Proceedings of the
International Joint Commission's
1995 Biennial Meeting
on Great Lakes Water Quality

"Our Lakes, Our Health, Our Future"

September 22-25, 1995
Duluth, Minnesota

The following includes proceedings
of all plenary sessions held
at the meeting, and of the
concurrent session on
September 24, 1995 entitled,

"Male Reproductive Health
and Environmental Chemicals
with Estrogen Effects:
Science and Public Policy
Considerations"
The following proceedings include all plenary sessions of the 1995 Biennial Meeting on Great Lakes Water Quality held in Duluth, Minnesota in September, 1995. We apologize for any errors in the spelling of personal names.

OPENING CEREMONIES

SATURDAY, SEPTEMBER 23, 1995
8:30 a.m.-9:15 a.m.

Welcomes from:

Thomas Baldini, U.S. Chair
International Joint Commission

On behalf of the International Joint Commission, once again, good morning and welcome to Duluth. Welcome to the Local Planning Committee who have contributed countless days and hours assisting the IJC in planning and hosting this Eighth Biennial Meeting on the Great Lakes Water Quality Agreement; welcome to the non-governmental organizations and environmental activists; welcome to business and industry; welcome to the media; welcome to our representatives of the Governments of Canada and the United States; welcome to the Native Americans and the First Nation representatives; welcome to the representatives of labor of this country and of Canada; and to the physicians; the scientists; the educators; the researchers; welcome to those who are here on behalf of the Remedial Action Plans around the basin; welcome to the members of the International Joint Commission's Great Lakes Water Quality Board, Science Advisory Board and the Council of Great Lakes Research Managers; welcome to all the students; the children; and all who share in the stewardship of the Great Lakes.

My name is Tom Baldini and I am the U.S. Chair of the International Joint Commission. I am joined today by my colleagues and I would like to introduce them to you. To our new Canadian colleagues, Adèle Hurley, the Chair of the Canadian Section; Pierre Béland, Commissioner from Canada; Frank Murphy, Commissioner, Canada; Alice Chamberlin, Commissioner from the United States. Our six commissioners. Not with us today, as many of you know, Susan Bayh is late in the pregnancy expecting twins, and has been advised not to be here, with the type of schedule this activity has. She regrets not being here. Alice and I spoke with her just yesterday, and she wants to make sure that she sends her greetings. We will see Susan probably in a couple of months.

We applaud the commitment and the diversity that you bring to this meeting and we welcome the advice and counsel that all of you will provide to the International Joint Commission to shape and guide the policies that will determine the future of these Great Lakes. We welcome you all here to the shores of Lake Superior for the Eighth Biennial Meeting of the Great Lakes Water Quality Agreement.

When we started looking at various U.S. sites for this year's meeting, we were struck by several very positive attributes in the Duluth/Superior area. Its beautiful setting on the western shores of
Lake Superior, the unique relationship it has with Superior, Wisconsin, another important Great Lakes state and with Thunder Bay, Ontario, as well as the important role that this region plays as the headwaters of the rest of the Great Lakes system. We are also struck by the warmth and the friendliness of its residents.

Yesterday, more than 450 biennial meeting delegates participated in one of eleven Youth and Community tours, which were organized by the Local Planning Committee. If you participated, you had the opportunity to experience some of that beauty and that warm hospitality. Travelling by bus the delegates visited and talked with citizens of all ages, and learned about some of the activities in the region designed to restore and sustain the health of the Great Lakes.

We are fortunate this morning to have several representatives from this region to bring us greetings and warm welcome. Mayor Gary Doty from Duluth, Mayor Margaret Ciccone from Superior, Mayor David Hamilton from Thunder Bay and Charles William from the Minnesota Pollution Control Agency. Mayor Doty...

**Gary L. Doty, Mayor**
**Duluth, Minnesota**

Good morning, Mayor Ciccone, Mayor Hamilton, Chuck Williams, board members of the IJC and delegates. We are real pleased that you are here and we are proud to be hosting the first binational meeting of the International Joint Commission ever held on Lake Superior. We warmly welcome each and every one of you to Duluth, here at the headwaters of the Great Lakes. I am pretty sure the love we Duluthians have for our Lake Superior, will rub off on you as you spend the next few days here. There is an urgency in the work that will be done and information that we will share over the next two and a half days.

The title of this biennial meeting: "Our Lakes, Our Health, Our Future," speaks to this long-term commitment. The future of our mission here is reflected in the faces of the young people from our two nations who have gathered for this important conference. A youth forum is an essential part of this year's biennial meeting. Young people from Windsor, Ontario; Sault St. Marie; Ashland, Wisconsin; Buffalo, New York and other points around the Great Lakes are here with us to demonstrate their interest in the knowledge of freshwater preservation. We are glad that you are here. These young people will participate in their own forums. They will be involved in leadership training and some will testify at the public hearings on the progress of the Great Lakes Water Quality Agreement. We need to seek out these young voices and listen very carefully. The youth representatives who come to Duluth are headquartered in the Lake Superior Center. This is a unique place that can be a terrific resource if we let our vision of the future soar. Our years of hard work and persistence are paying off, we are about halfway to our goal of raising the funds necessary for building this world-class aquarium on Lake Superior. I invite everyone in attendance at the biennial meeting to visit the Lake Superior Center, talk with the committed young people, camp there this weekend and picture this unique setting as a future centerpiece of freshwater education; help us to realize our goal.
When we in Duluth look to our lake, we look to our future as well as our past. We see reflected in Lake Superior our history, our culture, our livelihood and our health. I would like to take a minute and I think I would be remiss if I did not do this, to talk just for a minute about our city. We are happy that you are here to be able to see what is taking place. Some of you may have been here 15/20 years ago and in coming back now have seen a transformation in our community. We are a community that is growing. There have been thousands of new jobs brought to our community in recent years. We are an educational center, we have a college, the University of Minnesota-Duluth, we have the St. __________, __________ Scholastic; both are nationally recognized college and universities. We have Lake Superior College which is a combination of a community college and a technical college. We have an excellent school system. We are also a regional medical center for four or five different states. And I daresay we can do just about everything in Duluth that can be done down at Rochester Mayo. We have people coming from all over to seek medical help in our community. We are a tourism mecca. We have about 3.5 million visitors a year coming to our community. We have manufacturing, we have tourism, we have retail, we are a retail regional center in the community in Duluth. And things are just really going well and looking good in the city of Duluth. And we are proud of what we have here.

I hope you have an opportunity while you are here, and I understand that some of you have already been able to do that, to see some of our sites. Visit the site to the Lake Superior Center which we are excited about, which is right across the road from where we are at the convention center. If you look out in the parking lot, you will see construction taking place, and probably wondering what the facility is. When it is completed in April, it will be a state-of-the-art OmniMax Theatre, which will be opening in April. In addition to that, we have many, many other things going: the Northshore Scenic Railroad, our William Irving Tour Boat, the Vista Cruiser, our Canal Park, our Lake Walk which is also going to be expanded in the future, and there are so many things going on.

Generally when I go into a group of people, I tell them that with all of these things taking place in our community, that they have my permission to skip some sessions and wander around the city. I am not going to do that this morning, because I recognize how important and how crucial and how critical the subject matter that you are discussing in the next couple of days, is. So I suggest that you stay here, go to the sessions, but come back again when you have time to visit our community. We are very proud of what we have here, we are very happy that you have come. One of the biggest assets we have in our community is our people, and our people welcoming you into the city and treating you as one of our own. For the next couple of days consider yourselves a citizen of Duluth. We are very happy that you are here and very happy that the IJC has decided to come here, and we look forward to future meetings. Thank you very much.

T. Baldini: Thank you Mayor Doty. We have been assisted extensively in the planning and organization of this meeting by citizens from Duluth, Minnesota and Superior, Wisconsin. The local planning committee has put in hundreds of hours to help ensure that our biennial meeting on Great Lakes Water Quality is a success. We are extremely grateful for the effort and for the
assistance provided by both cities. This morning we have here to bring us greeting from
Superior, Mayor Ciccone.

_Margaret Ciccone, Mayor_
_Superior, Wisconsin_

Good morning. Are you all awake yet? Okay, good morning, thank you. What a glorious day
we have today, to invite you and encourage you to come and visit our community. I had the
opportunity to meet many of you yesterday. I went on the one of the tours, the Eco Tour, and we
went through the Superior Municipal Forest, past Murphy Oil, out to Brighton Beach and out to
Hawk's Ridge. Had the opportunity to listen to people who worked to keep those places in their
natural state, or improve their states, so that we could enjoy a better community here at home.
We also had the opportunity last night, I went to the Women's Caucus and met many women
there. They were not only from Canada and the United States, we had someone from Europe
here. And I think that speaks well for this group. It sends a message to the rest of the world that
what we are doing here is extremely important, not just in the Great Lakes region, but through
the whole world. It is important that we start saving our assets — the things that come naturally
to us today — so that tomorrow when our children and our children's children are here, we will
have preserved this bit of space, this air, this water — all the things that we have and take for
granted — for future generations.

I am going to do a little PR for the city of Superior. Mayor Doty offered all the amenities that
Duluth has to offer. And Superior, Wisconsin has things to compliment those. We have the
Superior Municipal Forest, it is 45 square... and I just lost that, but it's big. It is the second
largest municipal forest in the United States, we have a boreal forest which offers a great
diversity of the different kinds of woods, it is also set on wetlands and it runs along the St. Louis
base and I encourage anyone who would like to see that to please come over and visit. And we
also have Wisconsin Point, another area that is completely kept in its natural state. As you go
out Highway 2 over to Wisconsin Point, you will go out, you will not find restrooms, you will
not find homes, you will not find any place to buy a cup of coffee. You will only find the natural
state of Wisconsin Point and the sandy beaches that it offers, opposed to the beautiful north
shore, which has a rocky shore. Also off of Park Point it is sandy beach. I think these are nice
natural phenomena to enjoy in our area. The other areas you can enjoy are our parks.

And please tomorrow evening, come in and join us for a reception in the Whaleback which is
located on Barker's Island. We will be hosting a reception just for everyone to come over, have
an opportunity to get together and network, talk about what has been happening the last couple
of days, and you can tour the Whaleback which was built in the city of Superior. It is a great
opportunity to see what was done with the dredge materials that were taken out of the canal.
They built an island and on that island we have the ship history museum and a motel, and also
some condominiums on the far south end.

We have a beautiful area. This morning as I was driving over the bridge coming over here, the
sun was coming through the clouds, shining on a beautifully mirrored bay, and the geese were
doing an air show. So it was beautiful, it started my day off the right way. And those are the
things that I hope you all have an opportunity to get out and see. And as Gary said, this is a very important meeting, you are going to discuss very important things. But I think it is also important to remember the things that you are here to save. So have a good time. Please feel free to contact me if there is something I can help you with during your conference. Have a wonderful stay and meet lots of friends and enjoy your weekend.

T. Baldini: Thank you, Mayor Ciccone. When we began to look at a site for this meeting, one of the things that we were struck with, is the fact that we have Duluth/Superior — two states — but also the cooperative relationship that Thunder Bay, Ontario has with this area, and this area has with Thunder Bay. We are fortunate this morning to have David Hamilton, the mayor of Thunder Bay with us. David?

David Hamilton, Mayor
Thunder Bay, Ontario

Mayor Doty, Mayor Ciccone, headtable guests, ladies and gentlemen, it is an honour to be here for the International Joint Commission's 1995 Biennial Meeting on Great Lakes Water Quality. We in Thunder Bay, and there are many from Thunder Bay here this morning, we live on the edge of a monumental body of water, and we share Lake Superior with many communities, including the twin port cities: our sister city, Duluth, Minnesota and our long-time friend Superior, Wisconsin. The International Joint Commission Commissioners, scientists, environmentalists and others, who are participating in this biennial meeting assist and encourage those of us who make policy on both sides of the border in our common stewardship of Lake Superior; and that is at the national, provincial, state and in my case and the mayor's case, both here, the municipal level.

In Thunder Bay as in another Great Lakes communities, this has meant a growing awareness over the years of our responsibility to our magnificent lake and the importance of our role as stewards of the Great Lakes system. In Thunder Bay we are undertaking a number of initiatives, including: a major multi-million dollar upgrade of our sewage treatment plant, and a study is underway to develop a pollution prevention and control plan for Thunder Bay; we are also working in conjunction with counties in Minnesota, Wisconsin and the Upper Peninsula of Michigan on a plan to market tourism in the circle route of Lake Superior to European tourists, because our marketing research has shown both in Wisconsin, Michigan, Minnesota and in Ontario that European tourists want to come and see the world's largest water system, of freshwater, but they want to see a freshwater system.

The future health of all of our communities is vitally interlinked with the future health of the entire Great Lakes system. And on behalf of the citizens of Thunder Bay and the citizens of Canada, I would like to thank the International Joint Commission for its important work and I would like to close by thanking again our sister city of Duluth, Minnesota and our friends in Superior, Wisconsin for hosting this biennial meeting. You have made us feel very welcome and I know we will be welcome over the next three days as we listen and learn and work towards a better Great Lakes system. Thank you.
T. Baldini: Thank you, Mayor Hamilton. Many of the local planning committee members work for the next speaker. Commissioner Charles William of Minnesota Pollution Control Agency is here to bring us greetings on behalf of the state of Minnesota.

Charles Williams, Commissioner
Minnesota Pollution Control Agency

I always get to follow a tall speaker. Well, I would like to add my welcome to the Commissioners, good to see the mayors, this is probably my favourite spot in the whole state is the city of Duluth. And I am really pleased that the Commissioners picked Duluth to have this meeting. I think it is historical and I know that it is going to be productive. I am also here speaking to you on behalf of Governor Carlson, my boss, who unfortunately was unable to attend. We worked hard, he had a major scheduled conflict and we worked hard to resolve that and could not, so he sent me instead, and I apologize for that.

One thing I do want to do. There is a member of my staff that has really worked hard on getting this all together, Brian Fredrickson. Brian, I know you are in here someplace, my eyes are getting a little old and cannot see, if you could stand up and wave your arm. But Brian... he is probably out doing the work. And I think as long as I am talking about one member of my staff who is so committed to this process of helping us protect our environment and the quality of life in Minnesota, I have a lot of staff people here today and I am really blessed to be the manager of such a competent and dedicated staff. There are a lot of them around. Please ask them questions. We have a lot of work going on here in the Great Lakes and this part of the state, and others, and I know they would be more than happy to share that with you. And you can get a flavor of their dedication for this effort that we are responsible for in the state.

My fondest memories, I guess, even as a child, I have either been in the lake, on it or around it all of my life. I was born down in Hurley, Wisconsin and my earliest memories as a kid back in the '40s is Saxon Harbor, and Sunday drives with my dad and mom out to Ashland to watch the ore trains push cars out on the docks to load iron ore. And then they exercised a lot of wisdom back in 1950 and they moved to Minnesota, and I admire them for that choice because this is a great state and my governor tells me that I am allowed to be biased to this area. Mayor Doty urged you to take an active part in the community here and see some of our sights. This is a great city. I travel to a lot of cities around the state and this is still my favorite spot, is here in Duluth. It takes only the offer of a cup of coffee for me to jump in my pickup and head north from St. Paul to come up here to Duluth.

Minnesota's environmental leadership, I think is pretty much an established fact, and I am really proud to say that we have really developed some successful partnerships here on Lake Superior. And these partnerships go beyond just our relationship with the people we regulate. They include environmental groups, they do include industry, every level of government including our tribal government. We have some successes in this state and I think that the St. Louis River RAP is certainly one of them. This has involved as a partnership for us over 200 citizens and if you took the tour yesterday, you can see that things are on the move; we are improving the water quality in the St. Louis River and that is a tough challenge. This is a working harbour and we are
proud of that. We have got a lot of work remaining, but I think with the spirit and the involvement of all the interested parties, that is certainly going to be achievable. We are committed as an agency in this state to facilitate that in whatever way we can.

You know, when I talk about being biased to this area, that has a downside, because I use this area a lot to try some ideas out that we had. And one of them, for example was a program that we initiated in 1991 called the Lake Superior Partnership. Basically what this is, is we work with the people that we regulate and do an inspection that is a full compliance inspection, but we do it with all the media — air, water and waste — and the whole thrust of this initiative is to make sure that we take advantage of the pollution prevention opportunities up front. That has been hugely successful. When we ran out of money, the local people took it over and are now running that with our technical help. And we are really appreciative of that spirit. And I want to mention that because that is what this is all about, is this spirit of partnership, that we have to protect this great resource that sits out there.

One of my agency's strategic directions for the future is called Geographic Targeting. And really, it is our way of saying Ecosystem Management. And we think that is the way to do it for the future, because we believe and I think that this is something that folks were interested in the environment early on, is that everything is connected to everything else. Another way of saying it is, "to think and act globally, but to really think about the watershed."

Now when we talk about partnering, I am going to ask you now to help us form another partnership, because there is a serious threat to the water quality, in particular in Lake Superior, but also to the northeastern part of Minnesota. The Department of Defense is currently considering selling on the international market 9-million pounds of elemental mercury. Now let me put this in some relationship for you. All of our municipalities in this state, account for 80 pounds a year of elemental mercury. The world inventory of elemental mercury is 8-million pounds. Now do any of you believe that this is a good idea, what the Department of Defense is considering?... You bet! Do you think we ought not to do anything about it?... That's right.

So we are asking you, I have sent a letter to the Secretary of Defense and to the Administrator of the EPA with very strong comments, and we are asking you to help us with this partnership and start to write to your congressman and to the Secretary of the Defense and to Carol Browner, to stop the consideration of this. We believe that that mercury ought to be permanently withheld from the market and properly stored, because we all know that this is going to wind up in our lake, and in our part of the state. So with that, I want to offer you again, our hospitality. Welcome to Duluth, enjoy the conference and for certain, spend some money in Duluth or Mayor Doty will never forgive me. Thank you.

T. Baldini: Thank you Commissioner Williams. You may have noticed some individuals at this morning wearing yellow ribbons on their name tags, or purple. The individuals with the purple are IJC staff. They have been working extensively long hours. This begins almost a year and a half, we will make a decision probably in April of 1996 for the 1997 biennial meeting. A lot of work goes into it. Those wearing yellow are from the local staff. If you see them, say, "Thank
you" because they have given a great deal of time over and above that which is traditional of their work responsibilities. Finally our opening ceremony would not be complete without a formal welcome from the native community, which plays an important part in this and other Great Lakes regions. The Spirit Mountain Singers are going to provide an opening tribal drum for us.

... Native American Dance
On behalf of the Spirit Mountain Singers, we represent Fond du Lac and the Duluth Native American community here. That was a welcoming song and however, with this next song we are going to do, is an honor song. Some of our songs are sacred to us and this is one of the songs that we are going to be using, and on behalf of the Spirit Mountain Singers, it is an honor and with great pleasure to be here to sing. With the Honor Songs we ask that everybody rise at the beat of the drum and when it is done, you can sit back down. This is our way of honoring the IJC and Moby Dick and Greenpeace, so at the beat of the drum, please rise. Thank you.

T. Baldini: The welcome of the Native Americans, First Nation has become a tradition of the IJC, and it is one of the great traditions that we intend to continue. Thank you very much.
OPENING PLENARY

SATURDAY, SEPTEMBER 23, 1995
9:15 a.m.-9:30 a.m.
Commission Remarks and Introduction of Keynote Panel

Thomas Baldini, U.S. Chair
International Joint Commission

Once again, welcome to the International Joint Commission, the Great Lakes Water Quality Agreement. This is our Eighth Biennial Meeting and our first held here on the shores of this the greatest of the Great Lakes, Superior. It is my privilege this morning to set the context for our meeting and to emphasize the importance of our meetings in our title of this meeting, "Our Lakes, Our Health, Our Future."

These lakes, and this great river are ours; not just to use, but also to protect and preserve. We know that some things that we put into the water and the air harm us and other living things. We also know that what we do to this precious resource today and tomorrow will impact the future. So the theme of our biennial, "Our Lakes, Our Health, Our Future," should remind all of us of the importance of what we do here and the action that we take here, will impact future generations.

In the next few days we will have the opportunity to hear from many of you. Your diversity is great, your experience is immense and we as Commissioners take your input very seriously. We are going to listen to what you have to say and we hope that you will also take advantage of the presentations, workshops and concurrent activities to listen and learn with us, so that we can learn from one another. Getting here for this meeting, many of us had the opportunity to fly over these magnificent lakes or to drive along these shores. Some of us have the good fortune to live along its shores. We chose Lake Superior as our meeting site, partly because in many ways Lake Superior is the crown jewel of the Great Lakes, but also because it is demonstration lake that has been designated by the two governments for particular and special attention.

Lake Superior being the largest and the cleanest, is however, just part of a much larger system. But as vast as these lakes appear to be, and even after we add to these lakes all the other freshwater resources of the world, and the earth, the total supply of freshwater constitutes a tiny fraction of the global water resource. Let me try to help you visualize how rare and precious a commodity this freshwater is to our world. If all the water in the world were placed into a gallon jug, the amount of freshwater would fill a mere tablespoon. Think about that, a mere tablespoon. It is sadly so. A substantial part of that mere tablespoon is now beginning to show signs of contamination.

To protect this precious freshwater resource, Canada and the United States have exhibited a significant amount of foresight. This is not to say that everything that could have been or should have been done, nor is it to suggest that past and present policies and commitments are adequate
to the job of keeping and protecting this precious freshwater resource. But our two countries do have available to them two documents that taken together constitute a level of vision and commitment that no other two nations in the world can claim.

The Boundary Water Treaty of 1909 and the Great Lakes Water Quality Agreement contain the necessary principles and effective programs that have made it possible for our two societies to enjoy the quality of life that clean, abundant freshwater provides us. If we have the determination and the commitment, and the political will to continue to adhere to the principles and programs so wisely articulated in these two documents, we and future generations will continue to prosper and enjoy a clean environment. The Boundary Waters Treaty states that "neither country shall pollute the boundary waters on its other side to the injury or health or property of the other side." This provision has made possible a level of binational work on water quality in places like the Great Lakes that has allowed our two nations to create what is in effect a laboratory for development and implementation of model water quality programs that are the envy of the world.

Likewise the Water Quality Agreement made possible by the existence of the Boundary Waters Treaty has made it possible for a generation of Great Lakes residents and others to craft a vision and develop a set of programs premised on the realization that pollution does not respect international, regional, state, provincial or other human constructs. The Agreement, perhaps the first international document to adopt an ecosystem approach as its over-riding principle, continues to serve as an example of what two countries can do if they are fortunate enough to have the necessary visionaries, the committed civil servants, the political will and the support of citizenry to create a model document that can stand the test of time, that continually serves as a blueprint for setting and staying on a course that makes good environmental and human sense.

Some of you look old enough to remember when Lake Erie was considered a dead lake due to excessive phosphorous and nitrogen inputs that created poor water quality conditions. The turnaround we have seen in that lake, and in others to a lesser extent is truly an international success story, and one the Commission through its early reports and its work under the Agreement have been instrumental in creating. As a personal observation however, I would like to speculate, what would have occurred if we had said the new regulations required to clean up Lake Erie were voluntary. Would I be able to stand here today and point to Lake Erie as a major achievement of political will on the part of two countries? I doubt it.

We must not allow ourselves to go backward. The Boundary Waters Treaty and the Great Lakes Water Quality Agreement are both premised on the need to look at the whole, rather than parts. The Agreement in particular recognizes that societies cannot conveniently separate surface water from groundwater, or Great Lakes basin air from other airsheds. When it comes to the environment, we cannot build convenient walls to keep in those things that we like and keep out those things that we do not care to have. In my judgement, we cannot afford, literally or figuratively, to retreat to the lowest common denominator approach to environmental protection. We should not return to a time when community by community, state by state, or province by province approach to environmental management has had the predictable result that setting one
community against another and encourage states to compromise the health of its environment and its citizens, in the name of economic competition.

Nations, provinces, states or communities acting singularly cannot control their environmental fate in a vacuum. We are going to need more thoughtful international agreements and protocols, not less. We are going to need more initiatives, like the Great Lakes Initiative, not fewer of them. We are going to need more national and international leadership when it comes to coping with environmental deterioration, not less of it. I want to return to and close with some observations about vision, and specifically the vision and the challenge of the Great Lakes Water Quality Agreement.

Without vision, individuals and society would lack the capacity to make today's dreams, tomorrow's realities. The temptation we all experience is that when faced with adversity, our inclination is to reduce the scope of our vision instead of adjusting the ways that we have devised to achieve them, and when we do this, we cheat ourselves and we fall short of what we can be and what we can jointly create.

What are some of the visions offered by this Agreement? Clearly, one is the Agreement purpose, which states that, "The United States and Canada commit themselves to restore and maintain the chemical, physical and biological integrity of the Great Lakes Basin Ecosystem." Please note it does not say, partially restore or significantly maintain the integrity of the ecosystem, because the adding of those kinds of hedge words would make the purpose meaningless, and thus it would lose the very quality that makes it a vision, rather than an empty slogan.

Another Agreement vision is that manmade substances that have the potential to cause death, disease, behavior abnormalities, cancer, genetic mutation, psychological or reproductive malfunctions, or physical deformities in any organism or offspring, or which can become poisonous after concentration in foodchains or in combination with other substances, shall be virtually eliminated from the environment of the Great Lakes basin. This is a vision, and it is hardly a radical one. Who can argue that people that live in the basin should have the right and expectation that they and their children will not be exposed to these kinds of manmade substances?

And a third Agreement vision is the adoption of the philosophy of zero discharge of persistent toxic substances. In relation to zero discharge and the concept of virtual elimination, the Commission has said that zero discharge does not mean less than detectable and it does not mean the use of controls based on best available technology, best management practices or similar means of treatment that continue to allow the release of some residual chemicals. Humans can control what they do, so we say that there should be and there shall be zero discharge, or input, of persistent toxic substances as a result of human activity. Seen in this light, the Commission has concluded that virtual elimination is a necessary and a reasonable goal, and zero discharge or nil human input is not an unreasonable tactic for the achievement of a virtual elimination strategy.
I hope that all of us at this meeting can agree that the next three days will be characterized by a commitment to adhere to the visionary statements of the Boundary Waters Treaty and the Great Lakes Water Quality Agreement. I hope our focus will not be on whether or not there should be virtual elimination or zero discharge, but rather a concerted attempt to answer the questions of when and how do we do it.

On behalf of the Commission I welcome you to our Lakes, Our Health, and Our Future, to the Eighth Biennial Meeting of the International Joint Commission. It is now my pleasure to invite our keynote speakers to join us onstage, and to ask my colleague, Alice Chamberlin to introduce the first of these keynote speakers. Alice?
Good morning. Thank you very much, Tom for your opening remarks. It is a privilege to be here in Duluth with all of you and it is a privilege for me to introduce our first keynote speaker of the Biennial Meeting. When we began to think about this year's biennial meeting and the theme we would like the meeting to have, we wanted to accomplish two things. The first, was to ensure that all of us would have an opportunity to speak to one another and to exchange our thoughts and our ideas. And the second challenge was to make sure that we had available to us, the best information on the health and the future of our lakes. To do that, we have invited three keynote panelists and each of them will give their perspective on the future and the health of the Great Lakes and the St. Lawrence River.

I am pleased to introduce our first speaker, Bob Perciasepe. He is the Assistant Administrator of Water for the United States Environmental Protection Agency. Mr. Perciasepe oversees the nation's Water Quality Management Program, which involves among other things, criteria and standards; permitting and controls on point and nonpoint pollution sources, including sewage treatment; and linking ecosystem management with water quality programs.

Before joining the U.S. EPA, Mr. Perciasepe was Secretary of Maryland's Department of Environment, and has worked as Assistant Director of Planning for Baltimore City, and in various county and regional planning positions in New York. He has a keen awareness of environmental management issues from the community level, to the national level, to the international level.

So, it is my privilege to welcome Bob Perciasepe and we are looking forward to hearing your thoughts on the health and the future of the Great Lakes ecosystem. Thank you.

Bob Perciasepe, Assistant Administrator of Water
United States Environmental Protection Agency

Thank you very much, Commissioners for that very warm welcome, and welcome everyone also to this meeting. It certainly is a privilege and I am somewhat humbled to represent the United States on this opening session. But let me thank you for the opportunity to do this and I hope can help move us forward and offer some challenges that we should discuss and consider over the next several days, and indeed over the next several years.

Believe it or not on a personal note, the first speech I ever made in this position was to this group in Windsor, Canada at the last meeting two years ago. I was literally sworn in the night before that meeting, in what I often call a drive by swear-in when the Administrator of EPA and I met
in a parking lot and she swore me in after the Congress had confirmed me. I am not sure how much I was really focused on the Great Lakes that day, but being in my younger years from the state of New York, and had gone to college in upstate New York, I did have an appreciation for the region.

Much has happened in those last two years, just in my little world which is not all of your worlds, I think have made some progress that we should be proud of at EPA, and we have worked very hard with the states to put out a final Great Lakes Initiative and Water Quality Criteria, that I will say more about shortly, that we hope will help bring together the water quality standards in a uniform way around the Great Lakes region.

I have to say the other thing that is interesting that has happened in the last two years, is that there is a new Congress in the United States that is a challenge for all of us to work with in the environment. I think it is an understatement to say that I have learned a great deal about the Great Lakes region in the past two years. It was mentioned that my previous job in Maryland I worked a great deal on the Chesapeake Bay restoration which is not a binational effort, but a multistate effort on another major ecosystem of great importance to the United States. And I have to state I relied in getting that job done and working on that job and making progress, on the overall commitment of the citizens and the stakeholders as they are called, and the partners, and the regulative community, the local governments, and all those who hold the Chesapeake Bay dear. And if it was not for that, progress could not be made. I have come to know in my short time at the federal government, the deep profound commitment to the international treasure of the Great Lakes this entire community displays. It is moving to me and certainly helps the heart when you are toiling away to make decisions.

The Great Lakes region has been translating the idea of ecosystems management into practice for probably longer than almost anyplace in the world. Clearly beginning in 1978, with the Water Quality Agreement the approaches and the progress and the processes that we have, have been a role model for others, including the place where I used to work, the Chesapeake Bay. Not only has it been a role model, but also some of the roots of our most fundamental environmental laws in the United States are based and have grown out of the Great Lakes basin, whether I have looked at the Clean Water Act in response to water quality issues in the Great Lakes region, whether it be Lake Erie, or rivers in Ohio and different issues related to water quality in the Great Lakes that helped motivate the creation of the Clean Water Act, whether it be a Love Canal in New York that motivated the Superfund Program. These roots are deep in to the Great Lakes basin and have driven a national agenda in ways that sometimes we forget. It has been a driving force toward creating some of these laws and it is the efforts of the citizens in partnership with the business community, environmental organizations, state, tribal, local, provincial, federal governments that have allowed this to continue and resulted in environmental improvements.

But we cannot forget where we were just two decades ago. While we worry about and are concerned about and want to push forward, we have to remember where we came from. Whether you think of where Lake Erie was in terms of eutrophication which has already been mentioned and the recovery that we have made in the last 20 years from nutrient pollution. It is
one of the greatest environmental success stories of the 20th century. The continued public support for these efforts is profound. EPA recently did a public opinion survey in the Great Lakes basin and I quote a few statistics from that: of the 76 million residents in the eight states, 79% say they are personally concerned about environmental conditions of the Great Lakes. Quick math will tell you that translates into 60 million people who are personally interested and concerned about the Great Lakes. And those are just the people who live in the basin. I guarantee if you did this survey outside the basin, there is a national and binational imperative for the Great Lakes as a treasure that is of international proportions. When asked about changes in current environmental and human health protection actions in the Great Lakes, over 80% want to see more done. Less than 2% want to see a decrease in environmental and human health protection efforts. I have to say, this is a message that needs to be continually conveyed to the capitol. This dedication to the resource continues to be translated into action and that is the most important thing. We can all be concerned, we all can be dedicated and committed but it has to be translated into action. And getting people involved is important in getting that action.

EPA has published a final Great Lakes Water Quality Guidance in this year, back in March. That process that we used to develop that Guidance working in partnership with the state governments in the Great Lakes region, interacting with the regulative community, is a model for how to do a broad-scale ecosystem regulatory and partnership program with our coregulators. Providing a consistent level of protection from toxics and other pollution in the Great Lakes for fish, wildlife and most importantly to people. It is an innovative and holistic approach and it looks at and sets goals for both point source programs, nonpoint source programs and is going to be able to provide a framework for us to begin a serious consideration of the outside the basin issues in terms of where pollutants are coming from, entering this great system. And the implementation procedures of this guidance on water quality for the Great Lakes states, is also innovative in that it provides flexibility to be consistent to be equally protective, but flexibility in how the actual implementation measures are put into place.

Again, reflecting on the last 25 years, EPA Administrator Carol Browner in April, which was the 25th anniversary of Earth Day, reflected on how we were doing, and how our nations have created virtually from scratch, the most advanced system of environmental protection in the world. In the course of that relatively short history in human terms, we have made tremendous progress,; and Lake Superior provides some excellent examples of some of the progress we have made. U.S. and Canada have targeted nine pollutants on which to focus their zero discharge efforts. The total end-of-pipe discharges of these nine pollutants from U.S. facilities into Lake Superior are at close or below the nondetect level. Loadings from the major U.S. facilities, if I look at just two of those pollutants, PCBs and mercury, have decreased significantly in the last several years. Around 1991 PCBs and mercury released at a rate of approximately 20 and 13 pounds a year, respectively. These are from the point sources. In 1994, the rates had decreased to nondetect levels for PCBs, and to about five pounds a year for mercury.

Agricultural clean sweeps, conducted by the states and supported by federal funding between 1992 and 1994, have removed nearly 20 thousand pounds of pesticides from the Lake Superior basin. And since the inception of the binational program EPA and the federal government
invested significant amount of funds in Lake Superior basin on pollution prevention, contaminated sediment assessments, habitat protection/restoration, public education and outreach, air and water monitoring. This is in addition to the hundreds of millions of dollars that have gone into infrastructure development, hazardous waste cleanups and the development of the Great Lakes Water Quality Guidance. States, tribes and local units of government, businesses and non-governmental organizations have also spent significant dollars on a similar list of important activities like pollution prevention, technical assistance, air monitoring, solid waste management, contaminated sediment remediation, protection of habitat nonpoint source pollution controls.

Our partnership with Canada has enhanced this entire process. Nowhere else in the world does such a high level of cooperation exist between countries on a shared water. This does not mean we have to do things exactly the same way. What it does mean is that we share the same goals and that we are dedicated to reaching them together. Knowing that the Great Lakes are a model for the world, makes our collaboration even more exciting and challenging. The progress we have made over the last 25 years is due in large part to a firm belief of past Congresses in the United States, of six presidents that government has a responsibility to protect those things which we all share, those things that are held in common trust: the air, the water and the land. In effect, the health of the Great Lakes basin. But if we have had progress and we have made successes along the way, we cannot declare that our responsibility has ended. Our commitment cannot waver, our job is not done.

Here in the Lake Superior basin, the most pristine of our Great Lakes, we continue to face problems. We remain committed first, to the protection of human health, persistent toxic bioaccumulative substances in Lake Superior and all the Great Lakes even at low levels are a poison that attack our people, and even children before they are born. Through fish consumption human health effects range from cancer to more subtle development effects. Addressing all sources of these pollutants is a top priority.

All of the Great Lakes are currently under advisories for fish consumption to limit or not to eat certain species. The total number of fish advisories in the eight Great Lakes states increased in 1993/94 from 709 to over 1000. The majority, and this is a particular challenge, of the loadings of the persistent bioaccumulative toxic pollutants causing these problems are entering Lake Superior basin from atmospheric sources predominantly from sources outside the basin. We must continue to increase our diligence as well on habitat issues, exotic species and natural resource preservation of a broader scale.

Going back to Washington, we are engaged with Congress probably in the most important environmental debate in 25 years. The question really is whether we will renew our responsibility to those things we hold in common — government, industry, all of us — or whether we are going to shirk that responsibility in ways that we will pay for later. There are many who are ignoring the accomplishments and dwelling on the problems, and there are many who belittle the profound commitment of the citizens of both countries for the Great Lakes basin and the health of the environment. After all the progress we have made since the signing of the
Great Lakes Water Quality Agreement in 1972, we cannot go back. We must go forward. What has made our two countries great and has put the Great Lakes region in the leadership position it is, is our willingness to take on tough jobs, to rise to the challenge and to seek new frontiers and ways of solving our problems.

The people of the United States and Canada, the provinces, states, tribes that reside in the Great Lakes basin share a common responsibility: to hold the Great Lakes in trust, for themselves and future generations. But no one agency or government is going to solve this problem by itself. The actions must transcend political, ideological and geographic boundaries. The United States, the states, tribes have achieved much as coregulators and will be relied on to accomplish more. But we talk a lot about governments. Each of you is as important to achieving these goals as any given public official or agency. We need your individual and collective actions to continue to achieve great things. We must continue to push ourselves forward. And in recognition of that I would like to offer some challenges today, both to myself and the Environmental Protection Agency and to all of us.

To the participants of the Lake Superior Binational Program, I would like to see them accept the challenge to take that program to a higher level. We must move from the planning and the program development stage to the action stage, and we must begin to take action. So between now and the next conference we will have actions and solutions to report.

But before I challenge many others, I have to accept some challenges on behalf of EPA myself. Some of these will be simple, some of them will be hard. Certainly I challenge EPA and all the federal agencies to make all the resources available to gather the best possible information on the threats to Lake Superior and all the other Great Lakes and make that information available, in useable formats for the public.

I accept the challenge put forth by President Clinton and Administrator Browner to provide both the regulator community, and the states, and the tribes and local governments who work with us as coregulators, the regulatory flexibility sufficient to explore new and innovative approaches to pollution prevention and control.

I accept the ongoing challenge to move forward on implementation of the Great Lakes Water Quality Initiative. I will facilitate all necessary dialogue among the parties to ensure that this pioneering example of environmental regulation and coregulation and ecosystem protection is completed. I recently assured Governor Carlsen of this state, who has been a staunch supporter of our efforts, that we will address strategies to develop the broader issues of bioaccumulative toxics and chemicals of concern that are outside the control of water programs by themselves, particularly air deposition. We will continue to emphasize pollution prevention and source reduction. We will pay close attention to costs and benefits. Now I hope to fulfill this challenge in as many noncourtroom venues and locales as I possibly can, or should I say, that I am allowed.
I would like to point to one specific example of a project that is well underway related to mercury. A bioaccumulative chemical, I think of great concern to the Great Lakes and as we are coming to know, of the globe. Modelling work again pioneered in Minnesota, EPA and the Great Lakes states and a group of medical care facilities and educators have developed a pollution prevention guide that can be used by medical facilities to eliminate or significantly reduce the use of mercury-containing equipment. Medical waste incinerators are the second largest combustion source of mercury. This project as we move forward, exemplifies the kind of voluntary sector specific source reduction activities that will lead us to virtual elimination.

EPA fully supports the development of a binational strategy for the virtual elimination of persistent toxic and bioaccumulative substance and pledges to work with the Government of Canada to accomplish it. I challenge the regional EPA offices and the states to reinvigorate their multimedia task forces working on actions to develop strategies to deal with the bioaccumulative toxic substances from all sources: air deposition, runoff, contaminated sediments, hazardous waste, spills, wet weather point source discharges. I think I will accept Chuck Williams' challenge to work on the sale or lack there of, of the mercury storage stockpile.

I accept the challenge at the national level to join hands with the air office, the water and air office working together to push forward the recommendations and implement them in the Great Waters report that was prepared looking at air deposition in the Great Lakes basin. This is a landmark document for EPA, a crossmedia cooperation between the air and water programs, looking at the impacts of both on each other. We will work to improve that report and we will publish improvements to that report and we will continue to report on its progress.

I know our Canadian partners who share this most precious resource with us will continue to cooperate, the cooperation that we began formally with the original Boundary Waters Treaty back in 1909, reinforced with the Water Quality Agreement in 1972 and have taken to new heights with the State of the Lakes Ecosystem Conference last year and the development of the proposed binational strategy for the elimination of persistent toxic substances.

I challenge our state partners to hold to their commitments, made on the onset of efforts to develop the Great Lakes Water Quality Initiative and effectively implement the guidance with all due speed.

I challenge both EPA and the states to work together to develop a protection strategy for Lake Superior using existing authorities and programs.

Each state, I challenge to fully engage the public on issues related to the development of an outstanding national resource water designation. I believe if we ask the public, they will want the states to take substantial action in this area.

I challenge our tribal partners to serve as role models for all stakeholders in the basin by continuing to use their traditions of sustainable development.
I challenge the citizens of the Great Lakes basin already knowledgeable and active stewards of the resource to continue, expand your participation in the ecosystem management process, acting on the knowledge you have gained, teaching others what you have learned. And some of that teaching as I have mentioned needs to take place in the Capitols.

I further challenge environmental groups to offer practical and constructive solutions within a viable and sustainable economic context.

I challenge governments at all levels to expand their efforts to make available the raw information necessary for the public we serve to become knowledgeable.

I challenge the media to spend the time to educate the public on environmental issues, to avoid the temptation to sensationalize risks, to avoid the buy-in of the false choice of jobs over the environment. Help people to understand and to participate.

I challenge the academic and research community to continue to provide us with the sound scientific basis we are already using to protect and restore the Great Lakes. We must refine and expand the already sizeable weight-of-evidence that has driven us to the actions we have taken. I challenge the regulative community, the industries and businesses that have made the Great Lakes the focal point of the North American economy, to go beyond the regulatory standards, to act responsibly without the threat of litigation, and to become partners with us, in the restoration and protection of the Great Lakes. Many have made significant commitments in this area and they deserve our recognition and support.

Finally, it is clear that to address the problems of the Great Lakes that are associated with persistent toxics, EPA has to view this problem from a national and global perspective, and we are committed to doing that. We cannot just concentrate solely on sources inside the basin, we must work together with other national programs to assess, and understand and deal with the impacts that it has on this outstading resource.

Finally, again I invite you to join with me in accepting these challenges that I have outlined and together report on progress we have made at the next meeting. Thank you.

Pierre Béland, Commissioner
International Joint Commission

Thank you Mr. Perciasepe and I hope that people in this room and ourselves will be able to respond to those challenges. Allow me to extend a special welcome: (in French). Mr. Perciasepe has given us his insights into our lakes. I think that we can now move to the next theme of this meeting which is, Our Health. And we are honoured to have Dr. Helen Daly to provide her unique perspective on this issue.

Dr. Daly is a distinguished teaching professor at the State University of New York at Oswego and Director of the Center for Neurobehavioral Effects of Environmental Toxins. Those who have been to previous meetings and workshops of the Commission, and I have been to some of them and I remember hearing Dr. Daly talking about her studies on the behavioral effects of
feeding Lake Ontario salmon to laboratory rats. This work has contributed greatly in opening the dialogue on the possible similar effects on human behavior and she has since moved in that direction, having received most recently a research grant from the Great Lakes Protection Fund as part of an extensive study on human health undertaken by the U.S. Agency for Toxic Substances and Disease Registry to determine the behavioral effects of prenatal and adult exposure to toxic chemicals found in Lake Ontario fish. It is this latest research which is helping to confirm earlier studies in this area, and reconfirming the validity of the Great Lakes Water Quality Agreement's goal of zero discharge of persistent toxic substances. So please welcome Dr. Helen Daly.

**Helen Daly**  
*State University of New York, Oswego*

Thank you very much for your kind introduction. It is really an honor to be here today and to talk about the kinds of research projects we have been doing in the lab. There are so many wonderful people here doing so many great things about the Great Lakes. I really do feel it is a big honor.

I have been told that I am going to be cut off in half an hour and I have many hours worth of work to talk about. So I am going to tell you the end and then start at the beginning and then sort of cut me off whenever my time is up, please. I will start by telling you, as you have just been told, that I have been working for a number of years on the behavioral changes in laboratory rats fed Lake Ontario salmon and in human neonates whose mothers have eaten Lake Ontario fish, and that in both species we have found behavioral differences. The doses are low enough so that there are no physical differences, so that even when the cormorants' crossed bills go away, I have a feeling we will still be seeing behavioral differences, because they seem to be far more sensitive then the physical differences.

Now I am a psychologist, and the team of researchers that I work with are also psychologists, and we study behavior. And there are a lot of different behaviors that you and I exhibit, and psychologists have been very good at categorizing all of these behaviors and measuring them. Behavioral toxicologists, of which many are psychologists, are interested in the behavioral changes due to toxic chemicals. And there is a lot of research done on individual toxic chemicals; like lead, like methyl mercury, like alcohol, like caffeine. But what we are interested in, is the behavioral changes following the consumption of a mixture of a large number of toxic chemicals that many of you know much more about, but how much there is in every fish that we eat. And this is what I am going to talk about today.

But as background I would like to start... this first slide, I really do not have to show you because it is of the Great Lakes and all the hotspots and I am sure you are all aware of where they are. The reason I point them out is because we are way over on that end right now, but Oswego is way, as far away as you can possibly get, except for the St. Lawrence... probably you cannot see that tiny dot, well, it is way over in the most right hand yellow dot, is where Oswego is and where I do the research on Lake Ontario. This is what I like to do on Lake Ontario, but there are other people that prefer to fish. And this is what is going on right now in Oswego, we
have wall-to-wall fishermen catching large salmon and trout; our fishing frenzy. I am going to go through these rather quickly because I am sure you have seen these kinds of pictures before.

We have fish cleaning stations, we have large fish, we have children who are fishing... and I find it hard to believe, that he is not going to take that fish home and eat it, despite the kinds of advisories — that you probably cannot see in the back of the room — but basically it says that if you are a woman of childbearing age or a child under 15, you should not eat any of the fish from Lake Ontario.

Now we know that people are eating the fish from Lake Ontario and the other Great Lakes and so we began a four-pronged approach to try to find out if there are behavioral changes following consumption of Lake Ontario fish. We started out with the bottom two boxes, where we fed laboratory rats Lake Ontario salmon. There are huge advantages to this approach because we can use the experimental method. We can randomly take rats from our colony, randomly divide them into separate groups, which means that they are all equivalent to begin with. Then we feed one group Lake Ontario salmon. It is just a 30% diet for 20 days in adulthood. The control rats get Pacific Ocean salmon because that is the only source of clean Pacific salmon that we could find, and Pacific salmon are stocked in Lake Ontario. We also have another control group fed mash. We have never found differences between the groups fed Pacific Ocean salmon and mash. So it is not a salmon diet per se that results in behavioral differences, but it is the toxic chemicals in Lake Ontario salmon.

We have done a lot of research not only in adult rats, and tried to categorize the types of behavioral changes we find, we have also focused on the offspring where the mother rat is either fed during gestation or for 65 days prior to gestation, the 30% diet. And we wait until the rat pups grow up into adults, we test them in adulthood and find large behavioral changes. And I will show you just one example later.

The problem however with the experimental model, even though you have so much control, is that you do not know if you can generalize these results to humans. And therefore we have begun a huge research project using the correlational approach with humans. Here people voluntarily decide if they are going to eat Great Lakes fish. So it could be that there are other potential confounding variables that make them eat the fish. Perhaps they are poor and therefore they eat the fish and it has to do with their poverty, the behavioral changes in their offspring, rather than the consumption of fish. And so I will point out later that we have measured a large number of potential confounding variables, pulled them out statistically, and still found behavioral changes. So that we do believe that it is due to the toxic chemicals in the fish.

If you follow both of these approaches and you get the same kinds of behavioral changes in the animal model and in the human model, then we argue that you can generalize your results from the animals to the humans and that the human data are probably based on cause and effect, and not due to some extraneous variable.
The summary of all of our animal work that we have done is that we are not finding memory differences or learning differences, but that we are finding emotional differences; negative emotions. Let me just ask you quickly, "How many of you find it a positive experience to go up to a candy machine when you are very, very hungry, put your money in and get nothing?" Is that a positive experience? Negative? I assume you think it is a negative experience. It is what psychologists call, "frustration." If you got a mild electric shock from the candy machine, you would probably become fearful of that candy machine. These are the kinds of changes that I find in my rats fed Lake Ontario salmon. They are more fearful, they are more frustrated, but they learn very well. I will not go through all the data that we have collected but you have to eliminate alternative possible explanations and I have published papers that show that my conclusion I believe is correct.

Do just one type of research study. We make white laboratory rats hungry, we have fed them the 20 days, 30% diet, we put them in what is called a runway; the lid is shut of course, when they are put in there. They are put in the bottom part, they are allowed to run down to the end of the alley where there is a nice large food reward, like a nice big chocolate candy bar. And they experience that 72 times, so they always expect a large reward at the end of the runway. In this particular study we then shifted them not to a broken candy machine but to a lousy lifesaver, when you are expecting a big candy bar. And we measured how fast they run from one end to the other end, and the indication of how frustrated they are by the shift from a large to a small reward is indexed by how long it takes them to get the pellet at the end of the runway, and what they do, is they basically do not want to go get that lousy little lifesaver and they run back and forth, and back and forth saying, "I don't want that small reward." Just like you would behave to a candy machine.

This is the only data slide of rats I will show you. We have control groups that always get a small reward, they are the bottom groups that are running at about three seconds to get down the runway. And if you are given a large reward of a candy bar or 15 pellets if you are a rat, then it takes about two seconds to run down; that is significantly faster. But if you are now shifted down to the one small reward, the control group is fed the Ocean or the Mashed — you can see are identical, they are the green and the blue — they show us that they are frustrated by running more slowly. But with repeated experiences with the small reward, they recover and they say, "Okay, I'll go down and I'll get that one pellet."

However, the red dots on the top are the ones fed Lake Ontario Salmon, and you will see that they run much more slowly than the other group shifted. And after 90 experiences with the small reward, way out at 15 days of training, they are still running substantially slower. This is a huge effect; a huge amount of frustration aroused in the rats previously fed Lake Ontario Salmon. We have done this under many different conditions and we have done it in offspring and we get the same results, no matter what we do.

(Note: the remaining portion of Dr. Daly's presentation, and the entire presentation of Clifford Lincoln, Parliamentary Secretary to the Minister of the Environment, was unfortunately not available for transcribing. The following is a press release presented at the meeting by Dr. Daly, which summarizes her findings and...
"On May 29, 1995 Drs. E. Lonky, J. Reihman, T. Darvill and H. Daly of the Department of Psychology at the State University of New York at Oswego and Dr. J. Mather, Sr., of Oswego County OB/GYN PC, presented the initial results of their ongoing longitudinal study at the 38th annual conference of the International Association for Great Lakes Research (IAGLR) held in East Lansing, Michigan. These results reveal behavioral differences in neonates whose mothers had eaten high or low amounts of Lake Ontario fish and those whose mothers had eaten none. Newborns whose mothers had eaten Lake Ontario fish performed more poorly on the reflex, autonomic and habituation subscales on the Neonatal Behavioral Assessment Scale (NBAS). The study is the first large-scale replication and extension of the Jacobsons' Lake Michigan Maternal Infant Cohort Study.

"The fish in Lake Ontario are known to be contaminated with a wide range of persistent toxic chemicals including PCBs, mercury, dioxin, hexachlorobenzene, DDE, mirex, etc. With very little known about the behavioral effects on humans of the combination of chemicals found in Lake Ontario fish, the Oswego Newborn and Infant Development Project was begun to examine the behavioral effects on newborns, infants, and children of maternal consumption of these fish. It is a prospective longitudinal study of children born in Oswego, N.Y. (southeastern end of Lake Ontario) between 1991 and 1994 whose mothers either had or had not eaten fish taken from Lake Ontario. Each mother was given an extensive interview partway through her pregnancy and again shortly after the birth of her baby. The NBAS, which was developed by the noted pediatrician Dr. T. Barry Brazelton, was administered to three groups of newborns: 1) those whose mothers had consumed large amounts of Lake Ontario fish (equivalent to at least 40 lbs. of Lake Ontario salmon during their lifetime); 2) those whose mothers had consumed smaller amounts of Lake Ontario fish; and 3) those whose mothers had consumed no Lake Ontario fish. The test was administered twice, once at 12-24 hours after birth, and once at 25-48 hours after birth.

"Since newborn functioning can be influenced by many factors other than maternal consumption of Lake Ontario fish, data from a large number of such factors (e.g., maternal health, socioeconomic status, educational level, nutritional status, medication or use of substances such as alcohol and tobacco, birth complications, etc.) were obtained during the interviews and their influence on the NBAS scores was removed statistically.

"After controlling for these potentially confounding factors, significant differences were found between the three groups on three subscales of the NBAS; 1) Reflex, which reflects the number of abnormally weak or strong elicited reflexes observed; 2) Autonomic, which includes items assessing physiologic responses to stress (e.g., tremors and startles); and 3) Habituation, which assesses the degree to which an infant decreases his or her reaction to being stimulated while in a light sleep state. Babies whose mothers had eaten large amounts of Lake Ontario fish had a greater number of abnormal reflexes, and scored more poorly on the autonomic scale. There were no differences between the low- and no-fish groups on these two measures. The findings of poorer reflex functioning and greater autonomic immaturity in babies from the high fish group are consistent with the findings of Jacobson et al. (1984).
"As habituation was not analyzed by the Jacobsons, the Oswego study is the first to report an association between this behavioral measure and Great Lakes fish consumption. The assessment of habituation involves presenting a sleeping baby with mildly noxious stimulation (e.g., a bell, a rattle, a light to the eyes). Initially, this causes the baby to startle. With repeated stimulation the intensity of responding should decrease, eventually disappearing altogether. In the Oswego study, babies from the high-fish group showed the lowest degree of habituation, the no-fish babies showed the highest degree of habituation, with the low fish-babies falling in between. These results suggest that babies exposed prenatally to the chemicals found in Lake Ontario fish are more reactive to unpleasant events than non-exposed babies. Daly (1992) found similar results in her work with laboratory rats. Adults rats fed Lake Ontario salmon, and their offspring, were found to be more reactive to fearful events (i.e., mild electric shocks), and to frustrating events (i.e., reductions in an expected large food reward), both considered unpleasant events.

"The authors stress that the significance of the initial findings of the Oswego Newborn and Infant Development project is mitigated by several unknowns at this time. First, while the NBAS has demonstrated utility in studies of high-risk infants, maternal substance abuse, and the use of obstetric medication, evidence of the ability of the NBAS to predict behavior beyond the newborn period in non-at-risk populations is limited. Thus, the authors are at this time not prepared to hypothesize what the long-term significance of these findings might be. Second, while these results clearly link fish consumption to certain behavioral changes in newborns, it is simply not known what the specific nature of its teratogenic influence might be (i.e., which chemical or combination of chemicals are responsible)."
GOVERNMENT PRESENTATIONS

SATURDAY, SEPTEMBER 23
1:00 p.m.-3:00 p.m.

Progress to Accomplish the Goals and Objectives
of the Great Lakes Water Quality Agreement

Adèle Hurley, Canadian Chair
International Joint Commission

Thank you to our three keynote presentors, who have provided a wealth of information and advice for us to consider.

Next on our program are presentations by the two countries who have pledged to restore and protect the Great Lakes via the Agreement — Canada and the United States. Representing the United States government for this part of the program will be Val Adamkus, Administrator of the United States Environmental Protection Agency's Region V office in Chicago. Representing the Government of Canada will be John Mills of Environment Canada.

The Canada-United States Great Lakes Water Quality Agreement is a forward-looking environmental agreement. The government's explicitly stated purpose in the Agreement — to restore and maintain the chemical, physical and biological integrity of the waters of the Great Lakes Basin Ecosystem — marked the first time that two nations explicitly recognized that a comprehensive approach was required to successfully cope with human-made pollution, particularly pollution related to the presence in our environment of persistent toxic substances. What have also made the Agreement noteworthy and have captured the interest of many other nations as they grapple with how to cope with the problems posed to ecosystem and to humans by toxic substances are the Agreement concepts of virtual elimination and zero discharge. The two governments decided in this Agreement to abide by the philosophy of the zero discharge of persistent toxic substances and to virtually eliminate any and all such substances. I know everyone in this room is eager to hear from governments on the progress they have made in relation to zero discharge and the virtual elimination of persistent toxic substances from our shared environment.

The International Joint Commission has spoken, among other things, of the need for a binational toxic management plan; the advisability of ending the production, use and storage of the so-called list of dirty eleven chemicals; the need to adopt a precautionary principle when dealing with persistent toxic substances; the need to apply reverse onus in decisions regarding the licensing of and use of chemicals; and the need to apply the weight of evidence in determining prudent public policy with regard to persistent toxic substances. We are looking forward, as we know you are, to hearing the governments' views on these and other issues pertinent to their Agreement work, so let me now turn this part of the program over to Mr. Val Adamkus of the U.S. EPA and Mr. John Mills of Environment Canada.
Valdas Adamkus, Administrator
U.S. Environmental Protection Agency, Region V

Thank you, Madam Chairman. Commissioners, Ladies and Gentlemen. Nowhere in North America is environmental progress during the past 25 years more evident than here in the Great Lakes region. My career at the EPA Chicago office for all these years has given me a historical perspective that I wish to share with you. I especially aim these remarks at younger people here today, many of whom were not yet born at the time of the environmental challenges which our society faced just a quarter century ago. After my introduction, John Mills will discuss the state of the Great Lakes today and some measures underway to address current problems. After John's presentation, I will return to discuss present and future challenges. Before offering my introductory comments, I wish to mention that Canada and Ontario have provided their first progress report under their 1994 Agreement respecting the Great Lakes. There is a handsome blue and green publication available for the public which reports Canada's progress under the first year of this six-year agenda. The United States has also provided a very comprehensive, informative report to the International Joint Commission, and I invite members of the public to refer to these, both the United States and Canadian reports go into the detail that our oral presentations cannot and I think you may find the available written documentation to be interesting references. If we look back twenty-five years to around 1970, we will find that Lake Erie was choked with algae. The Cuyahoga River flowing through Cleveland caught fire owing to their oil and trash that clogged it. Americans realized that something was terribly wrong when a river could seem to catch on fire. Populations of sport fish around the Great Lakes had been ruined by the sea lamprey. Fisheries were closed in Lake Erie because of mercury contamination. Sport fish abandoned waters like the lower Fox River near Green Bay and the Detroit River. They could not live there. The water was too polluted because companies and cities pumped pollution into our waters. Bird species, including the bald eagle, were in decline owing to hunting and toxic chemicals, especially DDT. Farmers increased their output with pesticides but some chemicals were long lived and killed aquatic life. While the benefits of the chemical age were wonderful there was a dawning realization that there was a price to pay. The infamous Love Canal was lurking silent and still undiscovered beneath the neighborhood near the Niagara River. Atmospheric levels of lead were high since lead was an additive in gasoline. There were more polluting particles in the air we breathe. The stench from smoke stacks in industrial areas could be overpowering. Environmental problems were many and obvious. Government action was imperative to protect human health and dwindling species. Pollution was not something that the marketplace could solve by itself. There was a vital role for government to set rules regulating discharges into the water, emissions into the air and regulating the handling of harmful substances all for reasons of fairness. We had to protect the people and we had to establish a society where firms that respected the environmental good could compete successfully.

Such was the stage, the setting when the Canadian and United States governments got together in 1972 and dedicated their nations to joint protection and restoration of the Great Lakes in their landmark agreement. Since that time, our societies have made terrific progress. Canada and the United States invested billions to improve wastewater treatment in towns and cities. Both nations banned pesticides like DDT and the manufacture of PCBs. Mercury was banned from
pesticides and paint. Lead was virtually removed from gasoline. Two years ago, the United States Superfund Program completed its cleanup of Waukegan Harbor, Illinois. This harbor once received the greatest discharge of PCBs into the Great Lakes. This was an epic milestone in restoring the lakes. Similarly, many waste sites along the U.S. side of the Niagara River have been cleaned up. Even Love Canal has now been partly resettled. Even more important, we closed unsafe dumps and forestalled the creation of future Love Canals. In Canada, already one Area of Concern has been restored - Collingwood Harbour on Lake Huron and improvements in other areas are discernible. In Hamilton Harbour, beaches are open; marshes are being restored and Harbourfront Park has been created on formerly contaminated lands.

