavator pulled up sediments from the Cooling Pond, in the newspaper.

You could smell the odours from Prince Street up to the Steel Workers' Hall.

Were the residents living in and around the site informed that work was going to take place prior to disturbing the Cooling Pond?

In 2004, the smells from the Tar Ponds were unfit. When you passed by Sobeys, you had to plug your nose. The smell, at times, reached beyond Mechanic Street where I lived.

I was so upset by this, I talked it over with Neila, and we took turns checking the air monitors by the Tar Ponds. When they were on, when the smells were bad, how far the smells were from the site, and how she was feeling on them days.

We took notes from June 19th, 2004 to August 31st, 2004.

They removed the sewage from the Tar Ponds, but the toxic soup is still there today.

We are the real time air monitors. It seems when they disturb the sites, within hours, you sure feel -- you sure don't feel well.

In 2005, workers were on the Coke Ovens site digging up contaminated soil and placing it in the back of trucks. Dust was flying everywhere.

I was standing on the overpass looking down at the site, taking pictures. Within 20 minutes, my eyes were burning from the emissions from the dust.

Seeing all the dust, it seemed to me that no controls were put in place to keep the dust down on that day.

On April 4th, 2002, they removed asbestos from the Byproducts Building. Men were in white suits. No stationary monitors were on.

On April 5th, 2002, in the afternoon, about 2:30, I watched the Byproducts Building coming down. The plume of orange dust was huge, and the smell of gases were on my clothes. I was quite a distance away from the site. Donnie and Elsie Deleskie were there with me also.

They built a cover over the Domtar tank to keep the emissions in, but on Friday, September 19th, 2003, in the newspaper story, the highest concentrations of toluene ever recorded in North America.

The residents in Whitney Pier and Ashby were complaining for days of the smell. We knew it was coming from the Coke Ovens site.

Also, they made TNT explosives on the Coke Ovens site. By the end of the war, more than 700,000 gallons of toluene had been produced in Sydney.

Now, I will talk about my story on Frederick Street.

My family were victims of past mistakes, so I will name a few events that happened in 1998 and 1999.

They placed signs on the fence that read, "Human Health Hazard." We had no idea what that meant.

They hired students to go around the neighbourhood with brochures telling people that work would soon begin on the Coke Ovens site, but the residents living closest to the site were not informed by anyone. That was us.

I read in a document, work began on the Coke Ovens site removing coal March 23rd, 1998.

The first week of April, I started feeling really sick with headaches, nausea, fatigue, dizziness, burning eyes. And when they were out -- when we were outside, the taste of grit were in our mouths. My headaches were so bad, I thought I had a brain tumour.

When the kids started complaining, this really concerned me. Why were we getting sick?

I happened to be outside and noticed a man working on the site. You could see the dust and smell the coal tars in the air.

Heavy rains in the spring caused Frederick Street brook to flood, which backed up in my backyard. Over the years, this was a big problem.

I noticed two seeps in the brook, yellow and orange. Media was called, and I made it into the Cape Breton Post newspaper. This was all new to me, as I was never in the news before.

When the seeps were tested, arsenic came back 18 times higher than the CCME guidelines. We were told not to go near the brook, and to watch the children and pets.

They removed the seeps from the brook, and one year later, arsenic levels were back four times higher than the year before.

After arsenic came back high in the brook, they placed an orange mesh fence to keep the pets and children out of the brook. This was a joke.

The floods I lived with for years in the brook, to find out in 1998, arsenic was high. The very ground we walked on, sat on, played on, was no longer

safe for my kids.

My husband would take the kids up the street to play with their friends, as their friends were no longer allowed to come on Frederick Street. The parents feared for their children. Do you blame them? This was so hard on the kids.

When workers and contractors were on the Coke Ovens site digging up the coal, and the smell of coal tars were daily; when benzene smells were unfit, when dust from the Coke Ovens was airborne, more often on very windy days; our concerns were known to all.

It was so bad, we stopped the work on the Coke Ovens site because we were complaining so much that we were getting sick.

Even when reporters were on Frederick Street doing a story, the brook was the main attraction. They turned off their cameras and would feel sick like we were, but when we asked them to say something, they wouldn't -- they were not allowed, as they were there to do a story only.

They placed air monitors in my yard, and two in the next property. If they were on 24 hours, that was it. I only remember one time when they were on. The rest of the time, they were useless, as they were never turned on when they should have been.

In order for the air monitors to be on, they needed to be plugged in to my basement so the power could go through them.

For seven months, the machinery sat on the site doing nothing, and in December, Phillips was paid over four hundred thousand dollars ($400,000) for that contract.

Wayne Pierce from Environment Canada took samples from my yard to be tested.

Also, Mary White took samples from my yard and mixed the samples right in front of my eyes.

My guess, they didn't want the numbers to come back high.

In the document, it said, "Please mix SS2 and E." SS2 was my number.

We were concerned with high levels of arsenic, that Dr. Geoff Scott arranged for us to have tests done for arsenic and lead.

When my family went up to the hospital, a nurse took hair samples and put the hair in a skinny tube with a lead pencil. This was so funny.

When arsenic and lead results came back from a little girl who was two at the time, who moved on the street for only five months, to a man who worked on the Coke Ovens site for 40 years, 28 of us had the same

numbers for arsenic. How could this be?

They decided to do a Cantox study at the cost of fifty thousand dollars ($50,000) for three weeks, to come back and tell us there was nothing wrong on Frederick Street.

Yet, from my backyard, I could see coal dust bursts of air in -- from the site. The smells of coal tars were bad on them days.

Shrubs and tree leaves were turning black and dying. Can you just imagine what we were breathing in?

Workers on the site wore protective clothing and masks. We were not given the same precautions. All we had was a chain link fence between us. The workers even cutting the grass on the site were dressed in white suits.

August 4th, 1998, I videotaped a huge patch of black goo outside the fenced in areas of the Coke Ovens site.

Wayne Pierce took samples. When the results came back, Napthalene was 9,960, 166,000 times higher than the CCME guidelines, and the acceptable limit was 0.6.

We had a huge fire at the landfill. They had fire trucks from 15 departments to put the fire out.

In the Cape Breton Post on June 17th, 1998, an article read:

> "Mike Britton (sp) stated that there are 100 miles of underground pipes that hasn't been purged. Mike said he believes there are underground materials and chemicals that, when exposed to air, could burn. If other chemicals were added to the mixture, there could be an explosion. During a visit, he witnessed small bursts of fire coming from underground."

Also, eight dogs died of cancer who lived on Frederick Street within three years.

The people who lived in our home before us, I found out they all died of cancer: bowel cancer, lung cancer, breast cancer are only a few.

Also, there were surveys done on 18 homes and the results were the same.

My son, Stephen, played in an area with his trucks during the summer months. I asked for a sample to be taken there. When that sample came back, levels of arsenic were 435.5.

We had a heavy rain again. Stephen, our son, went down in the basement to work on his bike. He

came back upstairs and said, "Mummy, that orange stuff is in my basement."

I ran downstairs, and sure enough, there was a huge patch sitting on the basement floor. I was shaking. I ran back upstairs and got my video camera and videotaped the area.

Environment Canada came down and took samples and said the tests would be back in 10 days.

I locked up my basement. The kids were no longer allowed in.

I was getting anxious as the days were getting closer to find out what was in my basement.

I found out media knew before I did what my results were. I -- this really upset me.

I called Terry MacPherson. I asked him, "Was arsenic found in the samples of my basement?" He did not answer me. I repeated the question. He did not answer me. I was screaming at this point on the phone. Finally, he said, "Yes."

That night, I went in to a JAG meeting. When I walked in, all eyes were on me.

I started -- I stayed cool until it was my turn to speak. My last words to government, "If my kids get arsenic poison from living in their own homes, there will be hell to pay."

The next day, Michele Sampson called me and said, "We have a room at the Delta for you and your family."

My husband wanted to stay back with our dog, Quinny. I said, "No way. She's part of this family. She's coming with us." She was as good as gold.

Even if this was just a short time, I knew finally my kids were safe.

We stayed there for 37 days, until we were told to leave.

Our homes were worth nothing, as we lived on contaminated land for years and did not know.

The government knew. They bought our homes out of compassion, not because I had arsenic in my basement.

I can prove why I moved, it's on videotape.

Our homes were torn down, and now Frederick Street is just a memory for us. I no -- it no longer looks like home.

Since we moved, Quinny, our dog, had a tumour on her face. We had to put her to sleep. We were willing to pay the money to make her better, but the vet said it was no use.

My heart -- my health went downhill for

weeks, as I couldn't accept the fact that she was the last dog who lived on Frederick Street who died of cancer.

Since I left Frederick Street, I spent a great deal of time on my computer, and I asked questions.

As we speak, most of my papers are filled out in court, and I am going to speak for myself in court. I can't give you the time and day, but I can't wait to speak in front of a judge.

For the record, I asked this question to STPA about the Domtar tank material, where the 88 loop containers are gone, after months of sitting on rail piers, and what -- and they will not tell us where the material went, or how it was destroyed.

I would like STPA to send this information to the Panel and to me. Parker Donham said he would tell us, and yet -- and so far, he has not.

Why do we have a Department of Health, a Department of Environment, a Department of Fisheries and Oceans? Why are they allowing the owners of the Tar Ponds and Coke Ovens site, who contaminated our fish and water in Sydney Harbour, daily and for years, why are the owners not being charged heavy fines for doing so? Who do they protect? They did not answer my question.

Madam Chair, can I also take this as an

undertaking? I want the answer to this question brought back to me and to the Panel.

Also, a study was done on the fish that were on the Coke Ovens site. They had tumours on them.

As you heard here about two weeks ago from the Department of Fisheries and Oceans, the fish were not good.

If you go to STP0157 Health Canada on page 5:

> "Issue. In the ESI, health risks were identified for the workers not wearing appropriate personal protection equipment during remediation activities at the Coke Ovens site and Tar Ponds."

My question to Health Canada representatives, what were the health risks that were identified for the workers not wearing the appropriate personal protection equipment during remediation activities at the Coke Ovens and Tar Pond site? They did not answer my question.

Madam Chair, could I also take this as an undertaking? I want the answer to this question brought back to me and to the Panel.

STP0120 in the SIS Executive Summary on

page 2-3, I cut and paste this quote:

"The contamination of the sites had created increased risk to human health and the environment."

Finally, they admit that all these years we were at risk.

Has it been proven this contamination has not caused adverse effects or -- on either human or the environment? They did not answer my question.

Madam Chair, can I also take this as an undertaking? I want the answer to this question brought back to me and to the Panel.

What I would like to see happen, if they have to move the people out of harm's way, this has to be done first before they disturb the sites.

Place red zones around the Coke Ovens and Tar Ponds is a must.

Real time air monitors have to be on at all times when work is taking place on the sites. If they have to be on 24 hours a day seven days a week, so be it.

We want a written guarantee that this will happen.

I would like to see a cleanup, not a coverup. Just covering over does not get rid of the

problem.

Cover all areas when work is taking place at the Coke Ovens site and Tar Ponds. They can build domes on football fields. Why can't they do the same here?

Look at all technologies that will clean up the site once and for all.

No incineration, period. This was the least preferred option in the JAG work books, and 4,565 people who signed a petition in less than 36 hours did not want incineration. Placing an incinerator at Victoria Junction is the worst nightmare we all do not want to face.

Tell the truth, be honest, we trust no one.

We need to see all documents, breakdown costs, and audits should be done as to where all the money in the past and in the present is going, and to who.

Local jobs, local people to work.

In closing, I am here today to tell you and show you that in the past and in the present, the residents are being affected just by disturbing the sites. Residents that live in and around these sites pay the price, and so do the animals we love.

In 1998 and 1999, to me, the Coke Ovens was a sleeping monster. My fears of the unknown will always be with me.

The experts have to reconsider what will be the safest technologies, and are proven without a doubt to protect us.

The millions of dollars spent in the last 20 years could have moved an army out of -- from these toxic sites.

I want to take the time to thank two of my special friends who are sitting beside me tonight. I have many friends, but I just can't name you all.

Marlene, I can't thank you enough for all you do for me. You never want praise for all you do. We are very lucky to have you. The many nights we were on the phone when I was crying and wanted to give up, you were by my side. You kept me strong and you -- and we still talk on the phone every night before we go to bed. Thank you for being my friend.

Then I met Neila. I am really special, because I have an angel beside me. What a woman to know. Thank you for being my friend.

And Mom, you're my life, and I love you with all my heart.

To my family, the many hours I spent in

the last seven years away from you, I'm sorry. But thank you for putting up with me. I love you.

And Elizabeth May, I can't thank you enough for all you did for us, how proud we are of you. Go girl, go Green, we'll vote for you.

Thank you, Panel members, for being here. I really appreciate your patience in the last few weeks, and your staff went above and beyond for all of us.

Thank you. Debbie Ouellette.

If you have any questions ---

THE CHAIRPERSON: Thank you, Ms. Ouellette. Do you have a video presentation?

(30-MINUTE VIDEO PRESENTATION BY MS. OUELLETTE)

THE CHAIRPERSON: Thank you very much, Ms. Ouellette for your presentation.

MS. OUELLETTE: I'll make a better tape for you, I promise.

--- QUESTIONED BY THE JOINT REVIEW PANEL:

THE CHAIRPERSON: Okay. Thank you for your presentation, and also thank you for bringing in your video.

I do have a few questions arising from that, just right at the very end. How quickly did the seep arrive in your basement?

MS. OUELLETTE: Well, over the years, we

were getting smells in the basement. We had replaced 5 sump pumps. Every spring, my husband would wash out pretty well the basement with Javex because the smells would enter. We had no idea what it was. But that -- there must have been a pool under my house because it wasn't there the day before, but I can tell you, like there was a crack next to the sump pump there, and that's how it came in.

THE CHAIRPERSON: So that all arrived within the space of 24 hours.

MS. OUELLETTE: Absolutely.

THE CHAIRPERSON: Could you -- now you've talked a fair bit about monitoring, and the air monitors.

Now the two air monitors that you have in the video, were they by your house?

MS. OUELLETTE: They were, well, next to my back step, and in order for them to be on, they would have had to have been plugged in my basement. So I knew when they were on and when they were off.

And the reason why I can tell you they don't want to put them on for 7 days 24 hours a day, they're too expensive. So they'll tell you they'll put them on every 5-6 days, according to the standards.

Five days -- every 6 days is not good enough, because you don't know what you're picking up on

the 5th day, you don't know what you're picking up on the 4th day. So this is not a true way to protect the people.

THE CHAIRPERSON: Could you -- when they were on and when you were able to obtain the results, could you correlate, could you match up what was being picked up on the air monitors with the days that you felt really sick, or felt sick?

MS. OUELLETTE: I can tell you, Madam Chair, from March to August them air monitors were not on.

Bill Chew came over one day, I didn't know his name at that time, and he came to look at the monitor, because it was on in September. It could have been on for a 20-hour period, I don't know.

And I said "Bill, when you do your final report, and you give it to your boss," I said, "I want you to make sure you state that from March, when they disturbed the site, until August, these air monitors were not on." When they did the separation zones report, he stated from September on, and we never, ever did see the results.

THE CHAIRPERSON: And you had lots of footage of things happening close to the fence, or close to where there eventually was a fence -- I presume in

some of those shots, the fence was not up, is that right?

MS. OUELLETTE: Absolutely, no.

THE CHAIRPERSON: Could you -- when there were activities that were happening much further away from the site, did it make a difference in terms of the effects that you perceived how far away from the edge of the property the activity was taking place?

MS. OUELLETTE: Well, I know they disturbed it in 1988, but at that time I was working during the day, so I really didn't notice anything. But when they decided to disturb it in 1998, I certainly was home at that time.

But over the years, we used to have odours and smells coming from that brook, even from the Coke Ovens and the Tar Ponds, when the winds were really high, we would be getting the coal dust. Like the kids would come in black in the summer time. And when the trains go by, we'd still get the coal dust, as well.

But we didn't relate the illnesses or, like, how we were feeling, to the site, because we didn't know.

THE CHAIRPERSON: Now, your position would be, you've made a number of basic recommendations from your perspective, and so basically you're saying that all work, any disturbance of the material on the Coke Ovens

or the Tar Ponds, would need to be done under cover, is that correct?

MS. OUELLETTE: Absolutely. I mean, you just can't leave people next to their homes if they're less than 300 metres away and tell me that none of them are going to be affected. I could literally throw a rock at that fence, and I was affected by the smells.

I mean, you just have to disturb that site -- like they disturbed the cooling pond on April 27, 2007 (sic), the smells -- well, you could smell as far as Quint Street, as far as -- way up to the Steelworkers' Hall, just by taking samples of the cooling pond.

Can you just imagine if they're going to do the same thing with the Tar Ponds. And if they disturb the Coke Ovens site, people do live around these perimeters, they're going to get sick. Guaranteed they're going to get sick from these emissions.

THE CHAIRPERSON: Going back to monitoring, air monitoring again, and you've said now, and you've said earlier in other sessions when you've been asking questions, you've said that you want those monitors on basically all the time.

Are there other things that you want to see happen with respect to monitoring? What would you -- you've talked quite a bit about not feeling much trust,

or any trust, about this. What would -- what, if anything, would build more trust with you relating to monitoring?

MS. OUELLETTE: Madam Chair, I can tell you right now as a guarantee, a written guarantee, they are not going to be on 24 hours a day 7 days a week while work is going to be taken at the Coke Ovens site or Tar Ponds, they are too expensive to leave on. That, I was told right from the top, they're not going to do that.

But, that's all they will give us for protection. We have no protection. What do we have? How can you help -- how can you protect us?

We know the workers are going to protect inside the fenced-in area only. That's all the contractor's worried about. It's the people on the outside of the fence that are going to be affected by these emissions.

We know the workers are going to be dressed from head to toe with mask on and they're not even allowed to have a leak in their mask. I've seen men that even their hands were taped up, they weren't even allowed to get this stuff on their hands.

Where is our protection? When you come -- when you look and you see animals coming back with tumours on them, and you hear 8 dogs died of cancer in 3

years, and then Queenie, my dog, made the last one to die on Frederick Street of cancer, how much time do I have left breathing in this contamination? Every time we have an ache or pain, the first thing we think of, cancer.

I had taken -- they took a lump off my bowel they never, ever seen on another person before. How much time do I have left? And you guys sit there and "Oh, I'm going to agree with an incinerator." But you're not thinking of the health of us.

It's a money project for the next 10 years for the people sitting on that side of the fence. It's our health and our animals that are going to be affected on this side of the fence.

THE CHAIRPERSON: Thank you, Ms. Ouellette. I'm going to ask my colleagues if they have some questions for you.

DR. LAPIERRE: Thank you very much, Ms. Ouellette for your presentation.

I just have three short questions. The first one relates to the dust you showed us in the video.

MS. OUELLETTE: Yes.

DR. LAPIERRE: Was the dust a result of excavated material that had been left uncovered?

MS. OUELLETTE: Yes.

DR. LAPIERRE: Okay.

MS. OUELLETTE: Yes, they disturbed the site. The thing here is in 1998 and 1999, they had had students going round the neighbourhood, and they informed everyone, they were giving pamphlets, they were giving brochures, but the people closest to the site, we had no idea when work was going to start. They told us nothing.