These actions, plus many others too numerous to mention, have had measurable payoffs. Today there is much less lead in the atmosphere; smog is down; carbon monoxide is down; our citizens can swim at more beaches without risk of catching diseases from the water; levels of PCBs, dioxins, DDT and certain other pesticides have declined, lowering risks to fishermen; sport fisheries thrive and are worth billions to the regional economy; numbers of pollution-sensitive birds like eagles have steadily increased and this year, two pairs of endangered peregrine falcons nested along the Canadian shore of Lake Ontario. This is the first time in 40 years that these falcons have bred in southern Ontario. Numbers of double-crested cormorants have grown twenty-fold. Nutrient reduction targets for Lake Erie have been met and today the restoration of Lake Erie from chemical pollution is one of the greatest environmental success stories of the twentieth century. Fish have returned to rivers they had abandoned. The Cuyahoga riverfront today is a vibrant example of both environmental economic recovery - a centerpiece for the renewal of the great city of Cleveland. Housing values have soared in restored urban neighborhoods around the Great Lakes. Blighted post-industrial lands have become marinas and river walks. People routinely segregate their trash to recycle paper and bottles and they shop in stores that increasingly offer products with desirable environmental features - paints without lead; batteries without mercury; detergents without phosphorus.

This progress owes much to government leadership which has fostered the growing environmental etiquette across the breadth of our society and much of our progress owes to the innovation and energies of the private sector. Companies have realized that serving the needs of "green" consumers is good business. Large companies, like automakers and smaller ones like dry cleaners and printers, consider pollution prevention to be an essential aspect of their business practice. Today's cars, compared to those of 25 years ago, use only a third as much gas and permit only 10% of the pollution. The civic leadership benefits everyone.

Essential leadership has also been provided by committed citizens and environmental interests groups. People are pitching in to do their share to restore the Great Lakes and keeping informed about the actions of governments and industries. It is both their democratic right and responsibility to hold their elected leaders accountable for protecting them against the injustice of pollution. What I have witnessed during the past quarter century is that both in Canada and in the United States our societies have increasingly adopted sustainable practices. The importance of using resources wisely was woven into the very fabric of our cultural values. This offers great promise for mastering the problems of today and tomorrow. With this background, I would like
to introduce John Mills to share with you information on environmental conditions in the Great Lakes and ongoing actions by our two nations to address them. John.

John Mills
Environment Canada

Thank you, Val. Madam Chair, Commissioners, Ladies and Gentlemen. Mesdames and Messieurs. As you pointed out, Val, we've accomplished a lot in the Great Lakes over the past 25 years. It is my task, now, to give you some sense of what those many accomplishments add up to and what they mean in terms of what really counts - the overall health of the Great Lakes and St. Lawrence ecosystem. My presentation this afternoon is centered on the State of the Lakes Ecosystem Conference known as SOLEC and many of you were participants in that conference last fall. SOLEC is, in fact, a process. One which Canada and the U.S. initiated over two years ago with, I might add, some strong encouragement from the IJC Commissioners. I want to thank the Commissioners for supporting the SOLEC process and for giving governments the opportunity to share the SOLEC findings with you today. Canada and the United States, as partners of the Great Lakes Water Quality Agreement, believe that SOLEC information is important for several reasons. First, SOLEC allows the Great Lakes, in fact, to speak for themselves. Much as a physician uses pulse, blood pressure, weight and other indicators to gauge the human health, the SOLEC team of experts used indicators to determine the health of the Great Lakes. The result is a series of readings - one on the state of the Great Lakes ecosystem. The readings were identified as "poor," "mixed and improving," "mixed or deteriorating," or "and good." I urge you to pick up a copy of the State of the Lakes Report if you've not already done so. Copies are available here and at the meeting. I urge you also to find out for yourself what the patient's life signs are telling us. Is the patient off the critical list but still serious? Can we be hopeful of a full recovery with the proper treatment? Second, SOLEC is important because it examines the patient from a holistic, not just a one dimensional, perspective. SOLEC, in essence, amplifies or reamplifies the ecosystem approach.

Undoubtedly, everybody here today wants to see this magnificent resource, the Great Lakes and St. Lawrence ecosystem, restored and protected but whether representing government, public interest, academia or business, each of us comes to this meeting with his or her own agenda and focus. SOLEC offers us an invaluable comprehensive assessment of what's happening out there in the Great Lakes ecosystem. It allows us to step back and see the patient as a whole. This is important to answering a number of key questions. Are we responding to the most critical problems or are we tailoring our actions to suit just the symptoms? I might note, on a personal and it surprises me as somebody relatively new to the Great Lakes program, I'll give you my very short perception, Val has given you a 25-year perception - I give a 2-year perception - but it surprises me that despite the decades of intense study on programs to respond to a range of problems in the basin, SOLEC represents the first ever attempt to take full stock of the fate - the patient's condition and it couldn't come at a better time. As a manager accountable for a multidisciplinary, multifaceted Great Lakes program, I welcome this big picture. As a government manager facing fiscal pressures, I need this information to ensure that our programs are addressing the right priorities and are, indeed, effective.
Let me now move on to some of the key findings of SOLEC and more importantly, perhaps, I want to share with you some of the conclusions we, in government, are drawing from these findings. The first finding of SOLEC is that habitat health is essential to ecosystem health. That being so, we have cause for grave concern because during the past two centuries approximately 80% of the coastal wetlands have been lost in the lower lakes. In addition, nearshore habitat has been modified. This includes spawning and nursery areas for fish; nesting sites for birds; and hunting and feeding areas for mammals. Losses are still occurring at a non-acceptable rate. This is the problem. On both sides of our border we are working to alleviate it and here are some examples of some recent Canadian progress in this regard. Within the Canadian Great Lakes watershed there are approximately 500 protected areas. These include national and provincial parks, conservation areas and sanctuaries and they cover approximately 730,000 hectares in all. In addition, the St. Lawrence Plan has protected more than 10,000 hectares of habitat since it began in 1988. Ontario has designated three new provincial nature reserves and in a public/private partnership with government the Nature Conservancy of Canada has secured more than 810 hectares of wetlands at eight different sites. Also, in January of '95 Ontario amended its Conservation Lands Act enabling landowners to enter into conservation covenants and easements. A priority has been to increase public awareness of wetlands. Information has been developed; materials have been produced for local projects such as the Ottawa-Oshawa Second Marsh and activities have been organized involving voluntary monitoring of birds and amphibians in the 16 Areas of Concern as well as other priority wetlands.

The United States also has a host of habitat work underway and I'll give you a few examples. A public/private partnership between the Nature Conservancy, U.S. EPA and U.S. Fish and Wildlife Service, state and local governments is identifying high-quality habitat for protection and restoration. Another private/public partnership, a study on the restoration of wetlands on the Bad River Reservations in Wisconsin. In 1994, Wisconsin approved acquisition of five miles of the St. Louis River shoreline. This will protect this highly erosive habitat and protect fish habitat critical for the aquatic ecosystem of western Lake Superior. Another important U.S. activity are public/private partnerships to reclaim brown fields. These are post-industrial lands which sit idle because of environmental liability concerns. Brown field redevelopment seeks to benefit the environment and economies of cities by assessing actual contamination at a site, developing cleanup estimates, and restoring and resolving liability issues while protecting human health.

The second finding of SOLEC is that there has been a catastrophic loss of biodiversity in the Great Lakes ecosystem. This, of course, is closely linked to the habitat loss. In all, 17 fish species are listed as either extinct or not found in their former range or depleted. Of the 20 original stocks of river-spawning lake trout in Lake Superior, all have disappeared. We have seen heavy loss of nesting habitat for bald eagles and osprey but there are also encouraging signs of recovery. For instance, as Val mentioned, the two pairs of peregrine falcons have successfully nested along the Canadian shore of Lake Ontario, both pairs in Areas of Concern located in Hamilton and Toronto. At the local level, wetland restoration efforts will help to bring back plant and animal species. The common tern population has been successful using artificial nesting rafts on Lake Ontario and on that same lake, lake trout has begun to reproduce.
successfully. Measures aimed at restoring habitat contribute significantly to the overall effort to restore biodiversity.

The third finding of SOLEC is that non-native species have greatly upset the ecosystem integrity. Zebra mussels, sea lamprey, purple loosestrife, river ruffe and other invaders compete with native organisms for food and habitat. The results have been the loss of native species and narrowing of genetic diversity within surviving species. The Canadian Coast Guard has been evaluating options for controlling one potential route for the introduction of foreign species, that is ballast water exchange from shipping. In 1989, Canada introduced a voluntary guideline for ocean-going ships entering the lakes. This guideline is similar to the U.S. regulations. Through its monitoring program, the Coast Guard has found virtual full compliance with the guideline and at the same time, together with U.S. authorities, it conducts ongoing ballast water studies to ensure the accuracy of ship reporting and thus, to determine the effectiveness of current requirements. Should there be continuing problems, Canada will consider such options as regulations. Canada's Department of Fisheries and Oceans is continuing its research on non-chemical alternatives to the control of sea lamprey. In addition, the provincial Ministry of Natural Resources has maintained programs to increase awareness and involve the public in slowing the spread of harmful exotics including zebra mussels.

The fourth SOLEC finding is that food-chain dynamics may account for a slowing reduction of certain contaminants in fish and wildlife. In recent years we have seen little or no decrease in PCB and DDT levels in fish even though we know PCBs have declined in the waters of Lake Superior and Lake Michigan. Changes in the feeding patterns of fish, perhaps caused by the spread of zebra mussels, may have caused contaminant levels in fish to remain higher than expected. While research activities attempt to define the nature of biological change and contaminant transfer within the lakes, governments are paying a great deal of attention to other options to deal with critical pollutants. The development of Remedial Action and Lakewide Management Planning Process, together with the results of monitoring programs, are being used to identify problem substances and assess their continued impact on the lake. Most of the contaminants of concern have been known for some time and have already been subjected to controlled actions. More systematic effort to evaluate continuing sources and further intervention options are being pursued in Canada under the Canada/Ontario Agreement and in the U.S. through the Virtual Elimination Project of U.S. EPA. In addition, this past spring U.S. EPA finalized its Great Lakes Water Quality Guidance which establishes water quality criteria tailored to special attributes of the Great Lakes. While this guidance addresses many different pollutants, it gives emphasis to bioaccumulative toxins like mercury, toxaphene and PCBs. This is a landmark approach to protecting a body of water shared by many different jurisdictions.

The fifth SOLEC finding concerns long range atmospheric transport of contaminants. Up to 90% of mercury, DDT and certain other pollutants found in the Great Lakes are carried there through the atmosphere, sometimes from distant sources. Nowhere would this be more evident than in Lake Superior. Efforts are underway to research and monitor atmospheric inputs and impacts. The Canada/U.S. Integrated Atmospheric Deposition Network has provided data on atmospheric loadings to the Great Lakes of eleven organochlorine chemicals, five trace elements
and four polyaromatic hydrocarbons. Canada and the United States are taking the case of atmospheric contamination of the Great Lakes to broader fora such as the European community and the North American Commission on the Environment. In Vancouver last June, Canada hosted an international experts meeting to promote global action on persistent organic pollutants carried from long distances in the atmosphere and presented a case study on the Great Lakes basin. In addition, U.S. EPA and the Great Lakes states are nearing completion of a computer database which provides regional emissions of 49 different contaminants. Ontario and Environment Canada will contribute to this inventory in the future providing a watershed-wide perspective on emissions. When completed, this database known as RAPIDS, will be accessible through InterNet to any interested party. RAPIDS will allow assessment of the impacts of a large number of different sources for many contaminants.

SOLEC's sixth finding concerns new insights into contamination of the Great Lakes, namely that certain chemicals which mimic hormones in fish and wildlife have potential to do the same in humans. This issue is not unique to the Great Lakes but has received substantial attention here due to the research findings on fish and wildlife. Exposure to environmental levels of hormone mimickers in fish and wildlife has been implicated in developmental abnormalities such as demasculization and feminization, decreased fertilization, decreased hatching success, birth deformities, thyroid dysfunction and altered immune systems. These studies suggest a fundamental developmental effect in which the endocrine system is affected. Because of the effects seen in fish and wildlife, concerns have been expressed that similar effects may occur in humans. Breast cancer, male fertility, testicular cancer, prostate cancer and thyroid cancer are problems that may be associated with hormone mimicry. Major studies have been concluded or are underway to find answers to some of these pressing concerns in humans and you heard about one of those this morning. Studies are also underway to develop screen measures to identify hormone-mimicry potentials of environmental chemicals. However, a more focused international research effort is required to unravel the complex, biological processes involved. The U.S. EPA has held two workshops with international representation to develop input into its research program. As well, the IJC's Science Advisory Board in its report for this meeting, has identified some significant areas for research on hormone mimicry.

SOLEC's seventh finding concerns human health effects unrelated to hormone mimicry. To put this issue into perspective, contaminant levels in the general population in the Great Lakes are similar to levels found in residents in other industrialized areas of Canada and the U.S. What's more, since early pioneer days, better sanitation, better medical care and better food have brought dramatic improvements to human health. In Canada, COA calls for reducing the risk of exposure to environmental contaminants through education and enhanced public understanding and action to protect personal health. To meet this target we are currently working with six high-risk groups - for example, sports fishermen, hunters, and women of childbearing age — to reduce their risk of exposure to contaminants. We also have launched a multimedia educational campaign to inform the general population within the basin of ways to reduce personal risk through stewardship activities. We have concluded several studies to determine adverse affects from exposure of the fetus to chemicals and from exposure of sensitive individuals to polluted air in major cities. While we have done much and learned a lot we still have many unanswered
questions. We need to continue to work with populations at risk to reduce their exposure to these contaminants and we need to continue trying to better understand these issues and the links between chemical contaminants and human health.

SOLEC's eighth finding is that phosphorus control strategies has worked but it is now being questioned as exotic species upset the ecosystem. Back in the '70s, the problem was heavy phosphorus loading in the lakes, especially Erie. We adopted rigorous measures to control phosphorus loadings and they paid off. Phosphorus concentrations are now at or near target levels. Some localized problems continue to exist and these are being addressed through remedial actions but now we have a different problem - zebra mussels. In recent years, these have spread in staggering numbers throughout the basin and in Lake Erie they have seriously depleted the algae food supply for fish. Now some are suggesting that we redress the balance by actually adding phosphorus to the lake. The idea is that more phosphorus will result in more algae to feed more fish. The implications of such an approach are at a very preliminary stage of debate.

The ninth SOLEC finding highlights the importance of integrated social and economic factors into assessment of the Great Lakes health. The conference integrated these factors with consideration of traditional natural science because it recognized the need to understand their impacts. SOLEC also recognized that a strong economy provides resources both human and financial for protecting and restoring the environment. Potential environmental benefits of restoring five remedial action plan sites are being presented at a workshop at this meeting. Since their inception in 1987, Remedial Action Plans on both sides of the Canada-U.S. border have been keyed to organizing and integrating cleanup activities. The five reports demonstrate that watershed cleanup is not simply a matter of paying for the mistakes of previous problems, it is a sound investment that pays real monetary returns almost immediately and continues to pay dividends over the long term. This morning you heard Mr. Lincoln make that point very poignantly. I've only briefly touched on these key findings of SOLEC. Again, I invite you all to peruse the report in greater detail and draw your own conclusions as to what these findings should mean for the Great Lakes program and what they say about our progress to date. I do, however, want to share with you some governments' conclusions.

Without doubt, SOLEC findings are telling us we need to maintain our efforts to deal with toxic pollutants. The link to human health is being made. Evidence is mounting of hormone disruptions in aquatic organisms. As a result, finalizing a binational virtual elimination strategy remains a priority for both governments. You heard this morning — both Clifford Lincoln and Bob Perciasape — that this strategy is supported at the highest levels in both governments. The strategy provides a systematic and strategic framework in which both governments can work together. It concentrates on finishing the job on those substances identified as being the greatest concern in the basin. The strategy also sets the stage for our addressing another SOLEC finding - the need to look to pollution sources outside the basin. Here we face a new set of challenges. We must set our goals and objectives for the Great Lakes basin against a number of social and economic pressures in other regions, countries and other continents. The fact that Canada and the U.S. will work together in these other fora strengthens our common position.
SOLEC also sent us a strong signal that we need to pay attention to biodiversity issues. In fact, SOLEC concludes that overall habitat destruction, invasion of exotics, and loss of native species have all put far greater stress on the health of the Great Lakes fish and wildlife than has toxic pollution. Governments as well as other Great Lakes interests must work to undo this damage. We might consider extending existing strategies, whether local, lake-specific, or within one jurisdiction, for restoring and protecting the region's rich biodiversity to a basinwide binational approach. We must do a better job of identifying and understanding those social and economic trends that are affecting the health of the ecosystem. We must be able to make the connection between the impacts of all human activity in the basin from urban development to farming and the sensitivities and limitations seen in the lakes if we are to achieve sustainable development in the basin.

Overall our programs are trying to respond to many symptoms of ecosystem health that SOLEC has pointed out to us. I'm also interested in those management challenges which the SOLEC process has also identified. Few are new to us but we accept that they all must be met if we are to succeed and move forward. We have made great strides in improving information management systems. Some 70,000 inquiries a month are now being made through the Great Lakes Commission's Great Lakes Information Network. Similar success stories are available on the Canadian node in the network. Quick and easy access to relevant, up-to-date, comprehensive information is, in my view, imperative if we are to be successful in managing a large, complex ecosystem. It is also key if we are to make integrated decisions in a multidisciplinary, multistakeholder fora as the ecosystem approach demands. Governments, for one, must break out of the linear agent compartments and seek new institutional arrangements for making decisions; not an easy task for a bureaucratic culture. For Canada, we are taking steps in that direction. Under the Canada/Ontario Agreement we created a senior management committee that oversees a wide range of work being done by seven federal departments and four provincial ministries to deliver on the fifty+ specific results to the year 2000. We are exploring the use of an integrated information management tool which could link all managers involved in the COA activity. I invite you to visit the information technology room here at the IJC meeting and find out more about our COA tool and other information management tools available to the Great Lakes interests around the basin.

There is one specific management challenge that governments currently face which SOLEC did not identify. This morning you heard from both Mr. Lincoln and Mr. Perciasepe on this one - the ongoing fiscal and political realities which challenge us to focus our reference. At the same time, I am confident it will force us to seek innovative solutions and effective partnerships. That, in itself, is not a bad thing. More and more we face problems in the basin that call for innovation. More and more we are dealing with issues that call for the response of society as a whole where governments, business, communities, and individual citizens must be involved. I have tried, this afternoon, to give you a good sense of what SOLEC has told us about the state of the Great Lakes ecosystem and how we, in governments, may be using that information to assess the effectiveness of our efforts and to design our way forward. We believe that SOLEC is intrinsically linked to the IJC biennial process for reviewing and evaluating programs and process under the Great Lakes Water Quality Agreement. We believe SOLEC complements the
IJC process by providing scientifically credible and comprehensive information as context for discussion and debate which takes place at these biennial meetings. The first SOLEC was not perfect. Many or some may argue with the ecosystem health indicators used or the assessments made. Some may argue that the process was not inclusive enough. Let me assure you that SOLEC will get better and that its effectiveness at diagnosing the state of the lakes will improve as we refine our tools and our processes. Canada and the United States are committed to the SOLEC process. Work is already underway for next year’s conference and a second integration of information on the state of the lakes. We will focus, this next year, at the next session, on nearshore issues. I invite you all to use the SOLEC findings to rate how well we are all doing - as a society and as one community with shared interest in carrying out our collective stewardship for this invaluable resource. I invite you all to participate also in the next round. I will now turn it back to Val to summarize.

V. Adamkus: Ladies and Gentlemen. While great progress has been made the job is, by no means, complete. Some old problems and nagging new ones are emerging. In my closing remarks, I would like to talk about future challenges and both government and citizens actions needed to address these challenges. The environmental issues first identified and confronted in the Great Lakes region have often been a harbinger of issues needing to be addressed elsewhere in North America and around the world. As both John and I have noted, pollution caused by excessive nutrients has largely been brought under control in the open waters of the Great Lakes and the input of toxic chemicals has been sharply reduced. However, some of the challenges confronting us are: 30,000,000 U.S. citizens get their drinking water from systems that have violated public health standards during the past year. In Milwaukee, hundreds of thousands fell ill from water drawn from Lake Michigan. One hundred people died from complications resulting from exposure to a microorganism. Too many beaches are still too often closed because of release of untreated sewage. Aquatic species are disappearing at alarming rates here in North America. Loss of biodiversity is not merely a remote problem of the Amazon rain forest. A recent survey found 131 globally rare, endangered, or threatened plant or animal species here in the Great Lakes. These are valuable resources threatened by human alterations of physical habitats as well as streams, rivers and shoreline areas and by their continued pervasive introduction of exotic species into the basin. There are many hundreds of fish consumption advisories in effect across the United States. Clearly, contamination of fish with bioaccumulative toxics is not just a Great Lakes focus and issue but it is a national and global issue. The most frequent grounds for these advisories is mercury which, like lead, impairs learning skills. Thirty-seven states have issued advisories for mercury. Saltwater fish are burdened as well. The U.S. Food and Drug Administration has issued nationwide advisories to women of child-bearing age to limit their consumption of sport fish and shark to one meal per month. If the FDA used the lower, risk-based action levels of many state health agencies, it would issue advisories for still more ocean species. As John already mentioned, there are emerging concerns about noncancer effects of chemicals. We must consider these kinds of effects in our policymaking. There is emerging evidence that contamination resembling a cancelled pesticide, toxaphene, is too high right here in Lake Superior. The surprising finding is revealed by a new scientific and sensitive analytic technique. The Canadian and U.S. governments have agreed to work together to find the source of this contamination and if
toxaphene-like contamination has origins within the Lake Superior watershed we will work together to ensure that significant sources are eliminated where possible.

Also many current problems are subtle. They are not less important and solutions will often be more complicated. The Great Lakes Water Quality Agreement and the actions underway in the Great Lakes basin have again proven to be ahead of their times. Where the traditional approach to governmental regulations, even though it resulted in many successes, spawned rules for an agency to follow, ecosystem protection, restoration, and management must be dedicated to strategically respond to the best information and the needs of the resource in applying the full range of our management approaches including both voluntary actions to incentive-based regulations to address the critical problems of the lakes. The ecosystem approach requires coordinated, integrated actions by the federal, state, tribal, and local agencies; within government and private enterprises; and most importantly between government and the people for whom services are being offered and provided. Success will be achieved only with greater teamwork and by fostering an atmosphere of cooperation and positive action among all interests as we strive to harmonize our environmental protection and economic development goals for this region.

Our approach in the Great Lakes, the proving ground for ecosystem management, has been to utilize a "nested" approach, building upwards and outwards from the local communities in the Area of Concern to addressing the lakewide concerns through lake management planning and implementation and finally to strengthening partnership at a basinwide and international levels through joint actions such as the Binational Strategy for Virtual Elimination discussed here today by John too. There are no simple answers. I believe we must work effectively at each of these levels and we must continue to be leaders in the international community to achieve our environmental and economic goals. We have been pushing the envelope here in the Great Lakes with this approach to ecosystem management and we have enjoyed success so far. Resilient as the earth has been, human stresses upon it are increasing in keeping with world population growth. Yes, I am an optimist. That is what I wish to impart to younger people here today; you who are tomorrow's leaders. Many nations look to Canadian-United States shared stewardship of the Great Lakes for inspiration regarding protection of their own living resources. What we do here matters; not only here but well beyond the shores of the Great Lakes. By acting locally, we inspire global thinking. Challenges must be met for ourselves; for our posterity; for the sake of other living things. Based on our past record of successes here in the Great Lakes, I have surpassing confidence in the commitment and genius of two great nations to prevail over the environmental challenges to come. Thank you very much.

A. Hurley: Thank you, Mr. Adamkus and Mr. Mills. We have some time left for questions from the audience. Again, if you could please use the microphones in the center aisles and state your name and affiliation before asking your question.

Ann Mahan: My name is Ann Mahan and I'm speaking as a citizen. You talked about habitat health being essential to the ecosystem and biodiversity and the stress that it puts on an ecosystem when habitat loss occurs - just in travelling up here, we've been hearing reports that
Congress is in the process of trying to get rid of a number of our national lakeshores and I don't know all the details about this and I know you can't speak for Congress but what I'm wondering is, has the EPA put a strong objection to this because talk about a habitat loss, this is unconscionable.

John Mills: Maybe I could just interrupt for one moment - we do have a number of programs experts here to be able to respond probably more effectively to some of the questions and maybe I could ask them to join us now here on the stage and they can respond to some of the more detailed questions and then we can respond to our, Val, maybe will respond to your specific question. Maybe I could ask you to just repeat your question one more time now that everybody has forgotten it.

A. Mahan: The question is, in your presentation you talked about habitat loss being a real stress to the ecosystem and in travelling up here we've been hearing reports that Congress is in the process of trying to get rid of our national lakeshores and I don't know all the details but that kind of habitat loss is unconscionable and I'd like to know...you can't speak for Congress I imagine but are there branches of the government such as EPA who are objecting to this strongly? Is anything going to be able to stop this?

Chris Grundler: My name is Chris Grundler from the EPA. We've been hearing and reading those same reports and the Secretary of Interior, Bruce Babbitt, has been very outspoken about turning over our natural, national heritage and privatizing those lands and has been vigorously opposing those efforts and I'm sure our administrator would join him in that.

John Mahan: I'm the other half, my name is John Mahan from Gaylord. Some comments you made using the analogy of the Great Lakes ecosystem as an ailing patient hit me-just really hit my consciousness when you used that-I spent over ten years as a family practice clinician and spent some of that time in emergency rooms, some of that time I saw patients that were the result of poisonings. Now, I'd like to use that analogy to point out why some of us in the public have a real problem with evaluating the seriousness of government commitment to zero discharge. In spite of the commitments and treaties, I never once saw a family bring a loved one in that was poisoned; the doctors spent an inordinately long time agreeing that it was a poisoning and then telling them, "We figured out how to reduce the poisoning by...pick a figure 60%, 85% whatever, but the remainder is going to be a little expensive. It's not very politically popular and we have some interest groups that are going to really hammer us for it" and the person says, "Well, can you tell me - you are committed to eventually stopping the poisoning?" "Oh, yes, we are." "When?" And the doctor refuses to give you a date. It is time for the governments to walk their talk. You have made a very good commitment to using Lake Superior as a demonstration zone as challenged by the IJC whereby no persistent toxics, as point sources, will be allowed but it's my understanding that both governments have steadfastly refused to come up with any date. I suggest to you that a commitment to zero discharge without a date is not truly a commitment. Can you tell us not the date right now, I understand that; I know people will have different ideas about dates, will we be hearing a date by which the governments expect to meet their commitment at any time in the future? And if not, why not?
V. Adamkus: I will try to respond without a definite commitment because I don't have any authority to give you the dates.

J. Mahan: I understand that.

V. Adamkus: ...and I wholeheartedly support what you say. I believe that Lake Superior is the place where we could probably try to implement - that's what you and I and others are trying to achieve in many, many years. You know and I know a lot of difficulties we are running into with the bureaucracies but at the same time I would say that we have made tremendous progress; already moving to the target date and at this point I would like to say that we are going to continue working so that maybe during the next meeting we could sit here and tell you by such-and-such date we are going probably achieve what we are all waiting probably for the last 25 years.

J. Mills: The only thing that I could add, I guess from a Canadian perspective is that as we all know governments are not one dimensional either and there are many competing issues and focusses on governments and so there are choices that are being made. I think from a...I can just echo Val's comment...and from an environmental perspective that is the intention and that is the intention of both parties in this regard. The example that I would point out to you is the Canada/Ontario Agreement which gives you some hard targets with dates that...on some of those issues. The specific that you've identified, we don't have at this point.

J. Mahan: As a practical reality, we hope very much that our doctors will give us some dates by the next meeting.

C. Grundler: If I could just add to the comments, one of the principles of the binational strategy for virtual elimination that the two countries are working on is to have specific targets and dates in that document and we had a public meeting to gather public input on what those targets and what those dates should be. Moreover, in Lake Superior the Lake Superior public forum has proposed also targets and dates for specific pollutants and I think having some measurable goals and guidelines on the road to our goals helps the public decide whether or not we're getting better or worse.

J. Mahan: I agree. Four years since that commitment was made is a long time to not even have any dates so please take that message back to the governments.

Mary Powers: My name is Mary Powers and I am from Kalamazoo, Michigan. I'm here to represent the Kalamazoo River Area of Concern. I'm also an elected official in the State of Michigan; I'm a county commissioner. I am here to ask the IJC for some help. Kalamazoo is the home of Upjohn Pharmaceutical, which is the largest polluter in all the State of Michigan and the second largest in the United States. We also have a wastewater system that is a Zimpro plant; it's a tertiary treatment system and it doesn't work very well sometimes. Now, the problem that I'm
here with is the fact that EPA is considering exempting our wastewater treatment plant from certain regulations because Upjohn is a pharmaceutical company and some pharmaceutical companies have some potential legislation in Congress right now that may be dealt with next week regarding the exemption of pharmaceutical companies from certain regulatory processes and I'd like to know how this can even be considered in the United States at this time when we are supposedly moving toward toxic reduction and better public health and better biodiversity? How can EPA and the State of Michigan and anybody at this time be considering exempting such a large polluter?

C. Grundler: I can answer that.

M. Powers: You're from Kalamazoo, so maybe you can help us.

C. Grundler: I am from Kalamazoo and it's my favorite Area of Concern.

M. Powers: It's my biggest area of concern.

C. Grundler: Here's how EPA can consider it. The United States Congress and the House of Representatives on our appropriations bill has directed EPA in the law, should it pass and be signed by the President, says to provide this exemption so I have no knowledge whether or not EPA's been considering this before this action but this is known as a legislative rider. There are about a hundred of these riders that are being attached to various budget bills that are going through Congress right now and it is, in our view, not the best way to consider environmental legislation through the budget process and the President has opposed these legislative riders in the House and we'll have to see what happens.

V. Adamkus: I would like just to add from my perspective that that issue did not come before me and I have not discussed with any of the staff members so I believe that this is still away from our office. As Chris (Grundler) indicated, I believe that Congressional action will come first.

M. Powers: I'm just here trying to find out whose office it's closest to because eventually the buck stops and I hate to hear the answer that the buck has stopped at our elected officials because being an elected official myself I know how people can thwart things when they're elected. Thank you.

Liane Clorfene Casten: My name is Liane Casten. I come from Evanston, Illinois. I'm chairman of an organization called Chicago Mediawatch which watches and monitors the Chicago area press for its omissions and its distortions...especially about environmental reporting, but I'm here to address Val Adamkus especially because you are head of Region V. You mentioned just now that the input of toxic chemicals has been sharply reduced and that...you also said, during the same speech that there are no simple answers. I'd like to respond that the toxic and persistent chemicals that continue to get into the Great Lakes through incineration is an issue that Region V, especially, has not addressed at all adequately and that the
simple answer would be to start looking at alternatives to incineration rather than supporting the kinds of incineration that you have supported and actually fought for especially, I give you, WTI in East Liverpool, Ohio where even the Attorney General in East Liverpool, Ohio said this a patently illegal incinerator. Yet you went to bat to push this incinerator through. I will give you all kinds of incinerators belching forth dioxins, PCBs and other contaminants right into the Great Lakes from Indiana, from east Illinois, east Chicago, all sorts of areas and as far as I can see, EPA and incineration industries seem to be good bedfellows together. There are alternatives. There are Superfund tests going on as we speak; in Cincinnati, Ohio to test for closed-loop processes that will belch out nothing and you guys are not aggressively pursuing this. Instead, you are sitting there pushing for the continuation of illegal incinerators. I'm asking for a response.

V. Adamkus: I accept your statement and what can I say. Actually we can discuss here all technical aspects of it. I believe your Ohio example has been tested over and over at the highest levels. I believe that even the Government Accounting Office asked by the Congress to investigate this entire case came to the conclusion that as far as the region was concerned there was absolutely no violations of any rules and the decision has been made to the best of the ability and available technology so I definitely ... I cannot argue with you here. What's the best thing... and I accepted your comments and definitely looking into the future we have not at the present time made any decision on incinerators around Chicago as you mentioned and definitely we are looking at all alternative methods and ways which we could handle those chemicals.

L. Casten: I recommend that there are alternatives presently now on line and that even for a test opportunity you take just one site and see whether it works.

V. Adamkus: Thank you

Joseph Thomas: My name is Joseph Thomas. I'm the Remedial Action Plan coordinator for the Grand Calumet River Area of Concern in northwest Indiana. I rise to recognize Chris Grundler and the excellent job he has done as the Director of the Great Lakes National Program Office. As a RAP coordinator, one of the biggest jobs you have is bringing people into the process and God knows, it gets to be a complicated process and trying to explain to somebody why they should care about all the meetings and all the plans and all the hoopla is a real challenge and I have to tell you that of all the EPA employees I've dealt with, I admire Chris the most because it seems like he cares. He goes out of his way. He tells people what he thinks but he also is willing to take some criticism and I would hope that Mr. Adamkus if you have any opportunity to input into the successor who is chosen for Chris' job that I hope you pick someone as committed and as faithful to habitat protection and biodiversity as Chris Grundler. Thank you, Chris.

C. Grundler: Thank you, Joe. I'll get you back for that.

Tim Eder: My question is for Misters Adamkus and Mills. My name is Tim Eder. I'm with the National Wildlife Federation's Great Lakes Office and I want to return to the question that Mr.
Mahan in the first row here asked you just a moment ago and that was basically, when are the governments going to produce and implement a strategy to achieve zero discharge and virtual elimination? and really, Mr. Adamkus, I don't think the answer is all that hard as both of you have acknowledged, that strategy is out there. It's in draft form. There was a workshop held on it in August. We participated in that but this is at least the third biennial cycle where the International Joint Commission has called for exactly that type of strategy to achieve virtual elimination of persistent toxic chemicals. The public wants it. The IJC wants it. That strategy is good. The draft strategy is good in that it has timetables and deadlines and goals for achieving reductions. It doesn't have a timetable for when zero will be achieved but it does have some deadlines for when 50 and 90% reductions will be achieved which we heartily endorse and we strongly encourage you to complete that draft strategy - get it out and start to implement it.

When might we expect that strategy to be completed?

J. Mills: Maybe I can respond to that. We have a commitment to have the strategy completed by the spring of '96...so the process that we will be going through now is putting the draft strategy out for more consultation over the fall and winter and having it finalized by the spring of '96.

T. Eder: Mr. Adamkus, does the U.S. support that timetable?

V. Adamkus: Absolutely, I mean there is no doubt in our mind that this has to be done.

T. Eder: It would seem to us, Mr. Adamkus, that one of the things that's really needed is to make it more than just another piece of paper that collects dust on the shelf, is to have the support of the administration and you're someone who is very well connected in Washington and with the administrator and the various assistant administrators, do you think that this strategy has support that it needs from Washington to be implemented?

V. Adamkus: I believe that what Bob Perciaspe said today, I know it word by word indicated that but I understand that I mean at least from him that he is throwing his full support behind this.

T. Eder: Thank you.

(male voice) I'd just like to add something to the commissioner from Kalamazoo who inquired about this exemption that has been proposed for the Kalamazoo Wastewater Plant...I don't see Ms. Powers... We are, in fact, working on a new regulation for the pharmaceutical sectors. It is out in the Federal Register for comment. We expect that this new regulation, which would apply to the Upjohn Company, would result in reductions in their discharge to the wastewater treatment plant. I just wanted to reiterate that, for the record, that the exemption being proposed is a Congressional action. We are opposed to it and we are hopeful that this new regulation, when finalized, will decrease the amount of toxics which will be flowing to the wastewater treatment plant.
John Jacob: I'm John Jacob from Columbus, Ohio. I'm an activist with the Sierra Club, Ohio chapter and I also have been very heavily involved in wetlands issues for a long time. In Ohio, we've lost 95% of our wetlands and as anyone who's been remotely educated on wetlands, they're one of the ways to filter out and clean up a lot of pollutants before they go into the watershed system, yet 404 and 401 of the Clean Water Act do a very dismal job of protecting wetlands. I've probably been involved in about 40 development-type projects where they are non-water dependent; they want to put housing subdivisions and other things into wetlands and of all of the ones that we have been fighting against, the destruction of the wetlands, there hasn't been a single project in the last seven years that has been stopped by the regulations that we have. Is EPA going to start to take that message to Congress that we need a real set of laws with teeth in it to both protect the wetlands that we have and create new wetlands and stem the loss we've having... because we're still having a tremendous loss?

C. Grundler: Here again that... we're confronted with some very difficult realities in Washington and Mr. Periasepe touched on them but there are proposals in the Congress which would get rid of EPA's role completely in regulating the filling and dredging of wetlands so the practical reality is that the wetlands rules are under attack. EPA's role in regulating wetlands is under attack. Strategically the way to save wetlands is to do more of what we've been trying to do as a Great Lakes community which is to identify where the critical areas are across the basin and protect them in advance of development proposals and try to encourage economic development recognizing the values of these places. That's the way to save wetlands is through more information; better informed people; and wiser decisions.

J. Jacob: But there's another strategy too and one of the things that we've been involved in is we're trying to get the municipalities to create wetlands instead of putting storm water into sewer pipes that ends up going into the river systems. Create wetlands to channel that stormwater into those things and I don't see proposals coming out from the federal government recommending those types of things and it would really help our causes and help us to create new wetlands - in Ohio we are at 95% loss - we have to create wetlands in order to restore some habitat. Are there any moves going on?

C. Grundler: We agree. In fact, EPA has funded a project in Ohio to demonstrate the value of wetlands for that very purpose and it's... we're funding and are part of a partnership with a number of people at the local level to demonstrate that wetlands can actually be profitable and ... in terms of dealing with the sort of problems that you just raised, so we hope to do more of these demonstrations which again teach people why these are important and demonstrate the value both in terms of function as well as preserving this heritage. We hope that reason will prevail at some point in Congress so that we can continue to do this sort of work.

V. Adamkus: I would like just to more or less appeal and ask for help. I mean, people like you because we are exhausting every thing possible in our authority and power what we have to protect it and wetlands are closest and probably very dear to our hearts especially in Region V. We are fighting from the very beginning. I believe we won a few good cases. We are being sued; beat up; and then you name it. We stood up by our principles but believe me it's difficult and especially now when Congress simply wants to take away from us every what we even had so we need your help.
J. Jacob: Thanks.

Laurrie Iceman: My name is Laurrie Iceman. I'm from Chapel Hill, North Carolina. I'm here as a citizen and all this morning as I was listening to you I was thinking it sounds great but I know that Congress — or not Congress — that our government is cutting funds so how is all this going to happen with the funds being cut?

C. Grundler: I guess that is the - it's not the $64. question it's the probably $64,000,000. question. It is not a simple issue. Certainly, all governments right now are under some very tight fiscal pressures and environment departments are part of that. I think what it tells us though, and maybe again as has been indicated earlier here in the Great Lakes, we've actually been pushing the boundaries of how we address environmental issues and one of the lessons that we've learned is that we're going to have to work much more strategically and in a cooperative fashion. I guess that means that that's exactly what we're going to have to do is keep pushing the boundaries to find - to make sure that we are hitting the right priorities - to make sure that we're all moving towards that same vision that the speakers talked about this morning and that as we make our individual decisions based on the realities that we have to we keep that in mind.

L. Iceman: I'm thinking... get the public so that they're really more aware would be a big help.

C. Grundler: I think what is going to save the Great Lakes in the future is information, and as Mr. Perciasepe said this morning in talking about challenges, what's going to have to happen particularly in an era of devolution and declining government responsibility and resources is that we all have to figure out what we can do to contribute to the future; and I think increasingly the role of government is going to be to get information out to the people so that we can make informed decisions about the future. Information will be what will save us and so we're going to try to do everything we can to get the right information, the relevant information and get it in the hands of the people so that they can make decisions and engage in an informed political process to create the future.

Polly Mann: My name is Polly Mann. I'm here from St. Paul. Several times I've heard today about economic constraints - keeping our governments from doing the right thing. I think we should call things by their names. We're spending entirely too much on the military budget-on weapons and arms to be able to do the right thing. Thank you.

Eli Lake: Eli Lake from Washington, DC. I'm here as a reporter, I guess but my question is, "What aspect of the Great Lakes initiative do you anticipate being incorporated in the overall water quality revision standards in the country right now? and I guess it's open to you Mr. Adamkus or Mr. Grundler.

(male voice): Would you repeat the question... we couldn't quite hear you. Please...

E. Lake: What aspects of the Great Lakes initiative right now do you see being incorporated into the overall water quality standards revision process going on in the United States in EPA right now that's beginning?

(male voice): Can you slow down - sorry.
E. Lake: What aspects of the Great Lakes initiative or water quality standards in the Great Lakes initiative do you see being incorporated in the national Great Lakes -- rather, water quality standards revision that EPA is starting right now?

(male voice): The question was what aspect of the Great Lakes Quality initiative might apply to the national...

E. Lake: ...to the national water quality standards revision

(male voice): I'm thinking. I heard you now.

E. Lake: OK.

(male voice): I think I'd like to ask the national representative to answer that question. We love it.

(male voice): Well there's a number of things I think you have to consider. First, we don't have any of the states adopting the Great Lakes Water Quality criteria and those methodologies yet. We're working with the states to do that so we haven't even crossed that first threshold yet but I think that it's pretty safe to assume that there are a number of methodologies and approaches to setting water quality criteria that we pioneered in the Great Lakes initiative including the impact on wildlife, new approaches to metals, and things of that nature that are going to find their way into the national water quality standard-setting process, but we want to work in the Great Lakes basin with its unique situation in terms of water quality standards and get it implemented there to see how the mechanics work first before we would transfer any of it anywhere else and that would require a whole public process of rule making and all the other things we do in government so ... but I think some of the methodologies we are going to begin to use sooner and some of the states obviously around the country can see those methodologies and approaches and adopt them if they would like.

Elaine Kennedy: Good afternoon. My name is Elaine Kennedy. I'm chair of the Public Advisory Committee of the St. Lawrence Remedial Action Plan out of Cornwall. My question is to Mr. Mills. During lunch today the table I sat at down in the exhibit courtyard - we discussed the ballast water issue and then you spoke about it. However, there was a discrepancy and I'd like clarification from you please. First of all, my bias is that it should not be voluntary. That the exchange should be regulated. However, in our discussion we discussed the idea that there were four new species that came into the Great Lakes during the last two years under this voluntary compliance or lack of compliance, and so therefore I would like clarification. What's going on... four ... I hear four species have been introduced during that period and you say it's working fine.

J. Mills: Well, not being an expert in the area I cannot respond specifically. The information that I have indicates that there is a... the information I have from the Coast Guard indicates that there is full compliance with the guidelines. I can only take your point and maybe raise it with...
the Coast Guard when I get back to Toronto because I honestly cannot respond in terms of whether or not there are four new species have been introduced or not.

**Wayne Schmidt**: I'm Wayne Schmidt with National Wildlife Federation. The Commission has, for a number of years, raised the spectre of human health and behavioral impacts from exposure to endocrine disrupting chemicals in our environment, yet there seems to be no real progress being made on establishing screening methods or any programs to deal with this very complex issue. I'm wondering—what is the plan here? I mean, what progress can we expect in the future in terms of some sort of screening system to keep new chemicals that affect the endocrine system out of our environment and out of our lives?

(male voice) We've had under development a protocol that would look at sediments, effluents and water samples to look at bioaccumulative chemicals and this has been out for round robin testing and the results are being evaluated now. That's for ones of higher concentration and also there's the—in the Great Lakes themselves are looking at developing methods that use a thousand litre samples and at the same time collecting fish and benthos to get the bioaccumulation factors together so there is activity going on to get those methods developed.

(another male voice) Also, in terms of addressing the question with respect to people—human health, there are a number of screening tests which are being done in vitro outside of animals which aim to test currently... chemicals which are currently in the environment as well as chemicals which are...or new chemicals which are coming up. These can all be put through these tests in human tissues to see if they have those kinds of effects.

**W. Schmidt**: And how might these apply to potential new use chemicals that have not yet come on the market? I still don't see any sort of screening system that will prevent future incidences such as we've already got in place.

(male voice) I think, firstly, the systems will have to be developed. Right now I think there are a number of institutions working on developing the in vitro systems so that chemicals can be tested. Right now there aren't... there's I think just one that's underway and seems to be... everyone seems to be using that one right now as method of detecting these chemicals but right now it's like a two-step process. You have to develop the methods first and then put the chemicals through to see if they cause similar effects.

**W. Schmidt**: Thank you. I must say that that is not terribly reassuring in light of what we have heard and are likely to continue to hear at this meeting this week.

**Danny Iceman**: Hello. My name is Danny Iceman and I'm actually with Triangle Laboratories out of Research Triangle Park in North Caroline. One of the specialities that our company does is provide dioxin analyses and I guess the question is that I recently had a conversation with a gentleman through the LaMP program, that's a Lake Action Management Program for the EPA out of Michigan and we were discussing the... I guess... studies that might be done for dioxin contamination out of the Great Lakes involving the LaMP programs, and were informed that
there were really no monies to study the dioxin issue and I guess this all comes back to what maybe has been done and what are the future plans to study and look at the dioxin program within this activity?

C. Grundler: There's two parts to it. There's the human health dioxin review that has undergone public comment and the reports are being finalized now and due out next spring. There's also a part on the aquatic life aspects. The interim draft was issued about a year ago. The research is ongoing and just about completed that fill the data gaps and that will be brought forth in a document in FY96 with the thought that in FY97 there would be a new aquatic life criteria document developed.

D. Iceman: Under the guidance of the EPA new risk assessment document?

C. Grundler: Yes.

D. Iceman: Are you guys ...how is that document playing in your ...?

C. Grundler: That ...the research that we conducted on aquatic life side was aimed at a risk-based type criteria so it would be a risk-based type criteria.

D. Iceman: Thank you.

Andy Gilman: With respect to the EPA dioxin reassessment report in Canada, we have a multi-departmental task force that has reviewed the entire document from the health side within the Department of Health. Our people have reviewed it as well. One of the questions that was asked was, is Canada going to change its guideline level because of the EPA's reassessment of the situation? Our position right now is that we have looked at the document and we think that there's enough new information there to warrant a revisit of the dioxin issue in Health Canada.

Jeanna Paluzzi: My name is Jeanna Paluzzi. As a member of the Lake Michigan Forum which is the advisory committee to EPA on the development of the Lake Michigan Lakewide Management Plan, I found it very heartening for both an emphasis on pollution prevention, the use of LaMPs as the primary means of achieving toxic reductions and a commitment to open an interactive public participation as key components in the binational strategy. Part of the way we've designed an expansion of the membership of the forum is incorporating representatives from the RAP teams and the Public Advisory Committees into the overall membership of our advisory committee and we've been somewhat disheartened over the last year with a dropoff in participation of those PAC members in our meetings around our basin. At our meeting in Green Bay recently we've discovered that many of the public advisory committees are not funded and some of the RAP teams actually have not been meeting and one in particular has not met in over a year. We're somewhat concerned because we think it's really fundamental that there be an information and feedback loop between the development of lakewide management plans as well as very community-specific remedial action plans and we're hoping that there's some increased attention placed on the part of GLNPO and Region V in taking a look, with the states, in how
Ken Piirtoniemi: I'm Ken Piirtoniemi, I'm from Sault Ste. Marie, Canada, representing myself and students and staff of White Pines High School, which is also known as Home of Lake Superior Basin Project in Sault Ste. Marie. I am here representing I think, basically the youth and our concern. I wish I could say something positive. I know there are good things happening but these are some things that the students are seeing. And they are excited, they want to do something to help, but they are really feeling disillusioned, disappointed and rather unimpressed with what they have experienced in Ashland, Wisconsin at the First International Student's Symposium based on Lake Superior and here to the present.

And one of the things that they are concerned about and disillusioned with, the responsibility and accountability of governments, in terms of the fact that, we have two countries here which are democratic, however, that is fine, but we need democracy with a little more responsibility. And some of the concerns that they have experienced at the other conference are things such as Craig Johnson from the Endangered Species Act in the United States who informed us that, "Thou shall not add anymore to the list, because it is hampering our economic development." We have also learned that Canada does not have an Endangered Species Act federally, doesn't even exist. Ontario has one but there are no teeth in it. Oh, the spotted bullfrog is gone, too bad. We have a guide to eating sport fish in Ontario, that is really nice, the government prints out publications that we can look at, tells us what we cannot eat, rather than spending the money or doing something that is a little more productive, we are just being told what we can't do, moreso than what we can do.

Our group is involved in adopting a beach, they have adopted a highly used public beach on Lake Superior, with the consent of the Ministry of Natural Resources in Ontario. They were very excited about it and they have a contract with them. One of the things they were very upset about, was the fact that the federal government came in and decided they were going to put in, they built a breakwater. There was no discussion, they just did it. There was no consultation. The students wrote a letter to the federal government, to the minister responsible asking what is the story on this breakwater — why is this happening? — and what their concerns were about it, along with the residents. What happened there was, the minister responsible said, "That's a good question. Here are some junior environmental certificates for all the people of your club." How nice! They have been sent back rejected, with a letter.

We all have a role to play, and the students are very active, they want to do something. They were hoping we could already host the Second International Symposium at their school. They want to do something, they need help, we as staff members are doing everything we can, we are involved, we are getting more and more involved, it is really exciting, but we look to
government for more leadership and accountability and guidance, because you are in a position of power to do that, more so than we are. Please help us.

J. Mills: I guess my only comment would be, I totally agree with you. I think it is important that one government provides leadership, provides the stimulus if you like, for local communities, and particularly for students and young people to act. I think Chris mentioned one of the ways of doing that is making sure they have the information, the correct information in terms of how they can do and what they can do. I cannot talk about the specifics of it, but the principle you are espousing, I totally agree with.

K. Piirtoniemi: I would just like to make one short comment. I sincerely hope that a number of people are considering attending the Youth Forum tomorrow morning. Thank you.

Simon Llewelyn, Environment Canada: Let me just address one of the points you raised. You touched on Endangered Species legislation. You are quite right, there is no federal legislation right now but, the Federal Minister Copps has indicated her intention to promulgate legislation, and has tabled a plain language version document out for consultation, and if you have not received that or would like to comment, leave me your name and we will get that to you to provide input to.

K. Piirtoniemi: Okay, thank you. I do have one concern about that. That probably only has jurisdiction over federal lands, not over provincial?

S. Llewelyn: Yes, quite right. It is the plain language version bill intention is for those endangered species under federal jurisdiction. The fuller story is so that for the last year there has been very extensive discussions across the country with provincial wildlife directors to come up with a National Endangered Species Framework. Those discussions are still underway and the intent is in given the nature of our country, is to come up with fabric that has a combination of provincial legislation as there is in Ontario, right across the country, complimenting that with federal legislation. So those discussions are underway, but your point is quite right.

A. Hurley: Excuse me, we are running short of time and we want to take five minutes at five to three before starting into our next session promptly at three, so if we could try to take the questions from just those people who are standing now and if you could be very, very brief. Thank you.

Margaret Dochoda: I am Margaret Dochoda with the Great Lakes Fishery Commission and I would just like to expand on the lady's concern about exotic species that have come in since ballast management programs were in place. There have been several species reported for range extensions and new findings but, as far as I know, only two of them probably came in with ballasts, and these were discovered in 1994. You probably have not heard about it because we just recently wrote the two Coast Guards to tell them about it, and Canadian mail being what it is. In 1994, they discovered a European flounder in Thunder Bay. It was young of the year, so it probably came in in 1993. In 1994, they also discovered several Chinese Mitten Crabs in Lake
Erie and they probably came in in 1989, which is the first year the Canadian guidelines were in place. These animals had been seen before in the Great Lakes. Their significance is that they are not known to reproduce in freshwater. So when you find a juvenile, it probably came in recently and those two species, it is suspected by ballast water.

J. Mills: Thank you for that clarification.

Erie Reeves: I am also with Margaret here, Eric Reeves from the U.S. Coast Guard in Cleveland. And I want to help clarify a little bit about the ballast water regime, very quickly. You are getting good proof from the Canadian Coast Guard; the voluntary compliance has been very good. And I should stress out of fairness, that the Canadian Coast Guard has been an extremely active player in supporting the U.S. mandatory regime that has been in effect since early 1993. So, there is a concerted effort on the part of both Coast Guards. Canada is very much a player in this, and Canada led the way in providing us some of the research we needed to establish our voluntary regime. That is the good part. The bad part is, the Canada Coast Guard people that I work with and I myself with the U.S. Coast Guard, will be the first to tell you, that our regime is not 100% protection. It is far from it. There are a lot of severe technical problems. There are a lot of — I know you don't like to hear this, but it is true — the economic constraints we have to fight, and there are some real focused research that my counterparts in the Canadian Coast Guard and I myself, very much want to do right now to improve the ballast water regime. And I am getting full court support on that from the Canadian Coast Guard. I just hope that I still know who those people are after the reorganization. Thank you.

Bob Darling: I am Bob Darling and I am from the Upper Peninsula of Michigan. My job, I am a counsellor at an adolescent home, and some of the problems I deal with, with the teenagers are the effects of fetal alcohol syndrome and crack cocaine. And as I read the literature concerning persistent toxins and the effects they have on children, I find quite a similarity in terms of the effects of behavioral development and the capacity to learn. Now in the State of Michigan, we are starting to view mothers that interject these foreign substances into their developing child almost as a criminal act and in some cases some of these women have been prosecuted for that very thing. I wonder at what point are we going to treat industry the same way, for doing the same act? It seems like quite often in government we have a double standard, one that applies to the individual and the other that applies to the corporation. Does this mean business as usual? Thank you.

Shirley Tomasello: Good afternoon, my name is Shirley Tomasello and I am the Director of the Lake Erie Alliance, and I would like to ask my question to Mr. Adamkus, please. My question is, you had talked about moving toward the goals of virtual elimination and eliminating bioaccumulative chemicals and so forth, but in Ohio, Ohio has recently changed its antidegradation rules and this is a huge step backwards. It weakens the water quality protection of Ohio's rivers and streams, and the Ohio coastline of Lake Erie. It is based on assimilative capacity instead of fishable, swimmable waters as a goal, or the goal of virtual elimination or zero discharge. Assimilative capacity is basically saying, "How much pollution can a river or stream or the lake take?" It is really contrary to the goal of fishable, swimmable waters. People
in the RAPs have been working really hard for a long time to try to improve the rivers and streams in Lake Erie, and now we have this rule. Now the U.S. EPA, I don't know if you are aware of this, but the U.S. EPA sent a letter from Region V saying that Ohio's antidegradation rule was basically fine, even though it doesn't include anything about bioaccumulative chemicals and protecting us from that, even though it goes backwards, the U.S. EPA in Region V said, we have no problem with that. Now the people are pretty upset about this, that understand the complex rule. I just wondered how that could happen.

V. Adamkus: I will follow up on this, because I can reassure you that we are not going back what we fought so hard for so many years. I am not aware of that letter. I will come back Monday and definitely will ask the Water Division people and others who are involved to make sure... we will just review that entire case.

S. Tomasello: Thank you very much. I would really appreciate that.

B. Perciasepe: I would only add that since March when we promulgated the Great Lakes Water Quality Guidance, Ohio along with the other states would be required to develop antidegradation policies consistent with that guidance, which was developed in concert with the states. So we are planning on working with all the Great Lakes states to conform their programs with what is in the guidance, including antidegradation. And they would have from two years from March to do that.

Annette Majewski: Good afternoon, my name is Annette Majewski representing Citizen Action of Ohio. I am hearing from you that awareness, education and information are the ways to begin to solve some of our water problems. I would like to know from the EPA what techniques you are currently using to educate the state governments on the importance of adopting the GLI?

B. Perciasepe: Well, as you know, we have been working with the states all along to develop the GLI and it was more or less a joint product when it was promulgated. Here again we have a reality that we have to confront, which says, that at least in the House of Representatives appropriations bill, that any budget in FY 96 which begins October 1st, we are not allowed to spend any money to work with the states to carry out the Great Lakes Water Quality Initiative. Again we hope that these, this was another legislative rider, will not be on the final appropriations bill, so that we can indeed work hand in hand with our coregulators, the states, to carry out the Water Quality Guidance in a common sense way. And we are hopeful that that rider will disappear. If it stays, we are not allowed to do anything with the states to implement the Great Lakes Water Quality Initiative. At least, that's how our lawyers are interpreting it at this point. If it disappears, we plan on hosting joint workshops, creating a clearinghouse for across the basin for information and a number of other plans to work with the states who we believe are coregulators to implement this by the deadline; that is our plan.

V. Adamkus: I would like to add, you know, if we are talking about our work and achievements, the Region V who was the author and actually has developed that entire GLI project, probably never worked harder on any other projects, as we did on this one. We dealt
with every individual state, we pleaded with every individual state, we brought them in from the very beginning of the process and I believe that we have some moral support and I underline moral support from the states, but when it came into the bottom line when they have to commit the monies and actually sign on the line, that was a little bit different story because they faced the fiscal issues, even they were supportive of it and that is where it stands right now. But I hope that the GLI will become, probably the landmark not only for the Great Lakes community, but this will be a model for the entire country.

B. Perciasepe: Incidentally, the State of Minnesota where we are having this meeting, has approved the GLI and Governor Carlsen has indicated his support for the Great Lakes Water Quality Initiative.

Edith Hakala: Good afternoon, I'm Edith Hakala and I reside in the City of Duluth and I am a member of Greater Duluth COACT, which is a community organization interested in various issues, and one of them is the environment. And currently in the City of Duluth, we have been facing an elimination of the wetlands, and the Great Lakes, especially Lake Superior has to keep their wetlands. The reason they have to keep their wetlands, is they are based on an old mountain range that has very limited soil and the runoff from the mountain range which is the northshore, will result in erosion down into the lake, contaminating the lake. Therefore our wetlands on the border of the lake are extremely crucial to this runoff from the old mountain range.

Currently in Duluth, we have an evasion of the Clean Water Act, the federal law that is the law of the land and is strongly recommended by environmental groups, and the evasion of this law has been put within the City of Duluth by the State of Minnesota. The State of Minnesota has granted the City of Duluth its own panel to enforce the federal Clean Water Act, and that panel has never met to enforce the Clean Water Act and declare a wetland. The surrounding area outside of Duluth in northeastern Minnesota and northwestern Wisconsin is enforced by the Army Corps of Engineers. And the Clean Water Act ensures that no wetland of one acre or more should be eliminated without some type of compensation for that wetland; you either go around the wetland or you replace the wetland, or you minimize the extraction of the wetland. Now this is not occurring in the City of Duluth because the panel has not been enforcing that law.

Outside the city limits, if you go to one of the shopping stores, you will see where it was definitely enforced according to that law, and that store is the Walmart. And that is because they are outside the city limits, and the Army Corps of Engineers was the one that enforced the law. What we are seeing here is a takeover by commercial developments, especially retail. And they are currently going to take over a wetland on the other side of Ridgewood Mall called the Opus Development, and they currently going to extend the Miller Hill Mall which is up the way on 53, and they are trying to extend that into the Miller Creek wetland, and that is the same wetland that goes by the Opus Development. And that is because the City of Duluth has not been enforcing that law. We have the Miller Creek which runs on Highway 53 and it is like a snake that circles Highway 53. And so far we have preserved that creek to some extent, but currently if these two developments are extended, that wetland will no longer exist and all the water will not have a
filtration system for the water. A wetland has to be currently in existence for the water to be filtrated and cleaned out. The creek in some instances, looks very clean because we have still done some work to keep that wetland. But if these two existing developments go in, I fear that we will have a very definite problem, and then we will see water coming down the hill, that is going to bring in the pollutants from the parking lots.

My problem is that I have gone to the MPCA, the Minnesota Pollution Control Agency and the DNR and I have done this for two years, and tried to find out who could declare a wetland within the city. And I have never had anyone do that for me. I had to go to the Army Corps of Engineers to get a wetland declared, but he did not get that panel to meet in the City of Duluth.

And this is what has been happening for two years at least, if not more, and what I am seeing is that there is no sense in having these laws on the books if, if no one enforces them. You are going to find as much pollution in these lakes, Lake Superior takes 300 years to clean, and if this is the way the laws are enforced, the state laws and federal laws, and I don't know what the international laws are, that is not going to happen. We are still having big corporations that go through our Western Lake Superior sanitary district, and if these laws are not enforced, these Clean Water Acts are not enforced, it is all for naught. No matter what you say, the laws are not enforced. I am trying to declare a wetland for two years and not having it declared and then finally having it declared and nothing done about it, because it was declared a wetland in my backyard and nothing was done about it. What is your answer to that problem? Thank you.

V. Adamkus: First of all, I hope you do not expect from us to respond on a very special, very local issue. I see the Commissioner sitting right almost in front of you, and he heard the issues, I believe, that knowing how sensitive and how environmental he is, probably maybe the two of you can try to resolve that issue over here.

E. Hakala: I have been looking for him for two years.

V. Adamkus: So he is right in front of you (you've found him). I am happy that I at least could identify him for you.

Elaine Marsh: Good afternoon, my name is Elaine Marsh and I am with Friends of the Crooked River in Cleveland, Ohio and I want to address the issue of cost/benefit analysis. I am just a citizen and I really, really love Lake Erie and I really, really love the Cuyahoga River. I cannot put a cost on that. But can't you find some good credible, economic person who can, to combat and balance the voodoo economics that industry uses in order to demonstrate the costs of regulation?

(male voice): I cannot address the issue specifically, I know that there is somebody else that wants to make a comment, but I would suggest that there are examples where the economics of environmental protection, environmental cleanup do make sense, and the example of it, I guess there is five RAP presentations that indicate in quite strong economic terms that it is good economics to prevent and to clean up the environmental problems.
Douglas Jester: My name is Douglas Jester, I am with the Michigan Department of Natural Resources and I am in part an environmental economist. Certainly the kinds of analyses you are asking for can be done, in principal. The number of trained environmental economists around the world is not enormous and in fact, most universities who would like to employ environmental economists as faculty, have a good deal of difficulty keeping them because of the enormous demand for their services as consultants, and that is not to suggest that they are going to the wrong side of the issue, both the United States, federal and state governments, I know, I employ a large number of environmental economists on the basis of consulting contracts to deal with Superfund sites and things of that sort. So I think the problem is simply that it is a relatively new field, we do not have enough people doing it to keep up with the demand and consequently there are lots of analyses which need to be done, and they are not. In the absence of those specific analyses we are going to have to work on general principles and your principle is exactly right. There are lots of people who value resources and high quality resources, and all an economist is doing is finding a way to measure that to put a dollar sign in front of what is essentially the people's will. So yes, seek those analyses but also use the consultation processes that are available to you to make the point in a qualitative way.

C. Grundler: We actually did find some of those economists and hired them to analyze and try to quantify the benefits of the Great Lakes Water Quality Initiative versus the annual costs of it, and the outcome of that analysis which was quite detailed and looked at several different places and analyzed them on a permit by permit basis, we quantified the benefits to outweigh the cost. Of course most people here, and certainly I, believe these lakes are priceless, but it can be done and we will continue to look for ways to do this in the future.

Adèle Hurley: Thank you. We have run out of time. I would like to break at this point, very quickly for ten minutes and then we will be back for four thirty-minute presentations by the insight groups. Ten minutes, thank you.
INSIGHT PRESENTATIONS

SATURDAY, September 23
3:00 p.m.-5:30 p.m.

Adèle Hurley, Canadian Chair
International Joint Commission

In its evaluation of progress under the Agreement and in its formulation of advice to
governments, the Commission gathers advice from a number of avenues. The Agreement
formally provides for scientific and programmatic advice through the Great Lakes Science
Advisory Board and the Great Lakes Water Quality Board, both of which were established in
1972. Over the years, the Commission has broadened its information gathering to include public
hearings, which will be held this evening and tomorrow. We are also gaining insight into
particular relevant issues through a series of concurrent sessions, to be held tomorrow morning
and Monday morning.

Insights from a spectrum of societal sectors are also helpful. Today, we shall hear from four
sectors: Native Americans, business, environmental nongovernment organizations, and labour.
The Commission has found these insight presentations to be especially helpful in providing
indepth information for participants at this meeting, as well as important material for the
Commission to consider as it develops its biennial report to the governments. For these reasons
it is important that we give attentive and polite consideration to each of the speakers that will be
making presentations to us today. Just as each of us would like others to respect our right to be
heard clearly and without interruption, so too do these presenters deserve your respect and
attention.

In order to provide the maximum time available to these speakers, I would ask that you refer to
the profile section in your meeting package for extended biographical information on each
speaker. Also I would like to ask each of the speakers to be ready to move up to the speaker's
table as the previous group finishes. Each sector will have 30 minutes for its presentation and
time will be provided at the end of all the presentations for questions or comments from the
audience.

Now I would like to introduce the speakers for the first presentation who will provide insight
from a Native American perspective. Speakers include: Thomas Maulson, Chair of the Lac du
Flambeau tribe and chair of the Great Lakes Indian Fish and Wildlife Commission's Board of
Directors. Mr. Maulson will be followed by James H. Schlender, Executive Administrator of the
Great Lakes Indian Fish and Wildlife Commission; Maxine Cole, who coordinates the EAGLE
project for the Assembly of First Nations; and Chief Richard Kahgee of the Saugeen First Nation
in Southampton, Ontario. I just want to say, I have made a little mistake here and it is actually
Chief Kahgee who is going to lead. So if you would like to begin Chief. Thank you.
Chief Richard Kahgee
Saugeen First Nation

Thank you very much. Members of the IJC, Commissioners, Chiefs, distinguished guests. My name is Richard Kahgee, I am the Chief of the Saugeen First Nation, a small community located along the shores of Lake Huron, at the south end of the Bruce Peninsula. I would like to take this opportunity to thank the IJC for inviting me here to speak. And it is quite an honour to be a part of this group.

This year’s theme for the IJC is human health. I would like to give you the aboriginal perspective of what human health means. We view the concept of health holistically. We look at ourselves not in isolation, but we look at ourselves in conjunction with the environment, with our culture, with the animals, with the land and in that process, we offer respect to all of these elements because they are a part of us. In the development of our societies for the last thousands and thousands of years, we have managed our health and our communities, we have looked after ourselves, we have developed societies which had political structures which had economies, which had all the elements of a nation. In that nationhood we also had control of resources, and those resources became an integral part of our being. They provided us with sustenance, they provide us with the means for commerce, and the ability to ensure that our communities were healthy.

Our dietary patterns were established and the foods that we took into our bodies nourished us, nourished us as a society, and as a culture. Having control of resources has meant that we are able to facilitate our evolution as a society and provide for our people. Unfortunately, when Europeans came to this country there was a parting of ways, or understandings of how to share these resources. And eventually through the systematic erosion of our rights as a nation, by the encroachment of the settler governments, legislation was passed which inhibited our ability to regulate or to partake of the resources.

This had a dramatic impact not only socially on our people, but also on our health. And as a result of the change or the loss of being able to control our dietary functions or what we were able to eat, changing it over to a different type of diet, we are the victims of diabetes today, and heart and strokes and all manner of disease. Myself, I am afflicted with diabetes. And I guess it is really important from our position that if we had the ability to control our lives more than what we have we would be healthier as people, we would be able to impact on our lives socially and culturally. And that really is the fundamental basis I guess, for any kind of development.

When you are taking care of something or someone, you have to exercise responsibility. And as a people we realized that centuries ago, that we had to live in harmony with the environment; that the waters, that the fish, the animals, the land all provided for our sustenance and our life. Today we have to be responsible, responsible stewards. We have to understand that those concepts have bearing today, that they can be a part of this society, that we now enjoy. We have to look at development of resources and the contingent management of those resources in a holistic fashion. They have to have the respect of all the users.
I would like to use this opportunity to state Saugeen Nation's position on its sovereignty over our fishery. And to that end I would like to read a declaration, a monumental declaration which will set us apart from other communities, and hopefully it will start us on the road back to recovery for our governments, and our health and our people.

This is referred to as the Duluth Declaration, because of the location obviously. I would just like to read this from prepared text, so bear with me if I cannot follow through with it too carefully.

"We the sovereign people of the Saugeen Nation, have developed from time immemorial a society which exercises all aspects of nationhood. Our nation has been recognized by other nation states through the creation of treaties and agreements of mutual benefit. We have never abrogated our authority or relinquished it to any other entity.

"We hereby affirm our jurisdiction over the waters around the Saugeen/Bruce Peninsula. This jurisdiction extends to the median point in the water between the Saugeen Nation territory, water and land, and all other national territories. We assert jurisdiction over these waters in their entirety, which includes the fisheries, lands and minerals, above and below the waters, including the lake bed. We do so for the immediate purpose of the full regulation and management of these resources, over which we have inherent rights, treaty rights and unextinguished sovereign authority.

"We reserve the right and authority to enter into agreements concerning the disposition of these resources to the benefit of our nation. As a nation, we shall respect the international laws which promote constructive and cooperative relations among sovereign nations, and, as we deem appropriate, will include our sovereign rights in applicable international processes.

"The foregoing reaffirmation of jurisdiction over the Saugeen/Bruce Peninsula waters is without prejudice to the existence of other jurisdictional dimensions of Saugeen Nation sovereignty under the current or future international law, including in relation to the waters of the Great Lakes, and to the timing or manner of any other future affirmation or reaffirmation of such dimensions.

"This declaration will be formally signed on October 2, 1995, by the Councillors of the government of Saugeen at a public ceremony of the Saugeen Nation, upon which date this will become legislation of the Saugeen Nation."

In order for us to realize our true potential as a people, we also require the support and understanding and respect of other communities. And to that end, I would also like to call to action other groups for their support and understanding.

The Saugeen Nation shall begin immediately to implement various aspects of the authority over our fisheries. Such aspects include determining fishing seasons, establishing quotas, undertaking conservation analysis and announcing dates upon which we shall start issuing both commercial and sport licenses to fish in our waters.
Recognizing the importance of cooperative measures for the maintenance of the fisheries and of the related general health stability and viability of these international waters known as the Great Lakes, the Saugeen Nation makes the following calls to action:

We call upon other Aboriginal nations of the Great Lakes to support our assertion of jurisdiction over our waters.

We call upon the International Joint Commission, within the limits of its functional authority to recognize the Aboriginal nations of the Great Lakes as necessary and equal partners in the management of these international waters and, specifically, to cooperate fully with the Saugeen Nation in its regulation of the Saugeen/Bruce Peninsula fisheries, including by responding favourably to requests for advice and assistance from the Saugeen Nation.

We also call upon members of the international community to recognize and otherwise support the reaffirmation of the Saugeen Nation’s jurisdiction, entitlement to the Saugeen/Bruce Peninsula waters and, in particular, to recognize the international legal status of any agreements/covenants relating to these waters.

We call upon the Government of Canada to enter into negotiations concerning its orderly disengagement from these waters. These negotiations will be premised on dialogue in good faith and reciprocal interests. We trust that the people of Canada, like the people of the Saugeen Nation, seek a swift and just process based on mutual respect and a respect for future relations, future generations and the conservation of the resource.

We call upon people everywhere who are committed to a world that respects human rights, the sovereignty of indigenous peoples and the protection of our natural heritage, to support what we are now about to do.

I would like to take this opportunity once again to thank the members of the IJC for allowing me to take this opportunity to speak to you. I would like you to take what I said to heart and do what is possible in terms of providing us with support. I would like to provide a written transcript of these notes to the Commissioners so that they will have an opportunity to read them over at their leisure. Thank you very much.

Thomas Maulson, Chair, Lac du Flambeau Tribe and Chair, Board of Commissioners, Great Lakes Indian Fish & Wildlife Commission

I guess if they don't know what to do, I know what to do. I want to say Bozhoo. My name is Tom Maulson, that's my Christian name but Daweosh(sic) is my Anishinabe name. And I am not going to be here to give you any type of promises or hopes because I am going to expect you guys to start to clean up the water and clean up all the shit out there that your people created; we didn't do that. This is what it is all about with the Anishinabe people. I do not know if this water is pure or not, but this is what it is all about.

I want to thank the IJC membership here for allowing me to speak, tell you who I am other than...
my name. I am the Chairman of the Lac du Flambeau band of Lake Superior Chippewa Indians, Lake Superior, also the Chairman of the Board of Commissioners for the Great Lakes Fish and Wildlife Commission. This is an organization that is doing everything that everybody said here today. And I am proud to be Anishinabe because that is what we have been doing for the last thousands of years, protecting your best interests. I just want to say one thing. I think I was asking different people here, "How does Indian people get on this board?" Someone said that is our presidential appointments. Well as a president of my Nation, I would like to appoint Jim Schlender on that board later.

I would like to give a brief history of the Anishinabe people. We are people that are water people. That is why we are where we are at today. We were on those reservations because we wanted to be there because your people put us there. Today on my reservation, I can say that we have, at least clean water; I cannot say pristine water. But my ancestry, the Anishinabe people up here, out there, can say, "We are the first to have, what this says: zero discharge." Our stories have told about when they could drink the water when they paddled these Great Lakes. Today we cannot do that. So we as Anishinabe people, expect you people to start to put it at a zero once again.

Back home in Wisconsin, in our homelands there — this was all our homelands — we have real whatever the hell their name is, in the mining area, people had come from Europe digging in our grounds, polluting our waters, Exxon, we have to fight because we as Anishinabe people have got to protect these Great Lakes. Those tributaries come here; they do not go to Europe, because it is dead there. I was there a few years back on the Rhine River and one of the boat captains called over the loud speaker and he says, "Make sure no one uses the bathroom while we are docked up." So I sort of asked some person on that boat, they said that they flush it right into that river. We do not need that here. We do not want it on my reserve because we are doing everything, what everybody is trying to do here today.

It is really sad to be in this here audience, or to be in this America because you white people are guilty of what has caused the problems that we are facing today. Don't need the holocaust of Europe to show us that. It is here right in front of us; it's here, right in the back of this building. You know we talk about electronics, to see if things are polluted. We as Anishinabe people had those. They are gone. The animals that run those shores, the animals that ate that fish, all of those things, they were our canaries. They are gone, so we have to rely on you all out there that have the powers to make it to be.

I believe I heard a lady or gentleman say here, "Well we need your help," to the EPA people. Well, they cannot help themselves. Couldn't give you answers. Give you a lot of false hope. A lot of different type of answers, played a game of chess with you. And that's sad. Those young people, you should have had those young people here that you are going to have at that conference. Bring them here, to show what their leaders are doing — or not doing. We have been the buffer zone for you all, for a long, long time. They killed us with blankets, diseased blankets and now they are killing my people with asbestos pipes on my reservation and telling me that, "Oh well, there's just a little bit of fibers in there; that won't hurt ya." Or they are going
to put a mine over there by my brother's reservation that is going to pollute their waters. But that's all right because they want money. Because they need more pennies. Why the hell don't they melt what they got? We have problems today folks. It is really sad that we have to sit here and sort of get that in ourselves and listen to sort of like a retreat. I can't believe that you all don't know the problems. I heard a lot of them asked here, all across this country.

We need these people right here. They sat here very patiently taking in all of the problems. A heavy load on everybody. But we as Anishinabe people have been carrying that load for a long time, for you all. So we ask you, you the people of America, you the white people of America, don't let Congress do what they are doing, get on those telephones. Annie back here was going to give me a speech but I can't go by this because I have to talk from the heart. She's a good gal. But I want down in all those displays down there that's why I'm sort of getting down on you guys a little bit, because it was just like walking through the cemetery — seeing all the destruction that your people had. In our oral history, we can hear those stories in medicine lodges about when the water was pure. Today you have your history or his story about the pollution and I saw it down in your displays on how some of the good people are trying to reverse that process. There are not enough of us to do that right now. But if we put a pen to the paper and we talk to your congressmen — because we are not treated, they couldn't care less about Indian people, our people across the borders, they don't want to listen to them — I am hoping that the Canadian people will start to listen because they are a buffer zone. They are telling them they are having problems, Serpent River, we hear about those problems here, that water runs down hill. So if we want to keep this basin clean, we just can't keep sitting in here and having meetings after meetings, after meetings. We have to burn the damn telephone lines up, we have to do the new fax machines, we have to go over there and pound on those legislative doors — maybe they ate too much mercury fish, I don't know. But dammit, we have got to do something. We just cannot accept some of the stuff that EPA is talking up here. They are paid by the federal government, they are not going to say, "Yeah, I'm going to jump up there and tell Bill Clinton: Dammit to pass this, or do this, or that." He isn't going to have a job very long; we know that.

So I am just going to let you know that we need your support as Indian people, we need you to take a look at us as human beings also, because our people are dying from cancer too. Our people were told that we had a long life, years ago, when our hair was white, we heard those stories. Today our people are dying, according to the statistics — not only from alcohol but from cancer and all these other things that now we have to eat because the animals are eating it. Those animals do not need us; we need them. So we had better clean them up too. So, I am going turn this over to Jim, my brother Jim here he is really going to give you a hell raising here. But I want to say Begootch(sic) to you guys and let's get out there and let's get on those phones.

James H. Schlender, Executive Administrator
Great Lakes Indian Fish and Wildlife Commission
It is a great opportunity and a wonderful pleasure to be among so many VIPs (Visiting Indian People), and I want to welcome those visiting Indian people from Canada. In many ways they hold onto things that were rested from us as a result of government policies in this country, worst of those things was the loss of our language. And today we sit on the brink of a catastrophe of a
disaster. Now we talk about exotic species and extinction and yet in our country we allow the exotic species to enter here, the Europeans, the others that came here. We allow extinction to go on her in this country, through the genocide of Indian people. And yet that seems to measure so little. How can we care about a lake that can't speak for itself?

My job is the Executive Administrator of the Great Lakes Indian Fish and Wildlife Commission. It is a tribal organization of 11 federally recognized Indian tribes in Wisconsin, Minnesota and Michigan. These tribes hold hunting, fishing and gathering rights and territory ceded to the United States in a number of treaties. This territory includes parts of Lake Superior. These reserved rights have been recognized and defined in litigation over a number of years. As a result of these court cases, and as a measure of tribal self-determination, and because of their desire to implement a self-regulatory system for the exercise of these off-reservation rights, the tribes established our Commission to protect and regulate the practice of their off-reservation rights. Our Commission serves its member tribes by conserving and managing off-reservation fish, wildlife, and other resources in a very unique way. Our mission statement includes a mandate to infuse traditional Anishinabe values into all aspects of our work. These values are significantly different than non-Indian values. For example, in the Anishinabe view, rocks are alive, they are beings just as we are human beings. We call some of these rocks our grandfathers and our grandmothers, they must be protected and respected. These views are often difficult for non-Indians to comprehend, and may or may not lead us to similar conclusions about the desired future of the Great Lakes. Perhaps more important, however is the cultivation of a respect and a recognition of these different perspectives so that a dialogue can begin.

Our Commission is committed to the protection of the Great Lakes ecosystem, in particular, Lake Superior. Our member tribes rely on clean, healthy natural resources for economic, subsistence and cultural purposes. Therefore the goal of the Great Lakes Water Quality Agreement, to maintain the chemical, physical and biological integrity of the waters of the Great Lakes Basin Ecosystem, is a goal that is shared by the tribes.

Three resolutions passed by our Board of Commissioners demonstrate an inter-tribal commitment to the protection of Lake Superior. The first resolution, adopted in 1989, supports the principle of "zero discharge." It also supports the overall goal of the virtual elimination of all persistent toxic substances. The second resolution, adopted in 1992, supports anti-degradation of the ceded territory, and opposes new or increased discharges of mercury. The third resolution, which was unanimously adopted yesterday by our Board, supports the designation of Lake Superior as an outstanding national resource water under the Clean Water Act. We feel this designation will provide the greatest possible protection for this vital resource.

Lake Superior is the largest and most pristine of the Great Lakes. However, it is not free from contamination and ecosystem degradation. The State of the Great Lakes Report issued by the Canadian and United States governments ranks the state of Lake Superior’s aquatic habitat and wetlands as poor. In addition, fish consumption advisories continue to constrain the subsistence and economic activities of tribal members.
In response to these conditions, our Commission has become active in a number of areas that promote the goals of the Great Lakes Water Quality Agreement. For example, in Lake Superior, our Great Lakes biologists are cooperating in interagency studies of sea lamprey and river ruffe populations, as well as a study to gather information on the distribution and movement of juvenile sturgeon in and around the Bad River reservation in Wisconsin. We also monitor tribal commercial fishing harvest, and collect important biological information about fish stocks.

Finally, this Commission has been a leader in surveying and re-seeding wild rice in the Lake Superior and Lake Michigan basins. Wild rice is a resource of extreme cultural importance to the Anishinabe. In fact, it forms the basis for the migration of the Anishinabe people from the east. Our forefathers were told in prophesies that our migration west would be over, and that we would find our new home when we found the "food that grows upon the water." When our grandmothers and grandfathers reached the shores of Lake Superior they found the wild rice growing on the waters, and knew their journey was over.

Our Commission also participates in several federal and state initiated programs to protect fisheries and water quality. We participate from an off-reservation perspective on the Task Force and Workgroup of the Lake Superior Binational program, and on various committees of the Great Lakes Fishery Commission. Our work as members of these committees includes providing relevant data to other scientists, providing input on how best these committees can fulfill their various objectives, and reviewing and commenting on documents to be produced for the scientific or regulatory communities, or the public.

These activities are only a first step. Tribes themselves must be fully integrated into the Great Lakes decisionmaking processes at all levels. We therefore recommend that the IJC encourage the various governments to work harder to integrate tribes as meaningful partners in decision making processes that affect the Great Lakes, including the appointment of Native Commissioners from the U.S. and Canada to the IJC. Asking for a representative does not mean asking for one tribal representative to represent all tribal interests, just as the interests of the various Great Lakes states may differ, so do the interests of tribes. Each must have the ability to provide their unique perspective and help design solutions tailored to their needs.

Support for tribes should include support for programs and initiatives already underway, as well as support for tribal initiatives that will help document impacts that may be unique to tribes because of their culture and lifeways. Every year, each Great Lakes state has available $70,000 for participation in Great Lakes protection initiatives. Tribes have no such funding source. The IJC should recommend to the governments that they provide adequate funding for tribes that wish to develop or participate in Great Lakes protection initiatives. These measures will require monetary commitments by the governments. In an era of budget cuts, this will be a challenge. However tribes must be full partners in efforts to protect the Great Lakes if the goals of the Great Lakes Water Quality Agreement are to be fulfilled. The cost of not fully involving the tribes is to lose the participation of governments with substantial jurisdiction in the basin, as well as a cultural and historical tradition of living in harmony with the environment — the very goal that the governments are now working toward.
When tribes attempt to judge progress under the Agreement, they must do so either as "outsiders" or as "insiders." If tribes remain on the outside, they will only be able to say that the governments should have done this or they should have done that. If tribes are fully involved as "insiders," then they share in the decisionmaking processes and share responsibility for effectively implementing these decisions.

The theme for this biennial meeting is Our Lakes, Our Health, Our Future. If tribes are to add meaning and substance to the discussion of these issues, then their voice, their views and their vote must be heard, seen and counted. Thank you.

A. Hurley: Thank you. Unfortunately, we have run over time a bit. I would like to conclude that section and ask the next group to come forward please. Catherine Cobden, Dr. Ilene Danse and George Kuper who will speak next for our next Great Lakes community sector, that of business. I believe our first speaker is Ms. Cobden who serves as Manager of Environment for Avenor, Inc., followed by Dr. Danse who is President of Environmed Health Services of San Rafael, California, followed by Mr. Kuper who is from the Council of Great Lakes Industries.

**BUSINESS**

*Catherine Cobden, Environmental Manager  
Avenor, Inc.*

Good Afternoon, Commissioners, Ladies and Gentlemen. I am Catherine Cobden, Environmental Manager at Avenor, Inc. and we are a Canadian forest products company. I am here today representing the Council of Great Lakes Industries, and other interested companies. The Council unites major Canadian and U.S. firms promoting economic growth of the region in harmony with its human and natural resources.

Today we have divided our time into three separate parts. First, I am going to tell you some of the good news of the progress being made, and then Dr. Ilene Danse will give us an independent assessment of the toxicology and state of the Great Lakes and George Kuper will give you the Council's view of future needs.

Industry in the Great Lakes region is committed to improving the environment, and included in that commitment are hours of collective priority setting, extensive research, along with huge capital investments. Each industry faces unique environmental challenges but through technological innovation, employee ingenuity and industry investment, we are rising to those challenges.

Industries are developing new procedures to safeguard the region's water supply, reduce air emissions, recycle materials, save energy and produce less waste. At the same time, we are providing employment and a strong economic base for this region. In the next few minutes I am going to share with you a small sample of the positive steps that industry is taking to protect and improve our environment. As I share this good news, you will see behind me the faces of the people who live and work in the region, who make it all possible.
• At a Great Lakes chemical company employees have reduced wastes and emissions by 1,000 tons each year since 1992 and reduced landfill use by 45% in 1993.

• At a steel company, trees and ground cover were planted to eliminate the dust from dock areas and together with other improvements equalled a 30% reduction in visible emissions in 1994 alone.

• Action plans of about 120 companies under the Accelerated Reduction and Elimination of Toxics Program (ARET) show that 1993 emissions of approximately 28,000 tonnes of targeted substances have been reduced by 36% in one year. A reduction of 67% of these substances is projected over the next five years.

• In the production of particleboard and hardwood, new process adhesive formations and techniques have reduced formaldehyde emissions by over 80%, compared with the 1970s. At a Great Lakes chemical company operational improvements by employees reduced hydrogen chloride emissions by 70%.

• A steel plant now recycles alkali cleaning solutions through an ultrafiltration system. This system decreases residual oil levels in the cleaning solutions and allows them to be recycled on a continuous basis.

• Nearly 19,000 tonnes of volatile organic compounds will be captured annually by the year 2005. This is because Canadian companies are investing $75 million for the installation of vapour recovery equipment thereby reducing air pollutants and improving air quality.

• A chemical plant employee recognized the opportunity to reduce odours by moving gases through soil beds.

• A Canadian company created a joint venture to recycle wood treated products such as telephone poles. This project reduces the number of chemicals required, preservatives are reused, trees are saved and landfill space is reduced.

• Discharge to the sanitary sewer system was reduced by about 40% as a result of changes made by companies on Collingwood Harbour.

• A fiberboard plant hauls wastewater to an adjoining hardboard plant where the water is then evaporated into a substance which is used as binder in cattle feed.

• As a result of changes to the bleaching process in the pulp and paper industry, dioxin discharges have been virtually eliminated.

• At a steel plant in the Great Lakes region, release of water pollutants have dropped by 95%, water consumption by 50%, and new water treatment facilities costing $10-million will reduce water pollution by over 900 tonnes per year.
• A power plant is providing coal fly-ash, a by-product of coal fired stations, to a cement company for its cement making process. The fly-ash was previously landfilled.

• The U.S. pulp and paper industry's goal is 50% paper recovery by the year 2000 and is investing $10 billion to achieve that goal. Currently, in the U.S. one of every two newspapers is recovered and recycled, and more than 60% of all corrugated material is now being recovered, 37% of all paper and paperboard is recovered and a third of the domestic industry's fiber is now supplied by recovered paper.

• Steel in new cars contains approximately 43% recycled steel.

• A basin-based manufacturing company is recycling engine lubricating oil, and recycling old crushed asphalt into new road material.

• Through a joint effort between a chemical company, a parts supplier and an auto company, a manufacturer uses bumpers containing recycled material on cars.

• A major railroad company sponsors extensive training sessions and spill control courses to help train rescue personnel in case of leaks, fires, explosions or toxic emissions during the transport of chemicals.

• A chemical company, working within the community has converted a previous industrial site to a riverside recreation center, providing both site remediation and a community benefit.

• Benzene emissions were reduced from 60 tons per year to less than one pound by one basin plant after engineers developed a process to recover benzene in two storage tanks. This equates to a benzene recovery of 99.99%.

• A Canadian bank has established a non-profit organization to support local environmental projects in communities across Canada. The bank matches customer contributions. In the last two years $6-million has funded more than 2,800 local environmental projects.

Now these are just some examples of how environmental stewardship has become part of our daily way of doing business. Through the commitment of our people, we will continue to develop innovative solutions to environmental concerns.

At this point I would like to introduce Dr. Ilene Danse, a distinguished M.D., pharmacologist and toxicology. For the past 33 years she has been studying human health effects and chemicals in the environment. She is President of Enviromed Health Services, on the faculty of two medical schools, on the Science Advisory Board of the American Council on Science and Health. She is also a member of the Scientific Review Panel for the Hazardous Substances Data Bank of the National Library. We invited Dr. Danse to provide an independent assessment of human health and the state of the lakes. Thank you.
Thank you. Catherine Cobden just showed that when people try to work in harmony with the environment, good things happen. In a way we can divide the attempts that industry is making into two broad areas. The first would be process changes, and we can lump the process improvements into: their trying to contain more processes, use more recycling, use less toxic substances and in smaller amounts, generate non-toxic byproducts and reduce waste. And the people of the lakes are doing this.

Catherine did not concentrate on it too much, but there is also a lot of ecological improvement, I understand going on, by the good people of the lakes. They are trying to do on an individual basis, planting and vegetation, wetland preservation, generate fish and wildlife habitat and improve forest management.

But that is not why I am here. I have been working on environmental issues for over 30 years. We were reminiscing at the beginning of the afternoon and Mr. Adamkus said that he is reminiscing 25 years, and Mr. Mills was reminiscing two years, but I think I am leading the pack right now, because I am reminiscing over 30. So I'm about the age and time when before I forget what I want to share with you, I had better share it with you.

So I would like to give my perspective on toxicology and ecology and how it relates to the various issues that we have heard. There is a tremendous amount of energy and integrity in this room. But maybe we can generate a certain amount of harmony that can help solve the problems of the day. Certainly there is enough energy, I think the trick is how to harness it.

So, my objectives are to discuss some of the toxicologic issues, particularly as it relates to humans and to mammals, and I am going to use PCBs, dioxin (when I say, dioxin I mean TCDD), and I am also going to use some food and drugs as examples. Then I am going to try to put that information in a framework to look at the endocrine disrupting compounds and cancer risks so we know how to interpret what those regulations are. And then I too was asked to independently review the SOLEC documents and see what I felt were the most important issues and from that, I generated a focus for the future.

The first part will be toxicology and human health. And to gain a perspective on human health issues, for those of us that were there in the '60s, it came as a real shock to discover that in our environment in the food chain, and in our bodies there were DDT and PCBs widespread in the environment. And if there is a little historical recollection of how this happened, so we can deal with these issues now. What happened was, about 1/2 billion pounds of PCBs were manufactured for years in the United States, and it was incredibly widely used because they had stable and persistent properties, they were nonflammable. So they were used everywhere from electric transformers, to paint, to fabrics, to clothes, to paper, even microscope emersion oils and do you know, not only were they in insecticides but they were in bactericidal skin lotions which we applied to our skin on purpose. So they got everywhere.

Now before I tell you about how the PCBs got in the air and how much it meant to be in the air, for the few nonscientists in the audience, I would like to discuss the way we express
contamination in the environment, so we can put it in a framework. I have some blue and white jelly beans here and originally I had a lot more of them, but I ate them, so now I just have one white jelly bean and a few blue jelly beans. But I want to discuss the way we express environmental contamination. If we picture a railroad tank car full of the blue beans and if we had a million blue beans and one white jelly bean that would be one part per million (1 ppm).

Now if we had 1,000 railroad tank cars, each full of one million blue beans each and we only had this little white bean in the first car, that is one part per billion (1 ppb).

Now this is very hard to picture, but if we had a million tank cars all filled with the blue beans and just that little one white bean in the first car, that is one part per trillion (1 ppt). It is ironic, but a part per trillion is a million times less than a part per million. We have to remember that the numbers go backwards.

And this is from the 1980s, this was a report we did comparing the PCBs in the air around the world — and remember, we were using them everywhere, and we put them there — so, if we look at the worldwide air level in the first column that .05 means if we divided this white bean into a hundred pieces, it would be five parts of this one white bean. So air in the world ranged between .05 ppt and 1.3 ppt. And in a remote island in the North Pacific, it was about .03. Lake Michigan air which is highlighted for you, would be nine hundreds of this white bean. Which really was not so bad in comparison to urban areas, say Rhode Island, Milwaukee, Chicago. Was higher than urban and suburban areas, and the most ironic part of everything was that the part per trillion levels, while it is in worldwide air, it is relatively low, it was much higher in our homes and offices and the highest part was in the kitchen. And in the kitchen there would be say 55 of these white beans. And one of the reasons that it is so high in the kitchen is that in our homes we have 350 million appliances such as: TVs, fluorescent lights, and air conditioners, which still contain PCBs; these have not been regulated.

It was EPA's intention, although they regulated large transformers and capacitors that had industrial uses, they could not deal with the household appliances, so they are not regulated. When you get back to your room or your home, you will see that there is a little black box in the back of the TVs and the older sets have a pound of PCBs in each set and that is why we can fall asleep in front of the set or take a snooze and not burn down the house, so the appliances do not overheat.

The FDA in our food has regulated tolerances in the ppm range and remember now, that is one tank car full of blue beans, or more. And I have listed the tolerances for the food we eat, milk, chicken, meat, eggs, baby food and so forth, in both ppm range on the left, and ppt range on the right, so you can compare the amount in the food that we eat to the levels in the air and the environment. And we have PCBs in our body fat also, in about the ppm range. Now that gives us really, pardon the pun, food for thought. So if we are still wondering about PCBs in food, we have to look at other risks.

And what I did was (I talk about food a lot, I like food) this is a sample menu, let's say a Thanksgiving Dinner that is coming up, at least on this side of the lakes. And all food has both
potentially natural toxins and endocrine active substances and that is something that we are just really appreciating. The turkey would have heterocyclic amenes and maneldieldahyde, the stuffing has benzopyrenes and hydrazines and a whole host of substances, so does cranberry sauce. And if we get to the vegetables because we are eating healthier and there are lots of vegetarians now, the lima beans - especially the broccoli, broccoli is loaded — and baked potato, sweet potato, all have both natural toxins and endocrine active substances. I thought that would be a good way to do without estrogen supplementation, but I was assured I would have to eat 200 wild yams a day if I was going to try to get some endocrine activity here.

Now Bruce Ames, who is one of the most brilliant scientists that we have in America today, ranked the PCB contamination in our food to other both natural and added toxins and that is on the second line. He based his analysis on the amount that we are exposed to as well as the potency in rodent experiments. So that comes out to be this figure that you see in the upper left hand column called "HER(?).." And the ranking of the PCBs in food came out to be less than in tap water and peanut butter and basil. But the irony is that beer comes out to be 14,000 times more toxic, and wine twice that. So, the relative toxicity if we are going to look at animal experiments and how much of substances we use, it comes out to be not to be a zero risk but a very negligible risk in comparison to others.

This brings me to other risks, and there has been a lot of concern and understandably so, that the possibility that in the last 50 years, sperm counts in men are less. There are lots of possible reasons, for this if this finding is real, but I am not sure seriously trace environmental pollutants was meant to be among them. Unfortunately, many of us in this room were products of pregnancies where our mothers took DES, diethylstilbestril, a drug to prevent abortions, and there were many changes in the sexual characteristics of the offspring. The best known factor that affects sperm counts in men and I think it is something we overlook today, especially since we are also doing a lot of tasks now from regulatory agencies investigations wearing moon suits, is that sperm are very, very sensitive to heat. And protective clothing, jobs and today's lifestyles — when we get back, how many of us are going to drive to work, sit at a computer, go for a jog or a bike ride in spandex tights, sit in a sauna, watch a video — all of these things raise temperature, and the effects of a single episode of raised temperature can last for months.

Alcohol affects sperm; marijuana, very big effect, often unrecognized — so potent that when prepubertal children smoke marijuana, it can delay the onset of puberty. Many of today's common medications affect sperm counts and it is not an issue that the drug companies like to advertise. Other issues are sexually transmitted diseases and chemical poisoning. Now, of course, chemical poisoning can affect sperm counts but this is uncommon. It occurs in poisoning with large exposures and in workplace settings.

Now, we have spent in the United States about $2-billion on dioxin research and there has been enough on dioxin research so that we can compare receptor studies in mammals and in people. And these are also calculations made by Bruce Ames. What he did was he compared the EPA Reference Dose of TCDD, a can of beer, and a serving of broccoli. Let's see how this shapes up. The EPA reference dose of dioxin was equal to one three-millionth of a beer. Just in case
anyone in this room is thinking of having a beer tonight, that is equivalent to drinking one beer over a period of 8,000 years. In other words, one three millionth of a beer in the EPA Reference Dose of dioxin are the same if you are looking at teratogenic effects. And that comes from a lot of pretty good scientific data.

The second aspect is you look at endocrine activity, and I was no fan of George Bush, but one serving of broccoli has fifteen hundred times more of the effective dose of the so-called endocrine disruptor than the EPA Reference Dose of dioxin. And I think we need to keep these things in perspective when we are looking at enforcing regulations. Now we care about water and we care about endocrine disruptives, but we generate hormones everyday and we eliminate them from our bodies, the ones that we do not use in a given day, in the urine. So we and animals and wildlife are constantly putting them into the water supply. People take estrogen — a lot of women now, it is controversial, but they take estrogen in postmenopausal state to prevent osteoporosis, softening of the bones — but those estrogens come from animal urine. In a sense these are natural products and they do have these effects.

The second aspect of my talk is on ecological issues, and Mr. Adamkus and John Mills eloquently expressed their views of the SOLEC documents and what has been accomplished and in essence I agree with everything that they said. I also reviewed the SOLEC documents, by way of asking four questions: Why does the contaminant load? What are the levels in fish? How are the birds doing? and, How healthy are the 46 million people who live around the lakes? My assessment from looking at these documents is that the lakes, the fish and the wildlife levels of all contaminants that have been measured, have been improving.

This is a slide that you have seen before this afternoon. It is the levels of dioxin in herring gull eggs, measured over the past 20 years. And this is parts per trillion and it has fallen, thank God, dramatically by not putting anymore in. But the egg story is very interesting and it is analogous in a way to the breast milk story. Mother fish, mother birds and mother humans pass their body burden of PCBs and persistent chemicals onto the young in fat. The fish do it and the birds do it in the eggs, and women do it in breast milk. The stability of these substances suggest that the amount that is still around is likely to persist there although it does tend to fall with each generation.

I think it is important that we spend that money where it will do the most good and I, too, will echo what Mr. Mills said that we can't afford not to take a balanced holistic approach to our environment. Look what happened with Lake Erie and how it was brought back by people working together. But one of the most important issues that I find is, besides the habitat and wetlands not being addressed enough, and this has been said by Mr. Mills and Adamkus is that people have tended not to work in harmony to solve these issues. I've been impressed by the level of feelings in this room today that everybody is very sincere and full of energy but we would benefit from more harmony to solve the problems and acknowledge that there are problems and that we need to work together.

Some areas which I feel need more emphasis besides the human aspects -- we need additional research on habitat loss and wetland loss and prevention and restoration; more work on relative
impacts on bird and fish. Now, many bird populations have rebounded - some to levels never before seen but fish aren't coming back as much. And, what is the reason for this? I live in an area where we have natural redwood forests and they don't attract much birds but one little baby blue heron got there and nobody knew why but since there was only one bird there the park ranger could check how many fish that bird ate a day and that baby blue heron ate 150 fish a day so one question I ask, if the birds are rebounding and the fish are not what is the relative importance of fish that are food for aquatic birds and such other issues? The Nature Conservancy has pointed out many issues that need to be addressed regarding stressors on biodiversity including habitat and wetland issue and non-native species and other stresses which should be high-priority issues. I, too, am concerned about the purity of our drinking water and the fact there have been over 100,000 illnesses and 100 deaths from chryptosporidium. Some areas which I think need more emphasis...

A. Hurley: Excuse me, there are only four minutes left in this session and I know Mr. Cooper would like to speak so could you wrap up please

I. Danse: Yes, thank you. I think we need to prevent pollution, increase habitat and wetlands, control development, manage resources better and reduce and manage our wastes better. Sometimes environmentalists can get mean spirited but I risk speaking here because the region has such vitality and I feel these issues are so important. I have big birthdays now and I'd like to see results. I still harbor hope that people will cooperate for a common good. So much can be accomplished when all of us - people, industry, the environment, everybody - is in harmony. We must begin a harmony of common goals to protect and celebrate the lakes. I truly believe that together we can make a big difference. Thank you.

George Kuper
Council of Great Lakes Industries
Madam Chair, I'll abbreviate my remarks in the interests of time and if I can make the machine go forward fast we'll get there faster.

My name is George Kuper and I'm the President of the Council of Great Lakes Industries. We asked Dr. Danse, here, to provide an independent, scientific, human health view of the Great Lakes and she has done that, indeed. I don't think we're going to have any other presentations at this session talking about male gonads. However, I want to make sure that you understand the industrial members of the Council are in the business of searching--can you all hear me? you can't see anything. --for common ground among a bunch of different and divergent views because common ground allows for the commitment of resources and therefore, progress. It is our intent that we hope and pray that you will take from this discussion three things that will find its way into your final report. First, that industries within the Great Lakes region have made and continue to make major commitments to pollution control and pollution prevention. Second, these commitments and the results are paying off. Study after study documents these gains and you are referring to them yourselves. Most importantly, the future presents new challenges and opportunities for creative approaches to dealing with those new challenges. The way we've done things in the past is not the way we can afford or want to do things in the future. To address
these new challenges, the Council proposes four principles for us all to embrace and here is where I'll go very rapidly. Industry's vision, if you will, of the future of our Great Lakes - we want a commitment to collective action; a strong link between human, environmental and ecosystem health goals; we want to build greater knowledge on the potential impact of all human activity including our products and the processes that produce those products; and we want to do so with respect for all the needs of the ecosystem, the economy, and the public.

A. Hurley: I'm sorry - we've just run out of time.

G. Kuper: I'd like to give you my prepared remarks in lieu of holding up the balance of your program. Thank you very much.

A. Hurley: Our next presenters represent a variety of non-government organizations that focus significant portions of their efforts on Great Lakes issues. Let me introduce John Jackson, President of Great Lakes United who will begin the presentation followed by Jack Weinberg, Paul Muldoon, Laura Rose Day, Kathleen Brosemer, John Manty (sorry if I went too quickly there) Sarah Miller and a children's presentation so will you start please Mr. Jackson.

ENVIRONMENTAL NONGOVERNMENT ORGANIZATIONS

John Jackson, President
Great Lakes United
Thank you very much. The wisdom of the Great Lakes Water Quality Agreement becomes more apparent every year. Its emphasis on the ecosystem approach and on the virtual elimination of persistent toxic substances have become guideposts for all of us who are concerned about the wellbeing of the Great Lakes ecosystem. In interpreting the Agreement you, as the Commission, have provided the vision to others to attain the goal of virtual elimination of persistent toxic substances. Your vision and direction have been clear and consistent and it merits the reaffirmation of all of us in this room. We urge you to continue to point all of us down the path to solve these problems and to help us further define how to achieve the goals along that path. At the same time we ask you to broaden your perspective and thus the focus of governments, of industry and of all of us in the public to include a broader ecosystem perspective on Great Lakes issues. How will future generations judge our efforts to protect the Great Lakes? and how will we be judged at the end of this century for the work that we were doing at the end of this century and at the end of this millennium? On the one hand, science is providing the most compelling evidence every of injury to the Great Lakes and of the need for action. On the other hand, programs to protect the Great Lakes are under threat from industry and from politicians in all countries. But in the midst of this gloom is the reality that citizens' groups are more determined than every to protect our environment. All across the Great Lakes basin numerous volunteers and those few staff that were able to dig up the money to help work with us are devoting themselves to working with community, regional and basinwide groups to resist the backsliding and to help us move forward. We are doing so because what we see happening around us that we know we have no choice if we care about the wellbeing of all life in this Great Lakes basin. You'll hear today from a citizen's presentation and it's in more detail in the document that I think
has already been given to you by your staff and it's available for other people at the Great Lakes United booth in the display area—we'll begin with the issue of toxics.

**Jack Weinberg**  
**Greenpeace**

No time for a point-by-point reputation of the jelly bean ignorance that you heard just before this from the Council of Great Lakes Industries—we've been hearing today about we need to educate; we need to inform. Well, I want to warn industry and government that the more educated and informed citizens become the more angry and frustrated they get and that you'd better move before the education/information is so strong that we're going to have a crisis on our hands and we're not going to have an orderly transition. We're going to have chaos that's going to cause social and economic consequences and that's the theme of our mission. It's time to act now for a healthy future. I was going to go into detail on the injury but time is short. I want to put a challenge to the governments. I want to put a challenge to the Commission. The challenge to the governments - in '92 the IJC recommended that an international ban should be sought on production, use, storage and disposal for a number of the particular things like toxaphene, like DDT - the governments gladly accepted that - the states and the provinces were ecstatic - so we're talking about long-range transport, about things that are not being produced and used here. Well the challenge to the governments and to the IJC - there will be a conference in Washington, DC starting in October where governments, environmental ministers, foreign ministers from around to world will begin discussion and negotiation of binding protocols that do just that and the U.S. and Canadian government are on the fence and the IJC is not yet involved in that process. So you promised that in '92. It was non-controversial. Everybody said they were going to do it. It isn't going to cost you anything if you can't do that. It's late. Get on that ball. That will be a real thing that you can do and it's next month. That's number one. Now two - the IJC Commissioners, the Commissioners that came before you made a reputation around the world for their wisdom; for taking the idea of zero discharge of persistent toxic pollutants and turning it into real policies and they told the world what needs to be done. We're the ecosystem that first learned the wildlife/human connection. We're the ecosystem where the wisdom of what needs to be done. When I read the priority document when I came here today what you're going to be spending your money on the next two years I was sick. It was more studies - that's good. More monitoring - that's good. No money allocated for moving forward in your priorities and taking the wisdom of your past Commissioners and going from what has to be done to how to do it. The transition planning - we don't want to have to wait until there is a crisis; of public demanding immediate action so great that it just starts a train. We want an orderly transition. We don't want to trade an environmental crisis for a social and economic crisis and you, the Commission, could begin a discussion of transition planning - Paul's going to say more about it - in your next biennial cycle. As far as I'm concerned, that will be the test of whether you move this forward or if you're the Commission that puts this great experiment to sleep. Thank you.

**Paul Muldoon**  
**Canadian Environmental Law Association**

The question really is not if we're going to get to zero discharge but how. You have created a destination for us all in terms of toxics. Now it's your responsibility to help us form the road to
get there. That's what transition planning is. It provides the goal posts for that orderly transition so we can move from polluting to clean technologies. We can move in a direction that we can maximize environmental benefits and minimize social dislocation and impact on affected communities and workers. That's why we're not only asking you to reaffirm your recommendations to phase out persistent toxic chemicals; to further reverse onus; to further the weight of evidence approach; but we're asking you to put, as a priority, transition planning. It is through concrete research that you can do that can help us find equitable ways and measures to get to the "how" question to phase out these substances. We want you to partake in a process to engage a dialogue on that. We're reaching out and saying we're willing to work with you on decide how to do it and we also want you to take a tough case study - that of PVC. I admit it's a tough case but we've got to take it because it's the fastest growing use of dioxin or as a ... PVC is the fastest growing use of chlorine-containing industrial feedstock and is the most difficult one which means it crystallized the issues of the challenges ahead of us so that's why we're so emphatic on the need for transition planning but let me move on. You've heard today from the governments about the binational strategy. We welcome this initiative. You called for it. We called for it and we welcome it. However, we've also said to the governments in our comments that it needs a substantial reworking and that's because - for a couple of reasons - is that it defined virtual elimination as the absence of harm and we've rejected time after time a notion of thresholds. We know there are no thresholds for persistent toxic chemicals. In that strategy also - the virtual elimination strategy - it also talks about a management and control strategy whereas you have called - and we've supported - a need for sunsetting as the predominant strategy. We urge you to please review that strategy and see whether or not it meets the requisites of the Great Lakes Water Quality Agreement in their own past reports. I've just talked about a couple of initiatives but what really is also here today and we must recognize it hasn't recognized is the attack — the fiscal and legislative attack on the environmental programs protecting the Great Lakes. We know that Environment Canada is going through a 30% cut; the Ministry of the Environment in Ontario up to that cut. Somewhere between 25-35% we can expect for the EPA. This will affect research. This will affect capacity to regulate. This will affect cleanup. Please comment on those. And not only on those programs, but look at the legislative attacks throughout the Great Lakes, the legislative attacks on dealing with unfunded mandates. Look at what's being attacked in terms of the Congress; in terms of the courts; in terms of funding of the Great Lakes Initiative. Look in Canada. The first reading of the Regulatory Efficiency Act which is a wholesale deregulation initiative. Look at Ontario where they want to repeal a world-leader ban in municipal incinerators and look at ... we were hoping for a failed response for the legislative review of the Canadian Environmental Protection Act. We urge you to comment on this outright attack on the programs that protect us all. So in the end we're not only asking for a spotlight to show us where to go but please be courageous and put some barriers to protect what we have. Thank you very much.

John Manty
Save Lake Superior
Hello. I have the task that's been made a bit easier by a lot of the other comments today of talking about Lake Superior as a zero discharge demonstration zone and we are very heartened by the outpouring of support for the demonstration zone and for the implementation of a toxics
freeze on this lake. There are no other opportunities like Lake Superior. I think we all take that for granted. We've heard about the zero discharge demonstration zone for nearly five years now and what I'd like to talk about is what hasn't been done to implement that demonstration zone. The demonstration zone has to do with how we get to zero. We've had the mandate; we've embraced - even in multistakeholder fora - this concept and now it's time to get on with it so that we don't come to another IJC Biennial Meeting talking about what we haven't done over the last couple of years. First, the Lake Superior Lakewide Management Plan has still not been published and, Commissioners, I would encourage you to urge the governments to get on with the publication of that document. We need the plan before we can start implementing and it's a very important document. It will contain — well, the governments have promised that it will contain the recommendations of the Lake Superior Binational Forum, a multistakeholder citizens' group that has, just yesterday, passed an historic recommendation on the elimination of dioxin, octochlorostyrene and hexachlorobenzene. I urge you to look at that. It's our understanding that those recommendations may not be published in the LaMP and we think that, if were asking citizens to get together and go through a gruelling multistakeholder process, that the least that can happen is for those to be published. We've talked about toxaphene and we've heard and are heartened by the fact that we're going to get more information on toxaphene but we also heard that we're going to try to eliminate sources where possible. The IJC has said that zero means just that - zero and we ought to find out what the sources are and then we ought to have a timeline - an immediate timeline - to phase those out just like the rest of the substances.

On error, implement the Great Waters Report in the U.S. Put together a concerted air program in Canada and enable the people in the Lake Superior basin who are working so hard to accomplish what their trying to accomplish to demonstrate what we all have a vested interest in - zero discharge. Implement the Great Lakes Initiative. Urge the governments to move forward and adopt the Great Lakes Initiative especially the special designations for Lake Superior that have been promised for so long. Because we have not been able to get government action on this issue, there's a coalition of environmental groups and citizens have filed a petition and now a law suit because we could get not even a public hearing in Michigan on this issue. We're heartened by some response from Minnesota and Wisconsin but the time is now. If not now, then when? and if not on Lake Superior, then I ask you, where? Thank you very much.

Laura Rose Day
National Wildlife Federation
There are sixty nuclear power reactors that directly affect the watershed of the Great Lakes. There are uranium mines and refineries. There are mountains of uranium mine tailings in my backyard. There are nuclear waste storage sites, nuclear waste dumps, nuclear research laboratories, and nuclear weapons plants. Some of these places are up to sixty year old and they're facing decommissioning. Who's going to pay for it? Most of these are sited right on the shores of the lakes. Most use lake water for processing and for cooling and most of them use lake water to dump their waste. Their day-to-day operations continuously contaminate the Great Lakes with toxic radionuclides. The health of all living things is compromised; is threatened by these poisons. Different radionuclides partition in different organs in different systems in the human body and in the bodies of other individuals and wherever in the body an atom of a radioactive element is when it gives off its radiation, it can damage tissue. It can damage DNA;
it can create a mutation; a birth defect; or a cancerous cell. A single atom can do this. There is no safe level of exposure to these poisons. Zero is the only appropriate tolerance. This commission has taken a strong stand in favor of zero discharge of persistent toxic chemicals. We appreciate that two years ago you moved to include radionuclides in that definition. Radionuclides are, in fact, the most persistent of the poisons that we routinely dump into the Great Lakes. The persistence of these poisons is mind boggling. In many cases, we're not talking about months or years as we are in some of the other chemicals but of time on many times greater than historic terms on the scale of geologic processes. We're poisoning ourselves, all life and our home - this planet - on a timescale only God can comprehend. It is necessary for the survival of life on earth that we phase out the nuclear industry as soon as possible. In preparation for that phaseout, we have twenty three recommendations for you in this document including no new licenses, phase out existing reactors, and a number of recommendations on energy efficiency, renewable sources of supply, radioactive waste storage and disposal, and a number of other things but there are three that I'd like to point out because in the limits of time I'm not going to read 23. First, we ask you to direct the Science Advisory Board to convene a working group on radioactive waste, storage, transportation and disposal and that this Science Advisory Board prepare recommendations for your next biennial in 1997. Next, we want you to recommend to the governments that the utilities that run nuclear reactors and the entire nuclear industry be required to guarantee funds for all decommissioning and disposal costs. These funds must be a requirement in order to keep an operating license for all currently operating plants. Third, we ask you to immediately designate the Serpent River an Area of Concern. It's been severely contaminated by the 200,000,000 tonnes of radioactive mine tailings existing in the Elliott Lake basin and we want you to fast track the development of a remedial action plan for the Serpent River ecosystem. Thank you for deciding radionuclides are persistent toxic chemicals. Now let's get 'em out of the lakes.

Kathleen Brosemer
Clean North

The conservation of biological diversity is necessary for the continued health and wellbeing of residents of the Great Lakes region. By conserving biological diversity, we ensure the integrity of the ecological systems found here and upon which all life ultimately depends. A 1994 report from the Nature Conservancy notes there are 131 elements of such diversity within the Great Lakes basin that are critically imperiled, imperiled or rare on a global basis. These globally significant elements include many natural communities as well as plants, mollusks, fish, birds, and many other species. Of these 131 elements, 47% occur exclusively or predominantly within the Great Lakes basin and have many of their best examples here. Today the health of the Great Lakes ecosystem is under an unprecedented threat as the governments of the U.S. and Canada seek to roll back decades worth of basic conservation law that has afforded the components of our region - this unique ecosystem - at least some measure of protection. In the U.S., for example, this is manifested by the efforts of the U.S. Congress to eviscerate protection for nearly all wetlands by defining from 66 - 80% of the wetlands of the Great Lakes states out of existence. They wish to gut protection for species facing extinction by eliminating the requirement to protect habitat under the Endangered Species Act so it would be permissible to chop down a tree where a bald eagle was roosting as long as it did not shoot it directly. They're
trying to force taxpayers to pay polluters not to pollute and developers not to destroy wetlands or endangered species. They're attempting to smother attempts by the federal government to inventory biological diversity by emasculating the National Biological Service. They're seeking to downgrade protection of key natural areas such as the boundary waters, Canoe Area Wilderness and Voyageurs National Park and they're seeking to require that there is... or they have required that there is the logging of billions of board feet of so-called salvage timber on national forests nearly doubling the amount of logging with no requirement to comply with any environmental laws. Much similar activity is taking place in Canada with the Regulatory Efficiency Act, the Environmental Harmonization Initiative and efforts of the Ontario government to withdraw funding for basic conservation programs. We call on the IJC as the voice for us residents here in the Great Lakes to demand that the U.S. government and the Canadian government stop the roll back of basic conservation laws. Furthermore, we want to see wetlands restored and sufficient core reserves and buffer zones and connectivity areas established within the Great Lakes basin to allow for biodiversity to prosper. Thank you.

Mining has left a legacy of contaminated sites and contaminated groundwater and surface water throughout the Great Lakes basin. There are 557,650 abandoned mines in the United States. Thousands of these are located in the Great Lakes basin. The cleanup of these sites in the United States is estimated to cost anywhere from 32 billion to 70 billion dollars. In Ontario, there are approximately 2000 abandoned and unreclaimed mines. The pollution generated from mining and abandoned mine waste includes acidification of surface and ground water, lakes, rivers and streams, heavy metals contamination, sedimentation, and toxic chemical pollution. In Ontario, the Serpent River water system and the Elliot Lake basin have been contaminated by radioactive wastes from over 200,000,000 tonnes of mine tailings covering more than four square miles. The IJC has identified this site as the single largest source of radium in the entire Great Lakes. These irresponsible practices and continuing assaults on the ecosystem of the Great Lakes basin by the mining industry must be stopped. Mining and mineral exploration must be brought under public control and decisions about mineral development brought into the realm of public influence. The commitment to zero discharge must be reflected in the regulation of mining. We ask that the IJC do the following:

1. Designate the Serpent River as an Area of Concern and fast track the development of a Remedial Action Plan for the Serpent River water system.

2. Apply the provisions of the Great Lakes Water Quality Agreement to the mining activities in each of the Great Lakes' jurisdictions.

3. Direct the governments to identify all abandoned and orphaned sites in the Great Lakes basin within 1 year and report to the next IJC meeting on plans to remediate the sites.

4. Establish a basin-wide task force of citizens, labour, and First Nations' representatives to assess the progress of the governments in meeting the directions of the IJC and to comment on the plan developed by the governments to remediate abandoned and orphaned sites in the Great Lakes basin.
We will provide you with a more complete written statement on this issue. Thank you.

**Sarah Miller**  
**Canadian Environmental Law Association and Great Lakes United**

Commissioners, this morning we heard about small teaspoon of water that we’re stewards over in the Great Lakes and I’m here to talk about keeping that water in the teaspoon. We need action now to avoid future water resource conflicts in the Great Lakes basin originating from increased demands from both outside the basin and within the basin. 1995 is the 10th anniversary of the signing of the Great Lakes Charter but there’s still a very leaky framework to protect our water supplies in the Great Lakes. Even though there have been many studies documenting the harmful impacts of lower lake levels, there’s still not a good understanding of the current withdrawals from the system and demands being placed on the system. There’s little evidence of an ecosystem approach or a conservation ethic in our water management practices despite government pledges in the Charter to cooperate. The current dispute between Illinois and Michigan over the volumes flowing through the Chicago diversion is a case in point. That dispute is not being resolved through Charter mechanisms but it’s very likely to be settled by the courts instead. New issues not adequately anticipated ten years ago are now influencing our ability to manage our water resources while opportunities to practice sustainability are being ignored by every sector of the basin. Only areas within the watershed which are now experiencing water shortages are practicing conservation in a comprehensive way and crisis management still prevails. Attention to water quantity issues fluctuates with the rise and fall of the lakes. We also continue to vastly undervalue our water resources which encourages more waste and places Great Lakes residents as world leaders in wasting water. While we’ve recognized that the IJC spends considerable resources on the Water Levels Reference Study, that study has simply looked at ways to ameliorate the impacts of fluctuating lake levels on shoreline interests. We can no longer afford to see this as simply a control and engineering issue. We are calling on the International Joint Commission to take leadership in ensuring there’s a sustainable Great Lakes water strategy in place by the year 2000. This strategy should integrate the impacts of population growth, continental water depletion, climate change, the loss of regional control over resource management due to trade agreements and privatization with preventative actions to stem the wasteful water practices still prevalent in the basin. Targeted reductions of water use by 1/3 for all sectors would bring our level of use in line with European countries. We are recommending that the Commission review the lack of progress on the implementation of the Great Lakes Charter and we are calling on the governments to act cooperatively on water quantity decisions by treating the Great Lakes as one hydrologic system. We ask them to give those excluded from water quantity decision - native nations and municipalities whose decisions so influence water allocations - a place at the table. In the next millennium, will we be sustaining or draining the Great Lakes? We would ask you make this a priority in your 1995 biennial report so we can say to future generations that we have acted to prevent the loss of the region’s most precious resource.