And when we started getting sick, we couldn't figure out why. And then when we looked outside and we see these men on the site, and the dust is flying everywhere, then we knew that this must have been the reason why we were getting sick, because we weren't sick prior to that. We were sick during the year when the smells were bad, but not as sick as we were until they disturbed the site.

DR. LAPIERRE: Okay. Thank you. My second question is who was responsible for conducting the digging? Was it a sanctioned activity of the Sydney Tar Ponds Agency, or some other agency at that time?

MS. OUELLETTE: During the JAG process, they hired contractor Phillips. He was the contractor for that site.

Now, I don't know if they did a risk assessment before that, or environmental assessment on anything, I don't know. But that contractor was on that site in March.

We stopped the work in June because we were too sick, we just had to stop the work. And, in December, that same contractor, after 7 months, his machinery was -- he was paid over $400,000 for doing absolutely nothing.

That's why I always want to say, like, are there clauses in these contracts today that if work is stopped by residents because they're getting sick, or because emissions or seepages are coming into their homes, will these contractors still be paid today?

DR. LAPIERRE: I guess my question was, the other part was, was this a sanctioned activity of the Sydney Tar Ponds Agency, or was it some other -- and maybe I can ask that to the agency.

MS. OUELLETTE: I don't know, because, I mean, every time you turn around, somebody's got a different name. I don't know.

DR. LAPIERRE: I can maybe ask the agency for the answer.

The third question I have relates to your comment on the flow of information to the citizens. You obviously gave us some good examples of information that was not coming to the citizens.

In the future, if work goes on, or when work goes on, would you like to see a public flow of

information such as, you know, the Tar Pond Agency publishing on a daily basis the work that they're going to do on that day, prior to doing it?

MS. OUELLETTE: Absolutely. That's a must. I mean, we see nothing. We're the last ones to know when things are going to happen.

An example again, the cooling pond. Did they inform the residents that were living nearby? No. Well, I can guarantee you I was talking to Neila, and she was dying with headaches, and I said "Neila, did they disturb anything on the site?" She said "I don't know" until we read it again in the Halifax Herald. That's when we can relate why we're feeling sick. Somebody is working there and they're disturbing something, and that's why we feel sick.

DR. LAPIERRE: So you would support a ---

MS. OUELLETTE: Oh, there's no question. No question. We are the last to know.

I mean, take for example, they removed the Domtar stuff, they took it away in 88 cars. We asked where the material went. To this day, we don't know where it went and how it was destroyed. These are the questions -- every time you ask a question, they will not give you the answer. Or they'll do it after the fact. After it's gone then they'll tell you what they did.

DR. LAPIERRE: Okay. Thank you.

I wonder if I might ask the Tar Ponds Agency if they can comment on the second question, was the responsibility for conducting the digging, which we've seen in the video, work sanctioned by the Sydney Tar Pond Agency?

MR. POTTER: Thank you, doctor. No, it was not. That was back in 1998, as Debbie indicated. The work, at the time, was being carried out through the Provincial Department of Transportation and Public Works. Actually, the agency wouldn't have existed at that point in time.

We did -- perhaps I can indicate we did resume that work -- I was just trying to check the date, I don't have a firm date, but around 2002 we came back and resumed the removal of the coal on the site through the agency, through contracts, much tighter with much more strict requirements on the contractor in terms of dust generation, wind conditions and a number of the factors, and we think a substantial improvement over how the dust was removed in terms of the level of coal dust that was generated by the activity.

So we did resume work later on, around 2002, 2003, but the original work was done by a separate contractor.

DR. LAPIERRE: So I guess from your answer I can surmise that the province was responsible for those activities.

MR. POTTER: Yes, at the time it was the Department of Transportation and Public Works administered the contract, provincially.

DR. LAPIERRE: If that work was carried out by the agency, would the workers be dressed in a similar manner as they were in that video?

MR. POTTER: We have a pretty rigorous health and safety -- master health and safety plan for our contractors. They have to follow that master health and safety plan and develop their own, at least to meet that one, or exceed it, and we do require -- there are criteria for workers to have -- depending on the activity of course, they have to meet certain criteria, depending on the nature of the work they're doing.

Simple coal removal, they probably wouldn't have much in the way of additional special conditions for that activity. If they were working in a confined space, working around -- for example, the Domtar tank, when that was coming down, the criteria level were higher for -- they had respirators available as well as protective rubber gloves, and things like that.

But for the coal, it wouldn't have been --

the level of protection would have been a minimal level for the worker, at that point.

DR. LAPIERRE: Okay. Well, thank you.

I just have one more question maybe, Ms. Ouellette. The coal tar seam that came to the surface, is that a normal occurrence, or is that a once-in-a ---

MS. OUELLETTE: No. Like I said, we had smells in the basement before. We didn't have seepages like that. That was the one day when I went down there because -- like my freezer's down there, our food was in the freezer. Like that was after a heavy rain, and Stephen happened to go down the basement to play with his bicycle at that time, and that's when he noticed it.

Like I ran down them stairs not thinking, I said "What are you talking about?" I couldn't believe, until I seen that patch, then I decided "That's it, I'm taking my video camera and this is getting taped."

DR. LAPIERRE: No, I'm speaking more to the patch of coal tar on the outside or close to the fence, not the one in your basement.

MS. OUELLETTE: Oh, I'm sorry.

DR. LAPIERRE: Does that happen -- did that happen often?

MS. OUELLETTE: No. No. It was only when they decided that they were going to do work on the Coke

Ovens site that they started digging up the coal. Before that, it seemed like it was kind of flat. So I didn't see that before, no.

DR. LAPIERRE: Okay. Thank you.

MS. OUELLETTE: But I want to `reinstate' here, Madam Chair, that Health Canada stated here that health risks were identified when workers were not protected, and that's why I want the list. It does say here in their own document on page 5:

> "Health risks were identified for the workers not wearing protective equipment while they were on that site."

What were their illnesses, what health effects did they have?

MR. CHARLES: Debbie, I have one question.

In your list of what you'd like to see happen, there is -- the second bullet says:

> "Place red zones around the Coke Ovens and Tar Ponds."

Is that sort of a buffer zone or ---

MS. OUELLETTE: Absolutely. I mean, after doing some homework over the years, in the last 7 years, I mean, when I started on Frederick Street I was this very shy person, I didn't know anybody, and until you

become a victim of past mistakes, I didn't know Marlene, I didn't know anybody about the environment.

But after 6 years of being in the environment, I can certainly tell you that red zones should be around any toxic site anywhere in the world. They should not have people within 300 meters or more living next to these sites. Absolutely not.

MR. CHARLES: Thank you very much.

THE CHAIRPERSON: I'll now provide an opportunity for questions from other participants.

I will go first to the Tar Ponds Agency. We have quite a bit to fit in this evening. We have two more presentations, and already our second presentation is meant to have begun.

But we'll carry on with the questions, but for that reason, if possible, I'd like to keep the questions fairly concise.

Mr. Potter, do you have questions, a couple of questions for Ms. Ouellette?

MR. POTTER: Maybe I'll seek clarification from the Chair. There's a couple of points I'd certainly love to answer for Ms. Ouellette, a couple of questions she did raise. I don't have any direct questions for her myself.

THE CHAIRPERSON: And those questions were

what, about the health and -- you tell me what -- the two points of clarification.

MR. POTTER: The increased risk to workers, and I think the EIS clearly does state that.

What it was referring, and I can have Dr. Magee extend on if necessary, but we did identify that there was an increased risk to workers, and therefore there was a need for protective clothing, but it did not approach the level where there was a risk to cause, you know, health effects. Simply there was a risk, therefore you had to ensure that there was protection for the workers.

The other question regarding the goo, that would be the puddles we referred to, I think, in previous testimony.

There are certain areas on the Coke Ovens site where there are puddles or pockets of pure coal tar that, according to an indication from DEVCO, Development Corporation, that there may have been spillages of product over the years around the rail line, and that during the hot part of the summer the goo becomes warm and it becomes mobile, and will move a little bit, but tends to be generally in well known areas. It's been identified in actually the very first Phase I report done on the site back in '97 or '98.

So they are well known and well established pockets, and, as we've mentioned before, they will be -- some of those pockets will be picked up when the actual remediation -- more than likely the tar cell would be involved.

The last point was the reference to the highest levels in North America for toluene. There was a sampling problem with toluene. During the air monitoring problem, we do sample to very low levels for toluene. Because of that, we use a special type of canister. We discovered that because of the rigorous requirements in getting low detection levels, we were using an approach that wasn't standard.

We detected or discovered that the methodology that the lab was using for rinsing the canisters was using a toluene rinse. They thought they were getting all of the toluene out after the cleaning process, discovered that wasn't the case.

The result was we actually changed labs. We actually now use Environment Canada in Ottawa. Their testing lab for this particular test, because we do go very low in our testing criteria, and that was the only lab in the country to meet the rigorous QAQC testing criteria that we established.

So it was an erroneous result, as

indicated it was extremely high. We quickly investigated and determined that it was a lab problem. So I just did want to clarify that.

I hope that helps, and thank the Chair.

THE CHAIRPERSON: Thank you, Mr. Potter.

MS. OUELLETTE: Can I respond to that?

THE CHAIRPERSON: Yes, if it can be very brief, please.

MS. OUELLETTE: I just want to say to Frank, you have to understand they do state they identified -- health risks were identified, that's the key here, to the workers not wearing the appropriate clothing.

I want to know what them workers had. Did they have a headache? Did they -- were they tired? Were they dizzy? The only thing they didn't do was drop dead, but I just want to know what kind of symptoms they had, because if they're having symptoms without protective clothing on, I want you to know that that's what we have. On the outside of the fence, the same symptoms that they were getting on that side if they're not wearing protective clothing, we're getting on this side of the fence, and that's well documented in the Health & Safety Plan.

You talked about the coal tar. That coal

tar left the Coke Ovens site, passed over a rail bed, went in to the next property on Frederick Street. That property now, that same area where the goo is, is all dug out, and you have a holding area on the top of Frederick Street now. That's where that tar -- that big goo of tar, that's where that was at.

And the toluene smell, I read an article in January 1915 that they made explosives on the Coke Ovens site at 700,000 gallons of toluene. I think that's probably where that smell came from.

THE CHAIRPERSON: Just if we can move on from this fairly quickly, but Mr. Potter, can I just, just for clarification, Ms. Ouellette is referring to -- is taking the term "health risks" and you are assuming or asking about health symptoms.

MS. OUELLETTE: Yes.

THE CHAIRPERSON: Were these health symptoms that were identified, or were they health risks, and could you just clarify which -- what was the meaning of the phrase "health risks" in that particular instance? Was it, in fact, symptoms?

MR. POTTER: No, it was not symptoms, it was a predictive, a tool we were using to predict what the workers should wear based on our modelling and estimation of the work that was going to be carried on

the site.

THE CHAIRPERSON: So the workers that are cited in this particular instance, did not experience any documented symptoms, is that what you're saying?

MR. POTTER: That is correct.

THE CHAIRPERSON: Okay.

I would now like to see if anybody else has questions for Ms. Ouellette and, as we always do, I'm going to take registered presenters first, and then I'll provide an opportunity for others, and because we're beginning to run over schedule, I'm going to ask for basically one question, and possibly a follow-up.

I see Mr. Brophy, I see Ms. MacLellan. Mr. Brophy first, please.

--- QUESTIONED BY MR. ERIC BROPHY:

MR. BROPHY: Debbie, do you know offhand whether the first health risk assessment done outside the fence looking at residents outside the fence might have been the NOCO?

MS. OUELLETTE: That's the only one I heard of, but prior to say 1996, 1997, I don't know if any were done, and -- I don't know.

Transportation and Public Works, I don't know if they did any, but there was certainly a risk to us.

MR. BROPHY: And a follow-up, was there work ongoing on the Coke Ovens site prior to the NOCO health risk assessment?

MS. OUELLETTE: By that time, I think we were moved off the street, Eric, so I can't really answer that.

MR. BROPHY: I'll answer it for you, there was.

Madam Chair, thank you very much.

THE CHAIRPERSON: Thank you, Mr. Brophy. Ms. MacLellan.

--- QUESTIONED BY CAPE BRETON SAVE OUR HEALTH COMMITTEE (MS. MARY-RUTH MACLELLAN):

MS. MACLELLAN: I actually only have two short questions.

Debbie, do you remember ever seeing any rodents that were deformed, or any frogs that had two heads?

MS. OUELLETTE: All I remember seeing were mice coming back deformed. They were literally on the trap. My next-door neighbour had a trap, and she ran over and she tried to show it to me, and I'm petrified of mice, so we stood together and we did, we couldn't even tell what that mouse looked like. It didn't look like a mouse to us, but it was deformed.

MS. MACLELLAN: So you never did see the two-headed frog that was ---

MS. OUELLETTE: No, I did not.

MS. MACLELLAN: Okay. Do you remember back before JAG, somewhere between '93 and '95, any other Crown corporation doing tests in that area?

MS. OUELLETTE: No. I can't think ---

MS. MACLELLAN: You don't remember them testing the water in the brook or testing it.

MS. OUELLETTE: Oh, on top of the hill, yes.

MS. MACLELLAN: There were a few people that had wells on Frederick Street.

MS. OUELLETTE: Yes.

MS. MACLELLAN: Do you remember them testing that?

MS. OUELLETTE: Yes, I do.

MS. MACLELLAN: Were you ever informed of what was in that?

MS. OUELLETTE: No. No, and actually, there was a previous buy-out on Frederick Street, and I did not know that. The people on top of the hill, when they got their wells tested, they did come back really high contaminated, and they were given bottled water.

MS. MACLELLAN: For the record, it was

DEVCO who did the testing.

MS. OUELLETTE: Okay.

MS. MACLELLAN: It was their coal lab that was here at the time, and there was not only all arsenic and lead, there was also radiation in those.

MS. OUELLETTE: Okay.

THE CHAIRPERSON: Thank you, Ms. MacLellan. Is there anybody else that's not a registered presenter has a question for Ms. Ouellette at this time?

Well, thank you very much, Ms. Ouellette, for your presentation. Thank you Ms. Kane and Ms. MacQueen for your support for Ms. Ouellette, and ---

MS. OUELLETTE: I really thank you very much. I did make a few mistakes in that tape and I'm really sorry, but if you really want a good copy ---

THE CHAIRPERSON: No, it's a very interesting tape.

MS. OUELLETTE: --- I'll give you a better one.

THE CHAIRPERSON: I'm glad we didn't have to see the two-headed frog through.

MS. OUELLETTE: Thank you very much, but I just wanted to tell you it certainly doesn't look like that today, Madam Chair. They did put a cap on the landfill, but I can guarantee you what's underneath it is

not healthy.

And you can still see some of that orange stuff in some of the brooks if you go up that area. And I don't know what they're using the top of Frederick Street now, but it looks like it's a holding area, you know. It certainly doesn't look like home any more.

So thank you very much for listening to me.

THE CHAIRPERSON: Thank you.

We'll take a 5-minute break while our next presenter, Dr. Ignasiak, comes forward.

--- RECESS AT 6:12 P.M.

--- RESUME: 6:18 P.M.

THE CHAIRPERSON: Ladies and gentlemen, we will resume. If you'd like to take your seats. Our next presenter is Dr. Ignasiak.

So, Dr. Ignasiak, as you well know since you're another regular attender, you have 40 minutes, and I'll let you know five minutes before that time is up.

--- PRESENTATION BY DR. LES IGNASIAK

DR. IGNASIAK: Thank you very much, Madam Chair, Members of the Panel, ladies and gentlemen. I will come right away to the point.

What I would like to talk to you about is that in-situ solidification/stabilization applied to

Sydney Tar Ponds will end up in failure.

Now, I will have a problem with that, but I hope that if I read you will -- at the same time you will be able to get my point.

The principles of in-situ solidification/ stabilization, SS. In-situ SS is based on mixing of contaminated soils with chemical binders such as cement, bentonite, additives and proprietary chemicals. The objective of in-situ SS is to immobilize contaminants of concern, metals and some organics.

Deep in-situ SS requires machinery like mixing augers that is approximately the same size as large drilling rigs. Please note that a few days ago the Proponent announced that it will use backhoes for sediment homogenization during SS treatment.

Of all EPA administered SS projects, only 6 percent were in-situ projects treating organics. Organics content was in the range of several thousand ppm. EPA carried out one in-situ SS project with coal tar contaminated soils and the details are really not available.

According to EPA, 33 percent of all sites for which SS was to be applied were found not suitable for SS application either at the design, installation or operational stage. Consequently, other remedies had to

be selected to replace the SS. Please note, 33 percent of all sites, and that refers mainly to metals and metalloids, because there was, as you could see, a very small percent of the sites that contained organics.

In-situ SS for organic contaminants is in its infancy and its effectiveness has not been proven. The information that I will be providing for you is mainly based on EPA 542R00010 and also "SS of Organic Contaminants" issued by Environment Agency of the United Kingdom, Science Report, SC 98003, SR2, November 2004.

Also, this information that I will be providing for you is completely consistent with what is in the Portland Cement Association brochure, and it's undersigned also by the Cement Association of Canada.

Furthermore, as I already mentioned, some of this information is also based on rather very in-depth report which was prepared by Oakridge National Laboratories and published in March of 1994, and the Panel does have all the information on the subject.

STPA proposes to apply in-situ SS for stabilization of Tar Ponds sediment and it looks to me like also the Tar Cell material. Of all in-situ SS treated MGP sites only one -- Columbus, Georgia -- was treated prior to 2003, it was exactly in 1992, and evaluated nine years after completion of the treatment.

Nothing is known about the results of evaluation of the remaining MGP sites.

The STPA lists two SS-treated MGP sites -- namely Columbus, Georgia and Cambridge, Massachusetts -- as evidence that Sydney Tar Ponds sediment and Tar Cell material can be successfully solidified/stabilized. I will provide details on remediation of those two sites as well as other MGP sites in a few minutes.

In-situ SS, when applied to Tar Ponds sediment and Tar Cell material, will fail due to a number of reasons. The first one is high volumetric ratio of organics to minerals, and again I will provide you some numbers in a few minutes. High content of petroleum and coal-derived compounds.

I would like to mention here that really those organics, petroleum and coal-derived, were determined based on Alberta Environment TPH method, it was used by JDAC and it was used also by the Proponent, and those methods are really derived for petroleum organics not for coal-derived organics, but I cannot provide any information at this point what would be the difference.

Extreme variety of very high content of organics. I know it from Environment Canada data obtained prior to 1995, neither JDAC nor EIS provide the

results on total content of organics. The Earth Technology Report -- the Earth Tech Report does not mention also about total organics content.

Next thing, organics induced coal swelling and associated with the swelling pressure. I haven't seen any mentioning about that in the EIS. I will provide some details on the subject in a few minutes.

Lack of any compatibility between completed in-situ SS MGP projects and STPA proposed in-situ SS treatment for Sydney Tar Ponds. Again, I will provide some details in a few minutes.

Essentially unanimous agreement among the experts that SS is not a long-term solution, and it is not recommended for organic contaminants. These details are provided in some submissions for the Panel as well as my undertaking tabled with the Secretariat a few days ago.

Finally, failure of the 2002 Technology Demonstration Program, and in my opinion 2005 Solidification Technical Memo Report, to provide any solid basis that SS can be effective for Tar Ponds sediment and Tar Cell material treatment.

I will be happy to elaborate on this subject in more detail during discussion, if the discussion takes place. Some information, however, I

will be provide during the presentation.

Tar Ponds sediment composition on a dry basis. The data regarding the weight percent are average values and they are based mainly on Environment Canada information generated prior to 1995. As you can see, the coal and coke account for about 46 percent of the sediment on dry basis, petroleum hydrocarbons about 3 percent, coal tars about 3 percent, the mineral metal 48 percent.

Now, this 46 percent does not really include so-called intrinsic mineral metal which is really a part, a chemical part of the coal matter -- or coke matter.

If you really take that into account, and if you take into account the densities which I put over there for coal and coke, for petroleum hydrocarbon, coal-derived tar and for mineral metal -- they are approximate densities, of course -- then you can recalculate actually the weight percent and volume percent, and you will see that in terms of volume we have 59.7, for coal and coke 4.5, and the same, 4.5, for coal tars, as well for petroleum hydrocarbons, and the mineral metal drops down to about 31.3 because it is the heaviest.

Now, if you add the coal and coke plus petroleum hydrocarbons and coal tars, you will come to

about sixty -- close to 69 percent by volume. The mineral metal will account for about 31 percent by volume. So, what we really want to do is -- essentially what situation we have here is there is significantly more in terms of volume of organics than we have of mineral metal.

The Proponent proposes to introduce about 5 percent of slag -- this is the second column from the right -- and about 15 percent of cement. So, that will change a little bit, of course, the weight percent of all the components that I already presented for you, and this is shown in the -- right here, 41.6, 2.4 for petroleum hydrocarbons, for coal 2.4, for mineral metals 33.6, 5 for slag, cement 15.

And again using the same simple recalculation based on densities you will find that in terms of volume you've got about 50 percent for coal and coke, 3.8 for petroleum hydrocarbons, 3.8 for coal tar, mineral metal 26.5, slag 3.9 and 11.8 for the cement.

So, the situation has changed a little bit better for the mineral metal. Now we have about 42 percent of mineral components and about 58 percent of the organic components in terms of volume, but it is still an overwhelming, so to say, amount in terms of volume of the organic components.

Now, this obviously has a major impact when you want to encapsulate this stuff. How in real life in some of those SS projects the situation looks like.

This is not my transparency, this is based actually on Georgia Power photographs taken of cores which were taken from an MGP site -- and that was the Columbus, Georgia site -- and what I would like to show you here is that really on the left-hand side of this core you've got very little of slag, which is also inorganic component. Slag is a non-organic component.

You've got a brick, you've got a brick, you've got a little piece of something here which is not really the sand which is solidified, you've got a little bit out here, a little bit out here. If you really did measure the surface of those incorporated pieces of slag or whatever it is, you would find out that really they account probably for about 5 percent of the area, 5 percent.

If you recalculate that on the volume, you will come probably with very much the same conclusion, but I still would like to bring to your attention that brick and slag are not really organic components. Maybe those three are organic components, then we are talking about one or 2 percent.

I think we are getting right now some understanding that what is proposed for the Tar Ponds sediment just doesn't make much sense.

Now, this is -- on the right-hand side, is also a core but in this case, as you can see, there is really a tar identified. Now, I did do a lot of experiments with tar, I analyzed the tar from the MGP site, and believe me it is generally not anything that has a high compressive strength. It's actually quite soft.

So, this particular core obviously failed right away when it was subjected to the compressive strength test. Where it failed? Where the tar was. Those two, as you can see, they are slags, mineral components, not organic components.

Well, what does Georgia Power say on the subject? These are unconfined compressive strengths of those cores, some of them I just showed you. The 2001 results ranged from 283 psi to 899 psi with an average of 473 psi. We are talking here about 17 to 20 psi.

Now, this is again the comment made by Georgia Power.

> "The wide range of results is not related to QA/QC problem (quality assurance/quality control), it is

related to inclusions."

You probably noticed how small inclusions were in those two cores. The pre-remediation performance criteria were 60 psi.

Now, this is again from Georgia Power, chemical laboratory testing. They tested the PAHs in those cores nine years after the SS treatment was completed. They say similar composition and concentrations as compared to pre-remediation assessment data.

I think it is important -- it is important to look at this work similar. I will give you some more comments on the subject later on.

BTEXs. Analytical results revealed significantly lower levels of BTEX constituents, especially benzene and ethylbenzene. Well, if you want to be really fair, you have to point at this time that that does not mean that those BTEXs were removed during those nine years.

Based on EPA information, I'm rather sure that those BTEXs were really removed during the process of cementation. I mention here one day that EPA actually stated that in the very process of mixing and homogenization about 90 percent of all BTEXs are removed and the remaining 10 -- of the remaining 10 percent,

roughly about 50 percent is removed during curing. So, not more than 5 percent of the original BTEXs can be left after the process is completed.

Well, I haven't seen anything in the EIS, Environmental Impact Statement, about whether coal could contribute eventually to the problems associated with application of in-situ SS to organic contaminants. As we just said, SS involves mixing, agitation, introduction of cement, temperature increase, generation of homogeneous product, dispersion of liquid organic compounds, absorption of some of these compounds on coal.

What are the consequences of exposing coal particles to liquid hydrocarbons and hydrocarbon vapours? Well, let me just make a brief statement on the subject. If there are more questions later on, I'll be happy to answer them.

Coal is a polymer, it is really a huge macromelecular. It -- the molecule has hundreds of thousand weight. It's a huge molecule as opposed to something which would be like BTEXs or VOCs.

Now, cellulose-lignin are two key components of wood, but -- and they are also polymers -- but also they are coal precursors. Coal was generated as a result of coalification of wood which is cellulose-lignin.

Now, everybody knows that wood is swelling and that wood is really capable of exercising -- of exerting some swelling pressure. I notice, actually, last year when I was in Egypt that the ancient Egyptians were using wood for splitting rocks. They were just inserting wood into some slight places that the rock was not ideal, subsequently pouring water for a long time and they were successful actually in splitting rocks.

I think everybody heard about cracking basement concrete walls by tree roots or problems associated with weeping tiles due to roots.

Now, let's go back to coal. Any polymer -- and that includes coal -- in presence of some gases, vapours, liquids, solvents, including hydrocarbons, will swell. Coal, in addition, will also swell in presence of some metals. A metal that can pose tremendous swelling actually is magnesium.

There are literally thousands of books, monographs, scientific and technical papers on the subject of coal swelling. Coal swelling is really the key property of coal. It plays a crucial role in coal [--] and at the same time it plays a crucial role in utilization of coal. Any utilization of coal, be that combustion or coking or [--] or liquefaction technologies and coal bed methane are really to some extent helped or

hampered by coal swelling.

And I will not go in details but I will tell you that right now at this very moment in the United States and in Canada and in Poland they are doing a lot of large-scale tests, underground tests, that are exploring the swelling of coal as a result of CO2 absorption.

You see, coal, any coal which is deposited quite deep, any coal seam, will have a lot of methane, and for the last 15 years people are trying to utilize this methane. And, in fact, it is public knowledge that in the United States right now about 15 percent of all natural gas, which is methane, produced is coming from coal bed methane. Not many people realize that.

Now, everybody knows about problem with CO2. Now, [--] is a bureaucratic word for simply disposal. Here we are talking about disposal. It appears that those deep coal seams, when they are -- when CO2 is injected, they actually release very easily the methane and they absorb the CO2.

They absorb the CO2 in such a way that coal swells and practically is becoming porous-free[?] and exercises such -- and exerts such high pressure that the rocks which are above the seam and below, they are cracking. These are result of large-scale experiments.

And I can dwell on the subject more if somebody would like to have more information.

Now I would like to switch to a different subject, namely STPA results on testing of the SS treated Tar Ponds sediment and Tar Cell samples for unconfined compressive strength, permeability and leachability, and this is based on the Solidification Technical Memo Report.

Well, I went through this report in details. First of all, some of the results cannot be interpreted due to inadequate sensitivity of analytical field equipment used. Some provide further experimental evidence in addition to 2002 Technology Demonstration Program that SS will be ineffective in solidifying the Tar Ponds sediment and Tar Cell material.

Once again, STPA claim that unconfined compressive strength target of at least 0.12 to 0.4 megapascals, which is equivalent to 17 to 20 psi, is consistent with industry standards for strength testing on in-situ solidification product, and with the proposed future land use at the Tar Ponds and Tar Cell Site is incorrect.

USEPA requires a minimum unconfined compressive strength of 50 to 200 psi. Unconfined compressive strength below 50 psi is, as a rule,

unacceptable. I really have to make a comment here.

This is the brochure of the Portland Cement Association that I referred to you before. Those people are certainly interested in selling cement. There is no doubt. This is an umbrella organization for cement producers. Well, let's look what they say, page 14 of this brochure. I will quote the sentence which is over there.

> "Minimum unconfined compressive strength of 50 psi is typically specified."

How many minutes do I have still?

THE CHAIRPERSON: You have approximately about 12 minutes.

DR. IGNASIAK: Thank you very much. Well, further about this report, all samples except for two generated with North Pond sediment failed to meet the minimum unconfined compressive strength target of 50 psi. However, what is worse, no information is provided on total organics content in the sample.

If we know right now that we have about 55 percent of organics in terms of weight, then if we don't really have this information -- if you don't take into account this information, how we can argue, as a matter of fact, whether the sample can meet the strength

criteria or not?

What, however, I would like to mention is that the total petroleum hydrocarbon content is about 50 percent less for the North Pond sample that met the criteria over 50 as compared with the South Pond sediment sample that failed completely.

Of all samples for which the unconfined compressive strength could be measured all but three show lower compressive strength after 14 days of curing compared to seven days of curing. Why? Normal thing is that if you cure cement the cement increases -- the strength increases with time and after about 28 to 30 days it reaches maximum strength.

Here we have that reverse situation. I don't know. I haven't seen any really explanation for that. I think there are a few explanations but I don't know which one is right.

It is not clear whether the permeability measurements were carried out on samples after six days -- seven days of curing or not. The permeability should be measured after at least 14 days of curing.

The next thing which surprised me. The samples were not homogenized prior or during SS treatment and this is reflected in a very wide scatter of results of chemical analysis. In fact, what I found in the

report is that any particle that was larger than 2 centimetres was removed from the sample prior to SS.

Now, what is the percentage and the composition of those removed particles? I don't have the slightest idea. Perhaps that was coal, it could be coke, but it could be globule of coal tar. This is a major -- a major -- I would say, mistake.

The report does not provide the results of proximate and ultimate analysis, and that regards North Pond and South Pond sediment and Tar Cell material. If we really want to investigate the impact of those organics on compressive strength and other things, how we can ignore the results of total organics content? Obviously, this precludes any meaningful discussion of the results of geotechnical testing.

Next thing -- or last -- I will not bother you longer with that. Benzene leachability tests were carried out for sediment samples containing 3.1 and 4.5 ppm benzene. Benzene content in Tar Ponds sediment is in the range of 3 to 234 ppm. Why were not samples tested which had at least 30, 40, 50 ppm of benzene?

I just would like only to finish with nothing more but just with the -- final conclusions and recommendations of the report are quite surprising.

"The additive mixture with 5 percent

slag and 5 percent cement met strength and permeability goals for the solidification pilot test in the North and South Tar Ponds samples."

I went through this report a few times right from the beginning till the end -- this is the same report which was submitted to the Panel -- and there are absolutely no results that would justify this sort of a statement, absolutely nothing. There is no one result.

Next I am taking from the report, final conclusions:

"Further testing of the Tar Cell material is required to determine an appropriate additives blend for this material. Additional testing using cement and quicklime and other impacted site soil should be carried out to verify that the material can be adequately solidified for bacterium."

About seven days ago from this very spot I started apologizing when it appeared that the Proponent didn't really want to solidify this material but burn, but this is the conclusion from a report which is dated November last year. I am confused completely.

Well, finally -- I am coming to an end -- I think we should put a nix to this notion that there were MGP sites which were solidified and that the Tar Ponds sediment is very much like those sites.

Well, in-situ SS remediation projects listed by STPA, Tables IR-42.1 and 42.2, these tables were listed in response to Panel's request to provide the Panel with examples -- the best examples that -- there are five -- that were really containing very much the same contaminants that could be actually solidified the same way as the Tar Ponds.

Let's start with the MGP site Columbus, Georgia. I already provided information on this site. Many of my transparencies were regarding this particular site. Well, this site had 4 acres and 75,000 cubic metres of material were really solidified on the site at a depth up to 10 metres.

I had a hell of a time to find what were the contaminants, especially what was the content of contaminants, but I found it. The material that was solidified, the soil had about 2,400 ppm of PAHs, about 3,000 ppm of VOCs and about 5,500 ppm of petroleum hydrocarbons. There was no coal and coke from what I could conclude, but this is not really a clearcut conclusion.

I would like -- before I come further, I would like to mention about the second site. The second site is also the one which was referred to tge Panel's attention as a similar site to Tar Ponds Site.

It has -- the area of the site is 2.82 acres, 79,000 cubic metres were solidified, it was coal tar supposedly on this material. There was, however, fuel oil, most likely there was no coal and coke but I cannot guarantee that, and unfortunately I couldn't find any information on content of those two contaminants.

And, finally, the next site is MGP site Appleton where 26,000 cubic metres were solidified, there was -- I couldn't find any information on the subject of what contaminants were over there and what was the content. The same regards the MGP site Augusta, Georgia, which was 1.8 acres and 39,000 cubic metres were solidified. Below, just for your information, is what is really in Tar Ponds.

Now, I really dig very deep in order to find how the first site, this Columbus, Georgia, was remediated.

THE CHAIRPERSON: Dr. Ignasiak, five more minutes.

DR. IGNASIAK: Thank you very much. I will finish within the time frame.

It appears that what happened is that a cofferdam was built here to cut off the river from coming directly to this contaminated site and subsequently what was done is all this material was excavated and removed from the site, this one between the river and between this red line.

Roughly in the place where the red line is a huge wall 2 1/2 metre was built, 2 1/2 metre, 25 percent of cement, and was extended along the river for 125 metres. So, whatever all the [--] and this was the main contaminants were excavated and they were actually drain here, they were not left here. Then this portion which was impacted by this [--] was -- this portion was really solidified. There was no solidification of the byproducts, these byproducts that we have, for instance, in the Tar Ponds. And I roughly describe already what's happened with the Columbus, Georgia. I will switch right away to the next site.

When I started digging it appears that this site actually -- I mean the MPG site -- had area of 2.82 acres, but really the site, the whole site which was developed, was 10 acres.

What appears to be the case that at this point that an MGP plant was located 650,000 tonnes of contaminated soil were excavated and removed from the

site, but below that, about 10 metres below the surface, there were still soils which were impacted with small, I presume -- I don't know exactly but I presume it is very much like Columbus, less than one percent. Those soils were solidified, not the byproducts.

Well, I look at the next site, the MGP site, and I dig a little bit deeper what happened. All those materials, those byproducts which were in the soil, again were excavated to five feet below the surface and only the soils below which did not have any by products were solidified.

I am coming to an end.

THE CHAIRPERSON: Yes. Actually, Dr. Ignasiak, your time is literally up now.

DR. IGNASIAK: Well, essentially I can finish at this point. I don't think I really have to draw conclusions. Thank you.

THE CHAIRPERSON: Well, thank you very much, Dr. Ignasiak. I think the Panel would like a break before we move into the questions. So, we're going to take a 20-minute break. This means that we will be back at 7:18 to resume.

One more thing. I assume you'll provide copies of your overheads to the Secretariat.

DR. IGNASIAK: Actually, I already provide

it, yes.

THE CHAIRPERSON: Thank you very much.

--- RECESS: 7:00 P.M.

--- RESUME: 7:20 p.m.

THE CHAIRPERSON: Ladies and gentlemen, we will resume and move on to questions. Oh, well I see we -- in a minute.

Dr. Ignasiak, thank you very much for your presentation. I think the Panel have a few questions for you.

I wonder if we might have quiet in the hall, please, so that we can move on to questioning. Thank you.

--- QUESTIONED BY THE JOINT REVIEW PANEL:

THE CHAIRPERSON: The first question that I'd like to ask you is you refer in your presentation to -- on a number of occasions to the concepts of the success of solidification/stabilization, the failure of S/S treatment.

So I would like to ask the general question, first of all, if you could -- in the context of this particular remediation project, if you could tell us what it is that you would consider would constitute success of S/S, what should be attained in order for you to say that S/S was successful, and similarly, what

constitutes failure.

DR. IGNASIAK: Well, during the last 10 days, I think I was giving examples of major failure -- to prevent the leaching of, for instance, phenols by solidification. Specifically, I provided an example that a sample of soil was solidified, and subsequently the same sample was solidified after adding exactly two percent of phenol.

What happened is that after this sample that was solidified with phenol was subjected to TCLP, it appeared that 100 percent of this phenol which was put into the sample prior to solidification was recovered. Everything was recovered. It means no phenol was really retained in the solidified sample.

Then I also, I believe, provided a very interesting example that another researcher who is specializing is cement reactions was doing exactly the same what I described but he was waiting for seven days, for 14 days, for 21 days, and was extracting using TCLP procedure those samples after seven, 14 and 21 days, and he noticed something absolutely shocking -- that the rate -- it means the efficiency of extraction increased with curing time, which is completely against any reasonable expectation if you know that cement when it's curing is becoming harder with time. This -- something completely

opposite happened.

The other example that I would like to provide -- a simple example is that even for metals and metalloids, sometimes solidification/stabilization is full of complete surprises.

An example, sample was solidified with Portland cement only, and some sort of a strength was determined for the sample. I don't remember exactly, but it was, I believe, about 60/70 psi.

Now, in the next step, the same soil was -- to the same soil, 0.02 percent of zinc was added, and the sample was solidified and the strength was tested. Surprisingly, the strength went up to about 600 psi. So the same researcher did an experiment, that in next experiment, instead of adding 0.02 percent, he added 0.04 percent. Shocking example, the strength dropped almost to the level of sample that was not treated with zinc at all. So he continued with 0.7 and 0.8, and essentially the sample did not show any strength after that.

Well, if we are for single metal getting this sort of problems -- and you have to bear in mind that this is really a surface chemistry that is playing the key role -- if we cannot really establish those things for simple zinc, then how we can expect that we will be able to apply some sort of a formula that will be

available and will be successful when we have 60 percent by weight of organics, which by nature should not be solidified.

That is the point I was trying to make, and I -- really I didn't have enough time to finish.

THE CHAIRPERSON: So in your first reply to me, essentially you were talking -- I asked really for your criteria, what would make this form of treatment successful in your view, and your answer obviously referred to leaching characteristics. So in other words, the ability -- or your -- one criteria is the ability of the matrix to retain certain contaminants and prevent them from leaching.

Now the second part of your answer was in reference to the unpredictability of the methods in your eyes. Now, was that in relationship to -- are you primarily interested in the ability -- in the ability of the remediation to prevent leaching of contaminants?