We know that this is an ambitious agenda that we've set out but we know also that there's energy out there to do it. You're only seeing a minuscule bit of energy that's all across this basin to achieve that agenda. And why we have so much energy and so much to achieve that agenda is for the future and that's why we want you to hear from the children now.
(a bell rings in the background)

**Group of children.** We are youth from around the Great Lakes. Some of us have travelled hundreds of miles so that we could be here. We are the voice of the future and we want to grow up in a clean and healthy world so please stop dumping toxins in our Great Lakes.

**Song:**
These Great Lakes of fresh water were created clean and blue
But the discharge of pollution has affected me and you
These toxins in our bodies will now pass onto our kin
To know this and to continue is truly a sin

We don't want it here
They don't want it there
There stands the problem
we can't put it anywhere
Tell me why do we make it
if there's no where to take it
Not in the Great Lakes
to poison you and me
We don't want the problems
of pollution and grief.

When money speaks its loudest
When people's heart are numb
We kill the earth for money
We think that's really dumb
Tune out the sound of money
And look into our eyes
The choice is yours to hear
Our laughter not our cries.

We don't want it here
They don't want it there
There stands the problem
we can't put it anywhere
Tell me why do we make it
if there's no where to take it
Not in the Great Lakes
to poison you and me
We don't want the problems
of pollution and grief.

So let's be the example
For which we all speak
To show all those around us
Our love is never weak
Let's make the discharge zero
That flows into our lakes
We all know it has to happen
For heaven sakes.

We don't want it here
They don't want it there
There stands the problem
we can't put it anywhere
Tell me why do we make it
if there's no where to take it
Not in the Great Lakes
to poison you and me
We don't want the problems
of pollution and grief.

Audience joins children:
We don't want it here
They don't want it there
There stands the problem
we can't put it anywhere
Tell me why do we make it
if there's no where to take it
Not in the Great Lakes
to poison you and me
We don't want the problems
of pollution and grief.

Thank you. Thank you very much. On behalf of all the youth, I'd like to present Captain Bart
with this flag. We'd like to thank you for all the work that you've done to try to save our lakes.
Thank you.

J. Jackson: And we'd like to thank the kids because they're the only hope we've got and let's not
forget that they're not guilty

A. Hurley: Thank you very much. And finally for our last session, I would like to introduce
Brian Kohler and Les Leopold who will speak to us as representatives of the labour community.
Mr. Kohler is National Representative of Health, Safety, and Environment for the
Communications, Energy, and Paperworkers Union of Canada and Mr. Leopold comes to us
from the Labor Institute and as a member of the Oil, Chemical, and Atomic Workers Union.
Gentlemen please proceed.
LABOUR

Brian Kohler, National Representative of Health, Safety and Environment Communication, Energy and Paperworkers Union of Canada

Thank you and I know it's pretty late in the afternoon and everybody is tired of listening to speeches plus it's impossible to follow an act like that but I think we have a couple of things that are kind of important to say so... thanks for the opportunity to speak at this important conference. The Communications, Energy and Paperworkers Union of Canada represents about 150,000 workers in very key economic sectors such as the chemical, oil and gas, pulp and paper, pharmaceutical, communications, electronics and media sectors. Many of our members depend for their employment on industries that are at the center of the debate on which economic activities are sustainable and which are not. If we fail to protect the environment we will eventually face certain economic catastrophe and social disintegration. On the other hand, if we consider only narrowly defined environmental issues in isolation from their economic and social impact, we may destroy communities, enterprises and individual working peoples' lives and have nothing to offer them in return. Somehow society must be able to make the right decisions about what needs to be done and at the same time there must be a sense of fairness about who will bear the costs of those decisions for there is a very real danger that even if we are successful in saving the planet we will live in poverty and despair upon it. We are faced with the need to make some tough decisions. For example, how will we meet the objectives of the Great Lakes Water Quality Agreement and how swiftly will we make the necessary transitions. My point is simply this: that we cannot make far-reaching changes in society without considering the question of who will pay for those changes. Society is, in fact, all about how we make decisions collectively and every decisionmaking process involves the use of assumptions. For example, the underlying assumption of societies like Canada's and the United States is that if we make conditions sufficiently favorable for some members of society to generate and accumulate wealth, the rest of us will share in that wealth primarily through employment. Why, therefore, do we view labour as a cost when, from society's point of view, it should more properly be regarded as a benefit? Why are dollars spent on improving working conditions or preserving the environment viewed as a cost while dollars spent on improved production equipment are considered an investment? It is indicative of our bias that in risk-analysis based decision making both costs and benefits are expressed in dollars. The value of a human life, for example, is set for various purposes as anywhere between $300,000 and about $7,000,000 based on studies of such things as insurance and compensation costs, estimates of life expectancy, earning potential and quality of life. Incidentally, this defines the lives of poor people as being worth less then the lives of rich people. Other models, such as the theory of assumed risk which compares the pay in "safe" occupations to the pay in "hazardous" occupations, both defined by economists of course not by the workers in those occupations, to determine the value society places on a particular risk are also used. All of these models are flawed and tend to give different assessments. It depends, you see, on whether you're doing the assessment or facing the risk. What is really required for intelligent management of risk is integrated consensus decision making by the stakeholders with one of the most important stakeholders, of course, being the workers. The problem of what happens to workers whose lives are affected by decisions in which they had no voice is not a hypothetical one. Many of the good news stories that we've heard about companies that have
been able to substantially reduce or even virtually eliminate persistent toxic emissions do not report the fact that these achievements have often been accompanied by huge reductions in the work force. These job losses are economically catastrophic to the workers affected but equally catastrophic to their health, their families, and the communities in which they live. Our experience reveals that most of these workers will never work again at comparable wages. This has created a new energy source unfortunately a dirty one with explosive tendencies and that is anger fuelled by fear. In the absence of a structured transition program, therefore, it is the workers in industries affected by phase outs and process changes that will pay 100% of the cost of transition to a cleaner economy. What is important to understand is that the environment is an issue that at the end of the day has very little to do with legalities and science. It has everything to do with democracy and social justice. Just what kind of society do we want anyway? and who will pay for it? If we're going to discuss preserving the world for future generations we should also consider that removing the livelihoods of working people destroys the lives of future generations as well. We are not prepared to surrender decisions about our future to others but demand to be included in the decision-making process. Now, be clear on this. I'm not standing here arguing or defending environmentally damaging industries or products but we need to know how we can economically protect the workers and communities who rely on sunset industries. As we move towards sustainability there will be disruptions to existing employment patterns as certain industry sectors gain at the expense of others. If you're a fifty-year-old chemical worker and you're out of work our experience tells you you're never going to work again at anything near the same kind of earning potential. Others have suggested that it's up to the labour movement to negotiate adjustment programs in our collective agreements. Now, here's an interesting thing. Disappointment would be a mild way of expressing how we felt upon reading the IJC's 7th Biennial Report. Recommendation #19 - that labour unions include in their negotiations the issue of transition to a sustainable economy without persistent toxic substances. Now, this suggestion betrays a fundamental lack of understanding of the power relationships that exist in work places and of the realities of what unions are able to achieve relative to society as a whole. Leaving aside the fact that many workplaces are not unionized, the sad fact is that if we rely on our ability to negotiate transition programs we're going to be negotiating a lot of severance packages. We contend, therefore, that a structured adjustment program is essential if we are to demonstrate fairness while moving to a more sustainable economy. Failure to have such a program fails our communities and our workers who do not choose to destroy the environment but only found, through fate, that their employment was not sustainable. Worse still it guarantees unnecessary conflict - guarantees it because in the absence of an adequate transition program, workers and communities are more likely to frame sustainability questions in terms of jobs versus the environment rather than jobs and the environment. The choice of who bears the costs of transition should be a conscious one rather than one arrived at by default as the default result is that workers and their communities bear 100% of it. Now, we could look at who benefits and who has defined the problem in order to decide who should bear some of that cost and I think it's important to recognize that society, as a whole, is who defines the problem. We have defined the problem of persistent toxic substances as a whole and we have reflected that through bodies like the IJC but it's also clear and easy to say that "let the polluter pay." Now, certain corporations and individuals have clearly encouraged and profited from the production, sale and use of products that we have now decided that we should sunset. I think it's fair that
they should bear some of the responsibility for the problems they created but were we not all a part of the problem as well? Therefore, we propose something that we call shared industrial responsibility. By this we mean something broader than is usually understood by those who just want the polluters to pay. For example, are the problems created by the use of gasoline as a fuel the problems that the petroleum industry alone or does the automobile industry share some of that responsibility? It seems fair that industries that have profited by supplying and utilizing products should be held accountable. We could do this with regulatory and financial incentives. Now, in addition to that we feel that society as a whole should bear some of the costs. It's legitimate for society to decide that we no longer desire certain kinds of production but it is equally legitimate for us to ask what society is going to do for the workers and the communities that were dependent on toxic industries. Now in conclusion, a transition program for workers that provides assistance in creative ways by redefining, for example, employment is necessary to avoid intense conflict in society. The transition to sustainability will require a restructuring of the economy comparable in scale only to the industrial revolution. It's essential if, for reasons of fairness, justice, and the preservation of democracy, that the costs of society's decisions not devolve wholly onto one very narrow segment of society, namely the workers and the communities that rely on them. If we truly believe that we must build a sustainable economy we have to integrate our understanding of workplace issues with other environmental, economic and social issues. We must meet today's needs without compromising tomorrow. I'd like to conclude by just asking you to think about some issues that, while at first glance may not seem to be sustainability issues but in reality are. For example, if adult literacy suffers as a result of our present attacks on public education, will a future debate on sustainability even be possible? Will knowledge and technology be used to help workers control hazards? or to control workers? If environmental issues are destined to one day be human health issues, and given that we are in an age of organ transplants, advanced reproductive technologies, drug testing and psychological screening, are the old medical/ethical standards of "first do no harm" and "informed uncoerced consent" sufficient? Does informed uncoerced consent exist in workplaces? and if it doesn't there, can it exist in the community? Is universal health care an unaffordable luxury for countries as wealthy as ours? or is it simply a question of priorities? and what do we mean by equality? corporate citizenship? democracy? What happens when the generation and accumulation of wealth no longer generates jobs? is the distribution of wealth a sustainability issue? I think it is. These are some of the challenges we face and since time is short I'll now pass the podium over to Les Leopold.

Les Leopold
Oil, Chemical and Atomic Workers Union
Good afternoon. Bonjour. On behalf of the Oil, Chemical and Atomic Workers Union I would like to thank the IJC for this invitation. It demonstrates to us that the IJC is serious about bringing all the stakeholders into the sunsetting process. We represent approximately 100,000 production workers in oil refineries, chemical facilities, pharmaceutical plants and even nuclear weapons facilities. Almost all of our work is toxic related. We make the organochlorines that are polluting this lake. We are also the first exposed - we are your canaries. On behalf of these working people, I need to make four points. First, I need to explain why we so desperately cling to our toxic-related jobs. Secondly, I want to argue that justice for the ecosystem and justice for
working people are inseparable. Transboundary pollution and transboundary job dislocation are connected through the stateless, multinational corporation. Thirdly, I need to sound an alarm. There is a dangerous vacuum in the making that fuels anti-environmental sentiment. This vacuum is being created by the failure to develop an equitable transition program for dislocated workers; and finally, I want to offer a proposal to fill that vacuum. It is a call for a just transition to end the jobs and environment clash. So, why do workers so desperately cling to their jobs even at the expense of their health? Let me share with you a couple of stories. The first is from a conversation with a chemical operator from Bayonne, New Jersey about why he works in such a hazardous facility. Here is what he said. "Look. My family have lived around this plant for three generations. Of course I care about what it does to the environment. Maybe if I knew about all these problems 30 years ago I wouldn't have gone into this kind of work but I can't change that now. I've a family to support. My boy is about to go to college. If I lose this job, all I've worked for may be ruined. You can't expect me to give that up." The second story is from a conversation between father and son. The father, a retired African-American machinist in Chicago is gravely ill due in all likelihood to workplace exposure. The son asks his dad given all that has happened would he take that job again. The father replies, "Yes. Yes I would. I kinda knew it was harming me and probably the community outside the plant too." "But why, dad, why stay in there." "Because I had to. It was the best way out. Your sister, she's the first in this family to go to college. You, you're the first one of us to go even further. That was worth working for even if my life is cut short." Similar stories can be heard again and again from blue collar workers all over North America. Even though toxic and chemical and petrochemical jobs are among the best paying they are declining year in and year out. At the same time, production goes on and grows because more is produced with fewer. The problem is compounded by the fact that the next best job available is likely to pay near poverty-level wages. The data now show clearly that dislocated chemical workers can expect to lose 50% of his or her wages and benefits in the transition. This translates into a minimum over a lifetime of $100,000 U.S. In effect, a small proportion of us are being asked to pay a large tax so that this society as a whole can benefit. But job insecurity extends far beyond these workers. It's a general economic phenomena that impacts millions. Each day more decent paying blue and pink collar jobs are falling prey to what the Wall Street Journal calls the four horsemen of the workplace - globalization, downsizing, automation and the increasing use and abuse of temporary workers. Just since 1988, two million of the best jobs for working people in the U.S. have been destroyed. Of course new jobs were created but they are either at or below the poverty line or required four years of college to even be considered. Indeed, decent working-class jobs are now the occupational equivalent of an endangered species. But there's more than money at stake here. The health of unemployed workers is also severely compromised. We now have access to hundreds of medical studies around the world that conclusively demonstrate that unemployment is a disease. That dislocated workers and their families and their children suffer significantly higher rates of illnesses. Here's one from LANSET, a British medical journal, particularly relevant to us here today. The study compared immune response functions of unemployed and employed meat factory workers in New Zealand. The researchers found that unemployed workers suffer statistically significant increased damage to their immune functions. I must point out that this damage is not unlike that caused by dioxin. It would be a sad state of affairs if our efforts to protect the public's health by sunsetting organochlorines shifted the immunological
damage onto dislocated workers. To knowingly do so would be immoral. In short, we cling to our toxic jobs because job dislocation is a prescription for illness and financial ruin but why is there so much job security and how is it connected to the sunsetting of organochlorines. My second point is that the modern multinational corporation is the connection between job insecurity and pollution. The massive job destruction underway can be traced to the largest and most profitable corporations many of whom are represented here in this room here today. The list of recently announced layoffs in the United States reads like a who's who of the Fortune 500. It also reads like a list of the world’s largest toxic producers, users, and emitters. Just as pollution respects no national boundaries, neither does the mobile corporation. The rules of the game allow giant corporations to flee to low-wage and to low regulatory areas of the globe. They can do so with impunity because they are not held responsible for the human damage left behind. By just threatening to leave, these giants gain enormous leverage over North American public policies. To add insult to injury, the dynamic caused by capital mobility allows corporate interests to pit dislocated workers and environmental advocates against each other. At this time, capital flight transforms environmental regulations into a magnet for worker job fears. That’s because it’s so hard to have any impact on the bigger problem, unfettered multinational corporate behaviour. In fact, we are repeatedly told that capital flight and job dislocation are the natural outcomes of the invisible hand of the marketplace. We are told dislocation is the inevitable result of competitive pressures and the drive for increased productivity. These market forces appear so unstoppable and untouchable that it seems as if our jobs are being taken away by an act of God or a force of nature. But policy making is the work of visible hands - an overt act of human will. In a democracy, regulations are something tangible that can be effectively supported or opposed. A policy proposal like sunsetting provides an arena where working people can express their anger and their frustration. It becomes the lightening rod for job insecurity. The greater the overall job insecurity, the greater the jolt of lightening that sunsetting will attract. There’s nowhere to run, no argument behind which we can hide. Job insecurity and serious environment protection are joined at the hip, neither can be solved without challenging the corporate rules of the game. Now, the bad news. Unfortunately as a union, we hear far too many statements that miss the point. Most are a variation of the following - more jobs will be created in pollution prevention than will be lost through sunsetting; or, the industry’s just crying wolf; safe substitutes will be found and jobs will stay; or, it’s better for those workers anyway since they won’t have to be exposed at the workplace; or, regulations don’t really cost jobs; or, these toxics jobs are going to go away anyway as corporations downsize. To our ears these arguments sound like wishful thinking. Like an excuse for not confronting head on the worker transition problem. Every worker knows that there are simply not enough jobs to go around - decent ones that is. Every worker knows that there is no policy for making sure that dislocated workers are the ones to get the new pollution control jobs. Is it all a corporate bluff? It wasn't a corporate bluff when 1000s of tetraethyl lead workers lost their jobs as lead in gasoline was justifiably banned. It's not a bluff when it happens to you. This wishful thinking amounts to a dangerous surrender of the jobs turf. That’s my third point. By avoiding the question of job dislocation an enormous vacuum has been created. This vacuum is being filled by powerful corporate interests with much to gain from slowing down and reversing environmental regulations; by preying upon job fear, groups like the Wise Use Movement in the United States are reaching out to working people in the hope of using them as cannon fodder in their attack on
environmental regulations and I can assure that the U.S. Chemical Manufacturers Association and their Chlorine Chemistry Council are ready to fill that void on this issue before us today. As we speak, they’re working hard to build a massive propaganda machine to subvert this sunsetting effort. They have asked unions like ours to join in an alliance with the five largest corporate producers of chlorine to do battle against the environmental community. They have made it clear they have millions in their war chest. They will spend it on new studies to belittle the environmental problem. They will spend it to fan the flames of job insecurity and they will spend it to grease the political skids. Together, they say, corporations and the unions can crush this environmental initiative. What is left unsaid is that if we refuse, they will tell our membership that we care more about the fish in these lakes than we do about their livelihoods.

What should our unions say to this Faustian bargain? We say "No. Not now. Not ever." We are able to say no only because we have an alternative vision. We have a program for a just transition movement which we wish to share with you now. That’s our fourth and final point. The basis for our proposal is a simple principle of equity. We ask that any worker that loses his or her job during a sunsetting transition should suffer no net loss of income. No toxic-related worker should be asked to pay a disproportional tax in the form of losing his or her job to achieve the goals of sunsetting. Instead, these costs should be fairly distributed across society.

We propose that a special fund be established; a just-transition fund which we’ve called in the past a superfund for workers. Essentially this fund will provide the following: full wages and benefits until the worker retires or until he or she finds a comparable job; two - up to four years of tuition stipends to attend vocational schools or colleges plus full income while in school; three - post-educational stipends or subsidies if no jobs at comparable wages are available after graduation, and, four - relocation assistance. In the case of sunsetting organochlorines, we should start with a Canadian-U.S. binational fund and eventually develop a multination fund. It should receive revenues from a surcharge on the production of the substances that are target for elimination. There are ample precedents for this both here and abroad. Fifty years ago something very much like what we are proposing was the major transition policy of the United States. The U.S. developed this idea of a just transition when it was forced to redeploy 17,000,000 returning soldiers at the close of World War II. Then, as now, there were simply not enough jobs to go around. Then, as now, fiscal conservatives argued that the program was too expensive and violated the laws of the free market but what turned into the GI Bill of Rights passed and billions were set aside so that these GIs received a living wage and tuition for almost any school of their choosing.

And we now know that it was perhaps the best manpower investment ever made in the U.S. Strictly in dollar terms, studies showed that for every dollar invested in the GI Bill of Rights, six were returned to the economy and in human terms, the GI Bill opened the doors to college for an entire generation. It made the middle class in the United States. At this very moment, a similar transition fund is in operation within the European steel and coal community. To reduce the overproduction of coal and steel, a multination fund has been in continual operation since 1950 to provide economic relief, retraining and relocation expenses, of dislocated coal and steel workers. In recent years, to cope with another wave of restructuring, this fund has increased its level of assistance to the 60,000 workers who are expected to lose their jobs just between 1993 and 1995. If such a worker transition fund could help eliminate the overproduction of steel and coal, surely a similar fund could be established to eliminate the overproduction of hazardous organochlorine compounds. But in North America,
where the budget crunchers rule the roost, wouldn't such a program be totally unrealistic? Isn't it all pie in the sky? I hear this all the time and I must respond. Let me state the obvious. For centuries now the dominant Anglo-European system of economics has been based on conflict-conflict amongst peoples, classes, corporations, nation-states, and most importantly conflict against nature. The human versus nature conflict is no minor aberration of the system. It is and always has been a central feature. As a result of this conflict with nature, the global economy is rapidly reaching its ecological limits. I do not have to remind this audience of the litany of environmental disasters waiting on the horizon. Whether we want to admit it out loud or not every single person in this room knows that big changes lie ahead. Clearly, as a species we have to halt that destruction and that is going to mean making fundamental changes in what we produce and how we produce it. I'm talking about fundamental changes in the core sectors upon which all modern economies are built. I'm talking about chemical, oil, atomic, energy, transportation, pharmaceutical, just to name a few. Now if anyone thinks that a fundamental shift in production can take place without major dislocation then that is pie in the sky. If anyone thinks that the corporate invisible hand, on its own, is going to generate enough decent nontoxic jobs for all who need them, then that is really pie in the sky. If we want any semblance of a sustainable future we had better get very realistic about finding some way of getting ordinary people from here to there with their lives, their families and their hopes for the future still in tact. A just transition program provides us with at least one realistic path by which all working people can begin to embrace the elimination of toxic substances instead of fearing it. Fortunately, the IJC has already taken the first several steps to build a binational, just transition program. We commend the Seventh Biennial Report for clearly identifying the need to develop a worker transition agenda and the need for unions to be included in the process. Because it is binational, the IJC can build bridges across borders and across the jobs and environment divide. But will these proceedings really make any difference? They already have. We just received a letter from the Confederacion Sindical de Comisiones Obreras, a major union confederation in Spain. Someone had bothered to translate these proceedings and they had read them - the ones that happened two years ago. Here's what they say. "Any results you may have obtained are already a success, for you are fighting against one of the most powerful entities in the world — the chemical monopolies. This experience is encouraging from the workers' viewpoint. We too are seeking a transition to environmentally clean industry through which we can ensure retraining and relocation of all workers in the sector. We are motivated by the search for greater protection of the environment but we believe that none of these changes should harm the interests or conditions of the workers. We need as much information on how you are proceeding so that we may also demand this transition, and so that it can be done right." So let's do it right — right here — right now. If we have the courage to go forward we will have heard what working people are really saying to us all. They are saying that justice is indivisible. Economic justice and environmental justice must go hand in hand. And, finally they want us always to remember that a dialogue about justice—about a just transition—is never pie in the sky. For the sake of these workers, for the sake of their children, our children, and the Great Lakes let's join together to build a just transition movement. Thank you for your patience. Merci bien. Au revoir.

A. Hurley: I want to thank all of our presenters and you, the audience for listening carefully and for providing thoughtful questions and comments. Let me make a recommendation. All those
that would like to spend five more minutes because that presentation went over please raise your hands. It looks like a majority to meet. Is Maxine Cole here? Is it Maxine?

(male voice): No. Excuse me. I spoke with Maxine and Maxine is going to speak this evening and I gather she's asked to start at 8:00.

A. Hurley: Fine. We are now going to break for dinner until 8:00 p.m. The Lake Superior celebration dinner will begin immediately in the Lake Superior Ballroom, an event that our local planning committee has worked very hard on to organize and I'd also like to remind you that this is your last opportunity to turn in your speakers' cards for this evening's public hearing. Please deposit them in the boxes at the registration tables if you have not already done so and we will see you back here at 8:00. Thank you.
Good evening, everyone. Welcome to what we consider to be a very important part of our biennial meeting - the public hearing segment. This is where you, as participants, have an opportunity to tell us what you have been doing to help restore and protect the Great Lakes ecosystem and what you consider and your hopes are for the future. Even more importantly, we, as Commissioners, receive valuable insight and information that will help us in developing our report and recommendations to governments on progress under the Great Lakes Water Quality Agreement. We appreciate your participation in this evening's session and look forward to hearing your comments. Please know that the public hearing sessions are recorded as well as all other preliminary sessions are so we may refer back to your comments as they are needed. A few logistic details before we get started - We have many completed forms from those wishing to speak. They have been separated into seven groups of speakers - as you noticed those people who filled out request cards - private citizens, educators, government, industry, non-governmental organization representatives, scientists, or youth. What we're going to do this evening is call four names initially alternating between groups and after each speaker the previously called three names will be repeated and another name will be taken from another pile. Please listen carefully for your name and stand behind one of the aisle microphones that you see to ensure that we use all of the precious moments we have during our public hearing allotment to the best advantage. To respect everyone's desire to have his or her views heard, please limit your comments to no longer than 5 minutes. Doug, over here, will hold up a sign when you are at 1 minute. That is a signal to you to wrap up your comments and bring closure. Please rest assured that we will cut you off shortly thereafter - as politely as we can in order to hear from everyone who wishes to speak. We would also ask that, if you wish to visit with one another, that you do so in the lobby. We would like to provide those who are speaking the opportunity to be heard and the courtesy not to be interrupted. We also have several youngsters in the audience who have asked or requested to speak and we will try to get them on early in the evening for obvious reasons. We also recognize that many of you would like to speak this evening and we have marked the cards accordingly. We will try to get to all of you. However, if we do not and you are unable to attend tomorrow's public hearing session, we encourage that you send your thoughts to us either at the Windsor, Ottawa, or Washington office and the address for those offices are in your packet. We also ask that you get those comments to us no later than November 15 because then we have to begin assimilating the information to begin looking at recommendations as to how we are going to put this together. Also, the box for the cards is still over there on the side of the stage. Some of you probably haven't submitted one or may decide that you want to submit one later and as you know, there are several sessions tomorrow also for public hearing so the box is over there to our right - your left of front stage. Let me begin now and have the first four names read please.
Jim Chandler, IJC Representative

OK. Thank you Mr. Chairman. The first name we have is Kayla Olson and after Kayla, we'd like to hear from Marty Visnosky. After Marty we'd like to hear from Caryn Horton and then, I'd like to hear from Barry Boyer. Maxine Cole has asked to speak at 8:30.

Kayla Olson: My name is Kayla Olson and I am from Duluth. I don't think people are trying hard enough to keep the lakes clean. We need the lakes very much because they give us water to drink and water to get clean in. I think we should try harder to keep the lakes clean before it's too late. If we do, then the lakes will last longer and if the lakes don't stay clean your big companies that make money will have to be shut down. Then you won't get the money you want. Then you won't be happy. Is that how you want it? And, I will not have water to drink and to play in. Then I won't be happy and I won't like that.

T. Baldini: We read off four names and maybe some of the individuals are not here. We ask that they come forward and stand behind the mikes so that we can keep this moving. So maybe we should try this again, Jim...

J. Chandler: Next we'd like to hear from Marty Visnosky. And after Marty we'd like to hear from Caryn Horton, and then Barry Boyer afterwards and then Jenalle Rames.

Marty Visnosky: Good evening, Commissioners. I'd like to first thank you for allowing the citizens of the basin to speak here this evening. I'd also like the citizens of the basin to have my personal thanks and my organization's personal thanks for attending this biennial conference. I feel that this biennial conference, in light of the political changes that have taken place recently, particularly in the United States, is of the utmost importance. Particularly considering some of the mandates that the Commission, in the past, has offered to the governments of the United States and Canada. Certainly, we've given ourselves a mandate to protect human health. Is that being done? Is human health truly being protected in our ecosystem? We've certainly made progress in many areas but there is much progress yet to be done and unfortunately, in today's political times, this progress - this continued action to right the wrongs of many decades - indeed a century of abuse - is being threatened. Quite frankly the politicians in Washington, DC as we have heard this evening have launched an all out assault on what many of us have dedicated literally decades and indeed lifetimes to try and protect - to try and clean up - to try and right the wrongs of the past. I implore the Commission to go to the respective governments to stop this madness; to stop this wholesale give away to corporate America; to greedy individuals who want to take this binational resource and use it as they see fit to make profit; to make gain without regard for the effects that this will have on future generations. We have heard many speakers today, many learned individuals. You have access, through the Boards and Commissions of certain information and certain facts that are undeniable. The fact that we are, right now, threatening future generations by the continued dumping into this system of persistent toxics; not one generation, not two generations down the road; but indeed, as spoken today, six generations down the road. Does this make sense? Where is the common sense in this today of just wholesale changes. The Commission, also, in its wisdom and you've been congratulated many times today and let me again congratulate the Commission - past Commissions - for really
emphasizing the fact that we have to go forward because we are threatening our own species. Maybe it's time we all woke up. Maybe it's time the people who have appointed you, who pay your salaries and many of the regulators' salaries here today, woke up those appropriators in Washington, DC and in Ottawa and in the provincial capitols. Isn't it time to really look at what the true costs of what we're doing are? Are we actually costing ourselves? our species? Think about that for a minute. We've already cost how many different species not only in the basin but in the planet. We're costing people now by threatening their livelihoods; by actually threatening their existence because they don't know if they can eat the fish but they have to eat the fish because they have to eat to live. I say keep on - keep it on, Commission. Go get um. Really, don't back off. Don't backslide as someone said earlier today. And, don't roll over and play dead. When you go back to your respective capitols, emphasize the point that the citizens of the basin want continued regulatory controls. They want continued protection for the waters and indeed, enhanced protection. This isn't the time to stop the process. This is the time to carry on; to achieve zero discharge; and to virtually eliminate what we've done. Not for me; not for probably anyone in this room except for maybe this person behind me who is next to speak. These are the people that we have to work for not myself or people of my generation or your generation. Thank you very much.

J. Chandler: Next we'd like to hear from Caryn Horton followed by Barry Boyer, Jenalle Rames, and Lester Stumpe.

T. Baldini: Who are these individuals? What's the girl's name? Go ahead. Give us your name please.

Jenalle Rames: Jenalle Rames.

T. Baldini: Thank you, Jenalle, go ahead.

J. Rames: We are kids from Canada and the United States and we're here to try to make a difference. We dream of seeing wild animals and clean lakes and streams. We dream of a clean world; a world without pollution. We are only children yet some of us help more than grownups. We care what happens so that someday our children will get to see and live in a clean, healthy world and we also hope that you will help us so we can have a clean, healthy world for us too. Cars leaking oil; pollution factories; lots of wood cutters cutting down trees, taking the homes from animals and birds and bees - this should be a nightmare, not reality. Rivers, lakes, ponds, oceans and streams - clean and clear - that's a good dream. Wild animals, flocks of birds - we'd like this to be true - not just in words. Please help to save our world.

J. Chandler: Is Caryn Horton here? OK, now we'd like to hear from Barry Boyer, followed by Lester Stumpe and then I think it will be time for Maxine Cole at that point and then Felicia Cusic.

Barry Boyer: Good evening, Commissioners. I'm Barry Boyer. I'm Dean of the Law School of the State University of New York at Buffalo but I'm appearing tonight on behalf of another
organization, the Erie County Environmental Education Institute. Two years ago, at the Windsor meetings of the IJC, the Commission received a report from a panel of environmental educators that said many good things but two among them were "we need a clearinghouse for the Great Lakes basin educators - to be a resource for the exchange of teaching materials, curricula, audio-visual materials, networking human resources, training teachers" and secondly, it said that this organization that I represent, Erie County Environmental Education Institute in western New York, was the preferred candidate to take over that function as the Commission phased out of it. Over the past two years, we have made a lot of progress in realizing that objective and I'm here tonight to provide a brief update on the steps we're taking and the resource that we are in the position to provide to the educational community around the Great Lakes basin. First, we have managed to get funding to do very careful planning both for getting a facility and for getting an organizational plan to make the transition from the IJC to our organization to service the educational community around the basin. We will, as soon as the current tenants move out in a month or so, have space in downtown Buffalo in easy walking distance and site of two areas of concern and one lake, Lake Erie and for our friends in Canada, very convenient to the Peace Bridge where we will begin to staff up and offer the kinds of services that educators need around the basin. We have taken the collection of materials that the IJC has built up over the several years that the Commission staff was handling- environmental education materials. Those are currently being cataloged and a database that will be familiar to librarians throughout the region and easier to use and access and we will shortly begin adding to that database by reaching out to more organizations that are producing materials; getting them incorporated into the information that we can provide; making ourselves known around the basin. We recently received a draft report that was done under a subcontract from us by Mike Donahue and his staff at the Great Lakes Commission which sets forth a realistic but ambitious five-year plan for staffing up, for executing collaboration agreements and memoranda of understanding with education organizations throughout the Great Lakes region and beyond to provide a combination of basinwide coordination and local access for teachers, for students, and for others who are interested in learning more about this resource that we are all trying to protect. We will, in other words, be fully up and running and in business moving toward an aggressive, innovative, important presence in the Great Lakes basin by next year. So we look forward to working with the Commission. We thank you for your help and support. We're delighted that we were able to take over the work that you have started and carry it forward throughout the region and if anything has become apparent throughout these meetings so far it is that the need for environmental education at all levels from kindergarten through adult is absolutely crucial. We brought several young people with us here this year to learn; to report on the Kid's Summit that we held in Buffalo and I'm happy to see that others have brought the children who are the inheritors of the problems that our generation has not been able to solve. We have to make the connections, not only to the next generations, we have to make the connection between what the scientists know and the public doesn't know. We have to make the connections between what the public knows it wants and what the policymakers in Washington, in Ottawa, in our provincial and state capitals don't yet know that the future of this resource, the Great Lakes, is our future and we, at Erie County Environmental Education Institute are going to be doing our best to make sure that that's a promising future. Thank you.
J. Chandler: Now we'd like to hear from Lester Stumpé; if he's here. And then because of the time I'm going to make a slight adjustment in the schedule and ask Felicia Cusic, followed by Eleanor Roemer and then Maxine Cole.

Lester Stumpé: Thank you, Commissioners, for an opportunity to make just a brief comment and it really just comes out of my emotion of attending the sessions today. I was recently given a copy of The Prophet so I happen to be rereading it and one of the lines that I'm struck with is the line that encourages to move with passion but to rest in reason and I would certainly say that I enjoy and respect the passion that we've heard throughout the day. It's a stimulus to me but I'm moved just to say that I still am concerned about what I sometimes see as a little bit of villainization of others and others' ideas and a little bit of meanness of spirit that just concerned me today and was the reason that I wanted to make just a couple of comments. I think our purpose here is to share ideas and, as I try to do when I come here, to kind of pledge myself to be open to new ideas so I think that kind of talk and ...when we kind of disparage others really discourages that exchange and I think that it also really hurts us because it causes us not to look at ourselves and how were a part of the problem. So, what I wanted to say to you is that I think you're doing a good job in the conduct of these meetings and keeping them professional and yet I encourage you to think about ways to really help us to dialogue and to maybe use some of the social sciences to help us think about how we can do a better job of talking with each other about issues that we are passionate about and so it's a thought...maybe a thought for some future meetings. And, I would just say one other thing is that it strikes me ...and whenever I go to public meetings and I hear things and sometimes I come away a little bit tense about things that have been said...it strikes me about the value of the RAP process because the RAP that I'm associated with ...I know we see each other in a sense of community and I just think it's a very positive process in working in that kind of...that sense of community where we see each other and work through the difficulties and have respect for each other. Thank you.

J. Chandler: Now, we'd like to hear from Felicia Cusic, followed by Eleanor Roemer, and then Maxine Cole and Jenna Conley. Is Felicia here?

T. Baldini: Maxine, as you know when we ended the last session ...at the close of the last session, you agreed that you wanted Maxine to speak to you and present her project and what she was ...wanted to do earlier for ten minutes and Maxine, for those of you who know her, coordinates the Eagle Project for the Assembly of the First Nations. Maxine ...

Maxine Cole: I was also told that I would be given ten minutes...is that true?

T. Baldini: Yes

M. Cole: I've elected to give five of those last minutes to the Ontario Regional Vice-chief of AFN, Gord Peters so I will begin.

First off, I think as evidenced today that there are two very different perspectives that we are dealing with here and I see it all the time in the project and I've been involved with this project
for four years, is that because of the two cultures, we think very differently. What happened here, I feel, was very disrespectful to myself because I was an invited speaker here and not given the time. With that said, I’d like to go further and comment more on those two cultural values. First off, in one of the opening remarks today, I heard "our lakes are ours." I, as an aboriginal person don’t feel that way. Our lakes are a gift from the Creator. And, with that I am intrusted with the protection and the restoration of that lake; of the waters; of the land; of the total ecosystem. I am part of it. Those creatures, the other elements in the ecosystem, don’t need me; I need them. And we celebrate their life and the life in the total ecosystem by ceremonies in my own culture. Our grandchildren and generations yet unborn trust us that we’ll take care of our ecosystem. Another comment I’d like to make is that as Native Americans and First Nations People, are we really considered legitimate partners? In what I hear the IJC promoting in literature, and in talking about all the time is what is a true partnership? I’m sure it’s not the first time the IJC has heard this. But in the Eagle Project the only thing that’s made us a success is that it’s a true partnership in that we have a lot of community participation. We have over three hundred square kilometres to cover in our study area and with that, sixty three First Nations. I’m rushing a bit here because I’d like ... I have to get a lot said. And in that, the only way we’re successful is by putting regional staff into each of the lakes in an office and they, in turn, go out into the communities to actually discuss and air those peoples’ concerns and bring that back to the workgroup and see how it fits in to our study framework. It’s evidenced by partnerships with not only federal agencies, the Ontario Ministry of Environment and Energy, Ministry of Health, Health Canada, Dept. of Fisheries and Oceans, and there are just so many agencies that we are a true partner with. In the communities, we have our eating pattern survey which there is none other in North America. We have the largest database for the Aboriginal population and that success is due to the communities becoming involved and with the regional staff out there pushing for involvement and encouraging those people to get involved in the work that will benefit everyone in the study area. As I said, this hasn’t been done before in the Aboriginal population. A lot of what we are finding is standard indicators doesn’t accurately reflect the health and so we’re out there again groundbreaking and trying to find. provide a true picture for people as yourself to develop policies to protect our health and to make sure that this ecosystem is restored and protected. With that, I’d like to just go through some recommendations that we’d like to put forth and I’ll submit this as a formal document.

One, if it is truly our lakes, our health, and our future, a process must be put in place which recognizes and affirms the inherent right of First Nations government in the role as legitimate and functional partners in carrying out the goals and objectives of the Great Lakes Water Quality Agreement. Based in our traditional relationship with the environment, Aboriginal People possess a wealth of information and knowledge which can add to and complement the scientific and technical knowledge of existing research methods.

Secondly, the Eagle Project is developing baseline data which will accurately reflect and monitor the environmental health status of the Aboriginal population in the basin. This will assist all communities in the basin to develop strategies to protect their health and environment. The models used by the Eagle Project were developed and implemented by the communities thereby insuring meaningful community participation and accuracy.
Thirdly, due to high consumption rates of fish and wild meat the population in the Great Lakes, the Aboriginal population, is at a higher risk to contaminants. When the average Canadian Great Lakes person, which warrants, or more so that the average Canadian Great Lakes person which warrants a review of existing water quality guidelines. Based on a review of current methods both countries utilize, national average consumption rate of fish which is significantly lower than the average Aboriginal consumption patterns.

Fourthly, revision of water quality criteria and standards should be employed across the waters with no regard for the international or state boundaries. Revisions and development of these standards should respect the inherent right of Aboriginal self-government which is recognized in the Canadian Constitution.

Fifth, the risk assessment process should include qualitative methods to measure the social, culture impacts which have detrimental, long-lasting effects that are evident through community changes. The effects start with the individual, impact their families, communities, nations, and confederacies which either thrive or fail depending upon a relationship in contact with the land. Risk assessment process can not ignore the impact of contaminants to human conditions which affect the overall health and wellbeing of individuals and communities and these human health conditions can only be identified based on the values of the affected communities and must be incorporated throughout the entire process.

Six, multipartnerships, multipartnerships, not bilateral, must be developed at all levels from the technical to the political. The appointment of Aboriginal commissioners from the native Americans within the United States and from the First Nations within Canada would ensure that Aboriginal populations who are at high risk will be included in all phases of the restoration and protection of our lakes. An October 23, 1993 Windsor, Ontario copy of a resolution to appoint Aboriginal Commissioners to the IJC was presented at the IJC’s 7th Biennial Meeting and Gord Peters would like to address that. Thank you.

**Gordon Peters**: Good evening, Mr. Chairman, Commissioners. My name is Gordon Peters. I'm the regional representative for Ontario with the Assembly of First Nations. I wanted to address this issue of partnership and I also wanted to address the issue that was raised...some people think and I assume the remark was made to some speakers this afternoon in referral to being mean spirited about the kinds of things that were said this afternoon in recognizing that more than just non-natives are involved in the issues that we're dealing with. I come here this evening and I stand here and I understand the anger and the frustration that people feel. The things that are in their hearts, the things that are in their minds; the things that they see. I came from a standoff that took place in one of our communities and on September 7 of this year Anthony W. George was shot and killed by the Ontario Provincial Police while he was protecting an ancient burial ground of his ancestors. Governments denied that there was a burial ground there but after he was shot governments produced documents saying that there was an actual burial ground there. And where we say in these kinds of situations certainly aren't enough to be able to stop the pain that a lot of people feel. But we come back and we continually say to people that for decades we have put ideas and solutions on the table which we believe can help
to foster the kind of environment that people can work together in; an environment where people can feel free to express their minds and their views; an environment where people can trust each other; an environment where there's honor and honesty and a true partnership between peoples. In Canada, there is a recognition of our aboriginal treaty rights that is contained in the Constitution. In the United States, the treaties have been recognized but yet we have a very difficult time, as peoples, when we come forward to have any kind of full participation and full recognition of our peoples in these kinds of commissions, committees, and other institutions that are established to try to address things on a partnership basis. It's time for us to have that recognition as original peoples. It's time for us to have full participation. I don't want to see other things happen. We've always advocated to people that we can work things out if we go to the table and our elders have always told us to go back to the table and try one more time. But we need action. We need support from people that are here in this room to make things happen. We need support from the Commissioners that are there to carry our message back to both governments to say that we need to be full partners in this process. That's the message that we want to send to you this evening, to the people that are here. We're willing to do our share; we're willing to carry our load; we're willing to participate as full partners in any process that people set before us. Thank you.

T. Baldini: Thank you.

J. Chandler: Now we'd like to hear from Eleanor Roemer followed by Jenna Conley and then I'm going to call again two people I called earlier who weren't here then - Caryn Horton and Felicia Cusic.

Eleanor Roemer: Good evening. I'm Eleanor Roemer from the Lake Michigan Federation which is a four-state environmental organization working on a wide range of issues affecting Lake Michigan and its surrounding environment. I'm here tonight, however, to urge the Commission to address the growing problem of nuclear waste stored on the very edge of all the Great Lakes. Our lakeshores have become nuclear waste dumps. Millions of pounds of irradiated waste is now stored at 36 nuclear facilities. The storage is essentially permanent in that there are no removal plans; there are no operable transportation plans; and there's no safe repository. The Federation joins others and urges the Commission to apply the virtual elimination concept to radionuclides and to take a hard look at making the Great Lakes shoreline into a nuclear waste dump. Specifically we would like to recommend that the Commission establish a working group of the Scientific Advisory Board to address this crucial matter. This hard look should include looking at the nuclear waste storage without adequate assessment regarding the impacts on the environment of the design and the site and also the exclusion of the public from any meaningful involvement given the generic approach which the Nuclear Regulatory Commission has decided to use. The hard look should also include looking at the decommissioning issues; the safe shut down of these 36 nuclear facilities which will be happening it's happening now and it will be happening into the next century. The Commission needs to assure that there is sufficient funding for the safe shut down and that the waste issues are included. The current policy seems to be to exclude waste from decommissioning planning. And finally, and very importantly, we wish to recommend that the hard look include ways that
the public can be meaningfully involved not only in the plans which are made now but in the monitoring that needs to take place over time. It is essential that the Commission set up this working group in order to address the lack of any kind of policy that addresses the long-lasting toxic legacy which we are irresponsibly leaving to future generations. Thank you very much.

J. Chandler: Now we'd like to hear from Jenna Conley followed by Caryn Horton, Felicia Cusic and Dale Perry.

Jenna Conley: My name is Jenna Conley and I live on Lake Superior. I would like to talk to you about pesticides especially lawn chemicals that run off into our lake. Lawn chemicals kill song birds. They can give dogs and cats cancer. Children who live in houses where parents use lawn chemicals have a six-times greater chance of getting leukaemia than other kids. I think lawn chemicals are dumb. Why does it matter if you have dandelions on your lawn? Isn't it more important not to poison our birds, cats, dogs and us? I think we are more important and our lake is more important too. Thank you.

J. Chandler: Is Caryn Horton here? or Felicia Cusic? Then we'd like to hear from Dale Perry followed by Olive Hunt and then Bruce Lourie and Liane Casten --I believe it's Liane Casten.

Dale Perry: I'm Dale Perry. I represent God's Green Earth and I would like to thank you all for your attention - sitting up there all day long and I believe, for one, I've been boating in the Great Lakes now for practically all my life and I'm just really happy. My primary recreation area is Lake Erie and I really enjoy the difference that you and all the people in this room have made in the beauty of the Great Lakes. I would like to help in some way to clean up the Great Lakes. I was in the mining business for 20 years and I would like to use the technology and the things that I learned in the mining industry and some of the mining equipment to build an environmental dredge that could take contaminants off the bottom and put them in proper disposal sites without resuspension or near zero resuspension of the contaminants or the solids. I would do that with a page??? 732 machine that has independent motor drive and unlike most dredges that are out there today, it has an infinite control of its lines, its hoist and a drag line and instead of having lines that come over the tip of the boom like a dredge and they vary their operating radius by raising and lowering a boom, I would like to do that with the drag cable and the mining industry to pull the bucket so that instead of having a suspended load that hangs there from one point you actually have two loads. You have a cable that pulls it in and a cable that picks it up. And also this machine has state of the art thyristers??? and chips that have the capabilities of a digital drive that I would tie into a computer that would give exact positioning of where the bucket is and where the bucket needs to go even though the operator cannot see it. In order to do this, I would need financial help of course, but the biggest thing is the site because it seems like the people I've talked to in the different government agencies of the United States and Canada that there is a lot of sites - there's 42 sites that need some form of remediation - but I don't know of any that are licensed, permitted, and ready to go because in the summer of next year I could successfully remove, without resuspending the contaminated...where the other sediments off the bottom but it ..you know...somebody has to tell me where their going to put it. I will go anywhere in the Great Lakes system and conduct this service. I believe in my plan and
I just need somebody and I know there's somebody in this room that knows how to go about taking this machine into an area and making a difference with the Great Lakes. The problems with actually doing that seem to be that nobody can agree on whether contaminated sediments should be disposed in a CDF or whether they should be incinerated. They should be...what exactly needs to be done with them, but when the engineers and the scientists figure all that out and when the RAP coordinators have it all planned and if there's a site to go anywhere in the United States or Canada I can do what I say I can do. I can take the contaminated sediments or the noncontaminated sediments off the bottom and put them wherever they want within reason. I mean I can't take them a hundred miles away or 200 miles away but what I'm anticipating is a vessel that will take the material off the bottom, put it in its vessel, take it to where it needs to be properly disposed and then offload it without spilling any of it into water or putting any of it where it doesn't need to be. Thank you very much for your attention.

**Olive Hunt:** Well, I have a fact for you. When we get older the health of the lakes will be up to us. My mother has always told me to clean up after myself. Well, now it's my turn. All you adults listening, please clean up after yourself. The earth and lakes need our help before it's too late. We are taking advantage of these lakes. This is the 8th Meeting of the International Joint Commission. Things have been done but it's not enough. We have pleaded with you. Now we just plain need help. If we join together we can do a lot more but we need to do it quickly. It seems to me it's all about money. It's true, money is important but is it that important that you destroy the lakes? It makes no sense. If the lakes are no longer usable so many people and animals will suffer; even you. Stop pretending it's not happening. Think about what the lakes provide us with—clean, fresh water, animals, so many plants, most of all a safe place for children to play. If nothing else will persuade you to think of it, think of it this way—the lakes are like our children. We need to care for them, protect them, and love them. Before I go, I want you all to stop a minute. Think about what I've said. Is all of it worth it? Please stop the fighting. It does no good. Join a different fight; a fight to end pollution. Thank you.

**J. Chandler:** Next we'd like to hear from Bruce Lourie followed by Liane Casten, Rachel Davis, and Shirley Thompson. If Bruce is not here, Liane...

**Liane Casten:** OK, thank you. I'm Liane Casten. I'm basically going to address my remarks to the audience as much as to the Commissioners and I want to talk about media and I want to talk about the power of media. For the most part in this country we have twenty major corporations owning most of the mainstream press. There have been efforts...and the mainstream press, today has very little reporting going on. NBC is owned by General Electric so we are not going to hear much about nuclear pollution or the problems of nuclear waste storage. The New York Times and the Chicago Tribune both at one time...I'm not sure about the New York Times at this point - Tribune still does...they both have pulp and paper mills that use chlorine to bleach. They were part of a massive effort to detoxify dioxin about five years ago and when they finally had to face the reality that maybe the EPA has discovered dioxin is really more toxic that it wanted to believe, those stories went on maybe page 3, 4, or 5. It was not making front page on any level. Our local, national public radio station, WBEZ, admits they need to have an environmental reporter but won't put one on staff. So, I can promise you most of the people in Chicago know...
nothing about an IJC Commission meeting. They just don't know it. OK. What we have, instead, is a giant, media conglomerate pushing corporate messages and what are those corporate messages? We've got to buy plastic, our children are going to survive in little incubators because of these wonderful, plastic isolets; we've got massive ads; we've got Chlorine Chemical Council, people going out with million dollar budgets telling everybody how important it is to maintain the use of chlorine. We are fighting a massive education program. What are we going to do? It's a mighty message machine for polluters and that's fundamentally who sits on the boards of these massive media conglomerates. It's fundamentally what the message to America is so if you, all those out here, every one of you is not part of the problem, I urge you to become part of the solution. Find anywhere you can go to get this message out; become more proactive than ever because you're not going to get the compliance of an already corporately-owned media.

**J. Chandler:** Now we'd like to hear from Rachel Davis followed by Shirley Thompson, and then we'd like to hear from Marvin Awes[sp] Jr. and Ann Hunt.

**Rachel Davis:** I'm Rachel Davis and I've tried to think of things to say for this and I'm going to express myself the best way I know how.

(Song)
As the wind slips over you
Water
Sing to me sweetly
Superior
Sing me your Chippewa story
Under a quarter moon

Who has walked along a shoreline
Sweetly sing
Sweetly sing
Ancient footsteps washed before mine
Under a quarter moon

Who, like me has sat adreaming
Sweetly sing, sweetly sing
Down by your crystal waters gleaming
Under a quarter moon

As the wind slips over you
Water
Sing to me sweetly
Superior
Sing me your Chippewa story
Under a quarter moon
Who has heeded your subtle warning
Sweetly sing
Sweetly sing
Of coming storms with icy winds roaring
Under a quarter moon

As the wind slips over you
Water
Sing to me sweetly
Superior
Sing me your Chippewa story
Under a quarter moon

Would that we possessed your vision
Sweetly sing
Sweetly sing
Ancient waters bathed in wisdom
Under a quarter moon

As the wind slips over you
Water
Sing to me sweetly
Superior
Sing me your Chippewa story
Under a quarter moon

Under a quarter moon

**J. Chandler:** Now, we ask Shirley Thompson to try to top that.

**Shirley Thompson:** I want to commend the IJC for making the links — for making some good points — making the links between human health and the environment but I think you're missing some key points when, in the IJC program instead of looking at reproductive hazards you look at only male gonads. Yes, we know the effects on sperm and how it's decreasing at 50% but we know, also, that hormone copycats are affecting women; we know that from DES studies. These hormone copycats increased endometriosis, increased breast cancer; increased uterine cancer. I think you're also missing some key points when you're looking only at fish — at biomagnification and bioaccumulation in fish and not looking at beef and other meat. Like the Wendy's commercial, "Where's the beef." There is bioaccumulation and biomagnification occurring here. We know, from a recent study, that organochlorines that bioaccumulate in meat-eaters to a thousand times that in vegetarians. Another key point that is being missed is looking at immuno-deficiencies as concerns asthma, which is increasing in severity of attacks and also in prevalence, especially among young people and this includes transboundary pollution which the IJC should be concerned about. Also, concerning immuno-deficiencies is environmental illness
or 20th Century disease when people become hypersensitive to chemicals and potentially 15% of the population is potentially environmentally sensitive so these...as well as commending the IJC, I also want to recommend that they look at these issues and include them in future discussions.

**J. Chandler:** Now we'd like to hear from Marvin Jr. followed by Ann Hunt and then Ward Hodge and Aimee Crowley.

**Marvin Awes:** Evening everyone. I'm Marvin Awes. I'll keep from singing for fear of noise pollution but I represent Cass Tech, Earth Tomorrow, Detroit and an increasingly growing group of [unclear]. I have travelled a great distance to "chew the fat" about something for which I care deeply. This topic, which is worth driving a day and a half, mind you, is the Great Lakes. For some reason, many businesses think it fashion to pollute the Lakes. Now I'm not here to point out corporate America's blatant disrespect for the environment or even its insensitivity towards the needs of Mother Nature. I could have done that at home. I'm here simply to be a part of the solution. Some claim that they don't know the answer while some don't even know the question. Regardless of what category you fall into, it is all of our responsibilities to help protect and preserve the Great Lakes. Now I'm really not a very good speaker and I don't like to talk real long either because I can see that all of you guys are tired so hopefully I've reached somebody in the audience. Thank you.

**J. Chandler:** Now we'd like to hear from Ann Hunt followed by Ward Hodge, Aimee Crowley and Guy Williams.

**Ann Hunt:** Good evening. When I was telling my daughter to clean her room I didn't think she was paying attention but obviously some messages get through. My comments tonight are based on a story by Tom Beaudette who's a writer from Homer, Alaska known for the Motel 6 commercials. Alaska, like the Great Lakes, has much of its economy based on the waters that surround it. This story follows the Exxon Valdez oil spill, an event that impacted the community, polarized it, and destroyed many sacred places. The parallels have become obvious as the story develops. It's a story about an old man who lived in Alaska in this little town for about fifty years and he had this special place; it was a clamming beach and it had the sweetest little butterclams you could ever find anywhere. It was also the beach where he fell in love with this wonderful young woman. But then one day he went out to that butterclam beach; his wife had passed away; this was a long time later and always on his anniversary they would go to the beach and when he first got there everything looked ordinary until he reached his hands down and he came up with gooey, sticky mess and he said: "A deadly rage," he says, "A rage all too common in those days since the oil spill built again in his seventy-five year old frame and he forced himself to look away. He looked to that quiet little town and thought of the others. Those who would stay to help clean up and those who would live there happily but he no longer could and he remembered back to the meeting; the first one - the one that changed everything and everybody. The one that let all of us know why Fritz Ferguson couldn't live at the end of the road anymore. This was a meeting like so many of us have attended. The visiting experts sat on long folding tables in the front of the room. There was a coast guard officer looking solemn and
competent; there were two bearded biologists from state and federal wildlife agencies. There
were open-collared representatives from the DEC, the EPA, the DOT and every other jumbled
combination of three-letter agencies that they could find but all the real attention was focused on
one hangdog and rather tense-looking oil company representative in the middle. There's no
doubt he was tired; he'd heard it before. He had just arrived from similar town meetings further
up the way and Fritz could tell he pretty much knew what he was in for. There are lots of people
speaking at the meeting. There was the oil man who spoke first and explained that they were
doing 'everything they possibly could' and gave all the scientific data on it; there was a fisherman
that talked about what was going to happen to him, a woman got up -'I'm a mother. I'm
concerned about my children.' There was even a fellow that got up and said 'You cry babies are
driving me nuts. You've been living off this oil for years.' And then there was the resident expert
that talked about the economic impacts of the oil spill. Finally, Fritz decided to seize the
moment and he stood up and he said, 'You all know me. I've lived here over fifty years and saw
most of you come to town. As you know, I sold the newspaper last year after Meredith passed
away. I figured I'd retire and live out my last years enjoying the scenery. It's a little lonely
without Meredith but her memory is everywhere I looked but that was OK. There's this little
clam beach over across the way - you might know it - Eden Cove. That's where Merry and I met
and courted and it's still the most amazing little butterclam beach I've ever seen.' People looked
at each other and nodded in agreement. 'We went to Eden a lot and always on our anniversary.'
He describes further, 'Our anniversary was last week and I took the skiff over there by myself to
just reminisce and such. When I came onto the beach everything looked the same at first and
then I started seeing all the little blobs of oil. I got this rage built inside of me that makes me
almost blind. It pounded in my chest and it squeezed water out my eyes because that no part of
Meredith was left there anymore and I've waited a week and it won't go away. Everytime I look
over there it happens again. That's why I'm coming up in front of you tonight—to tell you why I'm
leaving town.' Fritz stopped and a mumble of wonder went through the townspeople as he tried
to think of a way to finish. 'I'm not blaming anyone so much as I'm just taking care of myself.
I'm an old man and I can't live my last few years being so mad. I'm going back to my family in
Illinois where I might die of boredom but at least I won't leave this world full of bitterness.'
The room was moved to silence. No one spoke. The pastor stood up and he said quietly, 'I wonder if
I might leave us with a benediction' and they all bowed their head in reflex and he said, 'Dear
Lord, you have created for us a near perfect world, one of wonder and bounty, security and
beauty; You've crafted in Your a delicate ornament that shines in Your firmament like a jewel in
Your holy crown and You've saved Your best work for what we know. This great land is a land
like no other, from the highest of our mountains and glaciers to the bottom of our abundant seas,
there is nothing but treasure. In our carelessness and lust for man's desires, Lord, we have
tarnished Your treasure. We have killed Your creatures, fouled Your golden shores and it seems
larger than we are.' He stopped for a pause, put his hand out on Fritz' shoulders and there was no
oilman in the room or an agency expert or an environmentalist or a fisherman or a mother; there
were only some small and very worried human beings who felt with all their hearts that the only
words the pastor could find to finish his prayer 'O Dear God,' he said looking up, 'We are so
sorry.'"

(applause)
J. Chandler: Now we'd like to hear from Ward Hodge followed by Aimee Crowley, Guy Williams and RoseMary Oliviera

Ward Hodge: Good evening. I speak tonight as a loyal American citizen. My name is Ward Hodge. I bring you greetings from the thumb of Michigan. Part of my input is the same as it was when I testified before your Cobo Hall task force in Detroit in 1992. I asked you then to stay the course you set for yourself in 1991 in Traverse City, Michigan. Even in this beautiful city on a Lake Superior shore we must face harsh realities. I support the organochlorine zero discharge campaign. To create a sustainable future, we must clean up the Great Lakes. To do this we must also clean up our political pollution. The very foundations of our representative government is threatened today as an alien ideology - an alien ideology in Washington DC and in Lansing, Michigan. So we must move forward on a broad front with sharp words. Grassroots activists must accomplish a number of tasks in the future. Your International Joint Commission can help. We must spread the word that the next century must be far different than the last if life on this planet is to survive as we know it today. We must serve notice on Mr. Newt and his congressional clones to stop passing on their environmental responsibilities to the states. We must derail the express train growth of limited liability multinational corporations who'll take over this planet if we let them. I wish you to witness the firestorm of antiregulatory legislation being proposed and passed in these United States. These actions do not reflect the wishes of a majority of our citizens. It is no secret that corrupted government officials do now allow corporate power brokers to help write this nation's laws. I have to ask - will we have to cross that rude bridge that arched the flood again and start a new revolution to restore democracy on the banks of the Potomac? Your task is a formidable one. I wish you well in the future. Thank you for this opportunity to speak this evening.