DR. IGNASIAK: Well I understand that this is the prime objective of any solidification/ stabilization, to prevent leaching. If we do not accomplish doing that here in Tar Ponds, then I think this whole exercise is worth nothing.

THE CHAIRPERSON: Yes. So what I was attempting to clarify from asking you these questions is

that you're not using a compressive strength by itself as the determinant of success.

DR. IGNASIAK: I think that the compressive strength is very important component, but from the point of view of spreading of those contaminants, the leaching is of incredible importance.

And this leaching is even more important because, in fact, if you look at some work that was done in the past, the organics which are solidified, they essentially should not leach because the leaching test, TCLP, is generally carried out with certain -- in an acidic region. It is about four/five pH.

Now, it was considered that since organics are generally not affected by acidic pH, they should not leach. But everybody forgot, for instance, about phenols. They will leach much better when actually the pH will be in the order of nine/eight/ten. They will really start leaching very badly at this stage.

THE CHAIRPERSON: Okay. Thank you.

DR. LAPIERRE: Good evening, Dr. Ignasiak, and thank you very much. I just have a few questions. The first one relates to -- there's one to leaching, but I'll ask the second one.

The first one relates to cement. If you integrate a greater amount of cement -- now you indicated

-- you gave two slides in your presentation -- one with the Tar Ponds component, one with cement, and you indicated that there was a diminishing -- the volume of organics becomes smaller as you increase more cement.

Now, could you double the amount of cement or even add a little more in order to dilute the organics and get a compressive strength that you could work with?

DR. IGNASIAK: Well this question should be really addressed perhaps to people who are specifically in this business. I am a surface chemist, and my interest is mainly in cement from the point of view of the surface chemistry. I don't want to build hypothesis here.

There is a possibility that you could increase this strength and you could reduce the leaching, but honestly speaking, I don't really think that the chances are really very good. If you start with a material which is 55/56 percent organics to start with, this is really against -- this is really against the principles of S/S.

I would like once again to bring your attention to what the Portland Cement Association says on the subject. And I believe that the people who really put together this brochure, they knew what they were talking about. The name of Mr. Conner is actually one of

the authorities in this area. So let me just answer with reading one sentence.

> "For nonhazardous oily wastes, techniques have been developed to solidify these materials when the organic content is below approximately 25 percent."

We have here 55/56 percent. Now, keep also in mind that this is for nonhazardous oily wastes -- that the leaching is of no importance because they are nonhazardous.

Now, for hazardous, the same brochure says:

> "For hazardous organic wastes and Equis wastes with greater than one percent hazardous organics, the LENSBEN (sp) regulations effectively [--] the treatment by S/S techniques."

These are not my words. These are the words of the Portland Cement Association.

DR. LAPIERRE: Okay. Thank you very much for that answer. I then have a next question that relates maybe more to your field of expertise. It relates to leaching.

As you've, I'm sure, listened to the presentations we had and the explanation as to how water will be treated in the monolith or the matrix, the water will be -- you know, there'll be some drainage systems from underneath up to the top. There's a collection of pipes, and these pipes would run to a drainage ditch or a drainage canal, and at the end, if I understood correctly, each one of those would be capped with a valve.

And the question I have, would not the leachate be collected -- isn't this a backup to collect the leachate and to ensure that the leachate would not return to the environment if most of the water is going to be recuperated through this drainage system.

My understanding is this is why you have this elaborate drainage system with these big holes from the bottom to the top, piped into a series of canals, and then monitored prior to release to the canal. Is this not a process in which you could collect that leachate?

DR. IGNASIAK: Dr. LaPierre, I am not a structural engineer, but when I look at the development of the concept of solidification/stabilization from the first day of the hearings and I could see continuously some changes, I really became extremely sceptical about the whole thing.

I simply doubt whether a system like that can work, but I suggest that you ask the same question to Dr. Fred Lee, who is an expert in this area.

DR. LAPIERRE: Okay. Thank you.

MR. CHARLES: Dr. Ignasiak, you gave us some information about coal swelling, but I didn't quite capture how coal swelling applied to this project. What was the significance of coal swelling?

DR. IGNASIAK: Thank you very much. I will try to be brief. You see, I give you a simple example. If you have a test tube, glass test tube, and if you put into this glass test tube about three grams of coal, you mark the level of coal, and then you put in one drop of methanol. If you pick a certain type of coal, like for instance, lignite, or some bituminous coal, you will observe during few minutes that this coal starts swelling. And if you measured now how far the level of coal swell, you will find that actually in this case, it will go up to 30 percent of the original volume of this coal.

Now, everything that swells exerts some pressure. So this is one case.

The other case, I -- I think my case with the coal bed methane is perhaps too complex for me to explain in two minutes, but there are some other cases.

You can actually place again the coal -- different type of coal -- not lignite now, bituminous coal -- coking coal or caking coal -- and you can do the same experiment except that you will put on top of this coal in this test tube some sort of a weight, a disc, and it will be -- it will have extended the arm with some writing system, and you will be, as a matter of fact, that when you heat it up, this thing will actually change the volume all the time.

MR. CHARLES: But when it changes the volume, are you suggesting that it does damage to our -- I don't know whether I should call it monolith or thing or whatever it is we've got there after we stabilize and solidify.

DR. IGNASIAK: Thank you for this question. I think it leads me right to good answer.

You know, this is the place that we're operating coke ovens. If you, for instance, treat coal in a coke oven, and if you do not prepare the right blend of the coal for coking, and if you don't have movable wall, the coal may actually damage the whole oven. It may -- it simply will shatter one or two walls.

So many, for instance, coke ovens are equipped with moveable walls. So when the coal starts expanding, this wall is moving away, thus, you know,

saving the other three walls from being shattered.

MR. CHARLES: Do you see this as a big problem with solidification/stabilization of the coal -- the Tar Ponds, or is it sort of a minor problem that's going to have to be dealt with?

DR. IGNASIAK: Dr. Charles, I cannot tell you whether it is a big problem or a minor problem, but I think that somebody who was looking at application of S/S should certainly be aware of this problem. This may be an important problem.

MR. CHARLES: All right. Thank you for that. I have one last question. In the -- in your presentation, I think you have a quote from the EPA that says:

> "The process of in situ S/S treatment is shown to be in the range of 50 percent effective."

Have you any idea on what criteria they were able to reach that percentage?

DR. IGNASIAK: Well, this has been taken -- this has been taken from EPA report published in 2000, and I actually provided this information to the Panel regarding specific reference to this report. I would like perhaps, if you allow me, to still come for a moment to the question that you asked me before whether ---

MR. CHARLES: Before you do that, do you have any idea what the criteria for reaching 50 percent is that the EPA used? How did they decide that it was 50 percent effective and not 60 percent or 70 percent?

DR. IGNASIAK: As far as I remember, I said 33 percent -- 33 percent simply. If they decided, for instance, to go ahead with 100 projects that were supposed to be remedied by S/S, then during either planning or designing or implementation or operation, they found that 33 of those projects did not work, so they had to go to different remedial methods.

MR. CHARLES: All right. I may be mistaken. I'll go back and check on my 50 percent. Thank you very much.

DR. IGNASIAK: Thank you.

DR. LAPIERRE: I would just like to ask a follow-up question on Mr. Charles' question. The question relates to coal and water, absorbing water.

Now, if the coal is lying in the Tar Ponds over time, wouldn't it already be reabsorbed? So if you're just mixing it in with cement, would it reabsorb additional water or would it not be saturated already?

DR. IGNASIAK: Thank you very much. I think that relates really to Dr. Charles' question, and I'm happy that you repeated to some extent this question.

You see, during S/S treatment, what you do is, as a result of placing cement in the thing and mixing, you generate higher temperatures. You should mix actually -- in fact, S/S requires that you should homogenize this material. If you have coal over there, you should actually crush this coal, you should grind this coal.

What is happening at this temperature of about 70/80 centigrade is that in fact the pores of coal which are filled with water, some of this water will be removed.

Now, the incredibly important thing that will happen at the same time is that the oil droplets or the tar droplets which were in form of droplets, at this temperature and at this conditions, pH about eight/nine/ten, they will actually be becoming like oil that can be spread very easily and they are absorbed on the surface of the coal.

If those droplets of oil had before minimal impact on surface reaction, now when they will be spread all over this coal, their impact will be one thousand more than before.

And I think that is one of the most important things in solidification/stabilization that is completely ignored.

THE CHAIRPERSON: Dr. Ignasiak, just a couple of questions. I want to come back to my -- well, I guess we've all been talking about success and failure, but we have heard during the hearings -- it has been kind of indicated to us that in fact the primary remediation technology for the Tar Ponds is in fact the containment part of the plan, of the design, and that in fact, solidification/stabilization is a kind of -- is a redundancy, is an added safeguard. Now -- and we've heard other things as well, and I think we were hoping to really kind of clarify that in the next couple of days.

But if that indeed is the case, do you still think that the success or failure of S/S treatment -- I mean, how crucial is it from your perspective with the design that you have seen?

DR. IGNASIAK: My simple question -- simplest question would be -- my simplest answer would be the sediments that exist right now can hardly maintain the weight of a person weighing about 160 pounds. It means that if you step really on the sediment and you move one foot up, you will start sinking in this thing.

Now, if we really feel that we are ready to leave the sediment the way as it is without solidification/stabilization and put something on top of that with considerable weight, then not being a

structural engineer, I have a real problem with understanding how that would be possible.

THE CHAIRPERSON: So in fact, going back to my first question about the criteria by which you would determine success, it is both the ability to contain contaminants to prevent it from leaching, it is also compressive strength in the light of final use or future use.

DR. IGNASIAK: The answer is yes.

THE CHAIRPERSON: And my last question, and then I'll provide other people with opportunities. Can I just ask for some clarification around the issue of BTEX, the removal? You've indicated that there are examples whereby there was 95 percent loss during the process basically of the S/S treatment.

Now, this has presumably obvious implications with respect to public health. In terms of performance of the S/S treatment, is it an issue, or is it a health issue?

DR. IGNASIAK: I think it is an incredible issue. And you know, my understanding when I came here was that the S/S is to be eventually, if it's approved, applied in form of using the augers, which means those big machines which go down to the -- well, 10 metres or whatever, and they are mixing -- homogenizing -- mixing

and homogenizing by lifting and getting down [--].

Well, that is not supposed to be more like that. Now the understanding is that we are going to -- to using backhoes.

Now, if you have the auger, the technologies were really developed that you put a pan over the auger and you can actually control those VOCs that are being evolved during this treatment. If we have here backhoes, I'm having a real problem to visualize how this is possible actually to do anything about those VOCs.

THE CHAIRPERSON: This is a very -- this is a very minor point, but let's just clear it up for the record.

When you had your overheads up, with respect to conditions at other sites, I believe it was the Columbus site, VOCs on your overhead, it said 300. In your -- when you spoke, you said 3,000. Do you remember that? Which was the correct one?

DR. IGNASIAK: Three hundred, 100 percent. If I said 3,000, I apologize. I'm sure that it was written 300, 300 in the original source of information.

THE CHAIRPERSON: Thank you. I just wanted to clarify that.

I will now provide opportunities for

others to ask questions of Dr. Ignasiak. I'm going to turn first to the Tar Ponds Agency. I'm going to -- as we have been doing in the past and we were doing on Saturday, I'm going to remind you that please address questions to the Chair, and that the answers will also be made to the Chair.

So Mr. Potter, 10 minutes for your questions.

MR. POTTER: Thank you, Madam Chair. I'll ask Mr. Kenyon to raise a few questions. Thank you.

--- QUESTIONED BY THE SYDNEY TAR PONDS AGENCY (MR. JONTHAN KENYON)

MR. KENYON: Madam Chair, I guess first just a point of clarification for Dr. Ignasiak.

In one of his last slides he had brought up, it was the conclusion from the Earth Tech technical memo which stated, I believe, a mix of five percent cement and five percent slag was -- had successfully -- was a successful mix.

That is a typo from the memo. If you go through the memo, I think it's quite clear that it's 15 percent cement and five percent slag that has passed. I apologize to Dr. Ignasiak if he went through looking for the five percent.

DR. IGNASIAK: Can I respond to this

thing?

THE CHAIRPERSON: Yes, go ahead. Yes.

DR. IGNASIAK: I would propose that I simply come up and pick up the memo and we can resolve the problem in no time. Is that reasonable?

THE CHAIRPERSON: I suggest that ---

DR. IGNASIAK: Or maybe I will provide this information for my colleague after we finish discussion.

THE CHAIRPERSON: That would be a good idea.

DR. IGNASIAK: Thank you very much.

THE CHAIRPERSON: Mr. Kenyon.

MR. KENYON: If I might just -- it's not a typo on Dr. Ignasiak's slide. It was a typo in the technical memo. I think that ---

THE CHAIRPERSON: Yes, I understand that.

MR. KENYON: I'm not sure that Dr. Ignasiak did.

THE CHAIRPERSON: Oh, I see. Did you understand that, Dr. Ignasiak? It's not your error.

DR. IGNASIAK: I understood that. I'm sure that in conclusions, it's five percent.

THE CHAIRPERSON: I suggest you resolve that between yourselves, and if there's any change that

needs to be put on the record, you can bring it back later.

MR. KENYON: Thank you, Madam Chair. I guess the first thing I'd like to do is -- my understanding is that Dr. Ignasiak is a principal of TD Enviro. I wonder if he could first clarify his interest in this hearing for us.

DR. IGNASIAK: I certainly can. TD Enviro and TDE is one of many companies that I am consulting for. I am not a principal of TD Enviro.

MR. KENYON: I guess what I'm wondering, is he here speaking on behalf of TD Enviro or TDE or some other company.

DR. IGNASIAK: Really, I was registered as Les Ignasiak. I was not registered as Les Ignasiak, TD Enviro, or TDE, or Mitsui Engineering and Ship Building Company, or whatever, Kuwait Oil. No. I am registered here as Les Ignasiak.

MR. KENYON: Dr. Ignasiak, many of your comments that you've made this evening, you've prefaced with "I think." My question is, Madam Chair, does Dr. Ignasiak have any personal experience with solidification/stabilization on site and practically.

DR. IGNASIAK: Madam Chair, I think I quite clearly spelled out that my main interest in -- are

surface reactions. There is a lot of surface reactions occurring during cementation, and my interest in cementing is only associated with surface reactions.

MR. KENYON: Has Dr. Ignasiak been involved in the clean-up of any sites with solidification/stabilization?

DR. IGNASIAK: Once again, I am not practically applying any of the remedial methods that I am involved into. I am providing advice as to the suitability of those methods, whether they can be used or they cannot be used.

For instance, I am providing advice to Kuwait government as to how those 80,000,000 tonnes of oil contaminated soils over there could be remediated.

I certainly wouldn't suggest solidification/stabilization. You can be sure of that.

MR. KENYON: Oh, I'm quite sure. If we went back to your presentation, I believe this evening you've spoken of a report that you read from the Oakridge Laboratory of March, 1994, which dealt with solidification/stabilization. You've also brought forward the Portland Cement brochure.

I wonder if you have any more recent material papers on solidification/stabilization that you have researched in coming forward this evening.

DR. IGNASIAK: Actually, I have quite a lot of very recent information about stabilization/ solidification of those four MGP sites that the Proponent referred to as very close to Tar Ponds. This is information from the recent years, because as you probably remember, those MGP sites were stabilized in 2002, 2003 and 2004, and I consider that to be quite updated information.

MR. KENYON: I guess the question for Dr. Ignasiak is what is the source of that information and has that information been provided to the Panel.

DR. IGNASIAK: I'm not sure I really understand the question.

THE CHAIRPERSON: Mr. Kenyon is asking whether the papers that you have just mentioned in that previous answer, whether you have provided them to the Panel.

DR. IGNASIAK: No. But I have absolutely no problem with providing those papers to Panel or to whoever.

THE CHAIRPERSON: Then I think we will take that as an undertaking, Dr. Ignasiak, for the record, that you will provide the papers you've just alluded to, recent papers with respect to S/S projects.[u]

DR. IGNASIAK: Yes, I will -- I will provide those papers. I think I can do that by tomorrow.

MR. KENYON: Madam Chair, I think Dr. Ignasiak cleared it up at the end of his presentation, but I just want to be clear, is Dr. Ignasiak aware -- I understand from his third slide, he had stabilization/solidification of the tar cell listed there -- is he aware that the tar cell is to be incinerated and not stabilized?

DR. IGNASIAK: Yes. I -- as I mentioned during my presentation, I, in fact, a few days ago apologized to the Panel and to the Proponent that I thought, based on my reading of the report, that in fact I thought that this stuff is to be solidified and stabilized.

But as I said, I looked at this report a few times after I apologized to the Panel and to the Proponent, and I realized that clearly one of the key conclusions in this report is that this tar cell material should be further tested for solidification/stabilization in order to be land filled.

MR. KENYON: I'm not sure if this was answered in Dr. Ignasiak's reply to Dr. LaPierre, but with respect to coal swelling, I guess the question, Madam Chair, is what would cause coal swelling in the

stabilized and solidified monolith.

DR. IGNASIAK: Just in response, I believe, to Dr. Charles' question, I provided a description of a very simply -- probably the simplest example of coal swelling where you put three grams of coal into a test tube, you drop -- you put one drop of methanol, and you observe that this material will increase its volume by about 30 percent.

Now, it appears that higher-ranked coals, they will be not affected by methanol, but they will be tremendously affected by some other organic liquids, including BTXs, VOCs and oils.

And, in fact, the penetration of some of those liquids into coal pores is such incredibly systematic, that this is being used actually as an analytical method for determination of the surface area of the coal using benzine.

So there are thousands -- thousands of monographs, books, that actually you can find out that this is a major problem.

And also I was trying in the response to Dr. LaPierre's question to emphasize that if in original sediment, if you have globules of tar or heavy oil, which are not really that bad because the surface area is actually minimal because they are globules.

Now, if you do solidification/ stabilization, by the very nature of this treatment, you will spread those globules all over the surface of coal. Now the surface reaction will change completely -- completely.

I believe -- I'm not sure -- I said that during presentation -- I believe that this may be actually the reason why the strength, the compressive strength of those samples stabilized as described in the report are really -- the strength is much worse after 14 days than after seven days.

It would be interesting to see what it would be after 21 days, but I think I would bet that it would be even weaker.

MR. KENYON: One final question for Dr. Ignasiak. This is dealing with the coal swelling or simply just coal problems with solidification/stabilization. Does he have any experience with coal swelling or coal problems in solidification/stabilization or does he have any references to provide the Panel of problems in solidification/stabilization from coal swelling?

DR. IGNASIAK: I've been working in coal science and technology for many years, and as I mentioned during my presentation, there is no other area in coal

science and technology which is more affected by anything else than by coal swelling.

Coal swelling plays an incredible -- incredible role in any sort of coal utilization, and as far as coal research is concerned, coal swelling is the key thing ready for determining the structure of coal.

Is that sufficient? I propose -- I propose that you simply write on internet, "coal swelling," and you will get about a half million responses.

THE CHAIRPERSON: I think Mr. Kenyon's question, however, was in relation to do you have experience of coal swelling directly affecting the success of S/S remediation treatment. Is that correct, Mr. Kenyon? Have I paraphrased you?

MR. KENYON: That's correct, Madam Chair.

DR. IGNASIAK: Okay. I was trying, but perhaps I failed in making that clear that coal swelling may actually crush rock. If this is not a clear example that coal swelling can do really and can cause problems, then I am really having a problem with further explanation.

THE CHAIRPERSON: I think Mr. Kenyon's question, though, is not -- you are putting this forward as something that should be a concern. You don't

actually have documented evidence of it affecting a particular S/S treatment project. Is that correct?

DR. IGNASIAK: Madam Chair, this is correct. I don't have any specific example specific with respect to S/S. That is correct.

THE CHAIRPERSON: And I just have a -- Mr. Kenyon, you'd finished, had you? Yes.

MR. KENYON: I had, Madam Chair. I believe Mr. Shosky does have one point of clarification, if we could at the end of our questioning.

THE CHAIRPERSON: Can I ask a question before you, Mr. Shosky? It relates to this. I'm just not sure if I've got this quite straight. We're still on the coal swelling.

Is it -- in this particular project, we're told that in fact the target compressive strength is not going to deliver -- if I've got this straight, is not going to deliver a solid -- you know, sediments with a solid property, but a far more friable -- a digable quality.

So is coal swelling still as much an issue in this instance as it would be if you were aiming to get something that in fact was going to be basically a solid block where I could see that if you had swelling of some element within that, you could easily have fractures and

cracking? Is it as important if you're dealing with something which is more granular?

DR. IGNASIAK: I will try to answer the question as best as I can.

I think that coal swelling has something to do with the problems that are described in the report. Now, I think I gave clear-cut examples that coal swelling can be tremendous. It can just shatter the coke oven walls.

I also was trying to provide example -- perhaps I went too fast -- that coal swelling may actually be right at this very moment a crucial point in developing a new coal bed methane technology because of what -- because of tremendous pressure that coal can exert on the rocks when it's deep underground as a result of CO2 absorption.

There are many examples that clearly show that this is a phenomenon that you can absolutely not ignore.

And please, keep in mind that I listed eight different reasons why in my opinion the S/S will not work. This is only one of those eight reasons.

THE CHAIRPERSON: Thank you, Dr. Ignasiak. Mr. Shosky.

MR. SHOSKY: Thank you, Madam Chair. I

just wanted to get in a point of clarification and possibly a technology transfer item.

It was insinuated that if we can't understand zinc, then we shouldn't have any business working with such complex organic compounds. I'd like to -- and the example was given that a research colleague of Dr. Ignasiak's was having trouble with that.

Perhaps your friend could give me a call. Four years ago, I personally managed and finished a 130,000 cubic yard project in Williamsburg, Virginia, where the compound of concern was zinc. We managed to crack that nut, and we used the same mixing and capping techniques basically that we're proposing for this project.

So we do understand that one, and I think we understand the other ones as well. Thank you.

THE CHAIRPERSON: Thank you, Mr. Shosky. Very briefly, Dr. Ignasiak.

DR. IGNASIAK: Can I respond to that?

THE CHAIRPERSON: Yes.

DR. IGNASIAK: Absolutely my intention was not to say that one cannot resolve the problem with zinc in the soils that you want to solidify and stabilize. My point was to make it clear how the surface reactions and the chemistry are complex if addition increase from 0.02

percent to 0.04 percent can cause entirely different effects.

I didn't say at all or at least I didn't intend to say that one cannot overcome this thing. My key point is, as a matter of fact, not metals and metalloids. I made it quite clear during my presentation that I am concentrating on organics and particularly on organics in high concentrations.

THE CHAIRPERSON: Thank you, Dr. Ignasiak. I'm now going to provide an opportunity for other people to ask questions. I think I'm going to ask you to keep it to two questions, please, and we'll see how the time goes. We're running late.

So could I just get a show of hands from registered participants who would like to ask Dr. Ignasiak a question. I see Mr. Marcocchio. I see Ms. MacLellan. I see Ms. Kane. Mr. Marcocchio.

--- QUESTIONED BY THE SIERRA CLUB OF CANADA (MR. BRUNO MARCOCCHIO)

MR. MARCOCCHIO: Thank you, Madam Chair, and thank you, Mr. Ignasiak. I wanted to ask you a question on a point that you raised several days ago that I found fascinating and interesting, and I hope you can shed more light on it.

As you pointed out, the chemical reaction

during the cementation process raises the PH very dramatically to the range of 10 or 11.

If I heard you correctly, is it true that at those PHs all of the phenolic compounds that normally would not become volatile, do, in fact, become volatile in those PH conditions?

DR. IGNASIAK: Yes, I believe that a few days ago I made a point of that, that while normally, when you raise the PH to 7, 8, and 9, 10, the metals, for instance, would not be solubilized so easily.

In case of phenols, it appears that, at this PH, there will easily be -- phenols are acids, very weak acids, and they are becoming better acids when you raise PH to 10, 11. Then they essentially are converted into, I said, phenolates, and those phenolates just leach like crazy.

I provided, a few minutes ago, an example that 100 percent of phenol could be extracted from solidified, stabilized samples. So phenol essentially cannot be solidified/stabilized unless -- there are cases that people that are doing that, if phenols were in small amounts, they're adding activated carbon. And I discussed it as a matter of -- discussed this with few experts.

However, please keep in mind that

activated carbon, the cheapest one is $1,000 per tonne. If you want to really get something better, you go to $4-5,000 per tonne.

MR. MARCOCCHIO: Thank you, Dr. Ignasiak.

One other question about the issue of coal swelling and stabilization/solidification.

Would it not be an elegant -- an eminently good reason not to do stabilization/solidification because of the coal swelling properties of it, and is it not quite possible that the reason that examples aren't apparent is it's not indicated -- a treatment train for these materials?

DR. IGNASIAK: Well, thank you very much. I think this is a perfect question for which I think I have a perfect answer.

I have never seen, in any project, that somebody's trying to incinerate material that contains over 50 percent of coal and coke, or somebody's trying to stabilize material that contains over 50 percent of coal and coke. This can be utilized, and is not going to cost.

I think the idea of really solidifying and stabilizing material that has over 50 percent of coal and coke is really very questionable.

DR. MARCOCCHIO: Thank you very much,

Madam Chair.

THE CHAIRPERSON: Thank you, Mr. Marcocchio. Ms. MacLellan.

--- QUESTIONED BY THE CAPE BRETON SAVE OUR HEALTH COMMITTEE (MS. MARY-RUTH MACLELLAN):

MS. MACLELLAN: Thank you, Madam Chair. Through you to Dr. Ignasiak, you have a core sample on the slide, and it showed cracks in the cement around it.

Were those core samples from Georgia?

DR. IGNASIAK: Yes.

MS. MACLELLAN: Okay. That was in a river bed?

DR. IGNASIAK: Sorry, could you repeat that?

MS. MACLELLAN: Was that in a river bed, a freshwater river bed?

DR. IGNASIAK: Actually, not. This sample was taken from an area about 50 meters from the riverbank on the other side of this wall, 2.1/2 meter wall, that I described.

MS. MACLELLAN: But there was no exposure to salt water.

DR. IGNASIAK: It was not exposed to water.

MS. MACLELLAN: What I'm trying to ask

you, I guess, is what effect would salt water exposure have on that solidified core sample?

DR. IGNASIAK: Well, I don't want to come up with hypotheses, but what I did not mention during my presentation, and thank you for actually making me possible to mention about that now, is that between the wall and between the river, all the soil was excavated and fresh soil was put in place of this contaminated soil.

Now, 9 years after the remediation was completed, as I mentioned, the evaluation of the site was done, and the samples of the fresh soil between the wall and the river were taken and were subjected to TCLP. It appears that they failed, the TCLP passed in terms of drinking water standards.

Please keep in mind, this was fresh virgin soil. There was a 2.1/2 meter wall between the soil and the solidified material on the other side of the wall. After 9 years already we can see that there is a problem. That's why I mentioned to you, at a certain point, that there was a word used of "similar" concentrations were obtained, but really concentrations were similar but in terms of TCLP this is a big difference.

MS. MACLELLAN: You mentioned BTEXs, and their effect on human health.

Were there BTEXs present in Georgia? Are you aware of any?

DR. IGNASIAK: Well, I have actually visited the worst MGP sites in the United States working for EPRI, and I have seen horror stories. I have never seen a site that didn't have BTEXs.

MS. MACLELLAN: How close to populated areas were these sites?

DR. IGNASIAK: Well, the problem is that when they were setting up those plants, 100-150-180 years ago, they always were setting up those plants as close to the river as possible, because the cheapest way to bring the coal which was required for running those plants was by barge using the river.

So essentially, the majority of those plants were really next to the river, and those plants are leaching. The companies, the private companies that are responsible for those sites, they generally paid the owners of the houses which are in the vicinity in asking them to move out.

MS. MACLELLAN: So they gave the people the option of moving.

DR. IGNASIAK: Pardon me?

MS. MACLELLAN: They gave the people in that area the option of moving away from ---

DR. IGNASIAK: Yes. For many of those companies, actually, it is much cheaper to move those people right away from those houses, and then start thinking about remediation.

THE CHAIRPERSON: Ms. MacLellan, I think that's at least two questions.

MS. MACLELLAN: Okay.

THE CHAIRPERSON: Thank you. Ms. Kane.

--- QUESTIONED BY MS. MARLENE KANE:

MS. KANE: Good afternoon. Good afternoon, Mr. Ignasiak, and thank you for your presentation.

We've heard about increasing compressive strength in the Tar Ponds by adding more cement. The S/S treated sediments have been recently referred to as a rock.

I'm wondering how the coal swelling that you've been talking about would affect this more solid material.

DR. IGNASIAK: When I listened to Proponent's presentation, I heard on a number of occasions this word monolith, and actually I must tell you that I looked in the dictionary, and then, when Portland Cement came and they actually acknowledged that this is a monolith that, in fact, you can shovel from one

place to another, I realized that we are not talking about monolith any more.

MS. KANE: Another question I have, I asked the Sydney Tar Ponds Agency several days ago if they felt that the unconfined compressive strength test results in Table 7, which showed only one sample out of 23 that actually increased in compressive strength, was due to where the sample came from, which was at the mouth of the north pond at the harbour, where the tidal flushing is the strongest.

Do you have an opinion about that, I wonder?

DR. IGNASIAK: I think your point -- I perfectly well remember when you raised this point and addressed this question, I believe, to Mr. Shosky.

Well, I have to say that I share totally your opinion. The reason why the sample from the north pond after solidification/stabilization showed higher compressive strength, slightly over 100 psi, in my opinion, is almost 100 percent sure due to the fact that the tight actions simply removed most of the contaminants that were absorbed on coal and coke out, and we've got mainly minerals over there. And then the problem of solidification/stabilization is not a problem any more.

But look at the sample from the south

pond. This sample is not -- south pond sediment is not subjected to this tight action, so those organics are mainly there. This sample, you know, when was tested for strength, essentially showed no strength.

MS. KANE: And there were no samples in ---

DR. IGNASIAK: Also, in fact, if you look at the report that we were discussing today about, and I believe I mentioned that in my presentation, the sample from the south pond contained almost exactly 50 percent more total petroleum hydrocarbons than this sample, which was from north pond, and which really had reasonable strength.

MS. KANE: One more question, and I think it might be for Sydney Tar Ponds.

I'm wondering if the tar cells, the contents of the tar cells are to be incinerated, why was unconfined compressive strength tests conducted on tar cell material?

THE CHAIRPERSON: Mr. Potter, do you wish to just clarify that?

MR. POTTER: Part of the alternative means we were looking at involved not having incineration, therefore the tar cell material would have to be dealt with.

The purpose of that testing was to see, sort of see the ability for solidification/stabilization as the tech memo identified. That is something we would have to follow up on if that was to be pursued, that there be a requirement to further examine that.

THE CHAIRPERSON: Mr. Potter, I need to ask a question of clarification there. You just said as part of the alternative means of carrying out the project you're looking at not having incineration.

My understanding, at least, correct me if I'm wrong, my understanding was that you made it very clear that, in fact, a non-incineration -- taking incineration out of the project would not, in fact, meet the terms of the Memorandum of Agreement, and therefore could not be considered economically and technically feasible, and therefore was not an alternative means of carrying out the project, but rather an alternative to the project. Have I got that wrong?

MR. POTTER: I understand from our previous discussion in the first week when there were questions to the agency, I believe there was a request to bring back -- there would be further questions coming to us tomorrow, and we were prepared to address that question at that point in time.

I think it would require more discussion

than we probably have tonight.

THE CHAIRPERSON: All right. So we'll have that on the record as something requiring more discussion. Thank you.

Thank you, Ms. Kane.

MS. KANE: Thank you.

THE CHAIRPERSON: Is there anybody else who is not a registered participant who has a question right now for Dr. Ignasiak?

MR. POTTER: Madam Chair, could I get two very quick clarifications?

THE CHAIRPERSON: Yes, Mr. Potter.

MR. POTTER: Just to address the phenol question. We did take a look at the numbers. Our phenols, for the most part, are non-detects. We have very, very low phenols in our sediment.

With manufactured gas plants, they tend to be typically in the inner part of city cores. All the sites we've looked at, people we've talked to, these remediation projects took place in the city core without relocation of people. So that's a very traditional way of doing these cleanups.

THE CHAIRPERSON: Thank you, Mr. Potter.

DR. IGNASIAK: Can I answer this question?

THE CHAIRPERSON: I'm not sure it was a

question to you, Dr. Ignasiak, but if you wish to make brief comment.

DR. IGNASIAK: Well, I mentioned clearly that many of those plants were located by the river.

Do I understand that there are not rivers in city cores? Most of the rivers are flowing through the cities in the United States.

THE CHAIRPERSON: Dr. Ignasiak, I believe the point of clarification that Mr. Potter said was that, the sites that they had looked at, there had not been relocation of the residents around the sites. That was your main point, not the presence of rivers.

DR. IGNASIAK: Then I apologise.

THE CHAIRPERSON: Okay. Thank you.

Our next presenter is Dr. Lee. Dr. Lee, I think we're going to take a 5-minute break. I think we need to stand up. And then we will resume.

--- RECESS: 8:20 P.M.

--- RESUME: 8:24 P.M.

THE CHAIRPERSON: We're going to start with the Sierra Club of Canada.

MS. MAY: Thank you, Madam Chair. We are pleased to be able to provide the expertise to this Panel of Dr. Lee. He is one of the leading authorities in North America on hazardous chemical sites and landfill

technologies.

He has extensive peer-reviewed paper publications that you can find in his c.v. as well as over 1,000 publications of chapters, papers, books, and is recognized as a leading authority by the American Academy of Environmental Engineers. So, I'll turn it to Dr. Lee.

--- PRESENTATION BY SIERRA CLUB OF CANADA (DR. FRED LEE)

DR. LEE: Thank you, Elizabeth. As Elizabeth mentioned, I've been asked to review the adequacy and reliability of the Sydney Tar Ponds Agency's proposed approach for remediation of the Sydney Tar Ponds sediments.

Now, I'm going to be talking primarily about the Tar Ponds sediment, but much of what I'm going to be saying is equally applicable to the Coke Ovens Site soils, except for the method of treatment that they're going to use, but the issues I'm raising are about the same kinds of problems.

What I've done in preparing this discussion is to review the complete EIS, I have reviewed all the responses to your questions, the Panel's questions to the Agency, and I've also read all but two of the transcripts which haven't been available to me yet that have taken place here over the past -- what are we

in now? -- 15 days or so, and have prepared, as you know, a roughly 90-page review of these issues where I have quoted from what's been said by the STPA and then discussed those issues based on my experience in working on these kinds of problems for about the last 40 years.

So, as a way of background to this, I want to just briefly review my background that's pertinent to the conclusions I'm going to present to you.

I have a bachelors degree from San Jose State College in public health focusing on water quality and waste management, a masters in public health from the University of North Carolina focusing on these same issues, and then a PhD in environmental engineering from Harvard University that was obtained in 1960 where I also focused on aquatic chemistry issues. So, I have 30 years of university graduate level teaching and research in aquatic chemistry as it relates to water quality issues.

It's with this background that I come to you and say, well, I've been involved in many of these issues now almost throughout my career, and the -- I look at the research that I've done in the university which amounts to about $5 million dollars and published about 500 papers while I was in the university, and there are about four of these areas that are directly pertinent to the discussions we have here.

In the work that I did at the New Jersey Institute of Technology where I was a distinguished professor of civil and environmental engineering, I was also director of a multi-university hazardous waste research centre and it was my responsibility to look at remediation of sites, to help develop remediation approaches for sites and to do research that would be pertinent to this.

In the $5 million dollars of research that I did in the 30 years I was a university professor I looked at a number of issues that have direct relevance to the situation here. Back in the '60s my graduate students and I, while I was a professor at the University of Wisconsin, Madison, were some of the first -- I think maybe the first -- in North America to look at PCB issues.

And I've been involved now in PCB as a source of pollutants and their effects now since about the mid-1960s. This has included major research on just where PCBs are located, what is their leachability and so forth as pertinent to the situation here.

One of the areas I'm particularly concerned about is the leaching of chemicals from aquatic sediments. During the 1970s I had a million dollar contract from the US Army Corps of Engineers to examine

the release of chemicals from aquatic sediments when you suspend those sediments in the water column.

This is related to the dredging of sediments as part of waterway maintenance in the US. And the Corps was asked, well, what happens when you suspend a sediment -- in this case we measured 30 parameters, including PCBs -- into the water column, are pollutants released and what are the conditions that govern release?

My work on landfill liners has direct relevance to this. I started in the '70s where the USEPA National Groundwater Research Centre came to me -- at that time I was director of the Centre for Environmental Studies at the University of Texas, Dallas, and we were beginning to be concerned about the ability of clay-lined ponds and clay liners for landfills being able to truly prevent pollutants from transport through them.

And so I did some of the first work ever done on the effects of organics on clay liners, and this is subsequently shown by others to be correct in that organics can, under certain conditions, interact with clays to cause them to shrink and crack and become ineffective as a liner.

In the '80s I branched out in my work on liners to consider the HDPE liners, and I had a contract to examine the properties of HDPE with respect to is it a

proper liner material and is it the best out there at that time.

There was no question then, and today, that as far as chemical inertness HDPE is the material of choice. However, as I pointed out then -- and is still true today -- HDPE liners will degrade over time and ultimately will fail to be an effective liner.

I've also been involved in the evaluation of testing procedures, and in my report I talk about the evolution of what was called then the EPTOX test or now the TCLP test, and I published a paper for ASTM which was judged one of the best papers presented at their conference several years ago on the inappropriateness of trying to use TCLP to assess leaching of materials.

It's not a test designed for that purpose, it should not be used for that purpose. Unfortunately, it's widely used because most people don't understand its limitations. It is not appropriate to evaluate the efficacy of SS-treated sediments.

I have repeatedly been involved as an advisor to governmental agencies and industry throughout the US and other countries on solid and hazardous waste management issues related to water quality protection, and this involvement has included working with industry and public groups.

In 1989 I retired after 30 years of university teaching and began to expand my part-time consulting to a full-time activity. Since then, for the last 17 years, my wife, who is also a professor, and I, we have a two-person firm and we've published an additional 600 papers and reports, so we're now up to about 1,100 or so. This is part of our efforts as a continuing education of the field, it just helps get the information out that helps, you know, set up public policy.