J. Chandler: We'd like to hear from Aimee Crowley, followed by Guy Williams, RoseMary Oliviera and Chris Hayday. Is Aimee Crowley here?

T. Baldini: Give us your name please.

J. Chandler: Guy Williams?

Guy Williams: Good evening. I'm Guy Williams and I'm glad to be here-my first time at a function such as this. Greetings to the Commissioners. I'm here representing myself; representing my employer, National Wildlife Federation and in some ways, I'm representing my brothers and sisters of African American and Native American heritage and I want to share a dream with you tonight - a vision. I want to commend you for the start that you've had in this process, your predecessors especially have laid a great foundation and set us on a wonderful path but I want to challenge you to rise up to a higher level and to set yourself a target for carving a niche that you'll be remembered for. You've heard the voices of the children; you've heard the voices of concerned scientists and others. The facts are there. What are we going to do about it? I know...my own impression of their virtual elimination process that's been begun by both governments - you probably heard earlier today that several people gathered about a month ago to comment on that progress and the public interest sector unanimously asked the governments
to go back to the drawing board. The primary reason why is because we felt they backed away from your very own recommendations on virtual elimination and zero discharge. There is no middle ground. The other thing I'd like you to consider is to look at the faces in this crowd and remember the faces from this morning. For myself, I just had a really wonderful dream come true here because about a month ago I sat in front of a group of young people and I challenged them to pick something that made a difference to them in their environment; stand up for it and take some action. And you just heard a gentleman from Cass Tech High in Detroit speak. He was in that circle of youngsters. And I'm offering you the same challenge tonight. In the next two years pick out something, Mr. Murphy - Mr. Béland - Ms. Hurley - Mr. Baldini - Ms. Chamberlin. Pick out something that's really special that you can grab ownership of and make a difference. I offer you a challenge to diversify the attendance in these meetings. A few weeks ago I helped chair a meeting; somewhat of a pep rally; a pre-meeting to this event for people who could not attend and we discussed the issues and we came up with some consensus of what could be done to make the process better. One thing was that you folks really - it would be helpful if you put a tighter look on your own remedial action plan program and the participation of the public. We had people there saying that they were screened as members of the public whereas non-members of the public or people you might consider professionals had easy access to participating on these boards. It was recommended that you pick up the ball in education. You heard the discussion on media earlier tonight. Same theme came up there. Simply, there's not enough people who really know the dangers that they're facing and that's one thing that you can make a difference in. You can get the word out. You can crank up your own media machine and, as my brothers and sisters from the First Nations group said, we're all ready to pick up the ball and take our share of the load. So again I want to commend you for the good start that you've had but challenge you to press on and take this to a higher, even more virtuous level. Thank you very much.

J. Chandler: Now we'd like to hear from RoseMary Oliviera, followed by Chris Hayday, Ginny Yingling and Daniel Green.

Rose Mary Oliviera: Hello, I'm RoseMary Oliviera and I thank you very much for allowing us all to speak here this evening and I also thank you for sitting here and listening. I am from the Sierra Club from Milwaukee. I'm a volunteer and I'm a government worker. I'm a faceless government bureaucrat. You get to look at my face tonight because I am also a victim of cryptosporidium-the happy little parasite that visited Milwaukee a couple of years ago. It started out, we believed that the city really had a really bad case of the flu. By the time it was all over 400,000 people were sickened by this parasite which we got through our drinking water. Over 100 people died. My particular story, if you are interested in tax-payer dollars, I left work for 3 days. When I returned there was no one to work with. Everyone else was sick. I spent a week in the office cleaning out my drawers, filing, doing--catching up on reading--it was nice but not a lot of government work got done for about 2 weeks. Schools were shut down; entire government departments were shut down; county government and city governments. So, if you're impressed by taxpayer dollars, a lot of it was literally flushed down the toilet in Milwaukee. I'm fortunately alive to laugh about it; there were over 100 people who are not. Also, there were a lot of pets that were affected by this. They drank our water also. They ended
up at the vet. People ended up in emergency rooms which were flooded to overflowing causing a strain on our medical community not to mention our probably increased insurance rates for those people who are lucky enough to have insurance because there are many people who are unemployed or underemployed and don't have insurance. In Milwaukee, they ended up at the County Hospital at taxpayers' expense. I don't know whether anybody has actually put a dollar amount on what happened in Milwaukee, but is this simply a preview of what's coming? Is this a preview of what's coming in the United States? and in Canada? because we're not paying attention. I discovered to my amazement that cryptosporidium had been around for years. I'd never heard of it. I'd been in the environmental realm for about 10 years as a volunteer. I'd never heard of it. And there's really no way of repaying people for this lost time; mothers and fathers in emergency rooms with children with uncontrollable diarrhea. This is the kind of thing that kills children. It's the biggest killer in third world countries of children. Our population was thoroughly at risk. I'd like you to go back to your governments and encourage them to keep our environmental laws strong not weaken them. (applause) We need to remember who's at risk; citizens are at risk. Profits are important but taxpayer dollars are also important. Also, the lives of our citizens; the lives of our children; the lives of our pets. We need to be remembered by your governments, by my government; by the Canadian government. I'd like you to take that message back. Thank you very much.

J. Chandler: Now we'd like to hear from Chris Hayday followed by Ginny Yingling, Daniel Green and Kenneth Mavec.

Chris Hayday: Good evening. My name is Chris Hayday and I grew up in Lake Ontario and I say "in" because as a child that's where I spent most of my youth. I was since transplanted and regret and feel violated having to move to the landlocked state of Missouri and would like to someday return to our Great Lakes. I, again, will come back to the "in" part. I can't tell you how many hours I spent swimming in Lake Ontario and Sodus Bay. How many hours I spent sailing on Lake Ontario and I've lost count of the tons of fish that I've caught and eaten from Lake Ontario and Sodus Bay and as a child I didn't know what PCBs were; or CFCs, organochlorines or...I didn't know what that was. I was a young, carefree child and as an adult, after hearing all the impacts that these things have had on our lakes, I'm scared. I am downright scared to raise a family; to think that I could be a chemical...potential chemical soup and I don't want to pass it on to anyone and I'm scared of what we may be...what...the road that we're headed down. I would like to discuss the issue of public property versus private property. There's currently a big push here in the United States for private property rights. This is basically the concept that the individual has the freedom ...scratch that...the right to do with their private property whatever they like and as harmless as that may sound, what is often forgotten for whatever reason is the responsibilities that come along with that. You have the freedom to do what you like and with that freedom comes great responsibility. You have the responsibility not to negatively affect the public property. This is very, very important to consider. As humans, being the social creatures that we are, we work with each other; we help each other; we look after each other. The public interest...the public good is inherently greater than the private interest. That is one of the most basic concepts to human integrity that the public is always greater that what you, as the individual, feel. If a private interest, say a factory, wants to discharge waste water into a public
property such as the Great Lakes they have violated the public property and if the factory wants to produce pollution, if that's what their private interest is then fine; then you do that but you store your pollution on your private property not in the public property. It's yours. I don't want it. (applause)

J. Chandler: Next we'd like to hear from Ginny Yingling followed by Daniel Green, Kenneth Mavec and Colleen Bonniwell.

Ginny Yingling: Thank you. My name is Ginny Yingling. I'm the Associate State Director for Clean Water Action here in Minnesota. I'm also a volunteer with the Sierra Club and I wanted to thank you for this terrific weekend. It's a wonderful opportunity. I also want to thank the citizen organizers who helped to put it together. But today has been an extremely frustrating day because although we talk and we study and we assess risk and we work very, very hard and all of us are working very, very hard things just don't seem to be getting any better. They seem to be getting worse. Rates of cancer, respiratory illnesses, behavioral problems are all rising. Populations of deformed animals are being discovered across this nation. We just had a population of deformed frogs found in Minnesota that people are stunned and horrified by; 50% of those frogs are deformed in one wetland area. Thousands of people are dying from drinking their tap water every year and our wetlands continue to disappear and meanwhile our Congress tells us that our laws have gone too far and our industries tell us that everything is OK. Just don't eat your broccoli. I fear that this will always be true so long as our political system is controlled by corporate dollars and as long as we continue to reward industry for degrading the environment and devaluing human beings. I would much rather stand here and talk to you about the human and spiritual reasons of why we should protect our earth and I would like to think that that would make it change but unfortunately everything seems to come back to money and so here goes.....The first problem that I mentioned, the influence of corporate money on politics is one that everyone in this room is going to have to fix...we're going to have to put every ounce of our energy, our anger, and our courage into taking our governments back but the second problem, I'm asking you, the IJC to address. I want you to include in your recommendations and evaluations the problems of the way our tax structure forces industry to harm us. You've done a great job of identifying the chemicals and activities that threaten the web of life in the Great Lakes basin and you've made sound recommendations to our governments and we thank you for that but the problems are still mounting. I urge you, now, to consider recommendations to change the tax system which causes industry to maximize consumption of our resources because they are cheap and to minimize their work forces because workers are considered too expensive. This system causes environmental destruction, waste, pollution, and unemployment. Germany and Sweden are changing their tax codes to promote closed-loop manufacturing, pollution prevention and providing living wages. Milwaukee is using tax incentives to attract clean businesses that pay living wages. Many people, like Paul Hawkins, have written on these ideas and I urge you to study them and then make recommendations for similar changes to both of our governments. Further, as the labor speaker said so well today, I urge you to recommend that our governments reverse their rush to trade policies that pit countries against each other in a bidding war to offer the lowest environmental and labor standards that, too, attract industry. I also urge you to recommend the National Just Transition Program outlined by Richard Miller of the Oil,
Chemical and Atomic Workers. If, as they say, money makes the world go around then it's time we put a different spin on it. I'd also like to mention to everybody here in this room that cares about the boundary waters in Voyageurs National Park and is concerned about the attacks on those two precious public lands here in Minnesota, we're having a rally at our state capitol to show our support for our lands October 7...it's a Saturday...9 to noon on the west steps of our state capitol. If you need more information come see me. Thanks.

J. Chandler: Next we'd like to hear from Daniel Green followed by Kenneth Mavec, Colleen Bonniwell and then Diane Jensen.

Daniel Green: [Opening spoken in French, as translated] I'd like to thank the Commission for giving me the permission to be here and to be understood by everyone, I'll speak in the language of Shakespeare. The St. Lawrence River, as it flows into Quebec, is an orphan as it relates to the IJC. Its mother, the Great Lakes and its community forgets that it is part of the ecosystem and this is recognized in a legal document called the Water Quality Agreement. The Water Quality Agreement says and says this to me, almost as a personal insult that the parties agree to protect the Great Lakes and to apply the very sound approaches that the Great Lakes water quality gives us...virtual elimination, public participation, control of chemicals and the parties refuse that this approach applies to my waters. The St. Lawrence River flows by Montreal. It is there; it's on the map, and yet since 1982, since I've been coming to these meetings the Canadian, the American and the Quebec government refuses to accept the fact that what somebody "flushes" today in Detroit ends up in Montreal tomorrow. Article 1 of the Great Lakes Water Quality Agreement says that the Great Lakes System means all the waters, streams, lakes and rivers, and bodies of water in the basin of the St. Lawrence River at or upstream from the point at which this river becomes an international boundary between Canada and the United States. That point at which it becomes a boundary is Messina, New York, two inches east of that point is the Quebec/St. Lawrence River and this Commission has failed to recognize the right of the Quebec people to have the same protection the people of the eight Great Lakes states and the province of Ontario benefit from the Great Lakes Water Quality Agreement. (applause) If you read the Boundary Water Treaty of 1909 it says the countries agree not to pollute boundary waters and waters crossing the boundary. As the water flows into Quebec, it flows across the boundary. Thus, flowing across the boundary is a fact. Another fact is the Water Quality Agreement is in relationship and it's an abilitating treaty is the Treaty of 1909. Thus, it could be argued that the Water Quality Agreement by not including Quebec is illegal if we apply the strict definition that the drafters of the 1909 Treaty wrote and this is why we're here this evening. This situation is all the more illogical that all studies confirm that the Quebec that the St. Lawrence River in Quebec receives 40% of its loading from the Great Lakes. All the mirex that we see now in the beluga whales, and Dr. Beland knows this quite well, comes from the American side of Lake Ontario. Quebec and the people of Quebec are a victim of contamination without representation. Just at that border we have the General Motors superfund site, the most highly PCB contaminated sites in the basin if not in North America and again, because of this aberration, because of this illogic oversight in the Agreement, the Quebec government has no leverage as per the Great Lakes Water Quality Agreement because of this exclusion. We hope that this exclusion will be solved by this present Commission. There's a new government now in the province of Quebec. It's a government that takes its sovereignty and the protection of its water seriously.
T. Baldini: Could you wrap up please — your time is up.

D. Green: I understand. What we're proposing to the Commission is proposing to the Canadian government and to the Quebec government a language change which will read like this now...

T. Baldini: Why don't you just submit it to us, OK? The language change...

D. Green: The Great Lakes System...

T. Baldini: Excuse me - you've gone over your time, just submit us the language would you please.

D. Green: Pardon?

T. Baldini: Your time is up.

D. Green: Yes.

T. Baldini: OK - and I would ask that you submit the language to us, OK? Thank you.

D. Green: ...The Commission has a great opportunity to do something. I hope they do it to rectify this injustice. Thank you.

T. Baldini: Thank you.

(Applause)

J. Chandler: Now we'd like to hear from Kenneth Mavec followed by Colleen Bonniwell, Diane Jensen and Lisa Yee.

Kenneth Mavec: Hello. I'm Ken Mavec. I'm a registered respiratory therapist from Euclid, Ohio - it's the Cleveland area on Lake Erie and I want to reiterate what was mentioned about the asthma epidemic. It is really becoming frightening and you can't put a dollar value on the time spent in the emergency room of the parents worrying about their kids being able to breathe and it's pretty well paralleled ....(end of tape)

K. Mavec: (cont'd from tape 6) ... respiratory care, our professional organization. And we passed a resolution calling for a phaseout of chlorine, and polyvinyl chloride plastics are well, we used them a lot in my profession. Our ventilator tubing is PVC and our medicine nebulizers are plastic and meter dose inhalers have a lot of plastic in them, and the hospitals use a lot of plastic unnecessarily in bedpans and emesis basins, our packaging is chlorine bleached paper. And so we want to try and change that.
And I won’t read the whole resolution but basically, due to the evidence of persistent toxics and bioaccumulation problems and the dioxin is linked to cancer in humans and the immune system and reproductive effects appear at body burdens even a hundred times lower than those associated with cancer, we call for a phaseout of chlorinated plastics, as soon as possible and elimination of any incineration which puts uncontrollable emissions in the air, and that a rapid phaseout should be a priority with immediate action given to PVC uses with shortlife such as toys, packaging and quickly-disposed-of products, areas susceptible to fire, including construction and things in cars and in products recycled in smelters. Thank you very much.

Philip Slyfield: Next we will have Colleen Bonniwell, followed by Diane Jensen, Lisa Yee and Christine Myers.

Colleen Bonniwell: Good evening Commissioners and everyone, and I am grateful that I can be here and grateful for your concern. I want to give thanks for this day to the Father sky who brought us here and the Mother Earth who has given us, each of us, everything that we have. I am kind of used to being rushed through things so I kind of put my notes aside and will try to remember it the best I can. On my message I would like to state that this is the sovereign homeland of the Anishinabe people, that Manitoba, Ontario, Minnesota, Wisconsin are all sovereign homelands of Minnesota, or I mean of the Anishinabe people — excuse me, I’m a lifetime resident of Minnesota so I am kind of obsessed with what is going on in Minnesota.

As an anti-nuclear activist, I watched our state government sovereignty sold out to the nuclear industry in May of 1994, and I have had to shift to kind of a psychic level to keep up with the realities of what means after 15 years of fighting the nuclear industry. The privatization of the nuclear industry undermines all of our freedoms and all of our basic needs, and so I focus on that. The nuclear industry has made it very clear to me that I will be retaliated against if I go over the boundaries. It is not just our own lives it is the lives of our family members, it is maybe our homes, our education.

We are retaliated against as activists at every point in our activities. So, being that as it is, I would like to put this to the people that it is a treaty violation to pollute the waters, that there is an Agreement that the land and waters be shared. It is an international agreement, it is a constitutional agreement, it is based on natural laws that the indigenous people here, the Anishinabe people, it is covered under these treaties, the Grandfather Treaties in 1794 and 1795, right through 1855 and through the end of the Treaty-making era, that the lands and waters be held onto.

I would like to question specifically why the U.S. government is allowing the corporations, particularly the nuclear corporations or any of the poison spewing corporations — I would also like to add at this point, that this poison is spewed from our hearts — and I would like to know why they have constitutional rights when they have no responsibilities? The people have all the responsibilities, but they don’t have any of the rights. And the corporations have all the rights but no responsibilities; and it is causing a problem for all life!
Without a conscience how can an entity uphold a law. In our constitution it is at least as much as the people have to enforce natural law, and that has been totally undermined. We have got players, people create plutonium, people who create poisons. And at this point, the children deserve better, needless to say, but the pre-eminent jurisdiction over the land and water is the All Maker and if you are going to impose a jurisdiction, or any government imposes a jurisdiction, over the Anishinabe true jurisdiction, then you better get busy with your government. I mean I take an active role in the government, in that being a daughter of every American war, we put down our weapons before World War II, the plutonium legacy doesn't allow us to continue. I suggest that any women that want to go into the citadel, to rather than go fight heartless battles, to fight the toxins, to fight what we are doing to all life. The Mother of All Life is crying, she is sore.

P. Slyfield: Next we would like to hear from Diane Jensen, followed by Lisa Yee, Christine Myers and then Bob Olsgard. Is Diane here? (No) Lisa Yee?

Lisa Yee: Good evening, Commissioners. I represent National Wildlife Federation from Ann Arbor, Michigan. So I have also come quite a long way to be here today. First I would like to commend the International Joint Commission for its work to make the Great Lakes ecosystem healthy for both people and wildlife that depend on it. The second message is, I would like to challenge the International Joint Commission to continue the important work and not to ease up on its oversight of the governments.

Since the Binational Plan for Lake Superior was signed accepting the challenge to make Lake Superior a zero discharge demonstration zone for persistent toxic chemicals, the governments involved have been slow to respond. In fact it has been four years since the Plan was signed and no actions by the governments have been taken to establish even one zero discharge demonstration zone on the Lake Superior basin.

Despite government inaction, some communities have moved forward to work within their own communities to begin working toward the zero discharge goal. National Wildlife Federation is currently working with Northland College in Ashland, Wisconsin in collaboration for that university to become the first zero discharge community on the Lake Superior basin. National Wildlife Federation had a zero discharge campus conference in Ashland, Wisconsin in February, 1995. We brought together universities and tribal colleges from all over the Lake Superior basin to begin the exchange of ideas and strategies in achieving zero discharge communities.

It is our belief that campuses are many communities of themselves and that educational institutions have both the research power to work toward the zero discharge goal and are in the unique position as educational institutions to teach others and to reach out to folks in the Great Lakes communities to teach them techniques to achieve zero discharge.

I guess my main message to you today, is that people here in the Great Lakes do care, we are very concerned and we are very dedicated to the goals of zero discharge, but we need your help. Again, I want to thank the International Joint Commission for recommending the zero discharge policy and I encourage you to stand strong on this commitment. Thank you.
Christine Myers: Hi, my name is Christine Myers. I am not a very good public speaker so you will have to bear with me. I think the International Joint Commission has been doing a great job with what they have been doing. But I think in all this high tech jargon, a point has been missed, and that is who is doing the actual work with their hands, with the labour? And that is the youth. And I come from Sault Ste. Marie, Canada and I love my country. I am representing White Pines Collegiate and Vocational School. We have taken on the Lake Superior Basin Project as a mean feature of our school; we have adopted a beach; we have planted trees — we have done so many things — we have done recycling programs; we made a drama presentation, that astounded many people in our city — it was to teach people about the effects of the environment, without boring them to death. I think that the youth have been doing so many things, and I attended the conference in Ashland, Wisconsin the past spring and I saw so many young people between the ages of nine and 19 and they have done so many things for this environment, and I can see how much they actually care. So I just wanted to point out that sometimes in the media, teenagers are accused of doing so many bad things, and teenagers did this, and teenagers did that, but from my point of view I see that teenagers are doing a lot of things that are helping and I don't want to be stereotyped with everybody else because I am not doing the bad things, I am contributing to my society and my future and wellbeing.

And I am encouraging people to come to the Youth Forum tomorrow and see the projects that we have done, see the things that we have done with our hands, that actually you can understand that you don't have to read documents to know what we are doing, you can see the actual results, and I just encourage everyone to come out tomorrow morning. Thank you.

Bob Olsgard: I want to thank you. I'm Bob Olsgard, I'm with the Lake Superior Alliance. But I'm going to take off my Lake Superior Alliance hat, we do have more than two dozen environmental groups surrounding Lake Superior. What most concerns me is, my job as a County Commissioner in Washburn County, State of Wisconsin, it is the next county south of Douglas County here. I have to work on both sides of this issue, and I have to listen to people who are very concerned about the preservation of their wetlands, who are very concerned about the future of their clean water. They know we don't get anymore new water, and that is all we're talking about. We are dealing with the same basic resource that has been here since the dawn of time, if you believe in the dawn of time. What are we going to do about it?

I have been all around Lake Superior in the last few weeks, talking to people who are just fed up with going to meetings. They are ready for action and yet here we are at another meeting. We are talking to ourselves. So I want to challenge you Commissioners, you have the tools, you have the Great Lakes Water Quality Agreement, we have the tools, we have the outstanding
national resource, water designation for Lake Superior, we have the Great Lakes Initiative, we have the tools. What we don't have is the engaged public will to move forward as a nation, and as an international community of the Great Lakes. There are almost 50 million people surrounding the heart of the water of our continent — the richest continent on the globe — and if we don't have the will to fix this toxic sewer and restore it to the well of life that it was given to us... it was a gift, we didn't pay anything for the Great Lakes, now we claim it is too expensive to turn it back into a well, so that it can sustain our grandchildren. That is a crime! You will hear from Native people that it is a crime, you will hear from me that is a crime, but what we mostly need is ACTION. People want to do some thing. So I challenge you to come up with action, implementation to carry forward the work of discovery to make the Great Lakes Water Quality Agreement the virtual elimination of toxic substances, from the Great Lakes Basin Ecosystem.

I was at a meeting of journalists in 1992, in Toronto, Ontario where I told them — and I think they thought I was kidding — that what we had to do was engage a teach-in for the Great Lakes basin on water quality issues. So that every man, woman and child in the Great Lakes basin knew what they were up against: that there is increased chances of disease, increased chances of, heaven knows how many more diseases than we have even discovered yet, and what they could do: what their legal options are, what their community-organizing options are. Because there are countless counties and municipalities, and town governments, all around the Great Lakes basin that aren't even taking advantage of the legal tools that are available to them right now.

So, I want to issue you a challenge to engage this teach-in to the Great Lakes, so that when we come back two years from now, we have a report on what has been accomplished, how many more people have been contacted, how many more municipal governments, county governments, town governments; how many more linkages there are: legal, tribal, other organization linkages. So that we can really move from talk, to action. Thank you.

P. Slyfield: I have four cards from individuals indicating that they need to speak this evening and I believe they will be our final four for the evening. The first, Robert Eliff[sp], Walt Bresette, Susan Michetti and Michael Boyce.

Robert Eliff[sp]. Thank you. My name is Robert Eliff[sp] and I am an assistant project director with the Minnesota Center for Environmental Advocacy, a non-profit environmental group based in St. Paul. One of our current projects funded by the Joyce Foundation is seeking to reduce the amount of persistent bioaccumulative chemicals that are entering the Great Lakes, by entering into an intensive dialogue with representatives from a specific industry to try to help them overcome the barriers that are preventing them from implementing pollution prevention activities. Unlike similar projects, MCEA plans to engage in discussion those who greatly influence the demand for these products, as opposed to dealing with the manufacturers which supply them.

Two of the industries that we are examining are among the largest users of products made from polyvinyl chloride, or PVC, that is building construction materials and medical bags. MCEA's research indicates that PVC products are responsible for a significant proportion of dioxins in
our environment. These dioxins are produced both when PVC is manufactured and when it is incinerated. A recent study by the Center for the Biology of Natural Systems estimates that 70% of the deposition of dioxins to the Great Lakes is from medical and municipal waste incinerators, for which PVC is the main contributor. Fires in buildings also contribute PVC when buildings that contain PVC materials also contribute significantly to dioxin in our environment.

MCEA supports the Commission's goal of virtual elimination of the discharge of persistent toxic substances from the Great Lakes and its recommendation to sunset the use of chlorine and chlorine-based products, including feedstocks. So, accomplish that goal. MCEA also supports the position of Greenpeace and other environmental groups that because of PVCs potential for environmental harm, because of its bioaccumulative and persistent nature, the Commission should recommend PVC as the first substance to be phased out in the basin. Accordingly MCEA also recommends the Commission initiate a planning process to shape and guide the implementation of a PVC phaseout in order to minimize the costs and dislocations that such a policy will entail.

The outlines of such a transition planning process are contained in a report issued this past May, by Great Lakes United entitled, "Planning for the Sunset," which discusses the PVC phaseout in detail. We think this document can serve as a catalyst to begin the planning process. Declaring a phaseout is one thing, but planning for it is going to make it more likely to happen. Thank you.

P. Slyfield: Now we would like to hear from Walt Bresette, followed by Susan Michetti and Michael Boyce.

Walt Bresette: Thank you, it is going to be great in two years when I come here and I see the eagle feathers staff of our nation up there as well. For those of you from Canada, though my name is Bresette I am not from Ipperwash. I haven't been to Kettle Point yet, nor to Stoney Point. However I just came from Gustavson Lake, near hundred miles hence. And what I want to report there is, I saw a little sign and it said "$10 fine for polluting." I drove through Minnesota and it said, "55 means 55." I just want to remind you, "Zero means zero."

I stand before you as a member of the indigenous environmental network. And we buried a woman in Bad River some while back, a grandma, who ate fish from the wildlife polluted by the papermills of Minnesota. We have right-handed walleye here. When they come out of the St. Louis, they go down to our families in Wisconsin and they go up the Bad and other rivers down there, and our people eat them down there. So I just wanted to tell you that. And as a member of the indigenous environmental network, we are obligated to meet with different communities.

I also am a council member of the National Environmental Justice Council of the United States Environmental Protection Agency and our next meeting will be in December in Washington, D.C. And I am here to report to them on your actions.

Finally though, the reason I am here is to invite you to the people's rally tomorrow. It is just outside, good sunshine. And the people will be there. And I am going to ask that that get
recorded and everything said out there be submitted before you for testimony as well.

I come before you as a committee member of the Seventh Generation Committee and I wasn't planning on speaking tonight, I was going to read this to my friends, but after coming here, I decided perhaps you should hear it too. "Who will care for things after we have gone?" Well, the IJC should be acknowledged for beginning to address important environmental issues facing the Great Lakes. Let's hope that meaningful resolutions are not too late. In our lifetime we will survive, as will the lakes. But what about the generations to come; what will they inherit? Today we take another step forward by speaking out and acting out in defense of our home. Sometime way in the future, someone will read or hear of this gathering. If we are successful, they may even recall who was there. Your great, great, great grandchildren will tell stories of your bravery and your selfishness. They will tell stories of how a long time ago their ancestors turned the tide, so that they may live to tell stories. Some of us have been worried about those unborn generations, and we have a proposal for you to consider. And so for your Canadians, you can take a break, this is for our U.S. people.

We are calling it the Seventh Generation Amendment, a response to current anti-earth legislation in the U.S. Congress and an acknowledgement that these rights we all claim to hold so dear, also reside for the future generations. Our amendment is necessary because there is no safe place for common property. There is safe haven in the Fifth Amendment for private property. And if we do nothing now and let the corporate raiders throw the babies out with the bathwater, then there will literally be no safe places for our descendants. We have an obligation and they have a right, therefore we propose the following language: "The right of the people to use and enjoy air, water, sunlight and other renewable resources determined by Congress to be common property, shall not be impaired, nor shall such use impair their availability for the future generations."

May the Great Spirit who looks over this sacred lake look kindly on your heart and allow you to step forward today so that as we enter our elder years our children will care for us, like we today are caring for them. We must always remember that water is always more precious than gold.

P. Slyfield: Our next speaker will be Susan Michetti, followed by Michael Boyce.

Susan Michetti: I'm Susan Michetti. I am a citizen from Wisconsin. I commend the IJC for its fairness and honesty in listening to all concerns about the Great Lakes water quality and for creating truly the most scientific approach and the most democratic forum for information collection, research analysis and recommendations that I think has ever occurred on this world. This process of truth seeking by listening comes from the expansion into the most scientific methodology by virtue of its broadest base, that is being accomplished for the first time in history. And this comes from dealing with true realities upon which our health and ecosystem depend. Congratulations.

And also based on events which unfolded this afternoon, this democracy needs to be expanded further to the Native Americans, to the Nations. And this means going the extra mile to understand cultural differences so that proper respect is given to those who are culturally
different from the mainstream, particularly when the exotic human species is European and the native species is aboriginal Anishinabe. This implies some learning and growing pains. I think we can all appreciate this.

And then as an eco-feminist I ask the IJC incorporate into its checklist, research methods to examine if each project balances the male and females sexes equally, particularly since many effects demonstrate differently in females than they do in males; and we need to incorporate methods that ensure that this balance is not inadvertently omitted. Distribution of data also needs to be equally targeted towards both sides of the sexes and this requires development of plans to work in this direction.

Next, northern Wisconsin is slated not only for a mine in Crandon, but also a metallic sulfide mining district of up to 22 mines is in the works, right now. This will adversely impact the water quality in the Lake Superior and Michigan watersheds. I ask the IJC to carefully monitor developments, collect the facts, analyze the situation, support the tribes and other stakeholders opposing the mines, and I ask you to work with Fred Ackley and Jim Smith and others from Mole Lake Indian Reservation which will suffer the immediate effects of toxics from sulfide mining that are being proposed by the Exxon mine. They need help.

And specifically I ask that you file the draft EIR for Exxon at Crandon that is currently out for comment, that proposes a significant water diversion from the Great Lakes basin to the Mississippi basin. In addition, drinking water standards and other issues are of concern.

And I ask for the nomination of representatives from Native nations to be added to the IJC or else to the Council of Great Lakes Governors which has veto power over water diversions and input into other important issues.

And I would like to also state that as I child I drank from Pike River in southeast Wisconsin, with my hands with no treatment. And I had no breathing problems at that time as a child. And now I can't drink water anywhere out of any stream, anywhere with my hands, and I have to have treatment of water and I have trouble even drinking a lot of the treated water. And I have asthma, allergies and several other respiratory problems. I think that that is a state that things are getting worse. Thank you for listening.

P. Slyfield: Mr. Chairman, the last speaker this evening will be Michael Boyce.

Michael Boyce: Thank you everyone. I won't be the best speaker you will hear tonight, but I do have the privilege of being the last. First, evidenced by the presence of you on the stage being here and those of us in the audience also being here working on environmental concerns, evidenced by our endurance and our patience, I think we all owe each other a round of applause. Thank you Commissioners for the opportunity to meet with you this evening.

I am the administrator for an organization called the Great Lakes Regional Corporate Environmental Council. The Council was formed in 1988 through a grant from the Charles Mott
Foundation and Consumer Power Company, to bring together in a nonadversarial forum environmental organization and corporations all within the Great Lakes region, to work on environmental problems affecting the Great Lakes basin ecosystem.

I first have a challenge to those in the audience that might represent corporations and environmental organizations in this region and to you on the stage who perhaps can help direct corporations and environmental organizations to join in with the Great Lakes Regional Corporate Environmental organization or other similar groups to try to work on problems of this sort.

Secondly, the word hate should be reserved for only extreme special circumstances, it is a powerful emotion. But when it comes to environmental quality I hate failure. I think all of us hate failure, both on the stage and off the stage. Yet, I want to talk to you tonight about failure, because perhaps the biggest challenge facing all of us today is our failure — my failure, your failure, our failure — which is evidenced by the mindset of the 104th Congress in the United States and the Government of Canada trying to cut the budget by 30% of Environment Canada, by the actions that we see our 104th Congress taking, and by the lack of mass public outrage at all of this.

Our biggest challenge is going to be in educating the public and our political leaders both now and in the future, as to the grave importance of environmental quality. We only have one earth; it is a finite place. And we can't continuously go through and destroy this finite piece of real estate thinking that somehow magically it will all work out in the end. We have to take action and the action we need to take right now is education, so I challenge all of you on the stage and all of you in the audience to develop strategies between now and the next biennial conference of the Joint Commission, to come up with a strategy that will effectively reach the masses in the public and the hearts of our political leaders. Thank you again for all of your patience and all of your actions.

A. Hurley: Thank you and let me just close. I'm afraid our time has expired for this evening. For those of you who will not be joining us in tomorrow's public hearing sessions and who did not get an opportunity to speak because of time constraints, we strongly encourage you to put your thoughts on paper and to send them to us at the Commission offices by November the 15th. The biennial meeting will begin promptly at 8:30 tomorrow morning with six concurrent workshops, in smaller rooms near the registration area, and the Forum on Remedial Action Plans will take place in the Lake Superior Ballroom. Have a good evening.
Thomas Baldini  
*International Joint Commission*

The Great Lakes Water Quality Agreement, which was first signed in 1972 and revised in 1978 and further amended in 1987, obligates the Governments to undertake programs and other measures to restore, preserve and protect the waters of the Great Lakes Basin Ecosystem. Under the Agreement, the International Joint Commission evaluates programs in progress and provides its advice to Governments. In formulating its advice, the Commission secures input from a number of sources.

This biennial meeting is garnering input through a series of insight presentations — which we had yesterday — a number of concurrent sessions, — which many of you attended this morning and some more again tomorrow — that focus on specific subjects relevant to achieving ecosystem quality, the public hearings — held last night and which will continue later this afternoon. The Commission also received input from three other vitally important sources. The signatories to the Agreement — the Government of the United States and Canada — recognized the need for the Commission to receive focused expert advice from those who are involved with developing the science and policies necessary to achieving the goals of the Agreement, as well as advice from those who are most intimately associated with program implementation.

The Agreement originally signed more than 23 years ago established the Great Lakes Water Quality Board to be the principle advisor to the Commission and to include an equal number of members, presently totalling 20 from the United States and Canada, including representatives from the two federal governments, and from the state and provincial governments. The Agreement also established the Great Lakes Science Advisory Board, which is charged to provide advice on research and on scientific matters. The Science Advisory Board is presently composed of 18 members drawn from a wide variety of scientific disciplines. The responsibilities of the Science Advisory Board are rather broad and in order to ensure that the Commission receives the advice it needs, the work of the Board has been divided. The Council of Great Lakes Research Managers was created in the mid-1980s to focus specifically on research that is underway, or needed to be achieved to accomplish the goals of the Agreement. The Council presently has 22 members and includes researchers who are intimately involved with research programs and are well poised to advise the Commission.

I realize that this is a rather long preamble, but it is necessary to understand the context for the presentation that we are about to receive this afternoon. Therefore, without further ado, I would like to introduce the Chairs of the Great Lakes Science Advisory Board, Mr. Tony Wagner and Mr. Michael Donahue. Tony comes to us from the Waterfront Regeneration Trust in Toronto and Michael is Executive Director of the Great Lakes Commission in Ann Arbor. Mike and Tony will be assisted in the Board's presentation by Dr. George Lambert who is at the Robert...
Wood Johnson Medical School, University of Medicine and Dentistry in New Brunswick, New Jersey and serves as cochair of the Board's Ecosystem Health Workgroup. Gentlemen...

GREAT LAKES SCIENCE ADVISORY BOARD

Michael Donahue, U.S. Cochair
Chair Baldini, Chair Hurley, Commissioners and other friends of the Great Lakes, good afternoon and welcome to this presentation of the Science Advisory Board. As Chairman Baldini mentioned, my name is Mike Donahue and I am the appointed U.S. Chairman of the Science Advisory Board. My institutional home is with the Great Lakes Commission which is an interstate policy, research and development organization, and of course in my Science Advisory Board responsibilities, I and my board colleagues serve in a personal and professional capacity.

I am joined by Mr. Tony Wagner who serves as the appointed Canadian Chair and in our brief presentation today, we hope to accomplish four objectives. First of all we want to introduce you very briefly to the mandate, structure and membership of the Science Advisory Board; second, to review priorities pursued by the Board over the last two years; third, to present our biennial report to the Commission and meeting attendees, highlighting principle recommendations; and finally, we would like to highlight in additional detail the Board's investigation and recommendations associated with one area of particular interest, that being the human health impacts of exposure to chemicals in the Great Lakes basin environment.

The Science Advisory Board is one of three entities that serve the IJC in an advisory capacity under the terms of the Great Lakes Water Quality Agreement and as noted on this slide and mentioned a moment ago, the Water Quality Board and the Council of Great Lakes Research Managers also provide scientific advice. The Agreement of 1978 defines the terms of reference for the Board and as noted on the slide, it is designated as the advisor to both the Commission and the Water Quality Board. And further is noted, the Science Advisory Board shall be responsible for developing recommendations on all matters related to research and the development of scientific knowledge pertinent to the identification, evaluation and resolution of current and anticipated problems related to Great Lakes water quality.

We are organized into three working groups, each of which addresses a principle responsibility under the Board's terms of reference. The Workgroup on Ecosystem Health embraces an ecosystem approach in interpreting and advising on public policy issues that both affect and are affected by ecosystem health. It is charged with identifying means to measure and assess ecosystem health and it also takes an anticipatory approach relative to identifying injury to biodiversity and ecosystem integrity. The Workgroup on Emerging Issues also has an important anticipatory role, in that it identifies, evaluates and provides scientifically-based recommendations on emerging issues. And finally the Workgroup on Parties Implementation focuses on the Great Lakes Water Quality Agreement and identifies and evaluates obstacles to the Parties implementation of that Agreement. And this workgroup is also charged with
providing the Commission with recommendations on steps to improve the implementation process.

Over the last two years, the Board has focused its efforts in six priority areas. These were identified and selected as part of an open and extensive screening process that involved input from all Agreement institutions and many interested agencies, as well as organizations and other stakeholders in the basin. As noted here, these priorities include: Scientific Advice Related to Toxicological Mechanisms; Weight of Evidence; Climate Change; Followup to the Earlier Efforts of the Virtual Elimination Task Force; Parties Programs for Toxics Reduction; and Measuring Ecosystem Health.

I would like to acknowledge at this point in time, the fine work and commitment of my fellow board members as well, as the many members/other individuals that serve on working groups. And just as an aside, the International Joint Commission, I believe, has a very enlightened view of science and recognizes that sound scientific advice is not and cannot be the exclusive domain of any single scientific discipline. The composition of our Board reflects this view, as it is comprised of experts in the physical and biological sciences, the social sciences, economics, law, human health, ecology, urban and regional planning and others. Coupled with the expertise drawn from our workgroup members the Board of 1995 is perhaps the most multidisciplinary group ever assembled under the terms of the Science Advisory Board.

At this time it is my pleasure to acknowledge the several Canadian Board members and Workgroup members in attendance, and I would like them to stand and be recognized as I call their names: Rosalie Bertell, Brian Gibson, Ian Rutherford, Paul Muldoon, Michel Slivitzky, George Werezak, Mike Zarull and also we have present Workgroup members, Mark Goldberg and Ross Hall.

At this time I will yield the floor to my colleague Tony Wagner who will introduce the U.S. members and associates present and he will also introduce the Board report, its key findings and recommendations and also introduce Dr. George Lambert who will conclude our presentation with a special focus on one of the many areas of inquiry the Board is involved in. Tony?

Tony Wagner, Canadian Cochair
Thank you Michael. Chairs Hurley and Baldini, Commissioners, Ladies and Gentlemen. I should perhaps at the very outset clarify something that is in the program. Anybody who may have looked at it, just may have noticed that my initials are the only initials that are indicated in the program. Everybody else is identified by one of their first names, and I think to that extent I owe a debt of gratitude to Stephen Spielberg because some of you may think my name was too long to write it out, but ET does not stand for extraterrestrial, so I just want to clarify that at the outset. I would like to go through the U.S. members of the Science Advisory Board: Anders Andren, Stephen Brandt, Jack Day, Barbara Knuth, of course George Lambert is up in the front here, Suzanne McMaster and Jay Unwin. Then of course, we have a number of the working committee people here as well, I believe: Theo Colborn, Katsi Cook, John Magnuson and Mila Simmons, I don't think that they are here. Michael has indicated previously what the priorities
were of the Science Advisory Board so there is no need to pursue that any further. I will go through the report essentially very, very quickly so we leave more time for the issues really that we are going to be addressing, and that will be George Lambert's issue. I will go through in terms of the sections of the report, I will not specifically deal on any of the recommendations, they are in the report itself, you should all have a copy of it and you can take a little more time to deliberate on that.

Essentially the first section of the report deals with the summary of recommendations in the report itself. But the second section essentially deals with that of ecosystem health. And the scope of the task force was essentially focused on human health issues in the context of ecosystem health, specifically addressing the impacts of the ecosystem on human health and the role of human values in defining the health of an ecosystem. And the recommendations are here, I will not go over them, people at the back probably won't read them anyway from that distance, but again they are in the report.

The weight of evidence chapter essentially deals with facing uncertainty. Three methodologies were used to determine weight of evidence. When is it sufficient, when do we have sufficient evidence on which to base conclusions and make policy decisions? We cannot always find a smoking gun, and even sometimes bloody socks are hard to determine. There are recommendations in the report as well. We have two recommendations dealing with this issue specifically.

The fourth chapter deals with toxicological mechanisms. This is the topic that George is going to speak on in a little bit more detail in a moment or two. We have one specific recommendation, and along with it are nine recommended specific actions together with that recommendation.

The next chapter deals with federal, provincial, state toxic reduction programs and related activities within the Great Lakes basin. Essentially, what is the state of our Toxics Reduction Program? As well, what are some of the other related activities that the two main agencies, and the province and state are involved with? We have two specific recommendations there. This is the Toxics Reduction Program — the recommendations are in the report.

The virtual elimination chapter is essentially a followup of the actions of the Virtual Elimination Task Force. The Commission in its Seventh Biennial Report endorsed that strategy, and indicated their support for the Virtual Elimination Task Force framework for action. There are five recommendations that are indicated there, ultimately to indicate how we can go forward. What are the next steps that we might recommend to the Commission in terms of followup of the Virtual Elimination Task Force?

Climate change: we are told that three of the hottest summers of this last century occurred within this last decade, this last ten years. Is it because I am hot up here or is the climate really changing? This is an issue that has many research activities associated with it on a global basis. Also there are quite a number of local Great Lakes basin issues that are dealing with the question
of "climate change" and we are trying to track it for the Commission and we have also got three recommendations brought forward to the Commission with respect to this particular topic.

The last section is that of identifying and assessing emerging issues. What do we see as possible concerns that are on the horizon — little red flags that we might raise for the Commission? We have six specific issues that we have raised and in that very short chapter we have also identified the assessment process that we used in order to zero down the multitude of potential candidates for issues for the future.

And finally now I would like to introduce George Lambert. The only thing I am going to say is that he is highly qualified to speak on this particular topic, but I am going to leave his credentials for you to read in the profile booklet that is part of your handout at the beginning. George?

**George Lambert, U.S. Cochair Workgroup on Ecosystem Health**

Commissioners, ladies and gentlemen, good afternoon, bonjour, sago. In the next ten minutes, I would like to review some of the IJC recommendations that the SAB submitted to the Commissioners on endocrine disruptors.

The IJC supported the SAB in their efforts to hold a Wingspread conference on endocrine disruptors focusing on the human situation. This conference was held January of 1995 at the Wingspread Conference of the Johnson Foundation which supported by donating the facility and much of the support of the conference. In this conference we brought 40 of the world's best investigators who are dealing and working with endocrine disruptors. And this afternoon, what I would like to do is just review, we only have about eight minutes so we are going to review quickly what was discussed there in its most cursory and global issues, and then we will get into the SAB's recommendations to the Board based on the work of that conference. What we will discuss this afternoon will be what we know in the wildlife, the human data that was discussed at that conference in regard to the general trends that were discussed this morning, and particularly some recent studies on cohorts of exposed populations, then we will discuss what we need to know, some of the general rules that we should go about approaching in this data gathering, and then the recommendations.

In the animals of course, many environmental factors such as loss of habitat and environmental chemicals can alter endocrine function. At least 48 chemicals are known to alter the endocrine systems. Every endocrine system has been shown to be affected: reproductive, thyroid in men and in all the other endocrine systems having shown been affected by environmental issues. Most every other mammalian organ system, such as neurobehavior/immune etc. can be secondarily affected by the altered endocrine function. Many disease states such as cancer can be influenced by altered endocrine function, and this may be decreased or increased. The time of life when the mammal is most susceptible to endocrine disruptors is during development.

What we know about the human, as discussed this morning at the workshop on testicular and male reproductive function, there has been an increase in undescended testes in the male over the
last 30-40 years, there has been an increase in the testicular cancer rate and prostate cancer rates, puberty is starting earlier in life and sperm counts, are probably — if you look at the weight of evidence at least — sperm counts are probably decreasing over the last several decades. These are some of the general worrisome trends that are present in the scientific literature.

Now what do we know about environmental endocrine disruptors on the human, and what do we need to know? Well, there are several cohort studies that are very important to look at, and these are just beginning to be published and they are the first data on humans exposed, and particularly the second generation, the kids in utero exposed to environmental contaminants. The first ones are the Yu Cheng Cohort, the PCB/PCDF exposed cohorts of Taiwan. These individuals were contaminated by eating rice oil contaminated with high levels of PCBs and dibenzofurans. But from the studies that are presently in press we see elevated TSH or thyroid dysfunction, we see delayed sexual maturation during puberty in Tanner(?) stage four and five, the end of puberty, ages 14 and 15; we see shortened penises at the end of puberty, and a decrease in the boy's capacity to analyze spatial relationships. As you probably cannot see because of the focus, this is just one study presently being published and we surely need additional work to collaborate these findings.

This is just one of the piece of data that I selected to show. This is looking at children exposed in utero to the PCBs and dibenzofurans and looking at Raven's Progressive Matrix which measures the ability to understand and deal with spatial relationships. Spatial relationships are gender-specific, in that boys deal better with spatial relationships than girls, and even in that part of the brain the male brain is larger in that area that deals with spatial relationships, than the female. In the Yu Cheng children who were exposed, the higher numbers mean better ability to look at these relationships. And as you can see, the controls, the girls are lower than the boys and in the exposed which is in the bottom left hand side of the graph, the exposed boys have lower Raven's Progress Matrix scores than the control boys and even lower than the control girls. In addition, Yu Cheng cohort again shows the children are more sensitive to the toxic effects than the adults were. In a Japanese study of several years earlier, exposed in 1969 to a very similar accident, they reported menstrual difficulties, and both studies reported reproductive losses in those carrying children at the time of the exposure.

In the Seveso cohort, several recent studies have shown — and this is the cohort exposed to extremely high levels of dioxin after a chemical plant blew up in the neighbourhood in Milan — but we know that in these studies there have been some cancer rates, fibrosarcomas, that have been shown to be slightly increased. But as endocrine responsive cancers in some of the initial work, it looks like there is a slight decrease in the incidents of breast cancer.

There was one study that has just been published about ten months ago, from the Dutch literature, and the Dutch study is published in Pediatric Research which looked at a group of normal people in the Netherlands. This is a Dutch study of 105 pairs of mothers and their newborns, examined 23 congeners in their breast milk and thyroid function in the mothers and babies. They used to measure the congener specific PCBs in the breast milk as an indicator of the mother's body burden and did not try to look at breastfeeding relationships to(?) problems.
What they found was PCB breastmilk levels, which again corresponds to maternal body burdens, correlated with a slight decrease in the function of the mother and in the babies. These correlated with PCBs, there maybe contaminants that may have been responsible, but the initial correlation was PCBs.

At the Wingspread conference there was some general discussion on research methods but one though that I think is particularly important that people have not really started to think about that was raised there, was that if you are going to study these endocrine functions with their subtle differences, endocrine function cannot be fully examined in the homeostatic levels, but must be stressed to determine if the entire biofeedback mechanism, its responsive capacity of each function is normal; something like the glucose tolerance test. I might be able to go around and get a glucose tolerance test, a glucose level and everybody is normal but I give you a glucose tolerance test I might find people who have difficulty with their insulin output.

The other thing is organ systems than can be secondarily effected by endocrine disruptors have to be studied — sensitive parameters of that organ system and critical ages of exposure, and ages for study identified. In the report we discuss about neurobehavior function, was one that was very interesting, of course. And if you are going to study neurobehavior function, play habits at a six-eight year olds, may be the most sensitive behavior for finding a parameter than can be looked at. And we looked at the immunotoxins and many different aspects of human parameters and those will be outlined in an upcoming publication.

And then finally, so what? Are the changes clinically important? If you find a slight increase of TSH by 1%, does that mean anything? What are the critical levels and what does it mean truly, clinically to the human. We then had the general recommendations that the SAB submitted to the Commissioners, in animals certain chemicals in the environment can cause a range of effects on endocrine and endocrine responsive age systems — an important question is to determine if these are observed in/ or can be reasonable extrapolated to the environmental exposure conditions.

The Science Advisory Board recommends:
- Efforts between the governments, academia, the general population, and industry to focus on research to:
  1) identify which, if any, chemicals have the potential to be endocrine modifiers in the human, and identify the dose-response relationships
  2) identify the effects disease states and time of life that is most susceptible to the effects
  3) identify the mechanisms of action, if this can be factored into the risk assessment process
  4) determine if the structure activity relationships can be used to predict a chemical's potential to be a endocrine modifier
  5) determine if sensitive biomarkers can be developed in both the animals and the humans to monitor exposure to these chemicals
  6) determine in animals if we can differentiate between exposure to environmental
chemicals that are endocrine modulators and other environmental stressors such as loss of habitat, etc.

7) determine in the human if we can differentiate between exposure to environmental chemicals that are endocrine modulators and endocrine effects that are caused by endogenous, dietary or other lifestyle stressor, such as loss of job. And how do they interact?

8) identify chemically-exposed cohorts than can be used to study, and

9) identify if technologies can be developed to control the release of endocrine modulators into the environment using structure activity or other receptor function.

It is only by the cooperation and the assistance of the general population — and they are critical for identifying those populations that might be a risk in helping the scientist organize the research project into the community --but the general assistance of the general population: government, universities, industry, that the question of endocrine modulation in the environment can be addressed. The Science Advisory Board is prepared to help the Parties understand, monitor, and assess ecosystem risk of these potential endocrine modulators.

Finally, papers presented at the Wingspread conference, and there were 21 of them, will be published in an upcoming supplemental issue of Toxicology and Applied Pharmacology. Thank you.

Chair Baldini: Thank you for the very thorough and concise report. We will provide an opportunity after all three of the Boards report, for questions from the audience. So at this time, I see over there our Water Quality Board, I would like to introduce them for their presentation also. We have Mr. Val Adamkus and Mr. Denis Davis. Val, as many of you know is the Great Lakes National Program Manager and is also the Administrator of Region V for the United States Environmental Protection Agency in Chicago and has served on the Water Quality Board throughout his tenure as Administrator of Region V for 14 years, and until very recently Denis was Corporate Director General for Environment Canada in Ottawa. Gentlemen, let me turn it over to you.

GREAT LAKES WATER QUALITY BOARD

Valdas V. Adamkus, U.S. Cochair

Thank you, Mr. Chairman. My name is Val Adamkus and I am U.S. Chair of the Water Quality Board. Prior to the very brief outline of the Board's work on the priorities over the last two years, on behalf of the Board, let me extend a particular welcome to the new Commissioners, Ms. Adèle Hurley, Chair of the Canadian Section, Commissioner Pierre Bélard and Commissioner Calvin Francis Murphy. I am really glad to serve all the Commissioners on the U.S. and the Canadian side. I would like at the same time to acknowledge the presence of a number of Board members here at this session: Mr. Denis Davis, Canadian Chair of the Water Quality Board, Simon Llewellyn, Doug Dodge, John Cooley, Hardy Wong, Tracy Mehan, Peter Wise and Susan Sylvester.

- 121 -
We intend to touch briefly on the major aspects of the Water Quality Board contribution to the Priorities Report. Four major initiatives are described in the 1993-1995 Priorities Report, namely: Pollution Prevention, Pulp and Paper, Pesticides and Groundwater. Two of these items, pulp and paper and pesticides are recommended priorities for the next biennial period. We intend today to highlight findings, recommendations and in some cases, future work activities. I would like at this point to introduce Denis Davis, Canadian Chair of the Water Quality Board, who is going to report on some of those activities.

Denis Davis, Canadian Cochair
Thank you, Val. The way we intend to cover our presentation today is to give you, Commissioners and participants in the conference a short overview of the findings and conclusions that are outlined in more detail in the report to you. I am first going to call on Tracy Mehan to give you an overview of the pollution prevention initiative, largely because Tracy was one of the key participants in both the workshop activity that was sponsored by both the Science Advisory Board and the Water Quality Board, and also because of his continuing responsibilities for that particular initiative as a Board member.

Tracy Mehan, Overview of Pollution Prevention Initiative
Thank you Denis. Commissioners, ladies and gentlemen. The Science Advisory and Water Quality Boards hosted a workshop last March on what we will refer generally to, as Pollution Prevention. We would like to give you an overview of what came out of that. But as a lead up to that, I should mention that there are several people that have been involved on this project, that I would like to recognize. First of all, from the IJC staff, John McDonald and Peter Boyer were involved in everything including an independent study we did of pollution prevention activities throughout the region, the conference itself and then the finalization of the report. I would like to recommend their work to you if you are looking for really a fine introduction to the topic in the Priorities Report volume. In addition, it was mentioned George Werezak from the Science Advisory Board and Joyce McLean were involved, and I would like to thank them and note their effort.

As I said, we first got into this topic by getting a contractor to try and do what we hoped would be an inventory of pollution prevention activities both in the U.S. and Canada throughout the region. Quite frankly, we had neither the time nor sufficient funds to really do that properly and there is some question, whether at this stage of the evolution of pollution prevention, given the plethora of definitions, and descriptions and activities whether we really know how to define the universe of pollution prevention at this point. None the less it was useful to us, to get a survey at least of what was going out there and that gave us some direction for putting on the conference in March. Again pollution prevention, total quality management, industrial ecology — these are concepts that sort of interact with one another, and I think you will see that in the presentation.

Our basic goal was to try and evaluate pollution prevention in a way to determine whether it was an effective means to accomplish the goals of the Great Lakes Water Quality Agreement. In other words, most of us in our professional and personal lives are convinced of the value of pollution prevention, in many areas, but the specific focus was, is this the tool geared to the
minimization, or reduction or elimination of persistent bioaccumulative toxics under the Great Lakes Water Quality Agreement, and that is what we set out to do. We can argue until sunset on how to define pollution prevention. I will spare everyone that eventuality, and just listed here some generic characteristics that we determined were useful in describing the concept. They speak for themselves.

Suffice it to say, just as way of background, we had a hard time coming up with measurements of success because it was hard for us to get agreement among all stakeholders as to a proper definition of pollution prevention. The classic definition emphasizes obviously source reduction itself. However, there is a hierarchy, I know embodied in the U.S. Pollution Prevention Act for instance, which as you first look at source reduction, move onto recycling all the way through to treatment and disposal. Stakeholders in various breakout groups were hesitant to lock in on any particular definition, or they could not come to agreement and therefore, you had trouble coming up with a metric for measuring success. But suffice it to say, we are moving upstream away from the end-of-the-pipe to the prevention side of things and again, this just gives us some feel for that. These are typical actions that represent what most people would describe as some species at least, of pollution prevention and again, trying to take an empirical approach here, or more focused approach, rather than an abstract definition. Again the emphasis is on prevention, source reduction and then moving through the hierarchy to other approaches that might accomplish the goal.

I would like to go over some of the findings here of pollution prevention or our efforts. In the last decade, I think it is fair to say that much has happened in this area — I am sure all of you are familiar with it in its many manifestations — and clearly the initial impetus for this was regulatory efforts. One thinks back to the 33\50 program on the U.S. side and I am sure there are comparable things on the Canadian side, the spectre of regulation was many times a motivator for pollution prevention activities. And now we are seeing a greater tilt towards incorporating this into, not just the societal culture, but into the corporate cultures, also interacting as I say, with industrial ecology which has certain benefits in terms of eliminating cost and waste. Pollution prevention is, as I say displacing end-of-the-pipe as the preferred approach. However there is no way to capture all these various activities at this point, it is just too difficult to do.

Basically there are no common baselines or methods for quantification of toxics reductions at this point, at least to the extent that we would like. We can measure releases and things like that, thus an attempt to sum the achievements of preventive initiatives per se still eludes us; it is still difficult. We are going to have to measure progress in pollution prevention really through general societal considerations. Much of what is currently viewed as waste is going to have to be maybe redefined or reexamined as a kind of useful material. One current test in the industrial ecology area even talks about eliminating the concept of waste, and really referring to it as residue for which we have not yet found a productive use. So again, how we define success goes back to how we define pollution prevention at some point.

Education is a process we believe should stress the relationship between science, technology and the societal context. I think that seems really simple but it is all in the execution. We also think
there needs to include better separation technologies, improved process and product design, technology for energy efficiency, manage waste as useful materials and promote green chemistry needed. Again, this is as much the vocabulary of industrial ecology as it is pollution prevention, and I think the overlaps are very great.

Regarding our recommendations, should the Parties decide to review the Great Lakes Water Quality Agreement, we think pollution prevention needs to be discussed explicitly in those discussions and highlighted and given some prominence as the preferred approach. Again, we think governments ought to start looking at material management rather than waste inventorying per se. This ideal of materials accounting really comes out of the private sector, comes out of the industrial sector, and I think in our conference was actually highlighted by a retired General Motors official. And I know General Motors for instance, is trying to enter into using this mechanism in its dealing with its suppliers right now. Again this gets more back to the source reduction concept rather than worrying about things at the end-of-the-pipe and measuring just reduction and emissions. Again it is a tool, it is not the tool and no doubt several measurements or metrics are going to be required to measure success. The quantification of reductions from pollution prevention still needs to be attempted and again, the problem of cause and effects since there is a lot of reasons we are seeing progress, some of its regulatory, some of its just a cultural change, some of it is explicit pollution prevention.

Finally, and this actually comes from the Science Advisory Board, the identification of regulatory barriers to using a lifecycle approach, product reincarnation and things have to be encouraged. So basically as I said, the initial question, the initial goal was to evaluate pollution prevention in terms of its benefit for accomplishing the purposes of the Great Lakes Water Quality Agreement, I think the answer is that we do not know, obviously good things come of it, how useful it is for the focused purpose of fulfilling the Agreement's goals remains to be seen and our recommendations reflect that concern. Thank you.

DENIS DAVIS, OVERVIEW OF PULP AND PAPER, PESTICIDES AND GROUNDWATER
Okay, thank you very much Tracy. I will give a very short overview of the pulp and paper, pesticides and groundwater initiatives of the Water Quality Board, starting with pulp and paper.