During the course of this effort I have looked at about 80 landfills, and some of these are what I call capped waste piles, and that's what we're going to try to develop here, is a capped waste pile as a means of containment of the SS-treated sediments.

And this examination that I've made over the years is focusing on the ability of liners and covers for capped waste and landfills to prevent the release of pollutants from the capped system or landfilled system.

I've been involved -- and still am involved -- in advising the public on hazardous waste or hazardous chemical site investigation and remediation

These are Superfund sites, and some are not national Superfund sites but they're equivalent at the state level, where it's my responsibility to serve as

a USEPA-sponsored advisor to the public to say is the site being adequately investigated, is the site being adequately remediated to protect public health and the environment for as long as the wastes that are left at the site will be a threat.

So, this is something that is right in line -- what I'm doing here is in line with what I've been doing now as part of my work on Superfund sites.

An important issue also is the fact that I'm on the editorial board of the journal Remediation. Remediation is, I think, considered to be the premier journal in the field for remediation of hazardous chemical sites, and I'm part of that board, and also of storm water.

I've done a lot of work over the years on water quality criteria and standards development. I was an invited peer reviewer for the National Academies of Science and Engineering Blue Book of Water Quality Criteria in the early '70s.

I was part of the American Fisheries Society's review of the Red Book of Water Quality Criteria published by the USEPA in 1976 where I was on the PCB Criteria Committee and examined the appropriateness of the Red Book Criteria for PCB.

In the '80s I was an invited peer reviewer

to the USEPA on their so-called Gold Book of Water Quality Criteria Development Approach, and this is important because this helps establish now the issues of what should be the goal for remediation, to come back to, Madam Chair, your question earlier -- and I'll come back to that -- because it's important to consider what should you be trying to achieve with SS treatment of these sediments.

My findings, the first two are obvious, the Sydney Tar Ponds sediments are polluted with PCBs, PAHs, some heavy metals, and an area that is not addressed in the EIS but could become extremely important is the unrecognized, unregulated chemicals that are present out there in those sediments.

I will come back to that just at the end of my presentation, but it's an area that tends to have real significance here when you're trying to establish the efficacy of SS treatment, realizing that there's a lot of things that came from the sewage that went in there until just about a year ago or so that are out there in those sediments, and some of these, like the -- what I'll call PPDEs, they're out there.

So, we'd better understand how they behave in these processes, because it could make a big difference down the road as to, you know, are you really

effective. You might be effective on PCBs but there's going to be other things there where you could -- may not be effective at all which are significant hazards to public health and the environment. We're just beginning to understand that.

The Tar Ponds sediments are a wet environment, and as you'll see or as you know, they've talked a lot about trying to establish barrier walls of HDPE to try to prevent waters from coming into the sediments that are solidified, to try to capture through a series of trenches and pipes all the water that interacts with the sediments that could have pollutants in it to capture and treat the polluted water.

When I looked to this issue of, well, how are they going to treat -- because I have -- I taught treatment, water and wastewater treatment for 30 years to graduate engineers, it turns out the STPA hasn't defined this.

And I asked, well, have they defined the remediation goals? In other words, what are these? Clearly not. So, I said, well, I don't know how you make a judgment about this kind of a project without that information. That's crucial to trying to establish a good remediation project.

Now, there's no question the water that's

going to come into this system, that it will interact with the sediments and transport pollutants, possibly PCBs, PAHs and other chemicals, to your barriers which are supposed to control release.

But as we're talking about -- as we talk about this, we'll see that the whole barrier concept is a complex water management system that's going to be a nightmare to try to manage that system effectively for as long as the wastes are going to be a threat.

STPA is proposing to use SS treatment as a means to prevent further leaching of pollutants from the Sydney Tar Ponds sediments that could lead to pollution of the estuary. You know, as I look at this and I say, well, here are my conclusions of the potential effectiveness of this approach, it has significant long-term technical problems that the EIS does not discuss.

I find the EIS very deficient in properly complying with the requirements set forth for the EIS of informing the decision-makers and the public about the project and in particular its potential effects. Those are clearly delineated in the presentation by Mr. Swain of the Public Works of Canada where he talked about these issues back on May 3rd, and that's a bottom-line issue here that we need to consider.

As was discussed here, the Tar Ponds

sediments have a high organic content. That makes them unique. I don't know of any place that has the same kind of a mix of organics and the situation that you have out here. So, right off you're up against a situation that there is no other place that's going to be like this.

So, you're really into totally new grounds and so you've got to do very careful evaluations ahead of time to be sure that if you're going to spend $400 million dollars that you fully understand what you're going to get for that money and that it's going to be effective for as long as the residues in the Tar Ponds sediments are a threat.

The STPA claims that there are a number of examples of successful practice of STP -- or solidification/stabilization of high organic waste. Such claims are not -- are without foundation, and for several reasons.

As I've discussed in some detail, unfortunately our field has gotten off in a very bad direction with respect to trying to use TCLP as a proper measure of whether something is leached or not at sufficient concentrations to adversely affect water quality.

That is not a valid basis for doing this. The TCLP test evolved from the work that I did in the

'70s for the Corps of Engineers. That million dollar contract involved looking at what's called there in the dredging field the elutriate test.

The elutriate test is designed to simulate hydraulic dredging of sediments, and we measured the sediment release at 100 sites across the US for 30 parameters, including PCBs, we did major field studies where we took 1,000 samples in a day associated with disposal, like in New York Harbour and Seattle, in other places, and saw what was actually released in the field.

So, this is a massive database and it's served as a basis now for the USEPA and Corps of Engineers' regulatory approach for open water disposal of dredge sediments, and it all came out of my work.

The TCLP test came along, or EPTOX first, the extraction procedure, toxicity test procedure, tried to match the same conditions in terms of liquid/solid ratio and so forth. There's no rationale for doing that. The conditions that exist, the leaching of sediments, are so different, and all -- we know these factors influence the results.

And so when you say, well, we're going to, you know, use a 20 to 1 ratio of solids to liquids, that is fine for hydraulic dredging because that's what they dredge, it's not fine for TCLP.

And as I'll show you, these are not just my views, I've quoted a number of EPA officials on the same issue, that it's not an appropriate test although it's been used by EnviroTech and IT Corporation in their work for the Agency on the evaluation of SS treatment of the Tar Ponds sediments.

The water management system. And I do a lot of landfill work and so I've looked at landfill liners and caps now for many, many years, and where STPA claims that their complex surface water, groundwater and rain water flow management system will not allow waters to enter the SS-treated sediment -- but if it does then they have a problem because they've got an open bottom where you have fractured bedrock feeding up into the sediments, feeding water into part of it, and also letting water out of those sediments to the fractured bedrock which can then pass under the barriers out to the estuary.

That's another issue but that whole issue here is, will this system work? And when you ask, well, can a liner -- and this is an example of HDPE. Now, I don't know what thickness of HDPE they're going to use, they didn't say as far as I could see anywhere in the discussions, that's the Sydney Tar Ponds Agency.

This is a typical thickness that's used in

USA municipal solid waste landfill liners, 60 mil, or 60 thousandths of an inch, and basically you're going to say, well, can this material or material of something about the same thickness prevent water associated with pollutants derived from the Tar Ponds sediments, prevent transport to the estuary, through it, for as long as those wastes are going to be a threat?

And I'm going to come back to that issue, "for as long," because it's -- the STPA has grossly underestimated the period of time that it's going to be a problem.

The key issue is that STPA has failed to acknowledge and prepare for the inevitable failure of the HDPE. It will fail. There is no question about the fact that these vertical walls made from this plastic sheeting will in time fail.

I've cited one example of -- from a Professor Rowe at Queens University in Kingston, Ontario, where he investigated an HDPE lagoon and found that the HDPE in that system failed in about two years to prevent lagoon leachate from passing through it. And it's not a chemical reaction there, this is degradation of the polymer itself.

They can last for hundreds of years, too, but there's no question about the fact that they will

fail at some time in the future. That's not an issue. So, you've got to prepare for that.

Unless you can convincingly demonstrate that these systems -- you know, that the waste out there will not contain -- or the sediments won't contain anything that would pollute during the time that these liners are effective, you have to think about the possibility of failure and how you're going to detect failure.

When you have vertical sheets of this plastic sheeting, as the Tar Ponds Agency proposes, hanging in the -- you know, or suspended in the system, around that system, you're asking, well, how are you going to know when it fails?

You're only going to know it when there's massive pollutant transport. You know, you're not going to know it because you can look at it, because it's buried, and this is one of the real fallacies of this whole issue of can you properly detect failure.

With respect to the cap, Sydney Tar Ponds Agency made the claim that the -- what they call GCL layer, or geosynthetic clay layer, in the cap will be effective to prevent moisture from entering the waste. And I've quoted from some of their statements in the testimony.

That can be true at the time that the GCL layer is laid down, if it's laid down properly. However, this is a very thin clay layer and it's subject to all kinds of problems, and I've discussed these problems here from the literature, not just my work but the work of others, and particularly of concern is the interaction with high calcium like you're going to have around the cement.

The calcium interacts with the sodium in the sodium bentonite, and I assume that that's what they're using because that's typically used. You've got the clay layer in there and calcium substitutes for sodium in the clay lattice. That causes the clay to shrink and crack. It's a well-known phenomenon, it's been known well since the late '80s. It's being ignored, largely because they don't know what to do about it.

You know, we have a requirement in our landfill liners that we have to use a clay liner system and the agencies are allowing the use of GCL, but as you see form the quotes in my notes or the report, there are a number of people now all saying they shouldn't be doing that because it is not a stable system that can be certain of preventing moisture or moisture and pollutants, water, from passing through it.

The other thing about that GCL layer in

the cover is that, how do you determine when it fails? Again, it's buried under several feet of -- there's a topsoil layer and then there's a low-porosity -- I think they describe it as 10 to the minus 6 centimeters per second permeability layer on top of it, and that layer -- then you don't -- you can't visually inspect.

So, you're going to have to do this by either getting larger amounts of water to pass into the waste and then you see that in your collection system, which means that you've got more water in there than you originally projected when you said it wouldn't leak at all.

The key component of this system, I mentioned earlier, that makes this a very difficult system, is the fractured bedrock system.

There's a very nice modelling paper by King and a group of others that talks about the flow out of the fractured bedrock into the Tar Ponds and flow from the Tar Ponds sediments back out to the estuary.

This flow alone could negate all of the barriers that you establish where you could have the down-gradient side, you know, toward the barriers, with the pollutants that are leached going out the bottom of the system into the fractured rock, under the barriers and then eventually surfacing in the estuary and harbour.

So, that's an issue that needs to be considered as a potential significant failure mechanism here.

Madam Chair asked a lot of questions about walk-away, and I remember reading that transcript several times and saying that, you know, what are they going to say about this? Are they going to walk away from this? And STPA staff said, yes, in 25 years you'll be able to walk away from this system, it'll be remediated. They were emphatic on that. I couldn't believe that anybody would say that.

Well, I understand the politics of this, that was set up in the MOA, and that's a thing they have to be able to do. But it's not going to work. The likelihood of the sediments out there being in a condition in 25 years, or even 50 years, so that you could say you could just walk away and only have to do minor monitoring, as they have said, is -- there's no possibility of that. That's just simply wrong.

The planning purposes -- like for a landfill we have a much better liner system than anything they're proposing here -- you'd better plan on an infinite period of time for funding and monitoring, because that's the issues you're going to have to face.

And if you try to go into this and say,

well, we've only got $400 million and we've got to get it all in in 25 years, then we can forget about it, that's just the start of the problems that you're going to have.

The STPA claims that the 25 years -- you will eliminate pollution of the estuary by the Sydney Tar Ponds sediments through the SS treatment and the barrier system. This is not in accord with what I feel, having worked on these kinds of problems now for about 40 years.

The cost of the remediation could be considerably higher than the $400 million when you look at the ad infinitum monitoring and the maintenance that's going to have to be done and the treatment of these wastes and the replacement of the liners.

Ultimately, I'm very concerned about the fact that this SS treatment will be realized somewhere down the road that it didn't achieve the goals. It was cheap -- cheaper, not cheap -- cheaper than what you could do otherwise, but you're going to look back and say, well, we made a mistake in 2006.

And what we've come to is, well, we went ahead, we got stuck into some political decisions about the amount of money available and the time frame it all has to be done, and so we got -- you know, we got some remediation and that's fine, except that you may have to come back and do the remediation again. And that is a

real concern to me as to what the ultimate outcome of all of this will be.

Now, what about this proven technology? This MOA is explicit in that STPA is supposed to select a proven technology that has been successfully -- and this is Swain's words -- successfully employed for projects of a similar size and nature.

Now, that's a good requirement. There is no demonstration like that anywhere, because this is a different system, and you don't have the same kinds of mixes of organics, and particularly the high organics is of real concern here as to whether you can really make this system work.

What we know, and what I personally know, is that it's erroneous to conclude that prior use, which is the basis by which STPA has said what's proven because it's used everywhere -- well, I'm involved and have been involved for -- you know, in Superfund site remediation now, well, since the early '80s.

I know the political processes that frequently occur, especially at industrial sites where there's been a lot of SS treatment, that governs what happens, and it's not necessarily the control of contaminants. It's usually cheaper cost, get something done, get the public off our back, and just go on and do

something else and then let somebody down the road worry about what happens.

The bottom-line issue is that if anybody tries to claim that TCLP is reliable, they should just go back and understand how that test was developed. It was developed for the purpose of classifying garbage and solid waste as to whether you go to a municipal landfill or a hazardous waste landfill. That has nothing to do with the real world that we're concerned about here.

Even wastes that passed the TCLP test, which are classified as municipal solid wastes for hazardous waste classification purposes, still have high concentrations of hazardous substances. They're not classified as hazardous waste because of a definition but they're still hazardous and they can be a threat to health and the environment.

As part of my work I have reviewed the literature out there on these issues. You don't have these two slides in there. I just put them in last night. But I've reviewed two books. ASTM, the American Society for Testing Materials, has published two comprehensive reviews of solidification and stabilization. This is one and here's the second one.

My wife went through these page-by-page to look at what the numerous authors -- these are papers of,

you know, a few pages each -- typically have said about what do we know on solidification and stabilization of organic wastes and the use of TCLP?

And in my report I have quoted -- and been very careful not to quote out of context -- what various authors have said about this issue. And that becomes then the bottom line, is this a proven technology?

And in doing this I'm going to cite just a few here, but the others are in my report. And this is the work of Conner when he looked at this.

> "To date there has been little or no verification of these tests [and these are the leaching tests] to ensure that they accurately predict behaviour of the tested materials in field settings."

So, we just don't have that coupling between any of these tests and what happens in the field.

> "Even though [as it continues] SS has been used for over 30 years..."

In that case the use was in the radiological field for nuclear waste, but we have a lot of experience there.

> "... there's no direct evidence for long-term material durability in the

field. The durability of an SS waste is dependent on how well it endures the long-term exposure to environmental stresses. Where a number of physical tests have been applied to SS waste to determine the durability of the material, these tests are all short term and do not give a full correlation to field performance."

All right. And I've got a couple more here. A paper by Means et all talks about the long-term performance and talks about the fact that the TCLP is not an adequate measure of long-term leaching.

"The monitoring data from field sites are needed to detect premature deterioration of solidification and stabilization, and because of the uncertainties [and this is a key point] surrounding the long-term performance, waste previously treated using SS and disposed of may have to be retrieved and retreated."

This is not just my views, this is -- there's a fair number of people who say we're using it,

it's cheaper than a lot of other things, but it is not necessarily reliable.

Now, the key paper here with respect to work on organic waste, and this is the work of the USEPA staff, Wiles and Barth. I mentioned earlier that I'm on the editorial board of the journal Remediation. Ed Barth is also on that board, so I know him quite well.

Now, Ed Barth and Wiles published a paper in one of these ASTM proceedings where they talked about this whole issue of trying to solidify high organic waste. His one quote:

> "However, results of several studies as well as the data from remediation of several Superfund sites have raised concerns about whether SS is a valid technology for treating organic-bearing waste. Furthermore, studies have provided evidence that tests other than the regulatory test, the TCLP, will be required to evaluate the effectiveness of SS, especially when applied to organics."

These results of Wiles and Barth suggest that any successful durability test or predictive model will have to account for the significant chemical and

structural changes that take place over time in SS-treated waste that influence the leaching.

The durability of SS waste remains unclear, in part due to the relatively short time that these technologies have been used, and the lack of information on the sites where it's used.

That's a real problem with a lot of the SS projects, because, yes, it's used at a lot of industrial sites, but we don't have the information -- and this is just not my assessment, Wiles and Barth say the same thing -- we don't have the information out of those sites as to what really happens over time.

Finally, they talk about:

> "The evaluation of the SS process design, performance and treatment efficiency should be based on a matrix of several testing protocols. No single test, such as TCLP, can provide all the information required to evaluate contaminant release potential, contaminant release flux and physical durability. An appropriate test matrix to evaluate SS processes should include tests that will address these issues."

Now, when I got involved in this about a month ago when the Sierra Club contacted me and I began to read what this is all about, I contacted Ed Barth and said, what's the situation today? You wrote that in -- and these quotes are from the early '90s. Has it changed? And he said emphatically, no, we have not changed, we haven't developed the information now that shows that SS treatment of high organic waste can be effective.

So, although SS treatment of solid waste has been widely applied, largely because it's initially cheaper than removal and treatment of the waste, it is not -- and I emphasize "not" -- a proven technology that has been successfully demonstrated on similar wastes to the Sydney Tar Ponds sediments.

THE CHAIRPERSON: Dr. Lee, just five more minutes.

DR. LEE: Thank you. STPA's proposed approach for SS treatment of the Tar Ponds sediments does not meet -- or fails to meet the MOA requirements for a remediation approach for those sediments. There is no issue here about that situation.

Now, with respect to post-project management, when you look at the MOA you say, what happens in 25 years?

Well, Nova Scotia is going to inherit a legacy of highly polluted sediments out there in the harbour if you proceed with this, or in the estuary as you call it, that have the potential to release pollutants at sufficient concentrations to be a threat to public health and the environment in the estuary. There's no issue about that. It's going to be there.

Nova Scotia will also inherit an elaborate water management system that will require detailed monitoring and management to try to detect and then repair as best they can the components of this system, the HDPE, the GCL layers and so forth.

The inevitable failure of these components of the water management system will require that the -- Nova Scotia will look at this and say, my God, what have we got here? A mess. We're having to spend large amounts of money. We don't know when it's going to leak, and if these things start to leak, we see pollution, we have to go in and dig out these liners and so forth and try to repair them.

They're going to come to the conclusion -- you know, I won't be here to see it, but I'll bet you they do come to the conclusion that we made a mistake in 2006, if we proceed with this approach, and we'll have to re-remediate to stop the further pollution of the

estuary.

I want to touch just briefly in the last couple of minutes on this whole issue of unrecognized pollutants. This is a diagram that was developed by Dr. Thornton of the US EPA who heads up a program now of investigating unrecognized pollutants.

If you understand the water pollution control programs in the US and Canada, you realize that we got misled badly in the '70s with our priority pollutant list. We picked out 120-something chemicals, 127 originally, and said these are the most important and that's the only ones we really look at.

So, when we go analyze a waste and say, well, what's out there, we say, well, we're going to look at 100, maybe 200 if we really, you know -- and that's that little pink area over on the left side, that's all we look for.

We know that there are 22 million chemicals in existence. We've got six million chemicals in commerce in the US and Canada, six million. We're analyzing for and regulate 100 or so.

Now, we are seeing that domestic waste water, such as was dumped into the Tar Ponds here in large amounts until very recently, contains a wide variety of chemicals and some of the group of greatest

concern are what we call the PPCPs, pharmaceuticals and personal care products. These are the drugs that we excrete, we take and then excrete through our urine and faeces, or that we throw down the toilet as a means of disposal.

These are causing sewage plants throughout the country with good treatment to have problems with male fish being converted to female fish in the receiving waters, these are endocrine -- there's no end to this picture of the unrecognized pollutants.

And one of them I'll just briefly mention are the PBDs, polybrominated diphenyl ethers. These are fire retardants, they're used in your mattress, they're used on some clothing, they're used in curtains, they're used in furniture. They are now known to be widespread pollutants like the PCBs, they're everywhere.

And what's come up recently is that in Europe they've been archiving human breast milk over the years where they have been, you know -- and they started -- and they went back and said, PPDEs have been in human breast milk now for 15 years, we didn't know it, we weren't analyzing for them. They are carcinogens, they're like PCBs.

Are they out there in the Tar Ponds? No question, they are out there. They are occurring. We've

done a lot of work in San Francisco Bay, they're in seals, they're in other organisms, they're in fish, and they're starting to be banned so that they stop using them, but they're still in the environment and they're very persistent. And that's just one.

Now, alternative approach -- and I'll finish -- the removal and treatment and management of the Tar Ponds sediments would in the long term be more technically valid and cost-effective in restoring the estuary to a non-polluted or significantly less polluted condition.

The excavation and off-site management of PCB-polluted aquatic sediments has been found recently by the US EPA to be the most technically valid, cost-effective approach for reducing PCB pollution of the Hudson River and Estuary in New York and the upper Fox River in Wisconsin.

And with that I'll stop and I'd be happy to try to answer questions.

--- QUESTIONED BY THE JOINT REVIEW PANEL

THE CHAIRPERSON: Dr. Lee, thank you very much for your presentation. I will start with a couple of questions.

I guess the first one is a little bit of an obvious one. You've presented a critique of the use

of TCPL leachability test. You've indicated you don't believe it's an appropriate test to use to determine the likely success of S/S treatment, and you've quoted -- someone -- sorry -- yes, probably -- saying that -- emphasizing that and saying that what's going to be needed is, I gather, a kind of suite of tests.

And I guess my question is does -- and refers to the phrase of "an appropriate test matrix" -- does such a test matrix exist? Has it been developed? How can solidification and stabilization projects, whether it be this one or any other one, be evaluated?

DR. LEE: I asked Barth that question because he was the one in charge of the EPA Superfund site program to evaluate procedures for S/S -- you know, S/S treatment -- and he said back in the '90s, EPA was in the process of trying to develop a group of tests that never got finished. We got switched off -- he's not in this area -- he's in EPA still, but he's not in this area now. It's not -- such a, you know, cookbook approach doesn't exist.

But now let me address the question you asked earlier about how do you evaluate the efficacy of S/S treatment in this system. All right? That has to be done in terms of controlling the flux of pollutants, certainly PCBs, certainly PAHs, any metals, and PBDEs and

other things as we begin to understand this, so that their concentrations when they leave through the barrier system or through the fractured rock ground water system do not lead to violations of water quality criteria for these chemicals in the estuary, in the surface waters.

Now, you ask, "Well what is the EPA criterion for PCBs?" Well, first of all, in my report, I went into some detail on this. I was involved in reviewing this some years ago. The 2002 number that EPA has established to prevent excessive bio-accumulation of PCBs in edible organisms, which is the primary thrust of why we're concerned about PCBs, is four zeros -- that's 0.00064 micrograms per litre.

Now, in the Earth Tech study -- I looked particularly at the Earth Tech study and said, "Well what was their detection limit when they said that the PCBs met the TCLP test?" Well their detection limit for the analytical methods was either .25 or .05 micrograms per litre. And I think that figures out to be 7,000 times too high.

STPA does not know -- I do not know if the treatment of these sediments with S/S treatment, as they propose, can immobilize PCBs sufficiently so that you do not have, through water transport that will be surrounding the sediments and will bypass the barriers

either under them or through them as they fail and get out of the estuary and cause a problem. We don't know that. What we do know is that there's a potential for it and you better consider it.

So the flux is the bottom line thing and you need to consider that properly as to just what would be the flux. And we don't have that information at this time from this study.

THE CHAIRPERSON: And from what you're saying, you're suggesting that there's no way to determine it other than to put the project in place and then monitor for many many years, and then presumably at some point, you might be able to determine whether the flux is acceptable or not.

Are you saying that there is no way at the front end to ---

DR. LEE: Well, you could ---

THE CHAIRPERSON: --- determine whether that could be achieved?

DR. LEE: We could do a better -- excuse me, Madame Chair. We could do a much better job in evaluating S/S treatment than has been done by IT Corp or Envir -- Earth Tech, I'm sorry -- Earth Tech. They haven't done it correctly. STPA hasn't properly evaluated what you can expect to get, even in short-term

testing of Tar Pond sediments with respect to cement solidification. We don't know.

That we could begin to get a handle on. We could design a series of tests. But from my point -- and remember I mentioned I have a public health background, and there's some what we call precautionary principles that we -- from public health we look to all the time and we ask, "Well how should you proceed?"

In this case, it's pretty clear. Because of the known pollutants and the unrecognized, unmonitored pollutants, you've got to take them out. You know, people are not going to like to hear that. You've got to take them out, treat the residues, and then properly manage the residues in a landfill.

And we know how to design landfills so they'll be protected. I mean, I've discussed this in some detail. You don't do the cheap landfill approach either. But you can do this. Get them out of here, and then you will have solved this problem.

And that applies to the Coke Oven site soils as well. The land farming isn't going to give you a residue there that is not a long-term threat.

THE CHAIRPERSON: My second question is if you can briefly give me some idea of what the U.S. legislative context is, or regulatory context is with

respect to S/S projects, and particularly S/S projects in relationship to PCBs.

And is there a -- I mean, is there a limit on the concentrations of PCBs that can be treated by S/S?

DR. LEE: I know of no limits of that type, and I'd be surprised -- the way we select remediation approaches for particular locations, it's pretty much a local decision. If EPA is involved, it will be through the regional boards or the region -- you know, San Francisco Region where I am, or others -- working with the PRPs, if there are any identified -- that's the principal responsible parties for the site -- and then coming up with an approach that is acceptable.

The public has to be part of this process -- and this is where I come in -- but there's no national standard. We see a lot of S/S treatment because it does in fact provide some remediation. There's no question that in many situations, the flux is less.

The issue that Barth has addressed and what I have addressed is is the flux sufficiently low over the time that the waste will be a threat after treatment to be protective of the environment, or are we simply going to pass that problem on to future generations and have to address it at that time.

THE CHAIRPERSON: Thank you.

DR. LAPIERRE: Thank you very much, Dr. Lee, for your presentation. I would like to ask you one or two questions, please.

The first one relates to leachate and the control of leachate. It's a similar question I asked earlier this evening, if you were here, and it relates to the monolith or the cemented area of the Tar Ponds, which is going to have a very sophisticated drain system, drainage from the bottom, because water is going to be underneath the monolith, and it will drain through the top, tie into a series of drains that would catch the water coming, I would guess, from the top and from the bottom, and that would be canalled through a series -- if I understand correctly what's been presented to us -- to the drainage canal, which is going to be built on design -- all of these pipes would be capped and they would be monitored prior to release.

Now, could you comment on the efficiency of such a system to control leachate?

DR. LEE: Well this is very similar to the kinds of things that I face routinely in reviewing landfill design, because we have the same problem. We've got leachate that's generated because of water interacting with the waste, either hazardous waste or municipal solid waste, and we have leachate collection

systems. All right? That's the same as what they propose.

Now, the problem we have is the problem I discussed, in that if properly constructed -- if -- and that's not a small "if." If properly constructed and inspected, the HDPE, the GLC systems can be effective when they're new. They deteriorate over time. No question about it. And so you eventually wind up then with a system that's prone to failure over time.

And so you're going to wind up then and say, "Well, can it work?" Yes. Could you set up a system where, say, periodically like every 50 years or every 20 years or whatever, you could go in and just automatically do maintenance on these systems, so that you replace the HDPE, and you know, you know, that it's worked for that long, but you don't know how much longer it's going to work before the free radical attack will start to tear apart the polymer.

The system, new, can work. Over time, and especially as you start to get a little bit tired of watching and spending money on things that don't seem to be doing anything, you start to get sloppy in your monitoring and maintenance, and you're going to see then failure. This is a chronic problem in all of our landfill situations, and it's going to be a chronic

problem here.

Could it work? Yes. Will it work? Highly doubtful.

DR. LAPIERRE: Okay. If it was to work, it would have to be backed up by a fairly comprehensive water treatment system.

DR. LEE: Yes. And what -- I mean, if I were going to design this system -- it's like in my design of landfills to try to protect -- you don't use a single HDPE liner. You use a combination of liners with leak protection systems between them, so that you're monitoring not only the water that has passed through the solidified waste that's in front of the barrier, but also between the HD -- first barrier and the second barrier, because if you get pollution between those two barriers in a leak protection system, like we do with a double composite-lined landfill, that's a clear indication that your first liner has failed, and you better go to work and get that prepared.

So it could be done, but not at the kinds of costs you're talking about. You're going to have to pay for it.

DR. LAPIERRE: My second question relates to the permeability of the cap. And let's take the Coke Oven sites.

I think you indicated in your report, if I read it right, that ten to the minus six would be equivalent to letting in a thousand gallons of water a day.

DR. LEE: Per acre.

DR. LAPIERRE: Per acre.

DR. LEE: Or 933 -- what did I figure out -- litres per hectare per day, yeah.

DR. LAPIERRE: Anyhow, I used your rounded-off figure of per thousand.

DR. LEE: Yeah. All right.

DR. LAPIERRE: And the question I have is -- there's two questions. First of all, does that -- in order for that to happen, does it mean that the cap needs to be under water, or will a continuous rain over 24 hours give you that type of penetration? I don't have that knowledge, so I ask that.

And my second question is, this is an area, as you've indicated, which there is no cap at the bottom. So this water then would eventually have to be either captured by a treat-and-pump system or eventually it would filter, if I understood you correctly, in the lower levels, maybe reach the fractured bedrock and move out to either the harbour or some other place.

DR. LEE: Yes. I remember your discussion

of this issue with STPA staff in the transcript.

No question the -- as I said, the geo-synthetic clay layer in the Tar Ponds -- now, in this -- in the Coke Oven site sediments, as I understand it -- and they keep changing what they're proposing, but as I understand it, they're talking about a ten to the minus six centimetre per second cap of one foot or so. A very thin cap.

Well we went through that in California in '84. One foot of clay at ten to the minus six centimetres per second. It's the Darcy's equivalent rate of flow.

We found, by '90, that all of the landfills that they designed with that approach were leaking just like they had no liner at all. And so this thousand gallons per acre per day is based on the fact that you have to have water on top of the cap. It can be a thin film, but there has to be water there to supply that rate, to get that flux.

So it's a potential. If you have a long rainy period, you're going have it, for sure. It's going to go through there.

And it depends on the head. You know, if you know Darcy's Law, you have the -- the thickness of the water depth is important in calculating that. And so

it might be 980 or 1,200 or something, but it's a ball park figure. And that's not my figure. That's Dr. David Daniel, who is at the University of Texas as an expert in these matters. That's from an EPA manual.

So you do have then the potential. I mean, a ten to the minus six permeability is very permeable, I mean, relatively. And so we don't allow that. It's too permeable to be an effective barrier.

DR. LAPIERRE: Could you effectively conduct a pump-and-treat system to relieve or stop the water from permeating through the polluted ground level and reach the bedrock? Could you effectively put a treatment -- pump-and-treatment system in?

DR. LEE: Yeah. Pump and treat in fractured bedrock is pretty questionable if you don't know the flow pattern. If this were a homogeneous sand system, no question -- if it were even a clay system or silt system.

Now, I'm not really clear as to where the till layer is. It's discussed but it's not really laid out very clearly to me. So could you use a pump and treat in the till layer to possibly collect and to really suck up stuff out of the fractured rock, which is polluted now, and to capture anything coming down? Quite possibly, but you'd have to look at that. That's a very

complex hydro-geology situation out there, and it's not adequately defined. But in principle, this approach would work, so long as you don't have to try to pump it out of the fractured rock. You're not going to make that work.

DR. LAPIERRE: No, no, I was talking about the till layer that's going to be below these barriers that are going to be in there to stop the water table from effectively running over it.

DR. LEE: It could work there. You know, it depends on the permeability that you have there in the till layer. I don't think -- I haven't seen those figures. It would take a significant additional hydro-geological investigation out there, way beyond what's been done so far, to see if that's a feasible approach that might work.

DR. LAPIERRE: Okay. Thank you.

MR. CHARLES: Dr. Lee, we were referred by the proponent to a site -- I think it's Columbus, Ohio -- where they had done a look -- an examination of a remediated site some 10 years or nine years after the remediation ---

DR. LEE: I think that's in Georgia, but yes.

MR. CHARLES: --- in Georgia, sorry -- had

taken place. Do you know of any other examples where there have been sort of this long-term looking back to see how the system worked, how stabilization/ solidification worked?

DR. LEE: That is similar to the situation you have out here, no. There could be. There's certainly not very many. I haven't done a detailed review of all of the sites, and as Ed Barth points out, you really don't have the information from most sites as to what's really happening there. And so you -- it's hard to get because these are private sites.

MR. CHARLES: I was sort of following up on that. I noticed that in Wiles and Barth, is it, they conclude that:

> "S&S has not been demonstrated to be effective in preventing mobilization of high organic waste components to the environment."

And I just -- I was wondering what sort of data did they have from the remediated Superfund sites upon which to base that sort of conclusion.

DR. LEE: Yeah. As I recall, they've looked at a number of sites, and laboratory studies specifically.

MR. CHARLES: Sorry ---

DR. LEE: Laboratory studies.

MR. CHARLES: Laboratories.

DR. LEE: Yeah. And I think they're primarily concerned with a mass balance on a solidification process in the laboratory where they see that the low molecular weight volatile organics are lost. And that's what you would expect under these conditions.

MR. CHARLES: Okay. And I guess that was sort of an observation on my part, being a non-scientist. When I read your report and there were references to "the evidence shows" and so on, I asked myself is this evidence from an examination of actual sites or is it evidence that's collected from laboratory experiments.

DR. LEE: Yeah. I do not recall any actual sites. It could be done on an actual site. It's difficult to do because you've got to collect that off-gas.

In a laboratory, it's pretty easy to do, by a mass balance. You look at before and after. In the field, it would be difficult to do. It could be done. I don't know that it's been done. But no question -- I don't think there's any question that it occurs. You're going to have loss of the volatiles out of this system if you add cement to it.

MR. CHARLES: So I understand that, you

know, scientists work with theories and they can hypothesize about what should happen or may happen, but there's a difference between that and actually seeing what happens. Scientists aren't always right, just like lawyers aren't always right. But put that to one side.

I guess I was -- you've given sort of a suggestion that there's not enough evidence to suggest that S&S in the long term is going to be effective, but have you got any evidence to suggest that it isn't effective?

DR. LEE: Well, it's kind of like having spent 40 years looking at this kind of thing and having a very strong chemistry background, coupled with engineering, and I look at this and I said, "If I were responsible for this, I would not proceed that way. It's my own intuition. Don't do it."

MR. CHARLES: Based on experience, though, and a lot of knowledge ---

DR. LEE: Based on experience, right.

MR. CHARLES: The final question. You reference this -- the failure of the liner by the Queen's researcher, who -- and I think you said it was only two and three years old. Would that be considered sort of an exceptional occurrence?

DR. LEE: Yeah. I was ---

MR. CHARLES: I mean, liners last longer than that, don't they, normally?

DR. LEE: I'm sorry I interrupted. I know Dr. Rowe's (sp) work. I was involved in Ontario for a number of years on where do you put Toronto garbage. Do you take it up to Kirkland Lake or not? And I'm responsible for now Toronto hauling it to Michigan unfortunately. But basically ---

MR. CHARLES: I have relatives in Michigan.

DR. LEE: Yeah, well they don't want it either. But I'm also working with the Sierra Club to try to stop Toronto garbage from coming into Michigan. That's another issue, but ---

Basically Dr. Rowe has -- and I was surprised at his findings when I came across that paper. And I know him to be a reputable person. I said, yeah, this is failure in a couple years.

Now, that's conceivable, but that's unusual that in -- you know, and they looked at something -- I think it was 10 to 15 years or so -- that you would have that kind of failure.

But when you're getting near the surface -- and that's one of the issues of concern out here. See, in a landfill liner where you're buried down under

the waste -- and so you have a different kind of an environment that you're going to have out here -- that kind of a system is much more stable. It still deteriorates, but in the surface here, or near surface.

And the problem is what we call free radical attack. There are types of chemicals that interact with this polymer, you know, high-density polyethylene. It breaks this chain. These are well-established processes and they cause the polymer then to disintegrate and it looses its properties with respect to preventing the passage of water through it.

So they talk about, "Well, they might last for a couple hundred years." There's one speculation based on limited laboratory studies that these things will last for a couple hundred years.

Others, there's a series -- and I quote this in -- I have what I called a flawed technology review that I've cited repeatedly in my comments. That review cites the literature. And there's several English studies on "What do you expect out of this stuff as a liner in a landfill?" And they say, "We don't really know. All we know for sure is that this HDPE will disintegrate while the wastes are still a treat in a dry tube type environment." That's for sure.

MR. CHARLES: Thank you, Dr. Lee.

THE CHAIRPERSON: Turning now to the Tar Ponds Agency, Mr. Potter, would you like to ask some questions? Ten minutes.

MR. POTTER: Thank you, Madam Chair. I'll ask Mr. Kenyon to provide a few questions.

--- QUESTIONED BY SYDNEY TAR PONDS AGENCY (MR. JONATHAN KENYON)

MR. KENYON: Thank you, Madam Chair.

Now, I've had the opportunity to review some of Dr. Lee's report and his findings. I understand, from reading through his report, that he has extensive experience in dealing with landfills.

I'm wondering if he could please outline his practical and field experience with solidification and stabilization projects.

DR. LEE: Madam Chair, my primary experience there was in the 80s with what's called the Chemfix process.

Chemfix was a company out of Louisiana that attempted to commercialize using cement, pouring cement to interact with sewage sludge, and then to use this friable material, probably not too different than your shovelable tar pond sediment stuff here that you may get, to use that as a landfill cover for daily waste, and so forth, as a means of disposal of sludge.

In that system, we found -- and I was involved with the company looking at that as part of a university project -- it did not immobilize a lot of the key constituents that were of concern with respect to leaching from the sewage sludge.