PULP AND PAPER
One of the reasons the Board undertook this activity is the pulp and paper industry — of which their are 72 mills in the Great Lakes basin — are a major contributor of organochlorine compounds to the lakes and were a significant concern in terms of their contribution related to dioxin and furans. There has been a lot of change in the industry in the last few years, there has been a lot of activity, and so the Board felt it was a good chance to overview this major industrial sector, look at the binational data that was available, look at trends in the industry and have some feel hopefully, for what the future might hold for that rather important industry in the basin.

What we have here are a number of the findings that are contained in our report. Obviously over time there has been a shift from what we would call the traditional parameters being regulated and controlled which are biological oxygen demand, total suspended solids, through to the acute
toxicity that has occurred largely due to a dioxin and furan type substances and more towards AOX, and now I think more to biomarkers. All of these parameters do have significance. When we look at the traditional parameters, there have been significant reductions in loadings.

In the case of dioxin in particular, the loading has been reduced very significantly. Just to give you some numbers, the loadings of the industry as a whole to the Great Lakes are one gram equivalent of dioxin as opposed to roughly 20 grams per year from other waterborne sources, and 42 grams per year from atmospheric deposition. So when it come to dioxins and dioxin-like substances, the industry has done a relatively good job of control.

That is not to say that there are no longer any concerns with the effluents from this industry sector. We are still detecting subtle hormone changes, we are detecting difficulties with reproduction in fish and there is still more work to be done. But it was a finding of the Board that certainly secondary treatment and chlorine dioxide substitution have now significantly reduced dioxin inputs. It is also in this industry, fair to say that they have taken a serious look at the pollution prevention approach and that they have modified their technologies for the bleaching of the pulp and a number of other processes. So they have tried to make the changes at the front end, rather than the back end of the plant.

There are also some very significant efforts underway now in terms of, essentially looking at some of the newer pollutants. We are still seeing, as I mentioned, sublethal effects in terms of liver enzymes, reproduction. But we are also seeing significant efforts by the industry to move toward the true zero discharge mill. And you have seen both in Canada and in Sweden industry-government efforts to achieve that particular goal, and it is something that I think is a direction that you will see in the industry in the longterm.

**Pesticides**

Now I would like to move on to pesticides. Basically over the past two years, the Board has hosted several workshops which examined agriculture issues, and they have included issues such as progress and sediment and runoff control to reduce pesticide loadings to the lakes, pesticide effects, use-reduction, and to look at some of the alternatives to pesticides, such as integrated pest management (end of tape 8, side A)...

*(beginning of tape 8, side B)...* alternative. Just to give you a bit of the feel. As part of the work of the Board in contributing to the Lake Erie Initiative, we assembled a number of results related to atrazine. And this graph which you see before you, shows at the top, the concentration of atrazine is measured in the Great Lakes, as you can see as you move from right to left. Basically the numbers at the top indicate an increase in atrazine as you move downstream through the system, and the intermediate numbers shown in the profile of the individual lakes starting with Superior on the left hand side and moving down to Lake Ontario on the right hand side, shows the number of tons that are actually detected in those lakes.

Atrazine is profiled particularly, because recent studies have shown that it is a possible disruptor of mammalian endocrine systems and is also now listed as an emerging pollutant in the
development of the Lake Michigan RAP. It is the intent of the Board to track a number of other pesticides over the next priority period 1995-97. I would also like to mention, that in this case, atrazine is shall we say, the chemical of choice for on the crops of corn and soybean, and you have significant inputs, particularly in the Lake Erie area.

**Groundwater**

Now I would like to move on to groundwater. The reason for the Board activity here was to provide additional input to the integrated Lake Erie priority, and because the Board also felt that perhaps groundwater was what we might call the poor sister in terms of both government action and the activities related to cleaning up the Great Lakes. The reality with groundwater is that if you do not protect it you lose it. Largely because the cost of remediation are so large and are generally prohibitive, and there is a very strong feeling that there is a need for what we call protective or preventive approaches and a need by the Parties to in fact implement Annex 16 which deals with groundwater of the Agreement. Definitely there is a need in this area to look to prevention rather than cleanup. So we would like to encourage in this case, the Commission to again raise with the governments, the need to have some serious implementation programs under Annex 16 of the Great Lakes Water Quality Agreement. Thank you very much.

_T. Baldini:_ Thank you. Finally it is my pleasure to introduce the chairs of our Council of Great Lakes Research Managers, Dr. John Cooley and Mr. Nelson Thomas. Both have been engaged personally with research, germane to the health of the aquatic ecosystem system. John is with Canada, Department of Fisheries and Oceans in Burlington, Ontario and Nelson is with the Environmental Research Lab of the U.S. Environmental Protection Agency here in Duluth. Gentlemen?

**COUNCIL OF GREAT LAKES RESEARCH MANAGERS**

*John Cooley, Canadian Cochair*

Thank you very much. Commissioners and guests as cochairs of the IJC's Council of Great Lakes Research Managers, it is our privilege to address this meeting today. Our report to the IJC is on pages 134-156 of the Priorities Report that many of you already have. Now today we would like to take a few minutes and explain what our mandate is, provide brief examples of what we have recently accomplished and indicate where we think we should be heading. I would like to start off with a brief statement of why we think Great Lakes research is important.

We are well aware of the call for action and the need to focus efforts on diminished resources on the remedial, preventative, conservation processes. Research, we believe, has a role to play in all three of these areas. In order to preserve what we have already achieved, research is required on an ongoing basis to assess the status of the lakes. Longterm monitoring programs are an essential part of this process. New data are also essential to make the best decisions and order the priorities. As disturbed systems are remediated, researchers will provide quantified data that will be essential for delisting AOCs. Many delisting criteria, as set by the IJC call for research data as the criteria for delisting.
Research will also provide many of the solutions that we do not already yet have. The past provides an indication of the role research has played. It was research that provided the information necessary to convince the public and politicians that phosphorous control was the key to solving the eutrophication problem. It was researchers who developed the ecosystem approach that is now common throughout the rest of the world. It was researchers who provided compelling evidence of the problems of persistent toxic substances and the need for a zero discharge policy. And now we find the research community providing the data needed to remediate lost habitats, to prevent the import of more exotic nuisance species, and providing the solutions for comprehensive restoration programs.

Our purpose is really quite simple, and not all together different from the other Boards. We provide advice on the adequacy of research and promote research coordination within the basin. We hope our advice enhances the ability of the Commission to provide effective leadership, guidance, support and evaluation of the Parties Great Lakes programs. Now I would like to talk very briefly on one of our recent initiatives, and it has to do with what is on the screen there: **Recruitment, Training and Development of Scientists**. We believe the results of this study that we undertook recently are really worth noting.

We note that the members of the research community that are out there right now, the ones that are doing the research and involved in most of the research program are for lack of a better word, an aging population. They came into the system when the Water Quality Agreement was first signed and even before that with some of the IJC studies, and what we are seeing now is that cohort is beginning to leave the system. And we asked the question of whether or not there would be enough well-trained researchers coming in to replace them, and we undertook a study of the academic institutions that are inside the basin and indeed outside the basin, and we came up with a number of conclusions.

One of them is that, of course in the 1990s as this cohort ages, they will be leaving. And our study showed that there will be lots of well trained candidates with the necessary expertise to pick up and run with the problems that are now occurring. But in the last couple of years it has become increasingly evident, and in particular this year, that while there will be a lot of candidates, it is not all clear that there is going to be any jobs for them. What we are seeing, in particular with government agencies — state, federal, province — is that the main focus right now is in reducing the size, and that is being done in what I would say is a facultative way. Somebody is of the right age and retires, that particular job disappears, and there is very, very little replacement coming into the system.

A couple of examples from the experience of myself and my cochair, will provide some quantitative information on that point. EPA recently was looking for to hire 30 positions in the last couple of years. For those 30 positions they had 1,000 applicants. In my own department, Fisheries and Oceans — I work out of two institutes, the Freshwater Institute out of Winnipeg which is responsible for some of the fine research that has been done at the experimental lakes area, and at CCIW in Burlington — now within the population of PhDs of the research community there, those two institutes, there is 35 PhDs. The way the government in Canada
classifies them is from one to four which is a reflection to some extent of age and how long they have been around. Of those 35 researchers with PhDs there is one that is in entry category, the rest are somewhere along the line. As those researchers leave because of incentive programs or just leaving the system, there are virtually no plans to replace them. That is going to present a problem, because while there are candidates now, the incentive for people to move into those research areas for the future will not be there when they see that there is very little hiring going on. And of course, what we also find is the loss of corporate memory. There is a huge amount of memory that is leaving the system and unfortunately it is happening at an unplanned and uncoordinated way.

On the screen now is a couple of other areas that we have been active in. This is not the only thing we've been involved in, but it is an indication of the sorts of things that the Council gets involved in. I think we were the group that first brought to the Commission that there might be a problem emerging in Lake Erie because of zebra mussels and the change of the status of that system and that lead to a task force that involves all members from the Boards and the Council, and that is still ongoing.

The Research Inventory is something that my colleague, Nelson Thomas is going to tell you about in a few minutes, also along with the ecosystem framework which is a new tool that has been developed and recently we published a report on Ecosystem Health Indicators, and we were responsible for sponsoring three workshops on Cause-Effect. I would like to turn it now over to Nelson Thomas of EPA.

_Nelson Thomas, U.S. Cochair_

Thank you, John. Good afternoon Commissioners, ladies and gentlemen. The two areas that I would like to elaborate on are the research inventory and the ecosystem framework.

**Research Inventory**

Now the inventory fills two of the Commission's missions very directly. We address the adequacy of research, this is how much research is going on in a particular area and also the coordination of research. Most of the members of the Council are leads in their agencies and therefore if we want to get together on a project very quickly, why we can do that. Currently the inventory, we collect the data through an IJC solicitation and then we have two agencies that actually implement the data into a database form.

We have developed a classification system that is mainly based on stressors to the ecosystem. We have spent a lot of time, redid it once so that research can be looked at in many different directions. But these are some of the main ones that we want to look at, as the Commission moves into different areas, say habitat or something like that, we can have that area captured.

Now the first time we had the inventory completed we published it in a hard copy and by the time we got it through all the forms for printing it was already out of date, and plus our input was on an annual basis. Well, we turned and looked to Internet and we are now entering it into the Internet with the cooperation of the Great Lakes Commission and to give you an idea: It came
online in August, and from August 15 to August 30 there were 136 assesses to the database itself. So it shows that it is of high use. We always wondered if anybody was ever using this and we had no way of checking, but with Internet you can check the use. So we feel that it will move forward with this effort.

**Ecosystem Framework**
The other area that I would like to discuss is the Ecosystem Framework. Back in the 1978 Water Quality Agreement, it called for developing an ecosystem report. You heard about it three of the opening presentations. The Council decided, well we better take a crack at trying to look at what the ecosystem framework really is, how do we operate in such a ways so that management can be on an ecosystem basis. So we actually looked at providing a methodology, and subsequently then the Commission asked us to look at the zebra mussels as part of the exercise in the development of the framework itself.

So that the object was to be able to link the natural system — most people think when they think of an ecosystem, they just think of a natural system: the living animals out there and maybe their habitat, but actually it consists of the societal pressures that are on it too, the economics, the philosophies of the different groups, the environmental groups, the industries, the governments — and so we tried to capture all of that in a framework that was developed. It is on page 146 in the Priorities Report. The main thing we want to point out here is that in the lower lefthand corner is the natural system itself and that is one, like I said, most people are familiar with, but we also above it, have the economics, so we have the economic interest involved; on top, institutional arrangements and governments, so their interaction on the ecosystem; we have the philosophical approaches because we have many people who have different viewpoints on the ecosystem, so that is built in there, and then the cultural part as to where people might be in different groups approaching it. And also the interaction of all of these groups. This one was even a briefed down version of the one that we finally developed and then we had it tailormade for the zebra mussel.

The principle way that workshops are conducted. The first part of it is actually called an Ecosystem Game, because in each of these groups we have environmental groups, industrial groups, academic people and so the one common thing we had to get across first was, how do we communicate to each other. And so that was part of this ecosystem game that has been developed and subsequently then it was done through the University of Michigan and they have already started to market part of that game itself.

When we got all through with this exercise, what really came out was the mitigative approaches where the number one priority in all of the large numbers of pieces of research that we considered because basically once the animal gets in the system, you have the problem there. We went on further then to look in the mitigative part to see what pieces of research really needed to be undertaken or were being undertaken to look at this particular problem. So that the Council will then take and continue the research application then, addressing the priorities that the Commission has laid out for us in the 1995-97 biennial.
Vision Workshop
We had a Vision Workshop, the Council had proceeded to complete the major goals they wanted to in the last five years, and so we wanted to proceed and so we had a vision workshop and this would take us forth in where we are going in the next five years.

Communications and Education — certainly most academic people feel that their research is completed when they have it in a scientific publication, but it is really not that complete because we have to have sessions like these, concurrent sessions where we have people coming in and giving to a broader audience than normally reads the scientific publications, so we feel that that is one of the big things we had to look at for our dissemination of research.

Evolving Trends — sometimes we just get an inkling or predication that something is going on and we want to look at the amount of research that is going on in that area and try to enhance it. And that is one of the things that people from the Council can do, in that they can often influence the priorities that go on in their own institutions, can look at these trends.

Organizational Issues — this is the coordination between like the Lake Erie Project, many of the research organizations are joining up.

Research Review — we'll do one of the upcoming priorities.

Sustainable Development — looking at habitat, wetlands... kind of keeping what we have in place.

So this is the process that the Council will go through on the priorities as they are assigned to us. Thank you.

T. Baldini: Thank you. I think you will agree with me that the report, which took about an hour, which very abbreviated is very, very comprehensive. And you heard many of them refer to a book and pages, this was available, I believe it was in all your packets. This is their report from the last two years. There is an executive summary and then it is divided up according to each of the Boards. So I do strongly suggest that you look at this. We have a couple of minutes for some questions of the panel if you want to, and I know they will also be around after, if you want to go to one of the microphones and ask some questions, I'm quite sure they are willing to... Go ahead.

Unidentified speaker#1: Yes, I would like to pick up on your last slide.

T. Baldini: Maybe you want to direct it to someone or at least a...

Unidentified speaker#1: Well, I'll address it to the very last speaker. My own view is that maybe one of the other bullets you ought to have on there is marketing the research activity. I am just concerned about, I mean obviously you are convinced that you are doing good work, I'm convinced that the research community is doing good work, but I do not have that same sense from the funding sources.
N. Thomas: Well, there are two parts to the marketing. One, I think is the communications that I talked about, getting it out to the people — that the research is out there, and it is available. The other part is the adequacy of it. And there are two chapters in the Priorities report looking at human health and wildlife; what is the amount of research actually going on in those areas. So we try to market it in a way, the sufficiency of the amount of research going on. Is that kind of what you were getting at in your question there?

T. Baldini: Thank you, next question please.

Unidentified speaker#2: I want to refer to Nelson Thomas' report and especially to what is called the ecosystem framework workshop, it's a bit of a misnomer, but it is — I think, partially because I had some peripheral involvement — an excellent kind of activity, far beyond most of our kinds of workshop activities that people of Ann Arbor have developed together with Nelson Thomas and others. I would strongly urge that that capability be used and developed further within IJC capabilities and preferably involving all the Commissioners too. It really is quite an exciting and promising capability and wonder if Nelson agrees with me.

N. Thomas: Well at the Semi-Annual Meeting in October when we speak to the Commissioners again, we are going to propose that they participate in a framework workshop in that we are going to give them a number of suggestions on issues that might be addressed at the workshop. And so it is truly our intent to keep it moving forth, and there are some resources available for it in the budget, so thank you.

T. Baldini: One of the things I think I should mention is that through their leadership and with the participation of the University of Michigan, they put together this model, they have encouraged in their individual capacities for other people to utilize what they have and their hope really, is that other people will help refine it and expand and also utilize it in their own needs.

Unidentified speaker#3: I would like a little clarification. I copied down something from the Water Quality Board report, "Early regulations were crucial, focus now voluntarism." I in no way want to suggest that voluntarism is not our ideal and when we get it, it is not wonderful, but I am asking this question out of the context of the present catharsis of deregulation that is going through our political government. Is there anything about regulations that keeps us from having voluntarism? Why haven't we had voluntarism before? And my understanding of regulations and laws is that they are for those people in society that just simply will not do what they should do voluntarily and those people we need rules and regulations for. Now I would like clarification, I may be misinterpreting what that statement meant. I would like some clarification as to what it did mean.

T. Mehan: I guess I should answer that. There was no hidden agenda. I thing it was just that as a matter of empirical fact, if you go back to the earlier, what I would call pollution prevention initiatives in the industrial sector, its results are mixed, but the spectre of say, the Clean Air Act amendments of 1990, that is quite a way of focusing the mind of corporate officials understandably. But I do think think there is a sense that regulation may be a necessary, but not
a sufficient condition to accomplish the goals of the Great Lakes Water Quality Agreement — that we are moving to sort of a stage of, where we are into house to house fighting, chasing down every bit of mercury out of products, looking at process changes, and we are not just talking about end-of-the-pipe capital investments anymore, we are trying to transform the culture of the industrial base. So I think all we were trying to say is, this effort of voluntarism is a poorly used word, maybe corporate cultural change would be a better term, but we were not in any way trying to get in the middle of a crossfire on a deregulatory... 

Unidentified speaker#3: So that I understand what you are saying, you are talking about voluntarism in conjunction or in addition too, whatever regulation society views that it needs, not in place of.

D. Davis: I don't think we got to that level of collective decisionmaking, but that would certainly be my view.

Unidentified speaker#3: Okay, thank you.

D. Davis: I will perhaps add a few words of clarification to your question as well. I think it would be the general feeling of the Board that the next mile is probably best gained through voluntary actions, largely because they tend to be quite efficient and they can deal with the chemicals beyond those that are persistent, bioaccumulative and toxic. I think you will continue to see the regulatory regime play a significant role for the chemicals that fall in that category. But you will also see that combined more and more with the concept of pollution prevention where the intent will be to deal with the loadings of chemicals that do not fall into the dirty dozen, or the list of 42, or whatever. So what we are saying as a Board I think, is that the voluntary approach is probably the quickest and the most efficient way to go the next mile.

Unidentified speaker#4: Thank you. In addressing the reality that you folks proposed regarding the lack of opportunities in the scientific communities these days and how it is going to affect those scientists that are on your Board, I am curious as to what you are going to do to replace the retiring members. Is there going to be honorary positions for these people to keep the historical value of what has happened in the last ten years? And how are you going out and marketing and pursing getting more active people to come on board? Because obviously the research is what drives the regulations. Whoever can answer, please.

J. Cooley: One of the programs that seems to be very much in favor these days is, through scientist emeritus; even though people have retired we find that the people who have lifelong been working in the science community want to continue to do that even though they are not receiving remuneration. So these people are not totally lost to us and we still take advantage of them. The marketing of getting new, encouraging new scientists in, I don't have a good answer for that right now, because I know as a research manager, that most of my efforts are regrettably these days being spent on planning programs to reduce the size of the research that is ongoing, and there are restrictions that all of us are working under to get the size of the things down. It is not a very happy scenario and I would also like to encourage people to attend the session tonight.
that has been organized by John Hartig of the IJC, on the funding problems that are coming to light now within the Parties, and there is a special session that you can get a lot more information on that, hopefully a lot more ideas as well.

**T. Baldini:** Okay, we are going to take one more question and then we are going to break.

**Unidentified speaker#5:** I would just like a bit more clarification on how you see the role of pollution prevention in the way forward with the IJC. I found it a bit disconcerting that we do not even have a common definition. I also found it a bit disconcerting that it is considered as one approach to be taken. And I think there is going to be a lot of conflict. One of the things that came up with the endocrine disruptors is that the Science Advisory Board recommends that we research, or the possibility of research to control the release. I would like to see more focus on banning and substituting with cleaner materials. And is that kind of mixup of language that shows that I do not see that there is a very clear road or vision of where the IJC should be taking, particularly as more and more information comes through on toxic persistent, bioaccumulative and endocrine disruptors. The other thing I noticed in the presentation from the male reproductive health seminar, from Mr. Dekker of the Netherlands, where he talked about how the North Sea Conference and the Oslo and Paris Commission since they have established a phaseout of persistent organic pollutants within one generation — this is their recommendation — they have actually put a lot of research and development into good sort of support structures, so that there can be discussions about ecological tax reform, extended producer responsibility, substitution principles as they use in Sweden. They are really doing an aggressive look at cleaner materials. So where is pollution prevention going to be within the IJC in the forthcoming years?

**T. Mehan:** Well I think ultimately the Commission will decide that. I think when we were trying to make clear there was a difference of view on the definition or the conceptualization of pollution prevention, that is an empirical fact. I mean you can go into one group of people and they will say pollution prevention is always source reduction. You can go into another group of people and they will say it is anything that literally prevents pollution which might include containment or reduction of emissions. If you look at the Pollution Prevention Act of 1990 it is this hierarchy; it starts out with source reduction where feasible, and where feasible you then go to recycling, where feasible you then go to even treatment or disposal. Clearly, I think given the terms of the Great Lakes Water Quality Agreement and the cannon of interpretation that the Commission has followed for several years, they are going to tend to the source reduction and we have recommendations to them to further that effort, i.e. materials accounting. So, yes I think it needs focus, there is a difference of opinion or confusion out there, and ultimately it will be for the Commission and the IJC community to sharpen their focus.

**T. Baldini:** Thank you. Please join with me to thank all the members of these committees, because I have to tell you, the salary they receive is not sustaining their life. This is volunteer, this is on top of all of their other responsibilities that they have, and as you can see it is very extensive work that they do, and it is critical work that they provide to us in the Great Lakes system, more importantly to the IJC. They will be around I am quite sure later, so please join
with me to thank them for what they have done. We are going to take a break and we are going
to reconvene at 3:15 for our public hearing session. Thank you.
PUBLIC HEARING ON PROGRESS UNDER
THE GREAT LAKES WATER QUALITY AGREEMENT

SUNDAY, SEPTEMBER 24, 1995
3:00 p.m.-5:30 p.m.

Adèle Hurley, Canadian Chair
International Joint Commission
Welcome to the second segment of the public hearings on Great Lakes water quality. We heard from a great many people last night and we hope to hear many thoughtful comments this afternoon so let me ask Philip Slyfield and Jim Chandler to review quickly the format for the upcoming session.

Jim Chandler, IJC Representative
We have divided the cards that you all have filled out requesting to speak into a number of categories. We will be selecting from those categories and I will be reading off groups of four names for ... I'll begin with four for the first group of speakers. After the first speaker, I will repeat the names of the next three and then add one to it so you will have a bit of an alert as to when your turn will be to speak. If anyone has any specific requests as to when you would like to speak, please let us know and we will try to accommodate it.

Philip Slyfield, IJC Representative
Each person will have up to five minutes - after four minutes I will hold up a one minute sign. When time is up, I'll hold up this sign.

J. Chandler: And after that who knows? So, if we are ready to proceed ... the first group of speakers ... first speaker will be Michael Keegan. After Michael we'd like to hear from Grant Merritt and then there's a group of three educators - Dwight Morrison, Barb Ellingson and Barb Akre to be followed by Bill Dew. Are any of these in the room?

Michael Keegan: Hello. My name is Michael Keegan and I'm here representing the Coalition for Nuclear-free Great Lakes. This is my fifth cycle coming to you with concerns about radionuclides in the Great Lakes basin. There are some sixty nuclear power plants in the windshed and watershed. I've been travelling this summer throughout the basin, up in Ontario; through New York; throughout the basin stopping at nuclear power plants trying to create a registry of atrocities and an inventory of what is going on. Up in Ontario, at Port Hope, I took radiation monitoring and came up with 30 times background radiation being released right into Port Hope, right into Lake Ontario. I moved down into New York to West Valley. I learned that Dept. of Energy nuclear waste is making it towards the Great Lakes. Down to Toledo, Ohio - they are storing high level nuclear waste on the shore of Lake Erie. My home is Monroe, Michigan which is the Fermi Nuclear Power Plant. Two years ago, on Christmas Day, they had an atrocity there where they had a turbine accident. They narrowly dodged the bullet. We just missed having a Chernobyl-type accident. My point being that we cannot allow this failed technology to continue to jeopardize the most precious resource on this planet. We need to get
the Science Advisory Board of the IJC moving to investigate what is going on here. Once we look into these atrocities and once we learn the full economic cost of this, the prudent course of action is to shut these nuclear power plants down. The Safe Energy Communication Council out of Washington, DC just released a report on the economics of nuclear power. Nukes just don't stack up. It is economically conservative to move to a transition to immediately begin a phase out of nuclear power. It is a tremendous drain on our economy. Nuclear power is... energy... electricity from nuclear power - electricity is the byproduct. The product is high-level nuclear waste of which no one knows what to do with; no one wants it and yet if these nuclear power plants are allowed to operate to the end of their lifecycle they will increase again two-fold the amount of nuclear waste that they have. The time is now for the IJC to begin an investigation which will lead to a transition; to move us away from this dependency on nuclear power; move toward energy conservation and so forth. I could go on for hours. It's an atrocity. I've been here before - before you several times. Please move it into gear; and we need action and I've asked that the Science Advisory Board get involved and investigate what is going on in the basin. Thank you.

J. Chandler: Next, we'd like to hear from Grant Merritt followed by a group of three educators - Dwight Morrison, Barb Ellingson and Barb Akre and then Bill Dew and Michael White.

Grant Merritt: I just walked in here. My name is Grant Merritt and I've been here before but not since 1983 when Bill Ruckelshaus spoke at Indianapolis. I used to be the Minnesota Pollution Control Agency Director back twenty years ago and I had the privilege of being the Minnesota representative to negotiate this 1972 treaty, which was a much nicer treaty than we have now. Pardon me, it's not a treaty because Nixon couldn't get it through the Senate so it's an agreement but it contained among other things a nuclear moratorium and we used that very nicely after I left the PCA down in Midland, Michigan to help stop a nuclear reactor which would have discharged in the Tittabawasee River into Lake Huron. So then in 1978 they took it out. I think it was in there by mistake actually. We couldn't claim any credit for it - but it was a nuclear moratorium on any new nuclear reactors on Lake Superior or any of the five Great Lakes. I wanted to take a different tack here this afternoon and suggest a low-tech solution for the IJC to recommend to governments and that is kind of an institutional rather than scientific recommendation. Most of the recommendations, at least that I'm familiar with to governments by the IJC, are specific and have been very necessary... rules, regulations, standards, and that kind of thing; scientific studies and so forth. It seems to me now is the time to look at how we can improve the way the governments implement or take those suggestions and put them into action and I've been a student of public administration for a long, long time and I think that at least in my experience the best way to improve the implementation has been through governmental organizations that use citizens not just to make recommendations or be heard but actually have policy-making power. The agency that I headed - that is I headed the staff - has that kind of institutional framework. It was the recommendation and the long-cherished idea of a great lawyer-legislator here in Minnesota, Gordon Rosenmeier. In the late '60s he set up this Minnesota Pollution Control Agency which was a little EPA before there was an EPA. In fact, when EPA was created they came out and looked at the Minnesota Pollution Control Agency because it was an integrated one with air, water and solid waste; later radioactivity and noise...
pollution authority. But the most unique thing about this creation is that it is not run by an administrator only-in fact the policy is set by a citizen board; a board made up of citizens appointed by the governor and confirmed by the state senate. The administrator makes recommendations to the board so, for example, if the administrator wants a new rule it has to go to the board. Contested case hearings where there's been an administrative law judge have to be decided by these citizens and it's worked very well over the period of almost 30 years-28 years; ever since 1967. This part-time board makes the policy on all of these issues and the commissioner (they called the job I had was executive director it's now called commissioner) that person and it's been male or female is appointed by the governor not by the board so you've got a staff director that's responsible to the governor's office but in order to get his or her policies across or recommendations across has to sell the citizen board and over this past 28 years this system of environmental regulation has resolved many very controversial issues in Minnesota and placed Minnesota in the forefront of the states for many of those years in terms of cleaning up and maintaining the environment. I believe it is the most democratic form possible because it invites public involvement and participation in decisionmaking on basic environmental issues in a public forum attended by the news media whenever anything controversial or significant is on the agenda. The meetings are public and they are held once or twice a month. The board is legally the agency in Minnesota with the staff charged with carrying out its policies and decisions. Use of a citizen board in this fashion also expedites problem solving. In other words it's more efficient. It seems odd but it is because whoever the staff director is cannot hold up the decisions on the desk like the normal commissioner would but the hot political potatoes go to the board for their decision so I think that you ought to consider recommending to governments that they change their pollution control agencies or departments of natural resources or whatever to involve citizens at the policy making position and I'd be glad to answer any questions. I think what I'll do is submit this in writing and I hope you'll give it some consideration. Thank you very much. It's been a pleasure to be back at a IJC meeting and see all of you. (and participate)

**J. Chandler:** Next, we'd like to hear from Dwight Morrison, Barb Ellingson and Barb Akre to be followed by Bill Dew, Michael White, and Jolie DiMonte. Is Bill Dew here? Excuse me one second, sir?

**Dwight Morrison:** Yes, Dwight Morrison here. The other two have had to leave.

**J. Chandler:** OK, fine thank you.

**D. Morrison:** If you get an outfit and an excellent training of our program you can probably be a river watcher too. That's what this is all about anyway. It's not just humor though. It's true, River Watch is a program begun in response to the St. Louis River Remedial Action Plan and funded through our state legislature through the Minnesota Pollution Control Agency until this year. Individuals and organizations who now willingly consent to be dressed as I was even two or three times a year to monitor the quality of water in our area include more than twenty-five schools, an environmental learning center, a 4-H club, frog watcher families and citizens young and old and many other interested members of the community - so it could include anyone here. The program is no longer limited to the St. Louis River, though. It's grown to include streams
and people throughout the Lake Superior watershed as far up the shore as Devil's Track River near Grand Marais and it's not limited to field work in these clothes either. Communication types have dressed up at least their voices for radio programs and other media productions; artists - environmentalists known as "keepers of waters" have created visual messages about water quality from Duluth to China and students and teachers meet in the spring to share learning concerns and project work via an annual river watch congress. Although that's an overview, I cannot possibly tell you about all that River Watch is and does in five minutes so I'd like to tell you what we do in Duluth Central High School where I teach science. We have a team of excellent, interested students who work after school in the fall to monitor our St. Louis River site at Indian Point Camp Ground. The work involves on-site chemical testing and collecting of critters which can indicate water quality and a week of followup analysis in the lab after school. In the spring, our biology classes studied the St. Louis River and Lake Superior watersheds as the focus of an ecology unit. They learned the sampling techniques and each class participated in a creek which runs through our school grounds and ultimately into Lake Superior. Classes compared the data from the river to that of the creek. Then invited speakers introduced the students to six of the problems and solutions which have been defined by the Remedial Action Plan Citizen Advisory Committee. Students then formed groups and designed citizen's education projects to raise awareness about watershed problems. This year, with the help of the U.S. West grant for communications technology, an interdisciplinary group for teachers is working to involve students in producing a multimedia program and programs showing the River Watch monitoring process via hyper?studio. We hope to have the students communicate the results with other youth throughout the world by Internet. Telecommunication offers economies of scale and efficiency to improve networking and our ability to analyze and share water quality data. There are two significant things, then, that I would like to see this commission address. Number one is expand water monitoring educational programs such as River Watch and number two, utilize volunteer monitoring research and action systems. River Water has been an outstanding catalyst for community involvement in promoting water quality. We recommend that your support for educational programs such as River Watch, which provide highly efficient hands-on environmental education in a cost-efficient manner, education programs are a major part of the answer to the long term pollution issues that this commission faces. One of the areas of concern on the Great Lakes is the St. Louis Bay. Our data from monitoring Indian Point in the bay forms a baseline for our students' research efforts. Students have become water researchers in the sense of collecting and analyzing real water quality data. They come to understand what the monitoring results mean when they compare their data to the other sites monitored by other schools in the River Watch network. This is a very cost-efficient means of collecting vast amounts of valuable data throughout the Great Lakes basin. If you believe in ... if the Commission believes in a zero discharge policy you must support cost-effective community education programs like River Watch. This type of hands-on educational experience is the best investment in water quality that your money can buy. Thank you.

J. Chandler: Now we'd like to hear from Bill Dew, followed by Michael White, and then Jolie DiMonte and Darius Sivin.
Bill Dew: Hello, my name is Bill Dew. I'm an OAC or Grade 13 student at White Pines Collegiate and Vocational School in Sault Ste. Marie, Ontario, Canada. I am actively involved in our Adopt a Beach project and our Lake Superior Basin project. Through this project, I've come across many political barriers and I have been treated less than good. That's why I want to thank the IJC and commend you for treating us as capable, responsible, and contributing parts of this society. I'd also like to recommend that you go back to the governments and tell them that we have good ideas and we've been doing good projects for some time and I'd also like to thank you for putting on the Youth Forum and giving us a chance to exchange ideas and show that we do have good ideas. Thanks.

J. Chandler: Next we'll have Michael White, followed by Jolie DiMonte, Darius Sivin and Janice Watten.

Michael White: Thank you. I had an opportunity to talk to the Biodiversity Conference this morning and presented the same idea which I'm going to present to you right now. Probably it's redundant but I would like to use... since I put in my yellow card... use this forum. I come from the City of Toronto. I'm on the Public Advisory Committee of the RAP there and I have been for quite a while. We've been told that our city, and particularly the headwaters of our city, are going to be moved from 4,000,000 people to 6,000,000 people and yet we're expected to clean up our rivers, clean up the whole situation there. We're a little worried. I would like to suggest that when, as a planning tool, for our engineers, for the planners and the various people that are working to give homes and communities and so on to these 2,000,000 people that we have been told want to come to Toronto - it's a very nice place by the way, we... I invite you as well- that along with the roads infrastructures, the sewers infrastructures, the schools infrastructures that perhaps we should begin with the ecosystem infrastructure and that the ecosystem infrastructure is made proprietal; in other words it is something that we value; that we ask our best people, our best business people, our best engineers, our best minds to work on creating; an ecosystem infrastructure so those 2,000,000 people can plan to live and their children and children's children can plan to live in a part of the world that actually is improving rather than, right now, we're very, very worried that it is not going to improve; that if these people move in we're going to have even a harder time accomplishing what the Toronto - Metro Toronto RAP is trying to do right now and what all the different groups that have been working on it for quite a while. Thank you very much.

J. Chandler: Now we'd like to hear from Jolie DiMonte, followed by Darius Sivin, Janice Watten and Stephen Sedam.

Jolie DiMonte: Hello. My name is Jolie DiMonte. I appreciate the pronunciation. It's nice not being introduced as Jolly. I do work for the Sierra Club out of the Illinois chapter office under a grant that was set up for the Critical Lands Program to preserve and protect critical lands that lie in the Great Lakes Ecoregion. Today, I'd like to speak about the Lake Calumet area. Lake Calumet, its surrounding marshes, prairies and river system is located on the southern end of Lake Michigan's basin roughly between the southeast side of Chicago and the Indiana lakeshore. I would like to ask the Commissioners to consider designating the Lake Calumet region as an
Area of Concern. The Lake Calumet region, similar to the Indiana Harbor to its east, is similar in the respect that it is a multicontaminated site. Locals can easily relate to this contamination. If you haven't driven through there I can explain it as the port for Chicago and I think you might be able to envision the contamination that exists there. The nation's largest concentration of garbage dumps crowd the landscape in the area; locals are still fighting landfill expansion proposals and new landfill proposals on a daily basis. Steel making, oil refinery and chemical production are some of the past and present industry that is located in the area. As recently as last year, part of the lake was bulldozed...or part of the shoreline was bulldozed and destroyed to build a golf course. At $60 a loop, the locals won't even be able to afford to play. As recently as this year, a good portion of the lake was filled in and it's still arguable as whether there was a permit or not. Abandoned factories left to decay, leaking landfills, new development proposals and toxic sediments which lie at the bottom of Lake Calumet's harbor threaten the area on a daily basis and impair its uses. Despite all of this, nature is still trying to survive there. We have a heron rookery that was once destroyed that is still...that has now come back and doing well...actually on the edge of an industrial site and next to a part of the remnant of the area's remaining wetlands. These wetlands serve as critical wildlife habitat; precious open space and a valuable water filtration system. If we're serious about protecting the Great Lakes ecosystem this is an area where we can prove it. This is an area that really needs it. Despite past environment wrongs and future threats, many forms of wildlife and plant species exist in the area. They aren't giving up on the lake and I believe that we shouldn't either. We also should not give up on the Clean Water Act. I know that Section 404 helped save the Lake Calumet wetlands from landfill development and expansion. I know that most people in this room can also think of an area that is threatened by the recent attempts to weaken the Clean Water Act so I guess I have two messages and one is that I hope that the International Joint Commission will recognize the Lake Calumet region as an Area of Concern. Obviously, I don't have enough time to talk about necessary details. I will submit that in writing and also, that I hope the Commission can be instrumental and supportive in the efforts to strengthen the Clean Water Act and not weaken it. Thanks for your time.

**J. Chandler:** Now we'd like to hear from Darius Sivin, then Janice Watten, Stephen Sedam and Ken Piirtoniemi (I hope I pronounced that correctly). Is Darius Sivin here? Janice Watten?

**Janice Watten:** I'm Janice Watten. I'm from Duluth and I've been a supporter of the principle of zero discharge since its inception as a goal for Lake Superior. After reading your proposed priorities and listening to the Science Advisory Board it seems to me that they deal mainly with gathering information again to make reports to governments. How long are we and other living things to be used as guinea pigs in determining the effects of persistent toxics? Aren't we now aware that they are affecting every living thing? Why must it be proved again and again that these substances are harmful, even deadly? Why isn't it the responsibility of the producers to prove that their chemicals or emissions are safe before they are released into the environment? There's much documented information about the affects of dioxin and PCBs and so forth. Their harmful affects are obvious. This is not the time for more evidence gathering but the time for action in eliminating these substances. The member of the Oil and Chemical Workers Union who spoke yesterday has a handle on a way to begin. Your studies should be focused on...
problems of attaining zero discharge. We know the Commission cannot implement your own recommendations but it is critical that you impress upon the governments the urgency of the need for action. The use of chlorine should be stopped. Wherever it is used, it produces dioxin whether it is measurable or not. We must insist on zero discharge now. Thank you for allowing me to speak.

J. Chandler: Next will be Stephen Sedam followed by Ken Piirtoniemi then Joan Morrison and Sharyn Inward.

Steve Sedam: Thank you. My name is Steve Sedam. I'm the Great Lakes Regional Director for the National Audubon Society and want to thank the International Joint Commission for this opportunity to address you and the opportunity you provide citizens of the basin at every biennial conference for this citizen's town meetings to discuss our concerns about the basin with you. Today I want to particularly ask the International Joint Commission to once again show international leadership and speak for this region...speak on behalf of this region and urge our Governments in the U.S. and Canada to stop their attempts to roll back the very basic protections upon which we have relied for many years - decades now - to protect our ecological integrity and our health. A clear example is what's happened with beach closings and with what Congress is attempting to do with the Clean Water Act. In 1994, there were close to 600 beach closings in the eight Great Lakes states in the United States. Twenty-three of these closures of beaches were in the Indiana Dunes National Lakeshore Park and in the Indiana Dunes State Park in 1994 - an area used by hundreds of thousands of residents from throughout the basin for recreation. Should the plans go through as promoted by the U.S. House of Representatives to cut the budget of the EPA, there will be over 7,100 sewage systems that will...are...will be outdated and will be dumping raw sewage into local waters in the Great Lakes basin states. These are figures from the U.S. EPA that just were released last Thursday. This represents over $360,000,000 that are going to have to be made up in new, local taxes or otherwise these pollution gains will continue to be rolled back and raw sewage will continue to be dumped in our waterways. I also ask the International Joint Commission to be advocates on behalf of the other creatures in the basin. In addition to human health, let us also examine ecological health. We have in the U.S. Congress today serious efforts to roll back our endangered species protection laws and to get rid of any further listing of endangered species - those who are now waiting in the emergency room. There are more airplanes that crash into residential buildings and commercial developments every year than there are projects that are halted by the Endangered Species Act yet we hear cries from certain legislators that there is a need to roll back the Endangered Species Act because it's causing economic havoc. This obviously isn't the case. This is the emergency room for endangered species and they need our help. I also would ask that as you address our lakes, our health and our future that you take into account in addition to toxics and radionuclides and the affect of mining operations on our basin, you also look at the homes for these species; that you speak to their value and that you ask the Parties to set and meet ecological restoration goals pertaining to our forests, our protected areas, our wetlands and the habitat upon which endangered species rely. Study, in this area, is important but it's no longer needed for the IJC to make recommendations to the Parties. For instance, in the United States alone there were two very important studies that were released this year from the National Academy of Sciences on
wetlands protection and restoration and on endangered species. So again I urge you to ask the Parties to develop, with specific dates, times within which they will accomplish ecological restoration goals for the benefit of the Great Lakes ecosystem. Thank you.

J. Chandler: Now we'd like to hear from Ken Piirtoniemi followed by Joan Morrison, Sharyn Inward and John Rebers.

Ken Piirtoniemi: I'm Ken Piirtoniemi from Sault Ste. Marie, Ontario, Canada and I've experienced some events here and I've been hearing comments that I wish I wasn't hearing and I need to comment on this because this is a side issue and it should be - in fact, it shouldn't be an issue at all. I suppose maybe it comes from my experience as a teacher more so. It's only once every two years that you, the Commissioners of the IJC in whom we wish to have confidence, listen to individuals publicly who have made efforts to come here to share their concerns or recommendations with you. Not everyone who chooses to speak is necessarily a dynamic speaker. Yet he or she does have the opportunity thanks to you to respond and be heard. As a teacher, I know that communication is important. It requires a communicator and a good listener. Usually one would assume that it is the speaker who is communicating but the listener also communicates with his or her body language while listening. This is very apparent with the listeners on stage in full view of the public eye. Please consider reminding each other to be sensitive to this as some body language we have witnessed since these sessions began raises questions as to the credibility and level of concern of some of our Commissioners (applause) whom we wish to continue to support and confide in as our liaison with big government regarding water quality of the Great Lakes. Thank you.

J. Chandler: Next we'd like to hear from Joan Morrison, followed by Sharyn Inward, John Rebers, and Mary Beth Doyle. Is Joan here? Sharyn Inward?

Sharyn Inward: Hi. First of all I'd like to thank the IJC for recognizing the limitations of science and advocating the precautionary approach to phasing out persistent toxic chemicals including radionuclides. I would like, however, to urge the IJC to recognize the social injustice which has allowed environmental contamination to occur since the dawn of industrialization. Yesterday, I registered for a session entitled "Effects of Toxic Contaminants on Human Health" just to learn that at the last minute human health had become male reproductive health - the argument being we must talk about shrinking penises to get the patriarchal ball rolling toward zero discharge while women's reproductive health remains a mystery to modern science, treated as an irregularity to be controlled with hormone supplements and slips off the agenda without a word. This year, the UN decided that Canada was the best country to live in - period. But nothing could be further from the truth. In small print, for women it was only number nine; and for people of colour and First Nations People conditions are even worse. Marginalized individuals, including women, children, people of colour and First Nations People are the last to pollute but the first to suffer from environmental contamination. We are the last to pollute because we can't always afford to drive automobiles and have air conditioning. We can't afford shares in the nuclear industries or in the petrochemical industries. We are not poisoning ourselves. The media must stop blaming the victims. We are the first to suffer because of the
socioeconomic factors determining where we must live, work, or go to school putting marginalized women in areas of the highest concentration of environmental contamination. We can't always afford organic food or leaner meat. We can't afford water filters or bottled water, we can't afford vacations where the air is cleaner. Sixty thousand women will die of breast cancer in North America this year. The death toll world wide is expected to reach 1,000,000 annually by the year 2000. This is all unnecessary because we already have technology for organic agriculture; we already have technology for cleaner production processes; we already have technology for renewable energy sources. Let's start using them. I urge the IJC to include recommendations on implementation in their next report. Thank you.

J. Chandler: Now we'd like to hear from John Rebers, followed by Mary Beth Doyle, Jesse Deer-In-Water, and Scott Sederstrom.

John Rebers: My name is John Rebers. I'm a biologist teaching at Northern Michigan University over in Marquette. During the course of this meeting we've heard a wide range of scientific research discussed. Although we cannot wait for absolute scientific certainty to base policy decisions, having sound scientific information is an important tool for basing such decisions. I wanted to point out to the Commission and to those in the audience that, in addition to the cutbacks in environmental regulations that have been proposed by the U.S. Congress, there are significant cutbacks in the funding for the National Science Foundation and the National Institutes of Health, the two primary U.S. agencies that fund such scientific research. I would like to urge the Commission, as a body, and any individual U.S. citizens present in the audience to communicate to the U.S. Congress the importance of funding such research, the benefits that the research has provided already for helping to enhance our environment; and the necessity for providing continued information in the future. Thank you.

J. Chandler: Next will be Mary Beth Doyle, followed by Jesse Deer-In-Water, Scott Sederstrom and Thomas Beery.

Mary Beth Doyle: Thank you. My name is Mary Beth Doyle and I'm with the Ecology Center of Ann Arbor. I want to thank the IJC for giving citizens and NGOs a chance to speak. I think that's something that really makes these meetings exciting and different. I would also like to thank you for giving labor time this year to present from the stage. I really think that presents a significant step forward. I would be remiss, though, if I didn't mention that I think the fact that First Nation representative Maxine Cole spoke last night from the floor instead of yesterday afternoon from the stage as an indication that there is progress yet to be made. But what I'm here to talk about today is some things that the citizens are doing. You've been hearing a lot about what needs to be done and I would like to thank you for the recommendations you've made. In the meantime, however, a lot of citizens are working for zero discharge themselves. I'm working with a group called "CLEAN" - Chlorine Elimination Action Network and we're part of the Great Lakes United Little Zeros campaign. We've been focusing on getting a totally chlorine-free paper purchasing policy. So far, we've gotten our city of Ann Arbor to pass a resolution saying that they will buy TCF paper when it is available within 10% of the price of conventionally bleached paper. In the meantime, they're using an unbleached paper - the unity
DP as part of their letterhead and this is an important part of their campaign - their showing that you can use chlorine-free paper products and sometimes even save money in the process. Along with the work that we're doing on city hall; we have students talking to their high schools; university students talking to their professors; we have people talking to their churches and to their groups; and all of them are calling for the use of TCF paper (totally chlorine-free paper) not just because it's better for the environment but because the technology is out there. So this is something, I'm saying, not just to you as Commissioners but to the paper industry as well that more and more people are calling for the TCF paper and it really is the way to go. A second initiative that we're doing in Ann Arbor is working on a conference on health in the environment for December 2 which I'm sure a lot of people have already been hearing about since I've been shamelessly promoting it; but it's the chance for people to speak to the researchers, hear directly from people like Tom Darvil who's working with Helen Daly and other researchers about the science, some of the things that we've been learning here and along ...at that conference, we're going to have a chance to start organizing for change. And this is a time to get health activists, environmental activists, children's activists, to get labor, women's leaders, to get a broad spectrum of people...the anti-nuke people, all working together because environmental health is the issue that cuts across all our issues and we're finding that we have a lot in common. School psychologists have something to say to breast cancer survivors; and we have something to work together for. So, while you continue to do your work and I commend the work that you've done, and I ask you to continue to make the same sort of brave recommendations that you've made in the past, while you do your work on the binational level we'll do our work on the individual level. Thank you very much.

J. Chandler: Next we'd like to hear from Jesse Deer-In-Water, followed by Scott Sederstrom, Thomas Beery and Janet May.

Scott Sederstrom: Hi. My name is Scott Sederstrom and I'm the Field Coordinator for Great Lakes United's Clean Production Task Force. I also work on one of the Little Zeros campaign and will be talking about that and urging you to make a recommendation in line with one of our citizen initiated Little Zeros campaigns but first, however, at a Buffalo town meeting, Stephen Rednicki, a physical engineer, asked Great Lakes United to present the following to you. "In 1994, my wife and I purchased an organic vineyard in Westfield, New York. We quickly realized that most of the other growers in area are not aware of the hazards that pesticides and herbicides pose. One of the prime sources of advice for growers comes from the Cornell Cooperative Extension which has an experimental station in nearby Fredonia, New York. The extension office has done little to discourage the use of chemicals on the grape crops and does not promote any organic methods. If anything is to be done about the accumulation of agricultural chemicals in our water, the advising agencies like the Cornell Extension must be convinced that safer methods of farming should be used. With big business looming in the political structure of today, I have to ask 'why do millions of citizens have to pay for the pollution caused by industry?' We pay with tax dollars, our health and our quality of life as business profits. Force the industries to clean up the mess they make and further restrict their discharges. Don't go back to practices that let the lakes deteriorate like twenty to thirty years ago."
That's Stephen Rednicki from Cheektowaga, New York. One of the Little Zeros campaigns that is being put together throughout the Great Lakes basin is the Little Zeros campaign based on the use wet cleaning as an alternative to dry cleaning. As many of you are aware, dry cleaning uses perchloroethylene and other solvents; persistent toxic substances that are contaminating the Great Lakes. Wet cleaning poses a viable alternative to the use of perchloroethylene. For myself, I've made a pledge to only get my clothes wet cleaned as a demonstration that weaning oneself from the use of persistent toxic chemicals and in addition, supporting small businesses that have stopped using perk is something that is possible; it can be done, and it can be done today. I ask that the Commission take the pledge themselves and have your suits and clothes that can only be treated in a manner other than say ordinary laundry, take them to a wet cleaner. They're in Toronto; there are going to be projects in Hamilton; there's one in Chicago; and there are going to be outreach efforts on establishing more wet cleaner facilities in other cities around the Great Lakes basin. I encourage you to take that step and to urge the environmental agencies of both the United States and Canada on the federal and the state levels to do so as well. Thank you.

**J. Chandler:** Is Jesse Deer-In-Water here? Then we'd like to hear from Thomas Beery to be followed by Janet May, Shean Bjoralt and Harold Stokes.

**Thomas Beery:** Hi. My name is Thomas Beery and I'm the Program Director at the Lake Superior Center just across the street from this building. We held the first ever International Joint Commission Biennial Meeting Youth Forum this morning. It was a huge success. It was a very important event. We saw expressions of art and science; concern and action. I thank the IJC for allowing this to happen and helping to make it happen. I also thank the Commissioners who attended our forum, to take the time to listen to what the youth had to say. It should also be noted - I guess it's obvious but I'll state it anyway - that certainly the Youth Forum was not the only place where we've seen and heard from youth at this Biennial Meeting; right here in the public hearings, throughout other sessions; and it should also be noted that the Environmental Alliance for Great Lakes Education, the hard work of Carol Rames out of Ohio and other dedicated adults have worked to facilitate youth involvement at every level, formal and informal here at the Biennial Meeting. Even so, despite this strong presence that youth are making, it must be acknowledged that the nature of this event works against youth involvement and I'll give you two examples. It's financially inaccessible. It's very difficult for many youth to attend and with that said I do want to thank the IJC for providing scholarships for many of the youth; in fact youth that have spoken - one young man who spoke today - however, there are many others that it is impossible for them to get here. The local planning commission here in Duluth, Minnesota also deserve a thank you for raising $1000. to help bring youth to Duluth to participate but we all need to be thinking about keeping this financially accessible to youth so I advise you to continue to promote scholarships for youth attendance at future biennial meetings. The second point that I want to stress in regards to the nature of this event working against youth involvement is the timing of the event and I don't mean this — I personally think this is an important point. School, for most kids, started two weeks ago. I talked to so many teachers just today in fact. "I would have loved to participate. I've got youth that have so much to say. They're involved. They're active. They needed to see this; they needed to hear this; they needed to share. But with two
weeks of school there wasn't time" and I think we need to move it later in school year so that more youth can be involved. It takes a great deal of planning to get here; a great deal. There are youth here in Duluth that would have participated but didn't have enough time. It's very hard to reach youth... when I sat in my office in August and I would get calls "Alright, send down the list of youth that are participating" and they're on summer vacation. I don't know their names and so I think that's an issue to think about. Again, to the staff of the IJC they were really flexible working around this as much as possible so a special thanks to Bev Croft and Alan Clarke for their help in this issue. Finally, my point as to why I'm so committed to youth being here - as an environmental educator I have... I've taken on what I think is an all-important goal of promoting environmental responsibility. Education is key; it's essential. We need a citizenry with a historical understanding of how we have arrived at where we are today as a result of individual and group decisions to act in certain ways. With such a historical perspective, we can decide to act in ways that will display understanding and environmental respect. We can't make changes, true change, if we don't have this understanding and environmental respect. It takes years for that to be built. Thank you for allowing me this time.

J. Chandler: Next will be Janet May, followed by Shean Bjoralt, Harold Stokes and David Maschwitz.

Janet May: Hi. My name is Janet May and I'm with the Toronto Environmental Alliance in Toronto, Ontario, Canada. I'm here this afternoon, though, to speak mostly about the Little Zeros Pesticide Reduction campaign which was already referred to by a previous speaker. In May of this year a number of activists from around Ontario met in Hamilton to discuss what we could do to reduce pesticide use in the province of Ontario and what we developed was a position paper which we plan on presenting to all of the mayors and reeves in the Great Lakes basin in Ontario. What we are proposing is a two-year plan to phase out the cosmetic use of pesticides in urban areas. We believe that you will never get to zero discharge of pesticide use until people who live in the cities and are using pesticides to look after their lawns are told to stop doing that. We can't expect farmers who produce food to stop using pesticides when we, who live in cities, are using it just to make our lawns look nice. There are tons of scientific studies linking adverse human effects to exposure to pesticides. 2-4D for example, which is probably the most commonly used pesticide in urban areas it's used to kill dandelions on lawns is linked to endocr... is an endocrine disruptor. 2-4D is being found in our drinking water. Sewage treatment plants cannot remove them. If sewage treatment plants can't remove chemicals like 2-4D, then if we aren't going to remove these chemicals from the water, we're going to impose an enormous financial burden on our municipalities in order to either rebuild our sewage treatment plants or come up with a new way to take them out of the water. It is for this reason that pollution prevention is one of the best approaches and getting a ban on the cosmetic use of pesticides is a really good way to get pollution prevention. Like the IJC, the Little Zeros agree that banning chemicals chemical by chemical is not an effect approach. Asking for a phase out based on the use of pesticides will, however, result in a significant reduction in pesticide use. The cosmetic use of pesticides is unnecessary. There are effective alternatives. All around Metro Toronto, parks departments have either reduced their pesticide use to zero or have significantly... or are now using extremely limited applications of pesticides.
Why then do homeowners need to use these pesticides to look after small patches of lawn if parks departments are able to maintain acres of parkland without using them? Some chemical lawn care companies offer as much as four applications of pesticides and four applications of fertilizers in a season. This is totally unnecessary. There is no need to be applying all of these chemicals to look after a lawn. This, in the opinion of the Little Zeros pesticide campaign, reflects a lack of respect for children and young mothers who are the people, after all, who are at home and are exposed to people having their lawn sprayed. It also results in an unnecessary contamination of the environment and is a consumer ripoff. Chemical programs benefit no one except the chemical lawn care industry. I'd like to just read to you very briefly our two-year plan. What we are proposing is: In 1996 pesticide spraying be limited to specific hours when most young children are in school and limit the spraying to one day a week during the summer. Although this will not limit the exposure for all children, at least some children will be indoors when spraying takes place. We would like, also, too to see an immediate ban on the following pesticides that the Danish government is recommending be banned or restricted. I won't read all of them but the Danish government is recommending restrictions or bans on 2,4-D, MCPA, Mecoprop, Diazinon, among others and these are commonly used on people's lawns. By 1997 at the latest, we would like to see a phase out of the outdoor cosmetic use of pesticides in urban areas until such time as these chemicals have been conclusively proven to be safe and pose no risk to human health and the environment. I would like to tell you that in February of this year, the municipality of Metro Toronto endorsed these recommendations in principle and they are presently investigating whether or not they can actually implement them. I would like to see the IJC endorse these recommendations and I would like to also see you strongly recommend that municipalities start to implement bans on the cosmetic use of pesticide. After all, there are no studies linking cancer to dandelions. Thank you.

J. Chandler: Now we'd like to hear from Shean Bjoralt, followed by Harold Stokes, David Maschwitz and Mark Van Putten.

Shean Bjoralt: Hello. My name is Shean Bjoralt. I'm with the Prairie Island Coalition. It was formed in 1990 to stop profiteering from nuclear racism; change society's bad energy habits; promote the efficient use of renewable energy resources and demonstrate that the best nuclear waste management method is to first stop producing nuclear waste. We have a crisis with failing nuclear reactors in the Great Lakes basin. Thirty of the 36 reactors in the Great Lakes are pressurized water reactor designs using steam generators with steam generator tubes that are falling apart because of a substandard metal that was used. In the interests of profit, Babcocks and Wilcox and Westinghouse sold utilities tubes made of Incanl rather than stainless steel and now these tubes are cracking and leaking radiation routinely into the environment and are not only threatening with higher breast cancer rates but also threaten catastrophes because if multiple tubes rupture it can cause a melt down since the steam generator tubes are primary boundary of the containment. We also have a nuclear waste crisis. Utility fuel pools are filling up rapidly because of high output from these reactors because of the high profit associated with the production of nuclear waste and what's happening is we now have casks being stored next to reactors like at Palisades. Come December we'll have casks stored next to the reactor at Point Beach. We have casks at the Bruce station and the utilities, in their attempts to deal with this
nuclear waste crisis, are promoting that we ship this stuff off to "remote locations" rather than keeping it at the 109 nuclear reactors in the U.S. and the 22 reactors in Canada. What they're ignoring in that point is that there are many prob...you know ... multiple provinces in between the reactors and some of the proposed sites in Canada and many states in between the reactors and the proposed sites in the southwestern United States. What happens, also, with the nuclear power attempting to continue itself and catalyze their projects is they're targeting poorer communities and communities of colour and rural, conservative voting communities. If you look at where all the nuclear reactors are that's exactly where they are but we can't stop there. We have to look at everyone that is affected. Recent data has shown that counties that have or are next to a nuclear power plant contain 18% of the women in this country but account for 55% of all breast cancer deaths—that's unacceptable. What we have is a situation where the nuclear industry will eventually come to an end. It's how it comes to an end that is before us. Do we work together to phase it out and deal with the crisis for the next 200,000 years of are we forced to phase it out from another catastrophe similar to Three Mile Island or Chernobyl; and I say that by looking at who's here and recommendations of the Commission I'm optimistic that we can work together to promote an energy transition that accommodates that process of phasing it out sooner. Along with this, I have an additional recommendation for the Commission to go along with their recommendations of a full phase out of radionuclides - this is basically a mechanism to work towards that direction and that is make access for utility storage of nuclear waste ...make conditions for those access such that a utility before they can remove any more waste from a pool that they must meet conditions that I will outline here. On the utility demand side, it's flawed because presently electric utility financial health depends on energy consumption. As energy sales to consumers increase, so do utilities earnings but this energy consumption also promotes the production of radioactive waste; the more waste the higher the utility earnings but utility earnings could depend on efficient use of energy rather than consumption by allowing the utility rate of return and its rate base to rise or fall depending on the magnitude and performance of its conservation investment. No utility should have additional irradiated fuel storage capacity without making this correction. On the supply side, there's also another correction to utility regulation. Presently, electrical utility regulations protect nuclear power plants from fair market competition based on actual energy production costs. Independent power producers are not allowed to get a fair price on their product and most nuclear energy production costs are externalized. Regulations that require fair competition based on actual energy production costs should be operating before utilities can access to additional rated???? fuel capacity and we feel that with these conditions we will see a nuclear phase out along the Great Lakes. Thank you.

J. Chandler: Now we'd like to hear from Harold Stokes, to be followed by David Maschwitz, Mark Van Putten and then Ed Burt.

Harold Stokes: I'm Harold Stokes and I'm a citizen of the earth like all of us. And a lot of these issues have been addressed as far as all the different ways we're attacking the environment. I don't want necessarily to speak in behalf of those, those have been explained to the Commission and everyone else in the audience. I think everyone here on the panel and also in the audience realize that we're dealing with something that's very vital; we're dealing with life; we're dealing with future of life on the planet. The earth is our home. It's the only one we have. It's the home
of our children and it's going to be the home of our grandchildren. It's the home of all life on the planet. It's the home... it should be the home for all the life that follows us. It will be the home for what we leave for them. We need to respect that. We need to live as human... what I call human beings... to me a human being is someone who's humane, who wants to leave life behind besides exploiting it for all it's worth. While we are here, why don't we live as guardians. This is just a temporary home for us. As far as I'm concerned nobody owns property. You should be a guardian of property and that property is not only owned by human beings or part, it's not owned by anybody. It's part of the home of all life on the planet. Let's be guardians; let's not let the environmental laws be destroyed; let's keep life here. I'll give up my life so that life can persist here. And there's many in this audience who will do the same thing. (applause) Thank you.

J. Chandler: Next we'd like to hear from David Maschwitz, followed by Mark Van Putten, Ed Burt and then Frank Koehn.

David Maschwitz: Thank you. My name is David Maschwitz. I'm with the Minnesota Pollution Control Agency and I'm working on the adoption of the Great Lakes Water Quality Initiative in the Lake Superior basin in Minnesota and my purpose in mentioning this to you today is just to let people know that we're in the early stages of that process and we're very much interested in public involvement or public comments at this time so if people have ideas, comments, suggestions on the Great Lakes Initiative and our adoption of that in Minnesota we'd like to hear from you and particularly we're interested in the comments of environmental and citizen's groups as well as, of course, industry and municipalities that are in the basin and I'll give you my phone number. Again my name is David Maschwitz. The number is 612 296 7255. Thank you.

J. Chandler: Next we'd like to hear from Mark Van Putten, followed by Ed Burt, Frank Koehn and then Brett Hulsey.

Mark Van Putten: Thank you. My name is Mark Van Putten. I'm with the National Wildlife Federation's Great Lakes office. I appreciate very much the opportunity to appear before you today. I think I've been at every one of your biennial meetings on Great Lakes water quality since the Indianapolis meeting that was mentioned before by Mr. Merritt and I wanted to, as a citizen activist who cares very deeply about the IJC and its role, welcome the new Commissioners; to commend you for your patience in listening to citizens in what is sometimes a messy and difficult process and I appreciate very much that you are continuing that tradition. To me, the International Joint Commission has the most remarkable and worthwhile kind of power to have and that is the power that comes with moral authority. The fact that it is you who speak on behalf of an ecosystem and its citizens and the wildlife and not on behalf of any particular government or political jurisdiction or interest group. That is a very rare kind of authority and I urge you to use it wisely. We've heard a lot the last couple of days about these perilous times; perilous for budgets; perilous for our environmental laws; perilous for health; but these are very perilous times for the International Joint Commission as well. The issue that you face is how to deploy your moral authority without being marginalized; without getting caught up in some of
the partizan and polemics of the day that are occupying our nation's capitols and our state capitols. I'm no wiser that you or anyone else in this matter but I would suggest to you that the first thing is to return to your first principles and to be very forceful in articulating the principles of the Agreement that you have stood for so long in the Great Lakes Water Quality Agreement; for you to reaffirm the principles of zero discharge; of reverse onus; of the ecosystem approach. I would urge you then to note progress and to speak very forcefully in recognizing progress. In that regard, I would urge you to note the Great Lakes Water Quality Initiative on the U.S. side. The first time in the history of the Federal Clean Water Act that the United States government has tried to adapt that one-size-fits-all system to peculiar needs of a given ecosystem. You can help put in perspective the importance of that kind of initiative by acknowledging it and in that way lending some moral authority to it without getting caught in all the debates about EPA riders and so on and so forth. So I would urge you to take knowledge of progress ... acknowledge progress to do it in the context of the first principles that you have articulated and that the Agreement includes. I also wanted to note what is, for me, one of the most striking aspects of this meeting to date, particularly the public presentations, and that is the absence of industry representatives coming to this mike. If you were in Windsor, you saw busloads of proponents of their view coming to the mike and I ask myself, where are they this time? Why is it that they were there two years ago on the heels of your chlorine recommendation turning out workers and turning out their supporters but two years later their voices aren't being heard. Nothing makes me, as an activist, more nervous when I don't hear the industry spokespersons participating in public processes. It makes me concerned that they are unwilling to engage in the debate in a public forum. Nothing is more striking to me with respect to this meeting from the Windsor meeting and the Traverse City meeting and all the meetings in which you began to allow public participation. Perhaps there are things going on behind closed doors with which we should be concerned. Again, I want to thank you very much and congratulate you as new Commissioners. I appreciate very much the opportunity to appear before you.

J. Chandler: Now we'd like to hear from Ed Burt, to be followed by Frank Koehn, Brett Hulsey and then Eric Walters.

Ed Burt: Yes. Commissioners. I came with the intentions of ... when I filled out that yellow sheet ... of talking about our RAP. I'm on the Public Advisory Committee but I had a chance to talk to some Environment Canada people today for about an hour. I hope they share my concern ... but while I was sitting there I was ... I first of all looking back at the IJC and looking at it today I really I congratulate you for your integrity. I really do. But I'm concerned about the future the same as I'm sure you are or you wouldn't be in the position you're in and while I was sitting there I was thinking about how soon ... you know it may not be very long until some corporate executive comes home some night and his son is pretty disillusioned because the license bureau wouldn't give him a license because they told him that his reflexes were so slow because of pollution that he wouldn't be able to navigate in traffic and I also wondered ... I was thinking about the first baby ... and it would be quite a novelty, you know, that was born in a community and somebody asked him 'well, is it a girl or a boy' and they said, 'well, we're not sure.' But you know, after several of them are born, it gets to be like the jelly babies in the Pacific. The first one was a novelty but after that it wasn't funny anymore and I hope that that
never happens because I hope the ...because I know that the public outrage around this basin will be beyond belief and I just hope we never get to that stage but it is a possibility and it's frightening to me. I was thinking also ...before closing...and in sort of some of the fundamental flaws in our society and I was looking at incomes and salaries and I wondered about that. I've been an organic farmer for decades and when I get paid it's because I produce something that somebody will buy and if I don't I don't get paid and I wondered, you know, with all our monitoring equipment that we have and if we monitor pollution and we have people in control to do something about it if they weren't getting paid until the pollution levels dropped, I wonder would that give them more incentive. You know it works that way with producing turnips.

Thank you.

J. Chandler: Next we'd like to hear from Frank Koehn, to be followed by Brett Hulsey, Eric Walters and Elaine Kennedy.

Frank Koehn: Good afternoon. I'm attending this conference representing the Lake Superior Greens. In that respect I'd like to point out that I very carefully went over the Duluth newspaper today, which I believe has the largest distribution - geographical distribution of any paper in the United States and I found no comment about the IJC conference. I hope this isn't indicative of the knives - the fiscal knives that are slashing environmental programs in Washington, DC and how it may affect the IJC. Over the last couple days I've listened to the need for partnerships with local government and this need has been extolled by many speakers. And, in this respect, I want to speak as the Vice-chairman of the Bayfield County Board of Commissioners and also as the Chair of the Bayfield County Board Zoning Commission. I want to offer some suggestions and recommendations to add to the IJC's proposed priority for the 1995-1997 biennial cycle and I'm offering those to you in the spirit of partnership. I've served on the County Board of Commissioners for the past 10 years. In addition to that, I've been chairman, in the past, of the township in which I resided for eight, nine years and in addition to that, the small township I managed our sanitary district. Many issues have come across my desk in those various capacities and the first thing I would ask is that you, as a Commission, personally would applaud and endorse the initiative taken by the Douglas County Board of Supervisors, the Bayfield County Board of Supervisers and the Redcliff Band of Lake Superior Ojibway in passing the outstanding national water resource designation for Lake Superior. These, as you may know, these three governmental entities cover the northern tier of the state of Wisconsin from the St. Louis River to the Chequamegon Bay. Additionally, I would to recommend that the Commission recommend to the provincial and federal governments that all EIS's be prepared on a regional basis especially in terms of any mining that's to take place. As it stands now we're kept silent and we're kept from getting the information on how industrial development will affect the ...or increase the toxic loading of Lake Superior, in particular, and I'm quite sure the rest of the lakes. Every one of these developments is taken as a stand alone entity and that simply isn't working. I would recommend that an ecosystem health search conference...conferences be established for all basin communities to assess, among other things, toxins in mothers' breast milk, respiratory diseases, learning disabilities, sexual development in our children, frogs, turtles and all other critters that either are messengers sent from the Creator or indicator species of our ecosystem's health. These recommendations ....these incidences should be documented and
recommendations should be presented to the appropriate government agencies that offer remedial action. And, in closing, I too as a very dear friend of mine offered last, hope that in two years when I attend the next IJC Conference that there’s an eagle staff on that stage. I also hope that when I attend the next IJC Conference, that the plea from the Saugeen Nation and the Ojibway Nation for First Nations representation in the IJC process in all IJC Boards is a reality. Thank you very much.

J. Chandler: Now we'd like to hear from Brett Hulsey, to be followed by Eric Walters, Elaine Kennedy and Birkhard Mausberg.

Brett Hulsey: Thank you very much. I’d like to congratulate the Commission. I think this has been ... there’ve been a few bumps in this meeting but, this being my fourth IJC meeting, I think we made a lot of progress here and I appreciate your patience throughout this long process but I would like to tell you a little personal story about what I did today to clean up the Great Lakes. We’ve all talked a lot about cleaning up the Great Lakes but I actually made a conscious decision to go remove some of the pollutants from Lake Superior this morning by going Salmon fishing and I’d like to report that I was somewhat successful in doing so. I caught one salmon but in catching this fish I realized that this is the number one thing ....there were other people out there catching fish as well...this is the number one thing that the Great Lakes states and provinces are doing to clean up the Great Lakes. As we're spending hundreds of millions of dollars to stock these beautiful fish, to go swim in the lakes, to bioaccumulate the toxins, to bring them back so that then people like me can go catch them and go home and deposit them in our own private toxic waste dump - that is our families. And, I hear snickers in the audience but we're spending hundreds of millions of dollars to have people, to promote people and encourage people to go catch the fish, take them home and feed their families. So I have this beautiful fish. I talked to a person from the Wisconsin Department of Natural Resources - they said this fish is safe to eat but having heard what we have heard today - they said actually no, they didn't say it was safe to eat, they said it was the most safe salmon to eat from the Great Lakes and I respect this person but in taking it home I don't know what to do with this fish. I don't know whether to take it to a toxic waste dump, to barbeque it, to slice certain parts of it...in hearing everything we've heard this weekend, you know, it makes me even more concerned and that's basically the point ... I know Chairman Baldini made the point that the IJC is not the challenge right now, Congress is the challenge. Well, we have been here talking to you and you talking to us and basically the choirs singing to one another, the people from industry have been playing golf with Newt Gingrich and getting ...having their way in Congress with the dirty water act that they wrote themselves that we never saw. It actually says in this dirty water act...it says that people can go take more dioxin, not 2,3,7,8 but the other bad ones and actually dilute them ...to go back to the dilution solution for these toxic pollutants that we know are bad and even Gordon Durnil says this is the absolute wrong way to go and we hope that he will talk more with Newt Gingrich and try to convert him to our side but I would just like to show ...everyone showed... you know, it's kind of show and tell for the citizens... but this is my son, Tyler, and he was ...he's been to Lake Superior twice in his 3-1/2 month long life. He was not born...he was born two days prematurely because my wife said since she and I started knowing one another she has not eaten any Great Lakes fish, maybe one small meal a week and we had that great quandary...that great conundrum
like what to do with this fish when we had to decide whether to breastfeed our child; whether it was safe because we knew the most effective way for her to reduce these pollutants in her body was 1) to have a child, and 2) to breastfeed it and...I'll finish up...and that is sad. And that just saddens me...and as a parent you know you want to do the right thing but you don't know what to do and it's very difficult but we are making progress. We've heard about the progress but the fact that we don't know whether that fish that I went and caught is safe means we have a lot more work to do. In Lake Superior we have to control the air pollutants from the coal industry, a very big powerful interest - the mercury that rains in, the PCBs - we have to clean them up in the Fox River because PCBs in Fox River may be coming into Lake Superior and we need concrete things that we can look and say if they clean up the Fox River the fish in Lake Superior are going to be cleaner. So I applaud how far we've come but I encourage you keep working harder because there are kids like Tyler and hopefully someday he will be able to go eat the fish and know they're safe like we cannot. Thank you very much.

J. Chandler: Next we'd like to hear from Eric Walters, then Elaine Kennedy, Birkhard Mausberg and Susan Sang, I believe it is.

Eric Walters: Good afternoon. My name is Eric Walters. I'm with the National Wildlife Federation and I want to thank you for the opportunity to speak with you this afternoon. I came here today to make six specific recommendations to begin to achieve the promise of virtual elimination and they're directed at one specific area and that's the area of the deposition of toxic air pollutants to the Great Lakes. Being here on the shores of Lake Superior, I think it's particularly appropriate to talk about this problem because many of the...as you've undoubtedly heard from the Air Quality Board, many scientists believe this is the most significant source of most of the persistent toxic pollutants. We have a historic opportunity, at least on the United States side of the border, to achieve real progress towards virtual elimination in the next two years and that's why I think that it's particularly important that the Commission speak out on this subject. Right now there's a widespread opportunity throughout the Great Lakes basin among industry and municipalities, states, citizens, environmentalists and the federal government of the significance of this problem. Also, in 1990 Congress, under something called the Great Waters Program, required the U.S. EPA to protect and to prevent serious and widespread health and environmental effects from this problem. Moreover, we all heard yesterday morning, Robert Perciasepe in his keynote address make a specific commitment to implement the Great Waters Program and acknowledged support from the states including Governor Ernie Carlson from the State of Minnesota so there is really a tremendous opportunity to move forward in this area. The first recommendation that I'd like to make is to acknowledge the commitment and applaud the commitment of the U.S. EPA to implement this important program with one caveat and that is that as one looks through the recommendations in the Great Waters report too many of those recommendations are command and control type recommendations. We don't see the virtual elimination philosophy reflected in those recommendations. And specifically the report does not purport to implement Annex 15 to the Great Lakes Water Quality Agreement which specifically requires the elimination of persistent toxic air pollutants where they're contributing to problems in the Great Lakes. The second specific recommendation is that an opportunity is the Great Lakes Water Quality Initiative is now about to be implemented in all eight of the Great Lakes
states each of the Great Lakes states now has the opportunity to modify their air programs as well as their other programs including nonpoint source programs to adopt the specific focus of the GLI on the 22 bioaccumulative, persistent, toxic chemicals that have been identified as most threatening to the Great Lakes ecosystem... (end of tape) ... As the Commission heard yesterday, this is a ....recommendations came out of a multistakeholder group including municipalities, industry and citizens with specific deadlines for phasing out emissions and releases of the list of nine toxic chemicals in the binational program from all sources, including air sources. There are detailed recommendations on the pulp and paper industry, incinerators, and other important areas. Fourth, I think I would recommend to the Commission to urge the governments to bring all stakeholders together to complete the binational virtual elimination strategy and that will, also, assist in reducing air toxics. Fifth, encourage the EPA, Congress, and the State Department to move forward quickly with international agreements that are now underway to phase out and reduce the use of banned and other hazardous persistent organic compounds and heavy metals and finally, I'd urge the Commission to recommend to the governments to adopt the Outstanding National Resource Water designation for Lake Superior. This can act as a backstop if these other programs do not work and pollutants continue to increase in Lake Superior. The governments will have an opportunity and a tool to use to at least hold the line on the greatest of the Great Lakes. Thank you very much.

J. Chandler: Next we'll hear from Elaine Kennedy, to be followed by Birkhard Mausberg, Susan Sang and Victor McManemy.

Elaine Kennedy: Madam Chairperson, Commissioners, Facilitators, Participants. I'd like to thank the IJC Commissioners for giving me this chance to speak to you. I'm just sorry that neither you nor I, because of the timetabling, could participate in all the concurrent sessions this afternoon. I realize that it is very difficult to get everything into a program that everybody wants to see and listen to but it would have been nice for all of us to go this afternoon. I'm here today representing the Ontario Public Advisory Council. This is a council made up of one representative from each of the Public Advisory Committees in Ontario. We meet once a year and discuss our mutual concerns and I was asked to bring to you concerns from this particular group. I'm looking at today with you the role of the IJC, the government and the PACs. When the IJC proposed that remedial action plans be developed to clean up Areas of Concern in the Great Lakes and the St. Lawrence River there was much acclaim and positive reaction amongst concerned citizens, environmental groups and government agencies around the Great Lakes basin. I'm positive that no one in any of these groups foresaw the amount of time and work that would be involved in setting up remedial action plans, nor could they realize the potential in a group of knowledgeable citizens in the public advisory committees. They are groups that must not be turned off. At this time, the progress of the RAPs is in jeopardy because of the economic problems and changing political commitments in Canada, the United States, the states and the province but we and especially the IJC must not give up. The role of the IJC, I believe, is to be the conscience and watchdog in the next years as we reach the expensive stages of implementation. The IJC must not let any of the governments back down on their commitments. Biennial meetings, interesting as they are, are just a waste of time and money if real accomplishments are not evident. The role of the governments is to lead and the IJC must insist
that they fulfil this role. Under the Great Lakes Water Quality Agreement as revised in 1987, the Federal Governments of Canada and the United States are formally committed to developing and carrying out RAPs. The leadership of federal, provincial and state governments must be maintained throughout the Stage 3 implementation. RAPs must be a government priority. The amount of time and money spent getting to where we are now must not be wasted. Public advisory committees in Canada need to see positive government leadership backed up by formal commitment from all their agencies to believe in the viability of the Canada-Ontario Agreement. The Remedial Action Plan teams have finalized their five-year work plans. This fits in the COA target for the year 2000. There must be a fair distribution of funds and overall progress in all Areas of Concern. Achieving a minimum of 60% restoration in all areas of concerns is more important than delisting a few, although not as spectacular politically. In many Areas of Concern, PACs have endorsed the five-year work plans because priorities for action are established, actions are implemented systematically, progress on implementation can be assessed and resource commitments are over a longer timeframe so actions can be planned and partnerships can be developed. The COA Review Committee with its water perspective is in a good position to insist on the efficient cooperation between different government agencies for the implementation of RAPs. The role of the PACs has been to act as advisors. However, that role may change after Stage 2. Supports for the PACs may also change in light of government cutbacks. Some PACs are not structured or capable of doing everything required to fully implement RAPs; for instance, fund-raising, partnership building, etc. The ongoing financial support of public advisory committees is a drop in the bucket compared to the administrative costs of government programs. The benefits reaped from these groups well justifies the cost. On behalf of all the volunteers in 42 Areas of Concern, please do not let us down.

J. Chandler: Next we'd like to hear from Birkhard Mausberg, to be followed by Susan Sang, Victor McManemy and Stephane Gingras.

Birkhard Mausberg: Thank you. My name is Birkhard Mausberg. I work with Great Lakes United. I'd like to thank the Commissioners for allowing me to speak to you. My comments are going to be slightly different than some of my fellow citizens from the Great Lakes. I have a privilege in my position to travel a lot around the basin. I see the scenic beauty of the Great Lakes and I get to meet a lot of folks. I've been to a number of these IJC meetings. This particular one, I missed certain folks because they haven't had an opportunity to come here. So I would like, and like to urge the Commission to go visit these folks. Go visit Brenanne Lloyd in northern Ontario and hear her stories about fighting for forestry and fighting mining like uranium mining. Go visit the Niagara River and talk to Diane Hemmingway with all the toxic waste sites along the Niagara River. Go to Keweenaw Island and meet a very inspiring, wonderful couple, Bud and Janet Avery who've been victims of slander suits and go visit the people in Elliott Lake and Port Hope and all the other nuclear facilities who are dealing with this on a day-to-day basis. These people have stories to tell. Their stories are real. I can only hope that you'll take the time and make the effort to hear those stories. Thank you.

J. Chandler: Next we'd like to hear from Susan Sang, Victor McManemy, Stephane Gingras and John Mahan. Is Susan still here? I know she had wanted to speak earlier and we weren't able to accommodate that. Victor McManemy? Stephane Gingras.
Stephane Gingras: Hi. My name is Stephane Gingras. I come from a long way. I come from Montreal and I work for Great Lakes United and I want to thank the Commissioners for giving me the opportunity to talk here today. I want to talk about the Canadian Environmental Protection Act. As you know, the Act has been going through a process of revision and there was a report produced by the House Committee revising the Act and I would, as a first recommendation to the IJC, I would recommend that you support the report that is revising CEPA and the 141 recommendations in that report. So, that is my first recommendation. The second thing that I want to talk about is the Canadian Toxic Substance Management Policy that was released in June this year. This policy is far away from being in accordance with your definition of zero discharge or the definition of the IJC so I would encourage you to say to the Canadian government that zero means zero and that this policy should be revised in accordance to the recommendation of the IJC for virtual elimination of toxic substances. Thank you.

J. Chandler: Now, we'll hear from Victor McManemy, to be followed by John Mahan, Shirley Tomasello and Pat Lupo.

Victor McManemy: I want to thank you, Commissioners, for being here this weekend. A few years ago you were in my hometown, or not you but some other Commissioners in my home town of Traverse City, Michigan, and during my opportunity for public testimony. During my testimony I had an opportunity to invite a woman from Germany who's been a valiant and brave fighter on a nuclear plant in Michigan called Big Rock Point who's really put her life on the line; her character and reputation; she's been attacked over the years because of her intervention in this nuclear plant and I asked her to come up and read a quote that is on a...Greenpeace has a symbol...you see it on the Moby Dick out here...it was a gift from the Anishinabe; a gift; it was a spiritual thing. And there's a quote that they put inside there and it's from an old Cree Prophecy. The Cree were the furthest westward peoples of the 16 Fires of the Anishinabe and I just want to quote this now on Christa's behalf and then sing the song that I sang there for you. This is a Cree prophecy - "Only after the last tree has been cut down, only after the last river has been poisoned; only after the last fish has been killed; only then will you find out that money cannot be eaten." This song is a piece of history. I had the opportunity to visit an Elder - 86 year uncle Jim Marsagheesik[sp] - who was early on a fisherman in the Great Lakes and took the white fisherman all through the fishing grounds that were teaming with fish off the Beaver Islands and showed them where those fish were and so this is a song that's called "Scapegoats."

(Song)
I met a wise old Indian man
Remembered years gone past and
Talked about big fishing fleets
Said the big fish couldn't last
He explained about pollution
Simple - the eggs they work no more
They've destroyed the natural spawning grounds
When have you last seen the eagles soar?
And he said those smells don't belong in there
and neither do the lamprey eel
These ocean fish choken' out the lakes
Imagine how he feels
He said smoke that comes from the big stacks
Kills the trees and ruins the lake
And the fish that feed off the nuke plant
Grow too fast and they don't look right.

Then he said, remember what goes in comes out
What goes up comes down
The price you gotta pay
And what goes around always comes around
Just like night and day
And we can't get somethin' for nothin'
Always been and'll stay that way
And folks blaming it all on the Indians
Won't make your problems go away.

Said there's mercury in the muskellunge
and cadmium in the carp
With mirex in those trophy fish, boys
Make sure your hooks are strong and sharp
Cause they're testing for polyaromatic hydrocarbons and organochlorines
Like 1,2,5,6 diobenzanthrocene polychlorinated styrenes.

Said there's toxaphene on Isle Royale
Heard they found some in a trout
Dioxin in Saginaw Bay fish
It's natural, Dow says, no doubt
And with PCBs in their salmon
Sporties point the Indian's way
But now I'm curious to see just who gets blamed
For radiation in the bay.

'Cuz what goes in comes out
What goes up comes down
The price you gotta pay
And what goes around always comes around
It's just like night and day
And we can't get somethin' for nothin'
Always been and'll stay that way
And folks scapegoating on the Indians
Won't make the toxins go away.
Then he talked about the treaties
Made to ensure friendship and peace
How his people agreed to share what was here
If treachery and wars would cease
So now we're in the present, that is linked to the distant past
Well, it's time to share
For this earth you care
Cuz the future's coming fast.

Well, this story had no endin'
He had lots more things to say
Like 'this world still gonna be here
even if we pollute ourselves away'
Heh, but wouldn't it be nice if us old ones
and the children could once more smile
Cuz you started livin' here on this Mother Earth
Like you want to stay here for awhile.

And what goes in comes out
What goes up comes down
The price you gotta pay
What goes around always comes around
It's just like night and day
And we can't get somethin' for nothin'
Always been and'll stay that way
Try sharin' what we have in common
Start livin' in a peaceful way
Try sharin' what we have in common
Start livin' in a peaceful way.

J. Chandler: Now we'd like to hear from John Mahan, followed by Shirley Tomasello, Pat Lupo and Tim Eder.

John Mahan: Some things that have come together in my mind since I've been here that I didn't understand in some ways before. They have to do with science. My background is science. I've been a clinician in family medicine. I served as a clinical research coordinator in pharmaceutical research in the human efficacy phase. I'm currently a writer who specializes in the Great Lakes and I've thought about science a lot as Ann and I've been working on some of the book projects that have to do with the Great Lakes. You hear the call for good science repeatedly and it usually comes from the people that are misusing good science; not always. But we do need good science. We can never stop seeking good science and there will never be any point at which we can begin to ignore it. But I would suggest that there is an ecology of science. There is a succession of science in this process that we're going through. What I mean by that is, though we need all scientific disciplines we've been dealing with epidemiology and toxicology and the
other ologies as we must, but once some degree of harm is shown to be possible, likely, indeed showing up in at least the exposed members of the population - the most exposed, we're all exposed - then I would suggest that the stage of succession in the ecology of science moves up a notch. We still need epidemiology and the other ologies but at that point we're getting into values. We're getting into what for lack of a better description is the science of right and wrong, which is called ethics. That takes us to terms like negligible risk, acceptable risk; those are terms being used by people who are making decisions as to how much of the things we've been talking about are permitted in permits. These are not scientific judgements, they are value judgements. That's important to understand. Acceptable to whom? to the industries that profit from them? to the governments that capitulate to power? to native Americans? inner city and rural poor and other highly exposed? and politically dispossessed groups? Negligible, in whose opinion? the future's children who have no say in such decisions. We have already established international and national precedents for making these judgements. This is not pie-in-the-sky, sentimental, emotional type of things - talking about ethics. The Nuremberg Code laid out a course for us quite some time ago and it was in response to the misuse of good science during World War II where people were dismantled literally with good scientific principles but abysmal ethical principles and the Nuremberg Code - I'll read just a few quick excerpts - the first item on it after they say that certain basic principles must be observed in order to satisfy moral, ethical and legal concepts the first item "the voluntary consent of the human subject is absolutely essential. Without the intervention of any element of force, fraud, deceit, duress, overreaching or other ulterior form of constraint or coercion," further on "to protect the experimental subject against even remote possibilities," not absolute, conclusive proof but against even remote possibilities "of injury, disability or death. During the course of the experiment, the human subject should be at liberty to bring the experiment to an end." No one every asked me if it was all right to deposit toxic chemistry in my tissues. I'd like to have a say in that. No one every asked me, as a parent, if I would give my informed consent not only for my own body tissues to be used in this non-controlled experiment but for it to be put into my children's tissues; but it is in all of those tissues. Now, I won't belabor the point except to say the Nuremburg Code was just the first in a series of these types of agreements; international and national agreements. There is a Declaration of Helsinki. I won't read parts of that but it's virtually identical. The FDA regulations came about because of the Thalidomide incident and it insists again on informed consent. These same basic ethical principles are in reverse onus, precautionary principle and the medical dictum of 'first do no harm.' This is part of the science of ethics. We are at the stage where we're making these judgements and we must go to this stage of decisionmaking. I think that the comments that were made on transition are absolutely necessary. We must begin a very formal, very thought out transition process. We cannot continue this kind of debate. I wholly support and agree with the IJC's principles of virtual elimination, zero discharge, reverse onus, precautionary principle, sunsetting of chlorine as industrial feedstock, and I also wholly concur with a nongovernmental environmental group's statements yesterday as well as labor's very, very cogent points. I concur with all of these because they help preserve the sanctity and integrity of the whole as well as the individual and I thank you for your endurance.

J. Chandler: Next, we'd like to hear from Shirley Tomasello, followed by Pat Lupo, Tim Eder and Elaine Marsh.
Shirley Tomasello: Thank you. Again my name is Shirley Tomasello and I live in Cleveland, Ohio and I'm the Executive Director of the Lake Erie Alliance. We are an international incorporated alliance of organizations and individuals from the states bordering Lake Erie and the Province of Ontario. Today I'm here representing the concerns of thousands of citizens who live and work in the Lake Erie watershed regarding the water quality of Lake Erie and its rivers and streams. I thank the Commission for its past work in protecting Great Lakes water quality and for being here to receive these comments. I hope you will take a clear message from the people of the Lake Erie region back to the Governments of the United States and Canada. Please tell them that the citizens of the Lake Erie region want to ensure the continued protection of Lake Erie water quality and increased efforts towards meeting the goals of zero discharge of toxic substances. Please tell them that although Lake Erie has made tremendous progress toward better water quality, people are suffering terrible injustices from water and air pollution due to present environmentally unsound industrial and agricultural practices in the Lake Erie bioregion. Tell them we are concerned that Lake Erie may begin returning to the picture of environmental devastation that it once was if the recent policies of the United States and Canada, of roll backs of environmental laws and cutbacks in funding for environmental enforcement continue. Tell them we are concerned that the emphasis on research and funding for bureaucratic risk assessment over the goals of virtual elimination, fishable and swimmable waters and zero discharge threatens to end the progress we have made to improve Lake Erie and finally, tell them that there's no scientific or moral justification for ending progress toward a Lake Erie where people can drink the water, swim in the waters, and fish free from fear. I'd like to now specify some of our concerns and recommendations specifically. We commend the Commission for adding radioactive substances to your list of persistent toxic substances and in recommending that all levels of government in the Great Lakes basin work toward virtual elimination of these pollutants. Shortly after the last biennial report, the Lake Erie region was marked by citizen protests throughout the basin especially in Michigan and Ohio, because in the spring of 1994, as was already mentioned, the Fermi Power Plant discharged 1,500,000 gallons of radioactive waste water into Lake Erie. The waste water resulted from a fire at the nuclear plant on Christmas Day in 1993 and that accident caused pieces of the plant's huge turbine to tear loose, smash the condenser that cools steam from the reactor, and cause 1,500,000 gallons of water and 17,000 gallons of oil to pour into the basement of the plant. The water was discharged three miles from the inlet that provides tap water to the City of Monroe. Fermi is in the process of seeking approval from the Michigan Department of Natural Resources to renew its permit and discharge millions of gallons of radioactive wastewater routinely. We cannot afford the risks associated with nuclear power and risks and economic burden from their associated high-level waste on a source of drinking water for 11,000,000 people. Please recommend efforts be made to begin phasing out nuclear power plants in the Great Lakes region and that research and development of alternative energy sources be increased to make alternative energy widely available. Please recommend to the governments of the United States and Canada that an adequate regulatory framework be enacted to protect our waters from nonpoint source pollution. Although much lip service is given to the fact that it's unsound, it's a problem in the Lake Erie region, not much is being done. In northwest Ohio, a giant factory farm is being proposed near the Sandusky River watershed. The company, Agrogeneral, is proposing a factory farm of 2.5 million chickens. Area farmers are concerned but the Ohio Environmental Protection Agency has stated numerous
times it won't consider past performance and that they have very little regulatory authority. At this time, I would like to thank the International Joint Commission and please don't let our comments fall on deaf ears. Thank you for receiving these comments and I wish you well in making your recommendations.

J. Chandler: Now, we'd like to hear from Pat Lupo, followed by Tim Eder, Elaine Marsh and Colleen Cooney.

Pat Lupo: Good afternoon. My name is Pat Lupo. I'm a member of the Benedictine Sisters of Erie, Pennsylvania. I'm an environmental educator at a center on the shores of Lake Erie. I have been formed in a 1,500-year old tradition that among other things, tells me to treat all things as vessels of the altar. This simple mandate lived out through the centuries, has developed into a call to stewardship central to my life. For me and my community, then it is our responsibility as well as our privilege to look upon the care of the earth as an integral part of who we are. It is not a particular ministry or work; it is not a good deed to include daily; it is not even a moral imperative that prompts us to action. The stewardship of the earth and these sweetwater seas we call the Great Lakes is an essential component of our life blood. It helps define who and what we are. It is our legacy. All of us must promote an environmental ethic such as this. Over the years that I have attended the IJC Biennial Meetings, I have witnessed a growth in the role of the Commissioners and your influence in the basin. Citizens no longer have to literally seize a microphone as was necessary at Toledo to address you. And the Commissioners, themselves, have become more proactive and I certainly hope that you, too, will continue in this model. But we cannot stop here. I believe that we must still have more interaction for instance at these biennial meetings. There has to be a better forum to address these topics of great concern to all of us than our present model. We need to exchange ideas and interact with one another. I am asking that you design the '97 meeting in a more active, cooperative learning style rather that the predominately passive model we endured today. I also want to address the question of RAPS. I know that many people are as weary of the RAP process as I am. Weary, especially of the stakeholder stonewalling that is all too common and yet I know if anything is going to change. If I have to resist the temptation to move outside of the process and continue to be a voice in the room but so must you. Government is a stakeholder and has a role. Citizens of the Great Lakes have devoted enumerable resources and time to the basin and especially to RAPS. Social critique has been a tool that we have used successfully in the past and one that we still use today. However, in our stakeholder meetings we have to move from a position of social critique to one of social management; a position that encourages us to work together because we have claimed a common goal. Citizens need support and active participation from governments to make stakeholder groups work. Social management must embrace sustainable development. It must recognize the virtual elimination of persistent toxins including nuclear wastes and it must accept zero discharge as the mechanism to accomplish virtual elimination. Social management cannot be based on voluntary action; at least not today; at least not in the stakeholder groups that I find myself a part of. Regulatory authority is a necessary component in this scenario. It is not the will of the people in the basin to abandon or weaken the regulatory measures in place. Commissioners, you must continue to be our voice. You must continue to voice our concerns. You must be passionate. You must challenge and inform the governments and the citizens of the
You must find ways to move the RAPs forward. You must build on the foundation established by the past Commissioners and move our governments to action; to implementation. The book, *Our Common Future* by the World Commission on the Environment identifies a new refugee - the environmental refugees. Refugees who are victims of the deterioration of their natural resource base and its carrying capacity. The wildlife and the fish have been our sentinels. There is very strong evidence that our children and our grandchildren are now becoming our sentinels. Our lakes, our health, our future - No. We are the first generation who will decide whether the earth our children inherit will be habitable. Our lakes, our health, our future - I hope so.

**J. Chandler:** Time is growing very short for this session of the hearing and I think we'll only have time for the three people I've already called so we'll hear first from Tim Eder and then Elaine Marsh and Colleen Cooney.

**Tim Eder:** Thank you, Commissioners. I'm Tim Eder. I represent the National Wildlife Federation but as well this afternoon I would like to speak and represent some folks in the State of Ohio and the Lake Erie basin. I'm sure the staff didn't realize it but sandwiching me before and after other speakers from Ohio is very appropriate on the speakers from Lake Erie. On September 6, we sponsored a meeting in Cleveland - one of the circle tour meetings that were held as sort of a pep rally to encourage folks from around the basin to attend this meeting and we had a tremendous show of support there. We had about 60 people that came out and gathered with us on a boat and met and expressed their views and shared with us some of the concerns that they wanted us to relate to you folks here. Many of them were able to make it here but some of them weren't. And, I've put together this little report that I'd be pleased to leave with your staff so that you might hear from... or see some of the major recommendations that they made. I've spent a lot of time in Ohio in the last couple of years and in many other parts of the basin and one thing has impressed me time and time again that I hope you will take to heart and that is the importance of the work that you have done; the importance of the vision that you've articulated in the previous biennial reports; the importance of the research that the Commission has commissioned and contracted. It's constantly referred to; it's constantly used as the foundation, as the arguments, as the basis for why people around the Great Lakes basin are asking for the changes that they're asking for. Just as an example, one of the issues that was very important to us in Cleveland that we talked about at some length was medical waste incinerators. The most compelling presentation that we heard on September 6 was from a woman named Kathleen Gathers representing the Greater Cleveland Coalition for a Clean Environment. She spoke passionately about environmental racism - that her and her neighbors have experienced in the metropolitan Cleveland area. Her group had stopped the Mt. Sinai Hospital from constructing a medical waste incinerator. Now they're pressuring the Cleveland Clinic to stop spewing dioxin and other pollutants from four incinerators that are on top of that mammoth health care facility and Ms. Gathers and many other people across the basin, both in Cleveland and elsewhere, constantly rely upon the wisdom and the vision and the research that's provided by the IJC so I trust and urge that you continue the fine work that you've done. Now, I want to turn to another issue that was discussed in Cleveland and that is a bit more mundane but it's the issue of funding for the IJC; for U.S. EPA; for Department of Interior and the related agencies on the Canadian
I finally get to explain what this button means that says "No riders." People have been asking me all weekend what's that button all about and it's not because I have anything against car pooling but riders, of course, are legislative policy amendments that are attached to the budget bills that are working their way through both houses of Congress right now. These are bleak times as you well know. The good news, if we want to call it that, is that the Senate's proposals to slash EPA's budget are only to slash EPA's budget by about 24%-25% while the House version would slash it by about 33%. The riders that we're most concerned about and that we think you ought to be concerned about would prohibit U.S. EPA from being able to enforce any of the wetlands provisions in the Clean Water Act. They would prohibit the listing of any new endangered species. They would prohibit EPA from promulgating any new regulations or effluent guidelines under the Clean Water Act and of great importance to us and many people here is that EPA would be prohibited from spending any money to implement the Great Lakes Water Quality Initiative. This is in the House proposal. Now, you know very well how important the Great Lakes Initiative is and I hope that you will take it upon yourselves to advise the governments how important funding is for the agencies for the basic research; we're talking about keeping laboratories with freezers and specimen samples from thawing out and ruining years of data here but you can impress upon the governments the importance of that but particularly, Chairpeople Baldini and Hurley, who very well know how to influence government decisions at the highest levels, I would urge you to find a way to make an impression upon the President. The President has indicated that he will veto the Interior budget bill. He's suggested that he'll veto EPA's budget bill if it emerges from Congress in as bad a shape as we fear it will and you need to prop up the President, encourage him to stand firm on that veto. Impress upon him the importance of the Great Lakes Initiative and the Clean Water Act. Impress upon him that this really is of international significance and it's important to our neighbors in Canada. Thank you.

J. Chandler: The final two speakers at this session of the hearing will be Elaine Marsh followed by Colleen Cooney.

Elaine Marsh: My name is Elaine Marsh and I'm with Friend of the Crooked River, a nonprofit organization who advocates for the Cuyahoga River and I feel greatly for your gray matter. It must feel close to mush and so I will try not to be very intellectual. It is not my method to do so anyway. I want to make three very quick points. One is that I believe that good science can only spring from an honest heart and I hope that you will continue to be the honest heart at the table for the Great Lakes and two is that I am very impressed with the amount of scientific information that citizens, ordinary citizens have been able to amass and present to you today and I would say to you, please know that at least speaking for myself the reason that I assimilate that scientific information is because I love the Great Lakes and I think we can never, ever forget that it is the love of people that have brought us to use other mechanisms to get ...to bring forth this love and to let you know that this is why we want you to protect it. We are people of heart and the waters of the Great Lakes flow through our veins and arrive at that muscle contaminated as those waters are. Last, and this is a very concrete thing, when I go home one of the things that I do the most is go around and talk to people in the basin. I speak an average of once a week in behalf of the Cuyahoga River and our great, wonderful Lake Erie and when I do so I always quote you folks.
I always say the International Joint Commission and by the way, I first heard of you not from my alliance with environmental organizations but from my husband who is a chemist in a non-affected industry. I'm happy to say but at any rate that's how I first heard of you. At any rate, I also use you every time I speak and you know, not many general, ordinary people know about you. I use you as the authority for my credibility and I'm happy to do so. I spread your word. My request is very simple. Please toot your own horn. Educate the public about who you are and do it in a media they understand. Use videos; use television. When you produce your report please do so in video form that we can send out throughout the basin; to schools and to nonprofit organizations; to church groups so that when I speak and I use you as my authority and my credibility they will know who you are and they will say there is an international body who uses these strong principles. I'm impressed. I'm very impressed. Thank you.

J. Chandler: The final speaker at this session will be Colleen Cooney.

Colleen Cooney: Commissioners, I'm the last. I live in the Province of Ontario and I speak on behalf of children, our future. There is overwhelming evidence we are contaminating our life support systems, perhaps threatening the survival of our species. There's too much evidence to ignore. Inaction is inexcusable. The National Association of Physicians for the Environment emphasizes that air pollution can affect virtually every organ and system of the body. Human health is inseparable from the health of the natural world. The Physicians for Social Responsibility state, "Infants and children differ from adults in their ability to metabolize, detoxify, and excrete toxic chemicals. During infancy and childhood there are windows of vulnerability when exposures to chemicals can lead to permanent damage to developing organ systems. The nervous system of children appears to be particularly sensitive." Dr. Theo Colborn says that each of us has between 300 to 500 measurable chemicals in our body tissue. These were not measured 50 years ago. A single hit at a vulnerable period of development can have a lasting affect. The Canadian Medical Association Journal reports that the incident rates of cancer among Canadians 19 year and under increased by 1% per year over twenty years. In light of the weight of evidence presented by the medical and scientific community, we're very angry when we see corporate greed and political inactivity and complicity. I would like to give you two recent examples. Ontario's present ban on new municipal solid waste incinerators is in keeping with the recommendations of the IJC. However, a new Ontario government is planning to lift that ban. Our local member of provincial parliament, Bill Grimmett, told my husband and me that because we were concerned about the health effects of the contaminants from incinerators, dioxins, furans, lead, mercury, very fine particles, that we were a special interest group. Grimmett also told us that we lose credibility when we speak about children. We believe children have an inalienable right to a future with pure water, fresh air, fertile soil. We believe mothers have a right to breastfeed their babies without being anxious over contaminants being transferred from their bodies... (end of tape). Given the very positive and hopeful statements of the International Joint Commission, can we now expect recommendations that will lead to enforcement? Can we expect more International Joint Commission involvement in educational activities for the general public and especially for our decision makers, the politicians and government bureaucrats? We strongly urge you to do so for our future, our children. Thank you.
A. Hurley: Thank you, everyone, for your comments. I think we're all probably ready for a dinner break during which you may wish to visit the Exhibit Hall if you have not already done so. And, while several ancillary events will be held this evening we hope to see you back here for the evening session of the public hearing. This will be the last segment of the hearing and we will follow the same format in order to include the rest of the registered speakers. If at all possible, we also look forward to seeing all of you tomorrow morning in the various concurrent sessions and then in the Lake Superior Ballroom for our closing Plenary Session. Have a good evening.
Thomas Baldini, U.S. Chair
International Joint Commission
Welcome to the final segment of the public hearings on Great Lakes water quality. We've heard many interesting thoughts so far in these sessions, and while not all are directly related to our topic, rest assured that those of you who are here to take testimony, your thoughts are still going to be recorded and we're taking them down. We're here to listen to that. You're probably all familiar with the logistics. You've heard it enough times but I've learned some time ago that it's probably wise to repeat the logistic details and we don't have as many cards this evening but I'm going to turn that over to Jim and Philip and they can briefly explain how we're going to handle this. Thank you.

Jim Chandler, IJC Representative:
OK. Thank you, Mr. Chairman. Each speaker will have up to five minutes and we will be reminding you when you get near the end of that time. We have ten cards from individuals who have not yet had an opportunity to speak and what I will do is, I will call four individuals to the microphones and after the first one has spoken I will repeat the names of the other three and then add one so that everyone will have sufficient time to get ready to come up to the microphone. So that's the way I'd like to proceed. The first speaker tonight will be Doug Pryke followed by Ann Mahan, then Kate Aleford[sp], and Donald Marles.

Doug Pryke: Commissioners, my name is Doug Pryke. I'm a Canadian from Erin, Ontario, Canada - headwaters of three of the great rivers that flow into the Great Lakes, the Credit, the Nattasawaga and the Grand. I come to you tonight as a representative - I'm the executive director of the Alliance for Environmental Technology. I represent over 130,000 employees of nineteen chemical and pulp and paper manufacturing companies. I've come here tonight to submit to you formally our report to the Commission, for this Eighth Biennial Meeting, five great reasons why we care-the five Great Lakes. This report documents the successful and voluntary completion of the pulp and paper industry's virtual elimination strategy for the elimination of dioxin into the Great Lakes. We're very proud of that achievement as we have implemented all of the fundamental strategies outlined in the previous reports, changed our processes, changed our raw materials, and transformed our bleaching from chlorine to substantially chlorine-dioxide if not all the way. We were particularly pleased today where the binational forum awarded three of the producing companies in the Lake Superior basin for transforming to that technology, the Avenor Manufacturing Process in Thunder Bay, the Potlatch Corporation in Cloquet, Minnesota not far from here and also the James River Corporation in Marathon on Lake Superior. This report will document how we did it. It did not go lightly. It was a struggle; it took a lot of collaborative effort internationally, nationally, both in Canada and the United States, in Scandinavia. We have not only eliminated that from this basin, but throughout Canada and the United States and one of the great results of that effort is some of one
of the things that you've been looking for in your reports and that is indicators of progress. One of the most important ones we've seen is lifting of fish advisories here in the upper Great Lakes region as well as all across the United States. Over thirteen states have lifted seventeen advisories for dioxin downstream of pulp and paper manufacturing processes. This is the only industry where such liftings are being undertaken. This is also happening on the west coast of Canada and anywhere where pulp and paper manufacturing using chlorine dioxide has been implemented. But we're not satisfied with that. The international research community for pulp and paper is looking forward to — all of our research efforts now are moving into so-called closed loop systems; demonstration projects around the world are starting up right now where we can look forward perhaps down the road, not tomorrow, maybe a few years from now where process effluent will be eliminated from pulp and paper manufacturing independent of bleaching technology. I look forward to two years from now to come to you to report that progress. I think what we've been able to do is to demonstrate to you that we are consistent with the goal to the IJC to protect, preserve, and restore this precious resource that we've been given the opportunity to steward. It's my pleasure to present this report to you.

T. Baldini: Thank you.

J. Chandler: Next, we'd like to hear from Ann Mahan followed by Kate Aleford[sp], Donald Marles and Kathleen Brosemer.

Ann Mahan: I'm speaking as a Great Lakes writer and photographer, as a nurse, and as a mother. In Windsor, I presented the previous IJC Commissioners with a wish list and I have a new one for you. My first wish is that you continue the Commission's policy of encouraging communication and even more importantly of listening. In this time of state and federal governments enacting preemptive legislation that removes local control over issues affecting communities and of governmental reorganization that eliminates mechanisms for citizen input, the IJC's openness and responsiveness has been an increasingly rare example of participatory democracy. Please, since our representatives don't seem to be listening to us, you tell them we are angry about the recent congressional attacks on environmental protection and on our heritage of national parks and lakeshores. Number two - please recommend to the governments that a representative of the First Nations be appointed to the Commission. Number three - it's time for a moratorium and phaseout of incineration-municipal, medical, and hazardous waste incineration. Incineration is totally incompatible with the goal of zero discharge. Even when pollution controls do a good job of reducing the release of persistent toxics into the air, these chemicals don't disappear. They still enter the environment through toxic ash. Incineration creates persistent toxics that weren't there to begin with and releases others in more toxic and bioavailable forms than they started. Number three - please address the issue of nuclear waste storage including such storage right on the shores of the Great Lakes. Right now the search is on in northern lower Michigan for a community to volunteer to become the site of a regional nuclear waste dump with an incentive of a payment of millions of dollars being dangled like a carrot to potential host communities. This is an area of sandy, highly permeable soils in the watersheds of Lake Michigan and Lake Huron. There is no more persistent toxic than radioactive waste. I support the call to phase out the nuclear power industry. Number four - it's
time for the governments to reevaluate policies such as burning hazardous waste as part of the fuel in industries such as cement kilns and calling it recycling and policies such as including toxic chemicals and what are called inert ingredients in pesticides. These are easy, legal ways to get hazardous materials off your hands but that doesn't mean they go away. They're just redistributed throughout the environment, on food crops or, in the case of hazardous waste incineration by cement kilns, toxics go into the air in the ash. These short cuts for handling hazardous waste shouldn't be considered recycling and they shouldn't be legal. Number five - pollution prevention and zero discharge can't happen without real governmental attitude changes. As an example, Governor Engler's Michigan Environmental Science Board has been assessing mercury, lead, dioxins, chlorine and so on. We attended a science board meeting in which air pollution was being discussed and a board member stated and I'm paraphrasing — that it was important for them to evaluate potential recommendations based on how much they would benefit Michigan residents. If it would only benefit Ontario, which receives Michigan's air pollution then it wouldn't be worth the expense to change. On the other hand, the conversation continued with complaints about the air pollution Michigan receives from neighboring states to the west. So who's supposed to start first? We have heard that more education is needed and I agree but I submit that the governments need educating too. Trying to protect only your own little political area while caring nothing about the rest of the world backfires because it all comes back in the end. Certain chemicals such as DDT are banned for use in the United States but still allowed to be exported to other countries but they return to us carried by air currents. The herbicide, atrazine, is banned in Germany, Sweden, the Netherlands, Austria and Hungary because it causes cancer in animals including reproductive system tumors, lukemias and lymphomas. There is evidence that atrazine causes similar cancers in humans and birth defects, but atrazine is widely used in the United States and is showing up in Lake Superior including Isle Royale. Why are we still using it in this country? Number six - I urge you to look into our country's use of pesticides. I want to share some interesting statistics I came across and I'll provide them to you when I send my written comment. Since the 1940s there has been a 33-fold increase in the amount of pesticides used and at least a 10-fold increase in their potency; but 37% of crops are now lost to pests, up from 31% in the 1940s. In 1945, when all corn was grown in rotation and no insecticides were used, only 3 1/2% of the crop was lost to insects but today corn is the largest user of pesticides in the nation and 12% of the crop is lost to insects which indicates that the loss of crop rotation has been counterproductive. Number seven - I commend the paper mills for reducing dioxin inputs with their switch to chlorine dioxide but let's all remember that reduction is not zero. Totally chlorine-free paper is produced in Europe now. Chlorine dioxide is a good step on the way to zero; let's not confuse pollution prevention with pollution reduction. In closing, I ask you to imagine a foreign country in an effort to weaken and undermine our countries deciding to put something in our environment that gives our children birth defects, reproductive problems, learning deficits, heightened irritability and cancer; imagine the public outcry. We'd be at war; and yet that's what we're allowing our own countries to do to ourselves. It's time to stop. We need less talk and more action before more damage is done.

J. Chandler: Next we'd like to hear from Kate Aleford[sp], followed by Donald Marles, Kathleen Brosemer and then Joan Morrison.
Kate Aleford: My name is Kate Aleford. Thanks for the opportunity to speak here tonight. There hasn't been much, if any, discussion here of the nonpoint source pollution problems generated by boating and shipping. Motorized boats on the Great Lakes discharge significant amounts of oil and toxic hydrocarbons both into the air and directly into the water. The accumulation of oil that's been routinely discharged or spilled by motorized boats far exceeds that spilled by the Exxon Valdez and this is particularly a problem - an overlooked problem when it comes to pleasure craft. For a more exact quantification of the portion of this problem caused by small boats and pleasure craft, I'd like to refer you to a new book called "Polluting for Pleasure." It's by Andre Mele but I would like to recommend to the Commissioners that you read this book and act on what you learn from it. I think this is an issue that must be addressed by the IJC and by governments if we're truly to reach the goals of zero discharge and virtual elimination of toxins from the Great Lakes. Also, I wanted to repeat to you one of the more striking comments that I've heard while I've been at the meeting here-I want to quote Lou Guillette, who spoke on the panel about male reproductive health and he said, speaking as a scientist with respect to the health effects of bioaccumulative and hormone mimicking chemicals, "We have enough science to demand change." The change we need is a complete phaseout of all bioaccumulating and hormone mimicking chemicals, not just in the Great Lakes but around the world because we've seen that if these things are used anywhere in the world they're going to end up at some point in the Great Lakes and I think the IJC should be calling for this kind of a phaseout. Finally, I want to add my voice to those who've asked for two important changes, first outstanding natural resource water designation for Lake Superior, I think that's an important thing that we need and also just as important, First Nations representation on the IJC. Thank you.

J. Chandler: Next, we'd like to hear from Donald Marles. Then Kathleen Brosemer, Joan Morrison and David Mahony. Is Donald here? Thank you. Then we'd like to hear from Kathleen Brosemer.

Kathleen Brosemer: Good evening. My name is Kathy. I'm a citizen of all three nations. I was born in Chicago; I'm a recent Canadian citizen and I'm also a member of the Cherokee community. I live in Sault Ste. Marie now. There is a river that runs through the community. I live on the north side of the river and I'm here with eight of my friends around me here. You can't see them but they came. They're kind of crowded around this microphone right now - Don Wallis, a scientist in his late fifties; Joan Jaffet, an educator in her mid-forties of breast cancer leaving two young children; Don Myron, a scientist in his early fifties; Rusty Davieau, a national park employee in his mid-forties leaving a little daughter 13; Shotekia, another scientist; Steve Taylor, a scientist president of the Voyageur Trail Association incredibly fit active human being at the age of 38 from bowel cancer, Joe LaBeie, a carpenter in his early sixties and G.T., my camera friend who died of lung cancer after being a uranium miner in Elliot Lake. All eight of these people died in the last eleven months in my community and they were all friends of mine and I hope you'll forgive me for one more; I know that Dick has a policy of not allowing animals in but they didn't seem to notice my labrador retriever when she came in. She died last year on my birthday of lymphoma. Steve Taylor was the first. He died at the end of October - October
28, 1994. So these eight people that I’ve lost in the past year are here with me. Sault Ste. Marie has 1 1/2 times the Canadian cancer rate. We’re told by Health Canada that it's because we all smoke. We also have a steel industry that spews particulate matter less than 10 microns into the air that we breathe. We have, until 1987, drawn our water out of the St. Mary's River downstream of that steel industry and we were drinking PAHs, benzene, cadmium, and a number of other things. We have a regional biomedical waste incinerator in Sault Ste. Marie that takes biomed waste from all around northeastern Ontario. We have one of the highest spots for dioxin, TCDD contamination in herring gull eggs in Sault Ste. Marie. Our Area of Concern needs to be considered part of the Lake Superior zero discharge demonstration zone. It has not been and it needs to be. We are part of Lake Superior. We now drink our water from Lake Superior. The water from Lake Superior is in every cell of my body. The water from Lake Superior is in between in the interstitial fluids of every cell in my body. Lake Superior is part of me, part of everyone in our community and we need to be part of the zero discharge demonstration zone. If I were to put poison in my husband's food and I were caught I would be put in jail; I would have my freedoms taken away from me. If I were to do so, to collect insurance, I would be widely reviled in my community and I would justifiably have my freedoms taken away from me. Corporations are poisoning people. They are putting poison in our air, our water, and our food for financial motive, the same as if I were to do that to my spouse for insurance. It is time that that were considered a criminal act. It is no less violent than the murder of a spouse. It's time that we stopped the violence. It is time that "No" meant "No." It is time that "zero" meant "zero" and I see that I have one minute left and with that one minute I'd like to ask everyone in this room to picture the faces of the people that they know that they've lost with cancer. I can see Steve's face here; I can see Joan's face; I can see Rusty's face and I'd like people to take a minute and look at the faces.

(brief time of silence)

Thank you.

J. Chandler: Now we'd like to hear from Joan Morrison followed by David Mahony then Suzanne Goodwin and Ylang Nguyen.

Joan Morrison: Bonjour. My name is Joan Morrison. I'm in tears because I have to add my father to the list. I hope the Commissioners understand the depth of fear, of caring, of worry, of concern that we have that we drove so many miles to come here. It's not just talk for us. In the endocrine meeting this morning I sat beside a young woman who's a mother. She's about 25 years old. It looks like she ate a perfect diet. She had beautiful skin. She was healthy and beautiful and full of vital love for her children and she just came to find out something about endocrine and then she was told that when a woman gets pregnant it metabolizes her fat in her body which stores the toxins that she has eaten over her lifetime and that when she breastfeeds her children these toxins are metabolized and they go into her milk to her eldest child. When she heard that, she just said, "Oh, my God, Oh, my God. What have I done to my children." So this is our call to you. As fathers, your sons can't be men? Mothers, you are going to destine your children to pass on poisons. We urge you to take strong stands. I've heard the politicians won't
give you any money and so you'd better be careful. Well, what we have won, we have won because we haven't been careful. You can't afford to be careful. We need to protect all life. Our mothers, ourselves. Thank you.

J. Chandler: Next, we'll hear from David Mahony, followed by Suzanne Goodwin, Ylang Nguyan and then Daniel Pickroz.

David Mahony: Good evening, Commissioners. My name is David Mahony. I'm field coordinator for the Biodiversity and Habitat Protection Task Force at Great Lakes United. I'm here to speak on behalf of a couple of members of Great Lakes United so there'll be a couple of different themes to what I want to say. The first issue comes from members of Great Lakes United who live in Toronto. There's been a proposal by a company called Bedrock Resources to take 54,000,000 tons of sand from the bed of Lake Ontario a kilometre and a half off the shore and at the closest point of where this rectangle of mining would take place which is expected to be 11 km. long and 1/2 km. wide at that nearest point to shore 400m away is the water intake for 2,000,000 residence of the Toronto region. There is tremendous concern about the contaminants in the sediment there. The proponents own environmental statements have said that there would be a turbidity plume of 400,000 cubic meters by the suction dredging that would be used to take the sand from the lake bed to be used for aggregate purposes. This is expected to go on over a 50-year period - revenue of $.50 a ton for the province of Ontario. I would ask that the Commissioners put to the Science Advisory Board what are the effects of mining in the lake bed particularly with the benthic layer? what happens with erosion? what are the effects of this kind of massive proposal? As stunning as it is, this has gone through the Ministry of Natural Resources. This has been a proposal that they have considered for five years now without any public knowledge; not even of the city politicians in the city of Toronto so I would just ask that that be looked into. Please find out what the status of this proposal is and what are the effects of that kind of operation on the lakes.

A. Hurley: Excuse me, could I just ask you the site of that again.

D. Mahony: It's to be right off of, if you know Toronto at all, it is very close to the Scarborough Bluffs.

A. Hurley: OK.

D. Mahony: Right off of Bluffers Park, east end of Toronto.

A. Hurley: Thank you.

D. Mahony: And as I said, it's only expected to be a kilometre and a half off of shore. The second issue I'd like to talk about is on behalf of the Great Lakes United members Trout Unlimited who have asked that the issue of mercury in aquatic biota be part of the studies that go on. There is tremendous concern that there's a lack ...mercury has been investigated as to what the effects on humans are and what are the supposed "safe" levels of mercury allowed for
humans but there seems to be, and it's back up by the recent U.S. Fish & Wildlife report on Great Lakes Fishery Resources Restoration Study, about ...this is about the...one of their proposals is to develop and implement an action plan to analyze contaminant level effects on aquatic resources. There really seems to be a lack of information on this and please resist industry's pseudo-science as ... I'd like to echo what Jack Weinberg said yesterday when he talked to you...the idea that for the longest time it was told that citizens need to get more science and get more educated and as he said, the more educated and the more science we get the more peeved we get so I would resist the calls that most of the mercury contamination is naturally occurring and the "jelly bean" theories that were thrown around yesterday. Please resist all of that. Thank you.