MR. KENYON: I understand from listening to Dr. Lee's statements this evening, that the theory that stabilization and solidification isn't going to work for organics really comes from the Wiles and Barth articles or textbook, is that correct?

DR. LEE: Yeah, these are research publications. And it's not just that.

My own chemistry background talks about the issue that -- and other quotes that I have in my report talk about the fact that while, for metals, they can interact with cement, you know, with the structure of cement and get locked in, there is no locking in with respect to organics. They don't fit into that matrix. And so you wind up, then, with something that's kind of loosely absorbed there, and it certainly can be leached.

So you have to be careful about that. It's not a chemical process that's well defined at all, as I cited in several of my quotes.

MR. KENYON: I believe, Madam Chair, that the other authority that Dr. Lee cited this evening, with

respect to stabilization and solidification, was Jesse Connor and Jesse Connor's textbook.

I wonder if Dr. Lee had the opportunity to review -- I know Mr. Connor was unable to provide his presentation himself as a result of illness last week, but it was provided, on his behalf, by Wayne Adaska, and it also did provide many sites where solidification and stabilization has been used, including organics.

I wonder if you had the opportunity to review that presentation.

DR. LEE: Yes, I did read the transcript of that presentation, and I also was sent the PowerPoint slides that they used.

So I had a deep -- you know, I was particularly concerned about the Portland Cement and the Canada Cement Association's presentation as to what they would say, and I came away from that saying they didn't convince me, and I'm sure not very many others who understand the processes, that this has been demonstrated as a process that works for high organic waste.

Ed Barth comments on this, you know -- Connor's stuff was right around 1990, Barth's statement is "It hasn't changed." We still don't know, and there's lots of reasons to question whether it should be used.

MR. KENYON: I wonder if Dr. Lee could

just clarify. My understanding from his statements was that Ed Barth's theory was based on laboratory results, and my understanding from Mr. Connor's presentation was that that was based on solidification and stabilization actual field experience up to 2006. Is that correct?

DR. LEE: I looked at the comments made by the Cement Association representatives in their testimony, and in their PowerPoint slides, and I said, well how did they evaluate the effectiveness, was TCLP.

Clearly, the Florida site that they talked about, TCLP was used. TCLP is not a reliable procedure for making this evaluation. You could fail, or you could pass the TCLP test for -- now, TCLP has no limit on PCBs but it does have on a number of PAHs -- you could pass it and still cause significant pollution because it's a contrived test. It's actually a political test if you understand the origin, where EPA wanted to limit the size of the Superfund -- the hazardous waste stream in the US so that they didn't have to treat everything for hazardous waste and they put a lot of it in municipal waste landfills.

So they were using -- I looked specifically for that, did they do a proper evaluation. No. They used TCLP and that's not a reliable procedure for evaluating how well it works.

MR. KENYON: I wonder if Dr. Lee could comment on the current situation. I wonder if he agrees that right now there are no caps, no walls, no liners, and yet we're not seeing the massive pollutant transport that he predicts would occur if the stabilization and solidification failed.

DR. LEE: Well, you misquoted me with respect to distorting my statements on massive pollutant transport.

My statements were explicit saying that this approach could lead to continued pollution of the estuary with PCBs that would continue to have lobster and other shellfish out there, you know, unedible.

Now, I am familiar with the testimony that was presented here by Fisheries and Oceans, where they talk about since the coke oven and steel mill have shut down the flux out there has decreased, and we do have, then, decreasing concentrations in the sediments, and, apparently, in the edible organisms.

What I'm concerned about is, yes, that will occur over time, and there's no question if you can immobilize, truly immobilize what's coming out of the Tar Ponds sediments. So if they don't continue to be a source, then there will be cleanup, no question, in time. It may be a very long time, but it will come.

But I am concerned about the fact that you may have a continuous flux, low-level flux, which is just enough -- because remember, you're dealing with 4064 micrograms per litre of PCBs. If they get out there, that's enough to cause you problems, and so that's the issue of concern to me.

MR. KENYON: Madam Chair, Dr. Lee, in his written remarks, stated that:

> "Volume 7 of the Environmental Impact Statement failed to evaluate the potential for persistent organic chemicals, such as PCBs, to bio-accumulate through the food web to excessive concentrations in edible organisms of the area."

I'd like to know whether Dr. Lee is aware that the Health Canada guideline value for the protection of humans consuming fish products is 2 mgs per kg, and that JDAC in 2002 measured concentrations of PCBs in fish and crabs living in the Tar Ponds, and the values ranged -- the values that were found were below the Health Canada guidelines for fish consumption.

DR. LEE: I was not aware of the Canadian values. I do know the US values fairly well, and they're very close to what you have said here with respect to

tissue concentrations.

The issue is what's in the estuary. The estuary is now, and the harbour is now, polluted. The organisms are not safe to eat, they're closed to the fisheries. And so could this be a continued source that maintain the low level out there, not up here in the tar pond sediments, that's such an artificial -- out there, where you're really concerned about protecting the aquatic life and people who eat the aquatic life.

MR. KENYON: Why would Dr. Lee imagine that there would be an effect on the harbour if there's no effect on the tar ponds at present?

DR. LEE: Well, you have a different ecosystem. The situation is that you have the accumulation of materials, say in lobster or so, through a food web. You don't have that same food web out here in the tar ponds.

I went down and looked at those today. That's a really -- if there's any food web out there at all, it's pretty meagre. You may have some organisms but it's a totally different system in terms of bio-accumulation potential.

In the estuary, you know, as you get out to the marine part, and then in the harbour, it's different, and that affects how you bio-accumulate.

MR. KENYON: Madam Chair, in Dr. Lee's written submissions, he remarks on page 22 -- I won't take you to -- you don't need to turn to the reference, I will read it for you, if you prefer:

> "The most significant error made by the Sydney Tar Ponds Agency in their EIS evaluation of chemical impacts is their use of the co-occurrence (coincidence approach) for assessing the potential impacts of contaminants associated with aquatic sediments."

Is Dr. Lee aware that this approach, which is derived by Long et al, is the basis of the CCME Sediment Quality Guidelines, and that these guidelines were used by the Sydney Tar Ponds Agency in the EIS?

DR. LEE: Yes, unfortunately -- Madam Chair, unfortunately they were used. They are not reliable. This is an issue that I have addressed now for 30 years with respect to how do you relate total concentrations of chemicals, which the co-occurrence or what we properly call coincidence approach of Long and Morgan and MacDonald is based.

There is no relationship. In my core of engineers' work in the 70s, we looked at this issue, can you use total concentrations of a contaminant to predict

toxicity. We also measured toxicity in sediments. No.

Now, I am heavily involved, as I said, in the State of California current $2.5 million effort to develop sediment quality guidelines, or objectives as we call them, in this State, to determine when a sediment is polluted, and the guidelines are explicit. You can't use co-occurrence.

Unfortunately, MacDonald got into the Environment Agency and convinced them that you guys should use it. There are many Canadians who say you made a serious error, and I hope you abandon it because it's wrong, flat out wrong.

MR. KENYON: So Madam Chair, just so that I'm straight on that, is it the position of the Sierra Club of Canada that the CCME Sediment Quality Guidelines are not valid?

DR. LEE: In this case -- I'm sorry, Madam Chair -- I am not speaking for Sierra Club, but I hope that they would review the extensive publications. I cited the work or the conference that was organized by the CCIW, in Burlington, Chair, on the unreliability of this approach in my report.

There's paper after paper discussing this, it's well known that this is not a reliable approach. You need to use what we call a triad approach where you

use a combination of sediment toxicity and organism assemblage alteration, coupled with an examination of what is the cause of toxicity or altered organism, bent the organism assemblages.

This is the approach that California, after spending now a couple of years and $2.5 million has come to. This is the approach that many of the experts in the field agree is the approach that you should use to regulate contaminated sediment, not the Long and Morgan or MacDonald approach.

THE CHAIRPERSON: Thank you. Mr. Kenyon, that is, I'm afraid -- do you want one more question?

MR. KENYON: One follow-up on the ---

MS. MAY: Does Mr. Kenyon want me to answer on behalf of Sierra Club of Canada, or are we past that point?

MR. KENYON: Well, I'd like to ask my follow-up question, so as long as Ms. May is not going to lose my time, I'd like her to answer that question.

MS. MAY: The CCME guidelines are the ultimate political compromise in setting regulatory standards and negotiating lowest common denominator standards among all the jurisdictions in Canada.

The fact that they are too high for the Sydney Tar Ponds Agency is a continuing concern for us,

but we support Dr. Lee in his comments.

MR. KENYON: My follow-up question, Madam Chair, if I might.

Is Dr. Lee aware that JDAC used the triad approach in 2002 and arrived at site-specific values that were considerably higher than the CCME guidelines?

DR. LEE: I am not aware of the JDAC effort in this regard. I would be interested to see how that was carried out, and whether it was properly done with respect to incorporating chemical information into the triad. That's a key issue that is not often done correctly.

MR. KENYON: Thank you, Madam Chair. I understand Mr. Shosky has two clarifications. I don't know if we have -- I understand we're running late on time, but ---

THE CHAIRPERSON: Mr. Shosky.

MR. SHOSKY: They're very short, thank you.

The first one was a question that was asked by you, Madam Chair. It was concerning flexibility of looking at alternative designs for PCB treatment and disposal, and I'll point you back to the project we talked about a few nights ago in Alaska where we negotiated with Region 10 a final solution for that

particular problem.

Originally, they had a solvent extraction process which we negotiated out of the ROD agreement because of the fact that it was still experimental technology.

We also used the cap and containment system that relied heavily on stabilization because of international transport laws of PCBs out of Alaska. And finally that area was capped and reused as a temporary storage parking.

The second clarification goes to Dr. LaPierre, mostly because it really hasn't been discussed in a lot of detail, but to give him some comfort.

The water treatment system that we're looking at, while it's not totally finalized yet, includes equalization tanks to separate suspended solids, an oil/water separator for floating oils, some biological treatment to remove organics, and clarification for the biosolids. And, in addition to that, we would be looking at running the water through a series of filtrations with filters, microbags and activated carbon prior to discharge.

But, at this point, it is an end to the pipe option, and it's intended to be able to meet the criteria that we set forth in the EIS for discharge.

Thank you.

DR. LEE: If I might comment, there are no criteria for discharge in the EIS. I looked specifically. You're going to meet some criteria that are yet to be defined.

THE CHAIRPERSON: I'd now like to move to providing an opportunity for other people to ask questions, bearing in mind we are running late, I'm sure you'd like to go home, but can I just ask among the registered participants who has a question for Dr. Lee. Ms. Ouellette, Ms. MacLellan, Mr. McMullin.

THE CHAIRPERSON: Ms. Ouellette, could we make this more or less one question each?

MS. OUELLETTE: It's only going to be one question.

--- QUESTIONED BY MS. DEBBIE OUELLETTE:

MS. OUELLETTE: Hi Fred, this is Debbie Ouellette. I just wanted to ask you, I don't know if you have any background on the Coke Ovens Site, but in pictures they use like a plastic barrier, and what they're doing is they're digging out the soil, and putting down this plastic barrier, and then filling it in with rock and new soil, but they're only doing like some of the site, but most of the site, as I can remember, I think there was 200,000 gallons of benzene poured on the

site, just like thrown on the site.

Will that affect the barrier that they're working on now?

DR. LEE: First -- thank you, Madam Chair -- Debbie, I want to thank you for the 50-plus pictures you sent me, so I've got a tremendous wealth of background before I even got here because of your pictures, including the drains.

Yes, you have to be concerned about that system. First, in the deterioration of HTPE that's going to be in there lining the system underneath the rock, second, as I discussed in my report, when you're talking about benzene and low moleculate organics, we have another process that can lead to transport through the safety PE, it's called permeation, and it's been well known since the 80s. I've discussed it in my reports, and it's not just my stuff, there's plenty of literature on this, where benzene/low moleculate can pass through this without holes.

It's a chemical process where you dissolve into the matrix and out the other side within hours. It's a very, very rapid process. And so when you're dealing with low moleculate organics, you'd better be careful because they can go right through this.

MS. OUELLETTE: So actually, they're doing

the work for nothing basically, because that's what they're doing, they're taking out the contaminated soil, replacing it with rock and new plastic barrier, and here, the rest of the site is full of benzene. So they're doing your work for nothing is what I can see.

Thank you very much.

THE CHAIRPERSON: Ms. MacLellan.

--- QUESTIONED BY CAPE BRETON SAVE OUR HEALTH COMMITTEE (MS. MARY-RUTH MACLELLAN)

MS. MacLELLAN: With your permission, Madam Chair, I actually have two questions.

THE CHAIRPERSON: If they can be fairly brief, yeah.

MS. MacLELLAN: My concern first is with the effect of salt water on the barrier, and also salt water on the clay soil. We get very high winds here, and salt water carries in the wind. It doesn't matter how far you're going to put the clay soil, in the appropriate area you're going to get the salt water on the soil. How will that affect it?

DR. LEE: Yeah, Dr. LaPierre asked that question earlier, and I've looked at that. I'm not an expert in that area and, of course, the Cement Association has talked about "Well, the problem with salt water is it's a corrosion of the steel."

I'm not sure that's the only problem, because I have looked, and I've got a number of papers, I didn't put them into my notes, but they talk about the fact if you have cement-based systems around salt water, you'd better use a special coating on that to prevent the salt interactions.

There is a potential for interaction that you've got to be concerned about, and I don't know in this system, but it's one of concern.

MS. MacLELLAN: Well, I'll leave it at that, but the other question is regarding public health, and I think you said you had some experience in public health.

DR. LEE: Yes, I have a Bachelors and a minor Ph.D, yes.

MS. MacLELLAN: In view of the fact that there's all kinds of toxic soups in the Tar Ponds from the mixed chemicals and the synergistic effects, what would you do with the people before any work or any project started?

DR. LEE: I have been writing out, on the plane, on my 13-hour trip here the other day, as to what I would do if I were given the responsibility.

Now, I didn't put it in my notes. In fact, it hasn't been completed yet, but clearly you're

going to have to -- any excavation, movement of those sediments, as Debbie has discussed, has to be done under a dome -- has to be -- where the air is collected and treated to control releases, because there's going to be releases, if nothing else, odours. And odours can be a significant health risk, it's not just a nuisance.

I cite extensive work by physicians on odour impacts on people's health. So you've got to control it so that the people -- first of all, you get them away from this area, and that has to be a pretty long distance. I don't think 300 meters is going to do it ---

MS. MacLELLAN: I don't either.

DR. LEE: --- in terms of spreading materials without a cover over the areas that you're working.

You set a cover in there, and you make them operate it properly, and you've got to have -- in these systems, you've got to have independent third party monitoring. You can't rely on the agencies or industry, or anybody else, who's got a mission to accomplish a project within a certain time in a certain budget.

You've got to get independent review or it won't work. I've just seen too many failures in that respect.

MS. MacLELLAN: Thank you, Madam Chair.

THE CHAIRPERSON: Thank you, Ms. MacLellan. Mr. McMullin.

--- QUESTIONED BY MR. DAN MCMULLIN:

MR. McMULLIN: Good evening. Dr. Lee, thank you very much.

One question of clarification. Over the past two years there's been considerable time and considerable money spent to characterize our site as being one "like many others." In fact, there have been trips made to many areas of Canada and the States to characterize our site, once again, as being "like many others."

During your presentation, you mentioned that the high organic content makes this site rather unique, and perhaps a new ground is being set or should be set with this study.

Can you clarify that, please, are there other sites that come close to this site for the organic content matter here?

DR. LEE: Madam Chair, the issue is not high organic content, per se, you know, and you can characterize it just like TOC, it's the organic matrix that you're dealing with, the tar, the globules, the coke, the coal, all of these issues that were discussed

in the previous presentation here, are all part of making the site unique.

You can't really say that because you remediated some town gas site, and I worked on town gas sites where -- you know, they were discussing here earlier where you have a high organic waste matrix, with some of the same kinds of things. Although it's quite different in some respects, you do -- you have to look at these individually and see if, in fact, there are comparable situations, and there is not.

MR. McMULLIN: Is the presence of human waste, as in sewage, a factor in any other sites that you're aware of in the matrix?

DR. LEE: No, not like this. No. I mean, I'm trying to think, the only other place I see something like this, even though it's not really the same, there was a PCB situation in New Bedford Harbour in the States, where they did some solidification, but they also isolated that material in a much more effective way than we're talking about here.

I don't think there's any sewage -- no, I'm sure that the sewage sludge issue is -- I mean, this is really unusual where, in the 2000s, you've still got raw sewage going into open waters like this, you know, as you did till a year ago. So that sludge is out there,

and that's a real concern.

MR. McMULLIN: Thank you very much.

THE CHAIRPERSON: Thank you, Mr. McMullin.

Is there anybody else who has a question before we close the session? Yes, Mr. Ells.

--- QUESTIONED BY MR. CAMERON ELLS:

MR. ELLS: Thank you, Madam Chair.

Ultimately, Dr. Lee, would -- or Madam Chair, would Dr. Lee agree that ultimately success or failure in what happens at that Tar Ponds Site, if an S/S type approach were happening, would be based on the flux, or the rate that the mass of the compounds of concern, are ultimately transferred into the receiving aquatic habitat?

DR. LEE: That is the issue of concern, will the flux, as I described, after development of this approach, and especially after 25 years, be sufficient to continue to pollute, and by "pollute", impair beneficial uses. That term has very specific meaning, not just that there's some out there, but that there is a continued excessive bio-accumulation in the edible organisms, that's the issue.

MR. ELLS: And would it be fair to say that the variables that influence that flux or mass rate are going to be a combination of the hydraulic

conductivity, the permeability of the material itself, the leachability of the different compounds of concern, that there's a group of different variables that all influence ultimately that flux rate?

DR. LEE: Correct.

MR. ELLS: Thank you.

THE CHAIRPERSON: Thank you, Mr. Ells.

If there's nobody else ---

MR. POTTER: Madam Chair ---

THE CHAIRPERSON: However -- yes, a point of clarification, Mr. Potter?

MR. POTTER: Yes, just very quickly. Dr. Ells referenced the New Bedford, Massachusetts site -- Dr. Lee, sorry.

One benefit of going to these sites and looking is that you do first-hand get to see how they do the remediation there.

They did do solidification using steel sheet piling with armor stone in front of the sheet piling with a cap on top, that would be very similar to what we're talking about for our site.

THE CHAIRPERSON: Thank you, Mr. Potter.

DR. LEE: But the system is quite different with respect to organic content than out here.

THE CHAIRPERSON: Dr. Lee, thank you very

much for your presentation, and thank you for answering questions.

To everybody else, thank you for sticking it out an extra hour this evening, that's a long session. We really appreciate your attendance and attention.

So tomorrow we resume at 1 o'clock with questions to the Sydney Tar Ponds Agency, and then, following that, in the evening, we have two presentations.

So thank you again, and we'll resume tomorrow at 1 o'clock.

(ADJOURNED TO TUESDAY, MAY 16, 2006 AT 1:00 P.M.)

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Lorrie Boylen, CCR

Janine Seymour, CCR

Ruth Bigio, CCR

Gwen Smith-Dockrill, CCR

Monday, May 15, 2006 at Halifax, Nova Scotia