J. Chandler: Suzanne Goodwin is next, followed by Ylang Nguyen, Daniel Pickroz and Greg Price.

Suzanne Goodwin: Hi. My name is Suzanne Goodwin and I'm in a Lake Superior band of the Ojibwa and I'm here speaking on behalf of all native peoples of the North America. Thank you for allowing these words in this complex world of hearts, minds and spirits. We speak as representatives of our spiritual island - our Mother Earth. "Water is Life" is a primordial fact. In the best interest of us all we defend our treaties, our land, our rights to clean water and all third world human rights. Forgive us our elders as we speak we say this for the future children of our four directions. It is this reason that helps us to face the struggle and we continue. Those of you among the twenty-first century conquistadors are want to listen. We have an advanced living social order. We do not mine the earth for our financial gain. We took what she offered and only as much as we needed in a humble manner. Our tree of life was strong. Today we all suffer from the effects left in the wake poisonous biproducts of minerals and radioactive isotopes that were to remain in the earth. We are tired of the rhetoric. We know you know our elders remind us that all life is sacred - a gift of our Creator. We have our instructions. What are the guidelines you have chosen to inherit? The current governments do not represent, protect or increase our people. Those neo-colonial governments of the 1934 Indian Reorganization Act and the Bureau of Indian Affairs operate at the approval of U.S. and Canadian chief executive offices to undermine our sovereign rights to exist as who we are - the Anishanabe. Dictatorships have been imposed preventing us of our basic needs to raise our children and govern ourselves. We hear "submit or go homeless; submit or starve; submit or be jailed; submit or die." Daily we face oppression as we follow our traditional ways to respect all life. In the homeland of the Anishanabe, our traditions tell us, we are an honorable nation. Privatization and nationalizations of land gave you the right of way to impose your religion, your foreign language and ideas on a race of people who love the earth. Our children continue to learn as do yours. Will they and their children have a clean glass of water? We can stand up and fight. We accept the sacrifice of life in defense of our sacred mother earth. These are, perhaps, strong words. It is our hope to solve the conflicts in a peaceful, gentle manner. We pray. The Creator listens. We pray. The Creator helps us. Thank you.

J. Chandler: Next we'd like to hear from Ylang Nguyen followed by Daniel Pickroz, Greg Price and Rhina Ishum[sp].
Ylang Nguyen: Good evening, Commissioners. My name is pronounced "Elong Win," by the way. I'm the new field coordinator for Great Lakes United and a new resident of Buffalo, New York and relatively new resident to the Great Lakes basin and indeed, I am awed by its beauty. I've only been working recently on the issue of RAPS but already I can tell that a lot of citizens have devoted numerous hours to working to clean up their environment, to have swimmable waters for their children and edible fish. I can't stress enough, and I'm sure you've heard this before, but there needs to be funding for these plans. There a lot of good ideas floating and we should really make sure that these hours haven't been wasted and that the precious volunteer time that's been devoted to this aren't wasted. Also, I've been asked by a resident of Grand Island, New York to submit his own opinion or I'm sorry, his own thoughts to you. It says, "To anyone who cares. Last year..." I'm sorry, I should mention his name is William D. O'Connor from Grand Island, New York and the letter says "To anyone who cares - Last year, after the election Governor George Pataki began his assault on the environment selling out our public resources to big business. Bernadette Castro, our Parks Commissioner, is proposing commercial logging in Allegheny State Park. One of the Department of Environmental Conservation Commissioner Michael Zsagada's acts was to propose the abolition of nearly all the DEC's environmental enforcement officers and prosecuting attorneys. Recently, Dennis Vacko, New York State's Attorney General announced the business-friendly environmental policy. He promised not to prosecute environmental polluters to the letter of the law but to whack violaters with a 'big stick' if they break the spirit of the law. August 18, 1995-on the way to work my wife and I saw large, black lumps floating in the Niagara River and I knew the crisis was hitting closer to home. FMC Corporation improperly stored and/or handled sodium persulfate. The resulting fire caused the death of one man. There were several injuries including one that was very serious. The airborne contamination spread over a nearby house and the Niagara River. Our water supply was contaminated by a toxic sludge of water, ash and chemicals dumped into the Niagara via storm drains. The states response was inept as expected. The DEC response was slow, confused and inaccurate. First, they told us that, "There is no fish kill so our water supply is safe." Then there was a fish kill but it was small. Now we hear it might have been larger and the contamination might be worse than they thought. In the afternoon of August 18 on the way back from work, the river was full of people fishing, water skiing, jet skiing, tubing, etc. reassured by the state that the danger had passed. FMC has not followed the spirit of the law. They have a deplorable environmental record. In the past, they've had a history of fires, injuries and death. We have to face the facts that our DEC will never really know the extent of contamination. The DEC will never prosecute them to protect the environment. Dennis Vacko has no big stick to hit them with. New York State is in a judicial and executive environmental crisis. Failure to enforce environmental laws is a violation of the International Joint Commission Treaty. Ontario and Quebec would be wise to sue New York to make us live up to the Agreement to protect our Great Lakes ecosystem. Sincerely, William D. O'Connor."
around the country talking with folks and came upon what I see as a vision. I now live in Cleveland, Ohio and I work with the unemployed. I work with a couple of houses of hospitality, work with a group called Growing Together Organically. The vision I have is something that grew out of people asking me why I was in their town, why I skated there and I said, "well, I'm here to look at post-industrial America and to talk with folks." I grew up a farmer. I grew up raising corn and raising corn and raising corn and got to the point where I started hacking blood and I figured it was from the pesticides so I decided I'd try something else. So, with that background going through America I came upon the idea that local food production was a good idea. In Cleveland, we have 2,000 acres of vacant land. We have a lot of people that are unemployed. We have, in the next 18 months, we will begin shipping our landfill waste out of the county because we no longer have the land to landfill. I have experimented, from one of our local food markets, composting. One of the places I wanted to compost first was an organic garden and they said, "We don't want that there. We're concerned about the pesticides." I said, you know, being familiar with pesticides I felt that the heat of compost would be enough to break down the pesticides. Recently I've begun a little bit of research to become concerned. I've been asking many people and haven't yet found enough information to be confident to continue composting; but we got the land, we got the people, they need something to contribute. I believe that we can put a lot of people to work and reduce the amount of pesticides going into the waterstreams. Organic farming is one of the most labor-intensive jobs that you can find. I would like some help in learning how to get rid of the residues and the breakdowns to create new land, to create jobs. Thank you.

J. Chandler: Next, we'll have Greg Price followed by Rhina Ishum[sp]. Then Carl Rothfels and Colleen Bonniwell.

Greg Price: Members of the IJC and concerned peoples of the Great Lakes. I've visited various exhibits on display here with particular interest on the EPA's Lake Superior barrel display. It basically concludes that no further effort need be made to determine the contents of Honeywell Corporation's waste barrels in Lake Superior. I was given privileged information that these results were predetermined before the barrels were to be tested. It now appears my sources were correct. In less than a week, the three known barrel dump sites were, if it can be believed, thoroughly tested. As it has been admitted by the U.S. Army Corps of Engineers that there was a total of at least seven dump sites in western Lake Superior and the "quicky" testing of three to be the final effort to ensure the barrels' contents pose no health dangers to the users of Lake Superior's drinking water and to the aquatic life of Lake Superior, I believe it would be fair to say that the hurried testing of less than half of the barrel dump sites known to exist is not sufficient to allay the concerns of the residents of Duluth/Superior and I believe anyone who has heard my presentations to the Duluth city council over the course of several months. There are many sources of pollution of Lake Superior directly and airborne. They all should be dealt with as technology and funding allow but to sign off on a true accounting of Honeywell's Lake Superior barrels may be signing away more than we know or can afford. Thank you.

J. Chandler: Next we'd like to hear from Rhina Ishum[sp] followed by Carl Rothfels, Colleen Bonniwell and David Conley.
Rhina Ishum: Members of the IJC and guests. As I, a Native American who traditionally considers sacred the land and waters of this land you now call the United States, emplore you not to halt the search for the truth as the contents of Honeywell Corporation's Lake Superior barrels. Honor their mother, the Earth.

J. Chandler: Carl Rothfels followed by Colleen Bonniwell and David Conley.

Carl Rothfels: Good evening. It's a great honor to be here. My name is Carl Rothfels and I'm an OAC or Grade 13 student at Sutton District High School which is an hour north of Toronto, Ontario. As I said, it's a great honor to be here and I'd like to thank the IJC on behalf of all the youth that are here at this conference today and especially the Buffalo delegation of which I am a part for providing this opportunity to listen to us and for us to be heard. We really appreciate it. Many of the things that I've heard this weekend and especially tonight have been unsettling to say the least. It will probably take me a while to rebuild my usual healthy state of denial which is, I guess, a good thing and if you'll mind the presumption I'll offer a few laughs of my own. The IJC historically, at least from my point of view, seems to have focussed a lot on smaller issues - putting out little flyers; remediating this toxic hot spot and that toxic hot spot and I think that this is really good. It had to be done. These fires had to be put out and it's all these smaller victories, all these smaller battles that together have brought us really incredibly far to the state where we are at today. And now, I'm really glad to see that the IJC seems to be moving a bit away from that to a wider approach - the ecosystem approach which is being touted now and I think that that is a really, really positive development. None of these issues exist by themselves. They're all related and they all have to be dealt with if we want to ever achieve anything really conclusive and really permanent relating to water quality or any other of these issues - suburban sprawl, urban decay - our commuter, consumer, growth-obsessed culture. They all have to be cured if we ever want to have any serious permanent progress. Youth, in general, are often stereotyped as naive and empty idealists; heavy on faith, low on experience and for a wide range of reasons...that's probably true but I have to think that as you get older people tend to lose their ideals. You lose your dreams. You become more realistic and more pragmatic. I think that youthful idealism really does have a place and that's one of the reasons I'm glad that the IJC has invited us here this year. I'd like everyone just to close your eyes for a second and imagine what your own personal Utopia would be like. If you were invincible, had all the power you could possibly imagine, what would the Great Lakes look like? What would you do? What would your backyard look like? If you'll open your eyes, think to yourself, what have you done to achieve that Utopia and what are you going to do. I think we all admit at least unconsciously that society must change and that in all changes people get hurt, all changes resist it. That hurt - that pain is inevitable in my opinion and the more we delay and the more we resist the greater that inevitable pain will be. Thank you very much and thanks again on behalf of all the youth here.

J. Chandler: Colleen Bonniwell is next followed by David Conley.

Colleen Bonniwell: Good evening, again. This is my second time and I don't mean to take time away from anybody but I would like to continue to participate with my voice and I do have some
things to add to my statement from yesterday if that's alright. I'd like to make a plea again for the watershed and specifically Minnesota. Minnesota has a new mining bill. Evidently we're following suit after Wisconsin that after seventeen years of a battle to stop mining in Wisconsin the mining has begun first with the Ladysmith Mine for gold and now we're on the front lines of the Crandon Mine at Mull Lake. Our whole state is a great green belt mineral - green mineral belt and we have been targeted by the Republican government of the United States and it sounds like Canada and Ontario and Manitoba for the same thing - for radioactive waste dumping. They've been telling us that they've been keeping it under the table but it certainly doesn't appear that way. We're threatened in Minnesota, Wisconsin and Michigan with these Republican governors that have been put in by these huge corporate pacts and we're all watching our governments administrations being taken over by these governments pacts and so I would have to say besides zero discharge into the river that we deny sulfide mining. Minnesota has an opportunity to recover the water at the source and Minnesota, because the water goes out in three directions, also has the opportunity to set the example for the rest of the nation and the world in so doing. This is a critical thing as we've all agreed for our home Mother and all of our water. Minnesota also has the political intent by the people to protect it and at this point we're watching it being challenged by great powers coming from Washington and the corporate world. Our governor, Governor Carlson, signed a new mining law into effect May 10, 1994. Exactly one year later the radioactive waste on the river at Prairie Island bill went through. There seems to be time schedules and it's everything that the activists can do to keep up with these corporations. We no where near have the resources to do that. The Fond du Lac colony has been targeted by Governor Thompson to get everybody off welfare. They would love to force us to accept the mines by withholding our food and we're only asking for alternatives to use the alternatives...Minnesota would have the opportunity to invest in water research and recovery and we could do that for the benefit of all life in Minnesota but particularly our children to give them a new inheritance. My proposal has been an education to recover the garden. That is the use of all sustainable and alternatives towards zero discharge. It is as if within our hoop of life that anything that we make ourselves, that isn't already here, interferes with that hoop of life. We could, as a society, perceive that we give thanks for what we take. Then we give thanks for what we use. Then we give thanks and recover what we haven't used and give thanks to regenerate so that it's there for the children. I think we need a strong stand and I certainly hope that you go at it and take the strongest stand possible. One of the reasons that gentleman — he was here last night --and he said, "I'm ready to clean this up but we don't have the money or we don't have the designation of spots for toxins." The reason, I believe, that that isn't happening is because they're still creating it. Number one - we have to quit creating poison and find our role in creation. If we continue to create poison, of course we will not be here. It's important not in how many we are; it's important in what we do and if we each found our role here in this creation then maybe we wouldn't have this as a legacy for our children and that's what I'm hoping and I, too, pray to the Creator for help. Thank you.

J. Chandler: Mr. Chairman, I have one last request to speak and that's from David Conley.

David Conley: Thank you. I didn't mean to be a deadline speaker but this falls to someone and I guess I feel sort of an honor there. I am David Conley. I have been a lifelong resident of this
immediate area. I presently live in Superior, Wisconsin and I serve on the Douglas County Board of Supervisors and so in some way I think I can appreciate a little bit of what you may be going through. Also though I want to tell you that I feel that I am a supporter of the IJC and four years ago I was honored to be in Traverse City, Michigan and two years ago I was in Windsor, Ontario. I believe in the process and I believe in grassroots involvement. I've sat here for a couple of days and I don't know how you do it. You've heard a torrent of testimony and yet in the back of your minds, perhaps, is the reality of what's happening in Washington and from my perspective at least in Washington and I won't speak for the Canadian side only what's more familiar to me in Washington I think we have a bunch of phony public servants running around ... individuals who have managed to implement bogus issues with the help of corporate media and they have hidden agendas and, quite frankly, somehow I think with slick, perhaps Madison Avenue advertising, they've managed to become elected and certainly I think you can see from the testimony here that there's a whole lot of people that are quite disappointed in our political process. I think it's a sad commentary on our democracy. I know there are supporters of the people who get elected. There has to be ... but quite frankly, the implementation of their policies, I think has gone askew from what we would perceive as the dream of our democracy. So here we are and I think that what you are hearing from the floor, from myself and others, is a cry for help because we see the IJC as having some prestige; as serving certainly in an advisory capacity but still having respect and so we appeal to you because we understand that you do operate within that interface where legislation and implementation take place. Where else can we turn? So, I know it's been a long three days for you sitting up here and there's still tomorrow but where do we go and so we come to you. I hope that you will understand that we do appeal to you because we hope and we trust in this process and so I guess it's left to you to decide whether or not you can speak the truth. I hope you have the courage to do that. I understand that Jesse Helms has a stranglehold on this whole process. You know that and we know that but we have to be bold in the face of that and I would encourage the IJC to, perhaps, explore avenues or connections with more grassroots groups and certainly with the state governments because I think the future of your relationship with the federal government is uncertain. I don't say that they would strip your authority or your integrity as an advisory board, but they certainly can affect your funding and your funding is so critical as to what you can do within the area of research; especially in the issues of human and wildlife and ecosystem health. So, my appeal to you then is to stay the course, speak the truth, and just remember that we have no where else to go and I would hate to see the American democratic dream as being unrealizable and I think it's an awful responsibility but again, we feel that the IJC has such a profound, incredible reputation already and I hope that that will continue. Thank you.

T. Baldini: Over the last several days, we've had about six, six and a half to almost seven hours of testimony. I want to thank you all for your input and your testimony because we've sat here long but many of you have sat here to listen. There's also been a great deal of dialogue in the concurrent sessions and tomorrow morning again we also have some more concurrent sessions; we also have a busy day and I know that, as Commissioners, we were moving about those sessions and we did notice a great deal of discussion going on between the presenters and those who were in the rooms and that was our intent. We wanted people to have the opportunity to talk with one another. Just as a sidelight, we've heard a great deal of discussion here about
funding and just to advise the group, our budget ... our fiscal year is October 1 - September 30 in the U.S. and on the Canadian side their fiscal year is April 1. We are looking at a budget cut for '96 of $440,000 which is a 12% cut in our budget on the U.S. side. Ms. Hurley has indicated that they are going to begin work on their budget. We submitted a budget obviously some time ago. It did not reflect the $440,000 but it has been within the Congressional process and it has taken that sort of a cut. We don't know where it will end up. We'll probably hear - we're in the State Department budget and we obviously are keeping an eye on that. We encourage you all to be here tomorrow. We will begin again promptly at 8:30. We also have a wrapup session tomorrow at the end of the day to hear from all of the concurrent groups that report. Thank you all for coming here this evening and I look forward to seeing you tomorrow. Good night.
CLOSING PLENARY

MONDAY, SEPTEMBER 25
12:30 p.m.-3:00 p.m.
Reports from RAP Forum, concurrent sessions,
and public hearings.
Final comments from Commissioners

Thomas Baldini, U.S. Chair
International Joint Commission

I want to call this closing plenary session to order. I'm going to change the agenda a little - prerogative of the chair I suppose. We have a request. The students are - they have to catch a bus at 1:00 and I understand that being an old K-12 person that buses do dictate the life of school systems and so they have asked if they can make their report now and I thought, let's do that and then we'll get on with our other reports and our other introductions and things of that nature. So, I'm going to have the students - I think --Joe, are you coordinating that? OK. And what's your name? Heather Pear is going to report. Thank you, Heather.

Heather Pear: Hi. My name is Heather Pear and I'm from Children's Express, Marquette, Michigan. We are a news organization for children, giving children a significant voice in the world. We put out a page in our newspaper every other week reporting on issues dealing with and about kids. We've been here since Thursday evening and are going to leave today and we've all had a lot of fun so far at the conference. We think that youth have a very significant role in what things are put on so I just think that...the youth here gave a presentation yesterday at the Youth Forum and some gave really new, innovative ideas on problems than can help the Great Lakes...solutions to problems. For example, there is a girl from Ontario who came up with the idea that hemp can help reduce the toxins in water and we can use that for paper instead of trees and a group from Buffalo have a really neat idea about how they can help the zebra mussel problem adapting crawfish to live in our Lake Superior cold water to eat them up and then using their shells to grind into chalk and jewelry. I wanted to thank the Commission for letting the youth have a part in this because we have good ideas often but many times adults don't want to listen or don't take us seriously. The group from Sault Ste. Marie was telling us about a problem they had with getting the government to answer some questions and this is a great opportunity for us to figure out what to do and express our ideas so I wanted to thank the Commission and we've had a really good time here. Thanks.

T. Baldini: Heather, thank you and thank the Children's Express. It's my hometown paper and I read their articles and they do get a lot of coverage and they do a very thorough ...matter of fact...they do a better job of reporting the facts. I think you all know where I'm heading. Let's drop that. The next item that we are going to have on our agenda is something that's a tradition with IJC meetings and for those of you who have chosen...who have not stayed for the final moment they're really going to miss something today. Over the course of the last five days, the members of the Trinity Theatre Group from Toronto have been holding learning circles with various members of the community and with many of the Biennial Meeting participants and
Commission family. They have been absorbing, listening closely to our meetings; you probably have not seen that but they have been listening to you and they have a special presentation to summarize these last few days and their theatre group includes students and adults from the local community and we welcome the opportunity to hear from them.

*Trinity Threatre*

"Hello, I'm Allan and I'm from Toronto and I'm Amy, I'm from Duluth. I'm Sandra, I'm from Toronto; I'm Paul and I'm from Duluth and together for this moment we're ..."

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- 180 -
here, we're on the edge of a monumental body of water

I commend the Commissioners..
I challenge the Commission..
I urge the Commissioners...
I thank you.

MN stands for Minnesota
Nice

here's a living

thumb nail sketch of the voices of the IJC Duluth '95

the tours were marvellous

so much detail and hard work by the local planning committee

I'm overwhelmed by all the diversity I've seen

this lake has more moods than my grandpa!

in one day we go from petulant low hanging rain clouds to a stupendous open sky and expanse upon expanse of sea-

I've either been in the lakes, on the lakes, or around them all my life

in 1950 my parents exercised a lot of wisdom and moved to Minnesota and I thank them for that

- 181 -
but Duluth is nicer!

and for goodness sake, please shop in Duluth? Yes Mayor?

Our St. Louis River RAP is successful but threatened

we've finished Stage Two

with tremendous input from all the local people

people input is in fact our major success

though we've gone from seven staff two years ago

to one part-time person for one year

and we've come up with 43 recommendations

and there's been practical implementation projects along the way

coming installment of the Oliver Municipal Sewage System for instance

and the Connor Point Cleanup project

what you've got to understand is that we were kind of an "agency baby" here, and now it's flipping over-

without vision people would lack the capacity to make today's dreams tomorrow's reality
<table>
<thead>
<tr>
<th>If all the world's water were put in a jug freshwater would fill a tablespoon</th>
<th>and that tablespoon is threatened</th>
</tr>
</thead>
<tbody>
<tr>
<td>pollution does not respect human's cultural or political constructs</td>
<td></td>
</tr>
<tr>
<td>And when it comes to environment we cannot build convenient walls to keep in what we like</td>
<td>and pitting one province against another -</td>
</tr>
<tr>
<td>or one state against another -</td>
<td>in the name of economic competition</td>
</tr>
<tr>
<td>and keep out what we don't like!</td>
<td>is not sound environmental policy</td>
</tr>
<tr>
<td>Zero discharge does not mean best available technology</td>
<td></td>
</tr>
<tr>
<td>there's also a huge amount of frustration in Lake Ontario rates and their offspring</td>
<td></td>
</tr>
<tr>
<td>and remember not all fish are equally polluted</td>
<td></td>
</tr>
<tr>
<td>the creation of RAPs and LaMPs would never have happened without the IJC as catalyst</td>
<td></td>
</tr>
<tr>
<td>we owe a debt of gratitude to those who decades ago started the IJC</td>
<td></td>
</tr>
<tr>
<td>when binational treaties were not commonplace</td>
<td></td>
</tr>
<tr>
<td>I do not think there is a contradiction between the competitive nature of economy</td>
<td></td>
</tr>
<tr>
<td>and pollution prevention</td>
<td></td>
</tr>
</tbody>
</table>

I commend the Commissioners
I challenge the Commission
I urge the Commissioners
I thank you.

the public support is profound
79% were personally concerned about Great Lakes environment
that translates to be 60 million people

I commend the Commissioners
I challenge the Commission
I urge the Commissioners
I thank you.
short term must not leave
the long term behind

the tangible must not
obliterate the vision

I really really love Lake
Erie and I really really love
the Cuyahoga River

It's really sad to be in this
audience because it's you
while people that caused the
pollution

I expect you to clean up all
that shit out there that you
guys created

in 1000 railway cars filled
with blue beans, 1 white
jelly bean equals

I part per billion

there's one pound of PCBs
on the back of an older TV

it's there so we can snooze
and not burn the house
down

and in the ranking of possible
carcinogenic hazards

beer and wine are more toxic

I read the priorities
document and I was sick

jus remember the cars that
looked like battleships with fins
that stretched
from here to Toronto
<table>
<thead>
<tr>
<th>I urge you to broaden your perspective - to an ecosystem perspective</th>
</tr>
</thead>
<tbody>
<tr>
<td>orderly transition planning - that's the direction we go now</td>
</tr>
<tr>
<td>as I listened to the labour presentation, I appreciated how much they actually lived the complexity balancing risk with the dream of sending their children to college someday</td>
</tr>
<tr>
<td>I'm shocked and sad to see the plug being pulled after so much money and resources have been put into RAPs</td>
</tr>
</tbody>
</table>
was there anyone at the RAP forum from the Michigan state agencies?

for me partnerships is the main issue

I hate to say it but I've been here before

the same kinds of speeches the same kind of collisions

only the intensity is low

key-

people aren't tearing each other down personally while they're disagreeing with one another - that's new-

maybe the IJC's at the end of a cycle -

you know the organization's been stupendous

someone was telling me it's the largest conference they've had at the DECC

it's a pity the Commissioners couldn't revise the structure of the Biennial

to be more in line with the new emerging civility - committing to interaction as well as gathering information
but I hope they appreciate the energy and skill of their staff in organizing all this!

this conference - in contrast with Windsor or Traverse City

have been very even

| I think everyone's in shock at the threat of huge funding cutbacks |

commend challenge urge thank you.

is it the problems themselves that separate us or is it our attitudes?

we all live in networks of need and nurture and support

| our civility lies in how well we acknowledge that and express it |

who was that little girl with the great singing voice - does she have an agent?

interaction is not standing at a microphone making a statement

society's changing
T. Baldini: I'm really impressed that people can capture that and turn it into something... I mean it's an area I have absolutely no talent and so when I see that it's just... I'm very impressed. Thank you very much. Before we hear from our report from our concurrent sessions this morning we have a very important piece of business to complete and I want to do that early in the session because it has been very integral to this entire meeting. Every Biennial Commission Meeting that has been held, and this is our eighth, has many people who contribute to the success. While our offices are located in Washington and Ottawa and Windsor, the Biennial meetings are held elsewhere, Indianapolis, Kingston, Toledo, Hamilton, Traverse City, Windsor, and now Duluth. This year we are in Duluth and this meeting would not have been the success it has been without the assistance of several key people in the Duluth/Superior communities. Many local residents have donated long hours, dealt with numerous aspects which are necessary to ensure a successful meeting. In fact, the local planning committee has been working for more than a year to design and implement several portions of the meeting including the tours, the comedy theatre on Friday, the exhibits available throughout the meetings, Saturday evening's wonderful Lake Superior celebration dinner, the Sunday concurrent sessions on Lake Superior protection programs, and a great deal of assistance with publicity and local organization. I know that my colleagues, my fellow Commissioners, and our staff from our three offices will agree when I say that without these people the meeting would not have occurred as it has and we all owe them a great deal of thanks and we hope that their return to their regular job duties will not be too much of a let
down. Rather, I suspect it will be a great relief to all of them after we all get out of here and leave town and this meeting is behind them. I'd like to formally recognize the members of the local planning committee and ask them to come forward to receive a token of our thanks as I read their names and I'm going to ask Adèle please to assist me with this. Mike Birkeland - Michael OK. Tom Beery - he's here we know. Hugh Bishop. Jan Conley. Elizabeth Durhan. Joanne Gidley. Cindy Hagley. Dave Heimbuch. Dan Helwig. Jill Jacoby. Ann McCammon Soltis. Jackie Morris. Heather Nichols. Debbie Ortmann. Karen Plass. Doris Pride. Ralph Pribble. Jan Rau. Marie Sales. Ann Sigford. Tom Selinger. Sanders Sweeny. Nelson Thomas. Aivars Zakis (he's over there taking pictures-I think we've all seen him). In addition to these people, there's a core group of local planning committee has gone above and beyond the call of duty to help us with many, many aspects of this meeting...from financial matters to transportation to all the logistics that go on with this and I'd like to call them forward for special recognition. Diane Brooke, who did the tours for us which were tremendously successful; Henry Hanka who was our bag man. Yes, he just did raise money. Anybody that's looking for a political campaign. Keith Hanson, who was our accountant and then paid the bills. Robin Hayes. She was the secretary in Brian's office. She's now going to get back to her mundane job. Shannon Lotthammer. And Shannon did Great Lakes...she did the photo exhibit which many of you saw downstairs-great photo exhibit by getting the people involved. Lisa Marciniak, with publicity and boy we got publicity. Deb McGovern in entertainment. Those of you who had the opportunity on another great piece was Friday evening. Some of us had the opportunity to attend that. It was really very good - very humorous also. Joanne Morrison, publicity also. Joan, excuse me. Joan Parker and Felicia Raymond are not here I understand. OK Lloyd Vienneau who helped with all the exhibits and coordinated that downstairs. Pete Weidman who did ...helped with entertainment and many, many other activities. Finally, there are two people that need to receive really our special thanks and applause and I guess that their normal jobs have been almost completely set aside for these past several months and they took on countless duties that we didn't even anticipate and they just sort of assumed them and told us they were taken. Amy Weidman was essential to us as a local logistics and media consultant and Brian Fredrickson might as well have called him an IJC employee-I hope we don't get billed in recent months but given the level of support and the coordination that has been provided to us we are indebted to them and we hope that the recognition that we tried to show to them just is a way for us to say we really, really appreciate what you've done to make it a success. Amy and Brian, please come forward.

I think it was a year ago that some of our staff visited — when was it, Rita? '94. They came over and one of the things that did sell us on Duluth, other than the fact that it was the headwaters of the Great Lakes and we wanted to say something about Lake Superior - but it was also your local planning committee that really did help sell our interest in this community. One other group that I do want to thank and I'm not going to get into the names but I do want to thank our own IJC staff. They were not as visible - some of you saw them at registration, or other parts but they have worked very hard to put together the concurrent sessions, to put together the other activities; and so I also want to thank them. I now call on Commissioner... or Brian Fredrickson. Promotion comes quickly.
Brian Fredrickson: Boy, I didn't know that I was given that title. That's pretty good... (result of all this work) I've been given an incredibly complicated set of instructions... at least, I think that I have but I've got such a good group of people behind me that I think I can pull it off so I'm going to give it a shot. I just want to say that I really enjoyed working with the IJC staff and the folks on our local planning committee to make this happen - this Eighth Biennial Meeting. We had, on our local planning committee, a really wonderful group of people that gave a great deal of their time and talent to pull this off so my hat's off to all those folks and I would also like to thank my own agency, the Minnesota Pollution Control Agency, and supervisors for giving me the latitude to do some things that I probably couldn't have otherwise done and also to the organizations that supported the people on our local planning committee because those folks took a lot of time away from their normal work activities to make this happen so their generosity is really appreciated. As the chair of the local planning committee, I would like to recognize the work and vision of the International Joint Commission and they truly are a very important organization for all of us on the Great Lakes. It takes their vision and inspiration, I think, to point out some of these very important issues that the rest of us just aren't able to articulate quite as well. With that we would like to, as a token of our appreciation, give the International Joint Commission offices, in particular and on behalf of the offices we'd like to give Commissioner Thomas Baldini a token of our appreciation so that he can use this on his coffee table in the office there and make people... or at least remind them of Lake Superior and Diane Brooke is here to give out an award.

T. Baldini: This is the priceless book, thank you, thank the Committee.

B. Fredrickson: We would also like to give the Ottawa office a similar gift so that they can also have a book on Lake Superior that graces their coffee table and Adèle Hurley, Commissioner, will receive the gift. (Applause)

A. Hurley: I just want you to know that before I left town I was trying to figure out how I would have time to go and get this book. (Laughter)

B. Fredrickson: The last book that we have here is for the Great Lakes Regional Office in Windsor, Ontario and we'd like to have Debbie Ortman give that to Sally Cole-Misch if at all possible to accept it for their office.

Now I get into the really complicated part of it here. We have some other small gifts that we'd like to give to the Commissioners and staff as tokens of our appreciation and the first gift that we'd like to give to Commissioner Thomas Baldini and Deb McGovern will hand out the gift; and the second gift is to Susan Bayh who is not here and Cindy Hagley will give that to Tom. The next gift that we have is for Alice Chamberlin and Nelson Thomas will present that. We'd like to give the next two gifts to Commissioner Adèle Hurley, both for herself and Calvin Francis Murphy and Ralph Pribble will present that gift. The last gift that we have for the Commissioners goes to Pierre Béland and Jan Conley will present that gift.

As Commissioner Baldini mentioned, to make this happen there are a whole bunch of IJC staff...
people working behind the scenes doing all kinds of things to pull this off and we would like to recognize those people because we worked very closely with them and we have a great deal of appreciation for the work that you folks do to make this happen. I'm going to call up a few folks first and then we have some gifts that are boxed slightly differently so I'm going to call those people up first and then the rest of the folks next. Frank Bevacqua, Alan Clarke, Rita Kerner, Marty Bratzel, Sally Cole-Misch, Richard Delisle, Bruce Jamieson, and Marie Terrien. The last group, assuming that these folks are here-Peter Boyer, Bev Croft, Michael Gilbertson, John McDonald, Philip Slyfield, Sheila Tibbs, Charlotte Lamoureux, Doug Bondy, Bruce Kirschner, David LaRoche, Faye Morrison and Kevin McGunagle. If we missed anybody, I'm sorry. This is another one of those lists that we tried to put together and we undoubtedly forgot somebody so we'll get you afterwards. Thanks very much for coming and we really appreciate the chance to be involved in this meeting.

Amy Weidman: Brian, before you leave we have something for you. Could you just stand next to me for a moment. I think all of you know that in a group of people a leader emerges and there are many different ways to demonstrate leadership. Sometimes with a very strong fist and a loud voice and sometimes with a very soft-spoken but persistent manner. We, as the local planning committee, would like to thank Brian, you, for a number of different things; for your persistence; for your sense of vision; for your sense of keeping us on task; for all of the cookies that you brought to all of those meetings. We have this gift for you and here to present it is none other than Craig Blacklock - Craig. This is a Craig Blacklock original that we are presenting to Brian in thanks on behalf of the local planning committee. (Applause)

T. Baldini: On behalf of the Commission, and on behalf of the staff, I want to thank you. We, as Commissioners, this is our first Biennial Meeting. Needless to say there was some level of anxiety, apprehension, my Canadian colleagues even had greater apprehension. I shouldn't speak for them but they just got appointed and I really felt some anxiety for them but we are very pleased for what happened and we'll talk about that again later. It really was the warmth and the hospitality of the Duluth/Superior area and that is directly attributable also - the tours, all the other things - to the local committee and we want to thank you again and also thank our staff for what they've done. Thank you.

A. Hurley: We have two final segments to this final session that we feel are just as important as the previous ones; listening to brief reports from the various concurrent sessions and enjoying; pardon me - we've only got one session left. We moved the theatre. We've had that. I'd like to ask Ava Hottman from the IJC to start us off from Sunday's forum on Remedial Action Plans. Is Ava here? Commissioner Hottman (laughter)

Ava Hottman
Ohio Environmental Protection Agency
I'm sure I would consider an appointment to IJC a promotion but I'm from Ohio EPA and I would like to leave you with six messages - the Commission and the audience - about Remedial Action Plans. Remedial Action Plans planning processes throughout the Great Lakes are really part of the vanguard of ecosystem restoration and a model for water quality improvements
throughout the countries. In that way, we need to leave a message to governments that are reducing funding that programs like remedial action should rise to the top if we are to fund things that work. But also, in celebrating the success one of the other points that came through in the RAP forum is that not all RAPs are thriving and that they need assistance from their jurisdictions and from the Commission in reinvigorating their processes or indeed, starting them up again. They also need assistance from other RAPs and we challenge the Commission to provide those opportunities for remedial action community to meet not just to hear presentations of success but to develop strategies among the forty-two and we keep Collingwood in there because not all the uses are restored - so we can share that and build upon it for all of the Areas of Concern and recognizing that how we solve problems in areas of concern will lead the way to solving other kinds of environmental problems. RAPs are characterized by community-based solutions, collaboration, partnership and invention; and invention in government is a resource that deserves to be funded. RAP communities also have to respond by organizing themselves, marketing not just the things they've done that are successful but the things they have yet to do. Those things also need to be marketed to the jurisdiction and to the Commission. One of the things that a number of us did this summer was attend a retreat at Wingspread in Racine, Wisconsin. It provided an opportunity for a number of RAP participants, federal, state, local participants to look into the future; to look at the tough things that we have to do and one of those tough things is figure out ways to remediate contaminated sediment problems throughout the basin. Something neither — no jurisdiction is adequately dealing with; especially in the volumes and in the toxicity we are dealing with. We need new solutions and RAPs provide that opportunity and we ask the jurisdictions and the Commission to continue to support - to put us at the top of the priority list because this is where the real actions will take place. We also encourage the exchange of scientific information that will lead us to better solutions and as we have said - to put the best science toward the solutions and the restoration of the 42 areas of concern. Thank you, Commissioners.

A. Hurley: And now, Joel Baker from the University of Maryland will provide a summary of the session on air toxics in the Great Lakes basin. Joel.

Rick Artz: Hello, I'm Rick Artz from the International Air Quality Advisory Board. Joel Baker was one of the speakers at the meeting but Joel headed home and I'll give a very short summary. The session was well attended and we're very gratified to see the interest in air issues. The session started off with a talk by Gary Foley and Gary introduced a number of things; the Air Board reference; the recent progress by the Board; and then he covered where we've gone in terms of modelling and monitoring and a number of the models that we used to pull the whole thing together. The speakers that followed then each took pieces of this whole issue and the experts covered a tremendous amount of information. In fact, the biggest problem that we have is that so much information was presented it's very difficult to adequately summarize it. We will, by the way, try to put a decent summary into our Board Report that should come out, I guess, in a month or so - I hope. A few of the highlights - we had a thorough discussion of the International Atmospheric Deposition Network - a network that consists of five sites. I used to have a couple of slides on that. At the five sites we've learned a number of things in recent years - the most important probably that the organochlorides show similar concentrations at all the
sites. We note large seasonal differences. At some times the lakes are sources and at other times they're sinks. The network basically shows very similar concentrations across the entire basin for most things. We know that the pathways for metals tend to be through precipitation. We know that the pathways for many of the organic materials tend to be through the vapour-phase deposition into the lake and then re-volatilization back out from the lake. We have identified problems with the network in terms of - we're getting a good handle on the background areas - we need to do a better job of getting a handle on the urban areas. We know through studies - Joel Baker and Steve Eisenreich and others have done a number of cruises on the lake - they've studied PCBs; they've studied some of the chlorine compounds of interest - and we know that places like Chicago have a strong influence on the lake and we know that we need to do a better job of characterizing the urban input. In recent years we've gotten more information regarding mercury. We know that we need to do more to get a better handle on mercury issues in the basin. We're working on that. We have data and we will present it shortly. With regard to the models, we know that they're - we've studied using models. We know that there's things called grasshoppering. We know that some of these chemicals are deposited far away. They're revolatilized. They land in the basin. They move on. It takes a long time to get rid of this stuff. We know that the region of influence is huge. It's essentially continental in scale for many of these compounds, it's larger than many traditional pollutants that we study and we know that we must improve our source inventories if we're going to get a handle on a lot of this stuff. So I will wrap up very quickly and just say that we need to make this information of use to the local people, people that have real issues locally that need to be understood. We need to improve our models. We are, because of the computer revolution and such, we do have many things we can do with the models now that could not be done in the past. I'd just like to say that we'll work to make our information relevant to the local community and try to make sure this information is useful in the future. I guess I'll leave it at that for the moment.

A. Hurley: Next will be Jim Cantrill from Northern Michigan University to report on the session entitled, "The Role of Biodiversity in Sustainable Development."

Jim Cantrill: Yesterday we held what amounted to a workshop on the role of biodiversity in sustainable development. We gathered input from representatives from all of the major public and private sectors attending this Biennial meeting. By the end of that session, we had generated relatively strong consensus that the time has come for the Commission to act upon its previously stated commitments to ecosystem management in the Lake Superior basin. Specifically, to reassert and actually move in accordance with the idea that aquatic and terrestrial ecosystems in the basin are not independent; that the major reason for preserving water quality in this basin is to sustain a human presence on the shores of this and the other Great Lakes; that we should in concert, act to ensure that human settlements are managed to achieve the greatest possible harmony with those protected core areas that have already been preserved from development and that one of the best routes to, indeed a fundamental component of sustainable development, is to safeguard regionally appropriate levels of natural biodiversity. To this end, we will be formally submitting a series of recommendations for endorsement and active promotion by the Commission, drafts of which we would now like to provide to Tom and Adèle, the IJC cochairs. These draft recommendations are as follows:
First, the Governments of Canada and the United States through the efforts of the IJC should amend the Great Lakes Water Quality Agreement to include provisions for designating terrestrial and aquatic areas of quality in the Lake Superior basin. Such counterparts to existing Areas of Concern would mandate the development of sustainability action plans involving extensive public participation including the voices of First Nation Peoples and government partnerships to maintain currently operating core protected areas such as provincial and national parks and to promote the establishment of additional areas rich in biologically diverse species native to the region. To achieve this goal, the Commission should further endorse three subsidiary recommendations:

1. Actively promote the use of existing databases and yet to be funded inventories where monitoring plans to select areas of quality based upon ecological rather than political criteria; to ensure progress toward regional sustainability, the historical baseline of environmental conditions in the Lake Superior basin should be viewed in light of current values regarding ecological design thereby guiding the rational use of ecosystem management principles within and adjacent to the designated areas of quality.

2. Strongly endorse and disseminate to residents of the Lake Superior basin the current form of the Superior Workgroup's ecological findings... (end of tape)... expert and public involvement and it's now in the possession of the United States and Canadian governments, and

3. Highlight and foster innovative, economic incentives and mechanisms in particular through the offices of the Binational Program for Lake Superior to preserve or restore appropriate levels of biodiversity in or adjacent to the designated areas of quality in the basin. In many cases such funding schemes will become self-perpetuating since biodiversity enhances sustainable economies and lifestyles in harmony with the natural resource potentials of the Lake Superior basin.

To optimize the workability and benefits of the proceeding recommendations, we offer up two additional recommendations to the IJC. The first one is, the Commission should develop a plan to monitor and compare natural, economic and social benefits in and around designated areas of quality to ensure that locally managed, ongoing sustainability action plans effectively prevent or mitigate the overall reduction or biodiversity in the Lake Superior basin. And finally, the Commission should use its resources and international stature to actively demonstrate to all communities in the Great Lakes basin how areas of quality around Lake Superior serve as viable models for regional sustainable development. Such promotional activities will significantly strengthen the IJC's role as a leader in fostering transnational, cooperative agreements and sustainable development on a global scale. Thank you.

A. Hurley: Thank you. Alan Clarke of the IJC will provide our next summary on Sunday's health session.

A. Clarke: Commissioners, Ladies and Gentlemen. Concern with human health has been on the
agenda of the Commission since the Biennial Meeting in Hamilton in 1989 where the focus was on human health and children. Yesterday morning we had a distinguished panel of experts from United States, Canada, the Netherlands, and Finland. The title, "Male Reproductive Health and Environmental Chemicals with Estrogen Effects"; we looked at the science and we looked at the policy considerations during the session. In my view, it was one of the best discussions that I've participated in in my association with the Commission. There was considerable public interest that I think you will find when you get home in local media, but the most significant thing, I think, is something that we didn't get to and I'd just to read one excerpt from a study about the importance of this particular issue and the continuing concern that the Commission has had with the issue of human health. The study, which is entitled, "Male Reproductive Health and Environmental Chemicals with Estrogen Effects" which was published by the Danish EPA (Environmental Protection Agency) and is available from the Danish government - there are some excerpts in the Media Room of the summary of the report; but the report says that, "Male reproductive health has declined progressively since the second world war as a result of changes in environmental or life style factors. While the etiologies underlying these apparent changes are currently not clear both clinical and laboratory research suggests that all of the described changes in male reproductive health appear interrelated and may have a common origin in fetal life or childhood. This means that the increase in some of the disorders seen today originated twenty to forty years ago and the prevalence of such defects in male babies will not become manifest for another twenty to forty years or more." I think that quotation touches the significance of the discussion and, on behalf of the panel and the participants I'd like to thank the Commission for including that topic on this Biennial Meeting agenda.

A. Hurley: Next is the Status of the Lake Superior Protection Programs which will be reported on by Alden Lind of Save Lake Superior.

Alden Lind: I'm afraid I come rather unprepared. I was not aware I was to do this until a few minutes ago. I borrowed a program from Dan Helwig and will seek to recall as much as I can. This particular session was organized by Dan Helwig of Minnesota PCA and was basically a report on a variety of programs in the Lake Superior basin, some of which were intended to deal with the questions of toxic loadings; others which are intended to deal with a variety of habitat problems; one of which was intended to report on the progress made by the Lake Superior Binational Forum with respect to setting timetables for the nine persistent toxic substances for which sunsets are being sought in the Lake Superior basin. It was opened with a very brief review by the cochairs of Superior Working Group - Chuck Ledin and Jake Vanderwal, Chuck is with the Wisconsin DNR, Jake with Ontario Ministry of Environment and Energy - and they reported briefly on the work of the Superior Working Group. And front here we went to Tom Biazzo of Potlatch Paper Corporation up here in Cloquet and Potlatch has recently begun a project to convert from elemental chlorine to chlorine dioxide to double the production at Cloquet and presumably at the same time to reduce the toxic effluent properties of their effluent which are, incidently, discharged into the western Lake Superior sanitary district which is located here in Duluth and I'm sure all of you have heard during your visit if not before about WLSSD. Tom Lockner, from Georgia Pacific which has two hard board plants here in the Duluth area - one in Duluth and one in Superior reported on their project to go to total zero
discharge of liquid effluents and they, apparently, have now achieved that and I suspect that given that Superior Fiber Products, which is their plant in Superior, was at one time the largest discharger in terms of gallons per day into the Duluth/Superior Harbor. That, indeed, is good news. There was a report by Bruce Petersen from the Waubakeem[sp] Park Expansion in Ontario. They are working on a project up there cooperatively, government, private parties - working on a project to more than double the size of the Waubakeem[sp] Park[sp] to reintroduce in larger numbers the woodland caribou population there and then to seek to allow it to be a naturally-controlled or fire-limited forest area where the sort of natural presettlement characteristics will pertain. Fred Strand of the Wisconsin Dept. of Natural Resources reported on a tern project in the Bayfield/Ashland area - Chequamegon Bay. Blair Orr reported on a transition economic model which seeks to help us understand the nature of the transition from current situation to one in which zero discharge would, in fact, be the rule. Kathleen Brosemer of Clean North in Sault Ste. Marie reported on a series of projects that they have in the Sault Ste. Marie area. Jim Musso of Northern States Power reported on the project which they've undertaken to burn old railroad ties and woodchips and materials which otherwise would have presumably found their way into landfills and Dave Beal of Lake Superior Paper Industries reported on the timetable established for these nine substances that I referred to and they did a fine job. I'm sure we're all thankful. There were a good number of participants and we thank all of the presenters and all of the people who came there and we thank the IJC for having scheduled it.

A. Hurley: Don Murray will now provide a summary of the session on Pollution Prevention.

Don Murray: Commissioners and Ladies and Gentlemen. Throughout the last four days I've heard many references that pollution prevention is the preferred strategy for achieving the commitments under the Great Lakes Water Quality Agreement including the goal of virtual elimination of persistent toxic substances through zero discharge. Those of us working at promoting pollution prevention were encouraged that several Commissioners mentioned pollution prevention in their opening remarks of this Biennial Meeting. The Lake Superior Forum has recognized that pollution prevention is the way to achieve the zero goal of the binational program and have included pollution prevention as a key element of all of their recommendations. A written report will be referred to the IJC office in a week to 10 days that contains all of the reports presented by our panelists and comments from the ensuing discussion. On behalf of the 100 or so delegates participating in the session, the following recommendations are made:

"Recognizing that pollution prevention is a change in behaviour, a shift in culture not only for businesses and industries but also for each of us as citizens of the Great Lakes basin, to achieve pollution prevention those of us at the session recommend to the IJC that you work towards finding ways to encourage industry to convert to clean production processes, that you work towards finding ways to invoke cooperation and partnerships through multistakeholder processes; that you work towards finding ways to enhance pollution prevention education and awareness. People need to be informed so they can make the proper pollution prevention decisions, not only in their homes but in their
businesses. We encourage you to find ways to have the true cost including the cost to the environment reflected in the price of consumer services and goods produced."

During the session, several barriers to pollution prevention were mentioned and I'll just mention them so that we can think of ways, perhaps, to overcome them. In these busy times there are limited resources both in time and money for companies and government to direct towards pollution prevention activities. There are competing environmental priorities. People are looking for funding for remediation; people need money and help to work towards pollution prevention. For small businesses there is a lack of motivation to move towards pollution prevention. In the Lake Superior basin, we have a very active binational pollution prevention committee that has collected a wealth of information on pollution prevention. I encourage any of the delegates that are here that want more information on pollution prevention to contact their state or provincial environmental agency. A clear message from our session was that we all need to embrace pollution prevention in all our activities at home and at work. As a very small token of our collective commitment to pollution prevention, I placed a small cardboard box near the projector table at the back and I'd ask people to put their plastic name tags in that box as they leave. This will remove two to three hundred pieces of plastic from the waste stream that will eventually be incinerated releasing their byproducts to the atmosphere. It's a very small step but it can be a symbolic commitment on our part to pollution prevention. Thank you.

A. Hurley: This morning's sessions also provided participants with a wide variety of information. Judging by the ones that I was able to listen on and I'd like to start off the reporting out of those sessions with Bob Burris who will provide a summary of the session on Innovative Approaches to Urban and Agricultural Watershed Planning - Bob.

Bob Burris: Thank you. Our session, as she said was innovative ways to look at attacking watershed problems. We, essentially, had five presenters. I was the first one and what I'll do is to give some of the tidbits or nuggets - gold nuggets that we got out of that and summarize it. The first session was looking at trying to attack a large, very large, problem that covered the entire Lake Erie basin and addressing the phosphorus reduction needs which we had in the '70s. Some of the key things that came out of there I think were the fact that we tried to personalize a very large, diffuse problem and bring it down to the local level and then allow the local people to make decisions on how they were going to essentially implement measures to make that reduction to reach to goal that was outlined. Following that, we had Ava Hottman from Ohio EPA talk about RAPs and I think she's been talking about RAPs this whole session. She's been on almost every day so everybody knows who Ava is. One of the things that she brought about was a change in philosophy of their agency essentially from a command-and-control type of an operation to a system where you're allowing the protection and restoration rather than a command and control. She talked about reorganizing the entire Ohio EPA to look at how they were going to implement this measure across the board. She had an idea of "adopt a watershed" program which was going to be community based and they're just starting on that at this time. Following that we had a presentation from Ellen Brody from NOAA. She talked about the two main programs that they have under their jurisdiction and that is the CZMA program in 1972 and then the coastal nonpoint source program implemented in 1990 and she explained some of the
tools that they have to work with. They're somewhat regulatory in nature and in fact, they're voluntary except if an organization or state agrees to adopt those and they kind of have some regulatory programs associated with those. In the Great Lakes right now, I think four of the eight states have adopted CZMA and she also pointed out that three of the other four remaining are working on it and one state is essentially refraining from participating. Following that we had a presentation from Chris Wright from the Grand Traverse Bay and Chris talked about things they've done up there in the Grand Traverse Bay. Here you're looking at a situation of not remediating a problem but rather protecting a valuable resource and what they've done there is put in some innovative ways to network people within the watershed and bring them together to focus on their total goal which is essentially some way to keep that Grand Traverse Bay in a situation where they really want to have it to be - a very natural resource and they also pointed out that there will be an article in the National Geographic February '96 issue highlighting some of the things that they've done in the Grand Traverse Bay. The wrap-up was from Mark Mitchell who came from the River Rouge in Michigan and he came from a different perspective, looking at the educational components and how you network those or bring those into the overall process and essentially said, "How do you make a watershed educational program tie things together?" Some of the things he pointed out were number one - you get the students involved; students are doing the testing; they have hands-on experience and at the end of these on an annual basis they've had student congresses within the basin where you bring people from the upper end of the watershed and not only from geographic differences within the watershed but also the social and economic differences in the watershed all the way down through into one big congress and they talk about their problems and also the solutions and what's going on and he said that's the way you institutionalize and bring that into the educational process so that the people that are going through as young adults when they get to be adults will have an understanding and appreciation of what's going on. Thank you.

A. Hurley: We'll now hear from Marg Dochoda of the Great Lakes Fishery Commission. Marg organized the session on Maintaining Biological Integrity of the Great Lakes - Preventing Harmful Invasion.

Marg Dochoda: In 1993, experts in invasion biology at a workshop convened by Joe Leach and Ed Mills where my co-organizers this morning warned that vector management is critical in order to prevent more non-indigenous species from entering the Great Lakes basin. So today we looked at the four vectors identified by Drs. Leach and Mills and they were shipping, of course, that's provided perhaps 30% of the introductions into the Great Lakes, unintentional introductions which is tied for first place with about 30%, intentional introductions or stocking which is 8% and transportation projects such as canals at 4%. The remainder tended to be combinations or unknown. First, I'll discuss shipping. In 1990, the IJC and the Great Lakes Fishery Commission reported to Canada and the United States on exotic species and the shipping industry. We recommended that the governments require ballast exchange or other safe and effective treatment of ballast water by ocean-going ships. We also recommended a major applied research and development program on ballast technology and on ship design. Five years later, the Great Lakes are the best protected in the world from ballast invaders but unfortunately ballast exchange, at least as it's currently practised, has not proven 100% effective. Juveniles of
two species not known to reproduce in fresh water, the European flounder and Chinese mitten crab, have reappeared in the Great Lakes. Implementation of the ballast exchange program needs to be reexamined and tightened and the governments of our two countries need to direct resources into technologies in ship design to prevent the transport of viable organisms. Research on ship design and ballast technology is the long term answer to ballast invaders.

The other major source category of introductions identified by Drs. Leach and Mills was unintentional which is primarily associated with private aquaculture, bate fish, the pet trade, live fish for food, that sort of thing. The last five years have seen range extensions and new reports from this source, for example, the Whirling[sp] disease pathogen, big head carp from China, stripped bass hybrids, and grass carp. Commercial aquaculture is projected to be the growth industry of the 21st Century and this is likely to continue to be a vector for exotic invaders. We will have some written recommendations on engaging private aquaculture for the IJC's consideration. Paramount, I think, will be the recommendation that all concerned, state, tribal, provincial and federal authorities, agriculture, natural resource and environmental agencies and fishermen, environmentalists, and private aquaculture itself, cooperate to ensure that the industry realizes its potential without putting at risk the Great Lakes ecosystem and its beneficiaries.

Finally, we will have some recommendations on the other two sources - intentional introductions or stocking and transportation projects. While we must improve of vigilance in these areas, we think it will be easier than with private aquaculture and shipping because historically these two categories have been responsible for fewer introductions and none recently and secondly, governments are the actors; there are relatively fewer of them; and they are, can be made responsive to other jurisdictions' interests and to impacts on the ecosystem.

A. Hurley: Next is Neil Kmiecik to tell us about the native session entitled, "Tribal Natural Resource Management in Lake Superior and Beyond." Is Neil here? Oh. You are in his place? OK.

Ann McCammon Soltis: Neil was called away so he asked me to do this for him instead. My name is Ann McCammon Soltis and I'm a policy analyst also with the Great Lakes Indian Fish and Wildlife Commission. This morning we heard presentations on a variety of resource protection programs that tribes are undertaking within the Great Lakes basin. Instead of going through speaker by speaker I think I'll just touch on a few themes that seemed to emerge as a result of all the speakers. Tribes feel the need to join forces across the basin in order to formulate joint approaches to the issues that affect them and as part of this effort, the idea emerged this morning of an international tribal conference. This conference would emphasize the incorporation of indigenous knowledge into traditional science and research. Another important theme this morning was that tribes are initiating their own protection initiatives in the basin and using the traditional knowledge that I just spoke of. Some of the highlights of those programs that were spoken of this morning are - partnership between the Bad River Tribe and the Nature Conservancy to protect the Kaukagen[sp] slews and Bad River watershed; the tribal development of water quality standards and the redesignation of air quality on reservations from class 2 to class 1; and wild rice and other habitat restoration in the Great Lakes basin. The tribes,
once again, called for Lake Superior to be designated an outstanding national resource water and for the IJC to recommend to the governments that they work harder to create partnerships with tribes in decisions affecting the Great Lakes basin. In addition, they called for the appointment of native IJC Commissioners on both sides of the basin. The final theme, I think, was that tribes see the need for not only sustainable resource management but for sustainable science and what we mean by sustainable science is science that incorporates and preserves the traditional knowledge of native people. It needs to be preserved and utilized just as the resources that are the subject of that knowledge and I’d like to thank the Commissioners for having this concurrent session as part of the agenda. Thank you.

A. Hurley: William Hunt of the Natural Resources Conservation Service will outline the discussions and conclusions reached in the Pesticides section - William Hunt? Ah, Frank Bevacqua.

Frank Bevacqua: Bill Hunt couldn’t be here but we had a fascinating discussion. I’ll attempt to hit some of the highlights. We heard a bit about human health effects and some work being done at the University of Wisconsin where they’re using multi-generational studies with laboratory animals and looking at mixtures of chemicals that are not atypical from those found in the environment and they’re finding measurable differences in thyroid function and other hormonal functions as well as other endpoints that are not traditionally looked at. They are finding these effects whereas traditional toxicological studies just looking at one chemical at a time and narrower endpoints would not be picking them up. We also heard a lot about opportunities for pollution prevention. There are a number of successful demonstrations around the Great Lakes basin where farmers have significantly reduced their use of pesticides yet maintain their profitability. Some work, particularly, by the World Wildlife Fund to look at this described a continuum of practices ranging from and it’s analogous to what’s happening in industry, from control and that would be proper handling of pesticides, buffer strips, things that would reduce runoff, moving on towards source reduction which would be more efficient use and reducing use of pesticides to actually changing cropping practices, having cover crops, using scouting before you would apply pesticide and essentially one of the trends that is occurring is that we’re replacing our use of chemical products with a high-reliance of use of knowledge of how to raise healthier plants and how to understand the lifecycle of the pests and intervene more effectively. We also looked at some of the government programs that are encouraging alternative practices. Some of these are now at risk in the current budget-cutting climate in both countries but there are also a number of important opportunities that we need to consider in overcoming some of the obstacles and farmers have an awful lot invested in their crops. It’s a high risk business to begin with; there’s... change will come gradually and the role of education and involving the farmers in the planning is of critical importance as is providing some incentives and assistance to the farmers who will either change their practices, implement alternatives and also take the time to spread the message and their success stories to other farmers. The education needs to extend to our financial institutions who are often reluctant to lend money to farmers who would be implementing an alternative practice; consumers and food distributors need to be included as well because the market still tends to respond primarily to the price and aesthetically perfect
and I'm going to wrap up. The last thing we heard was suggestions that there's a strong role for the IJC to play in this area in terms of promoting regional coordination, developing protocols and standard measurements for measuring pesticide reduction and IPM practices, identifying funding priorities and making the links between urban pesticide users and the urban rural link as well as addressing urban pesticide use and this could perhaps be accomplished in the Great Lakes Areas of Concern. Thank you.

**A. Hurley:** For the session on Lakewide Management Plans I'd like to call Steve Skavroneck. I don't know if I've pronounced that properly. Is Steve here?

**Steve Skavroneck:** First of all I want to say that pictures of Tom Baldini and myself appeared side by side in a national journal this month and I'm glad to have the opportunity to come up here and see what it feels like in real life. Also, a few of us were talking in the back - a few of us who have been to many of these meetings and we came to the conclusion that this Commission has stayed awake for a larger percent of the time than any previous Commission we've watched. Thank you. (applause) Now to the LaMPs. I've got nine quick points I want to cover. First is that some very sophisticated tools are needed to implement the LaMP concept as it's envisioned in the Agreement. We heard about a North American dioxin transport model. We also talked about the Lake Michigan mass balance study. We also came to the conclusion that we can't wait for all the results to be in before we act. Secondly, we need good, high quality, up-to-date and accessible data. Concerns were raised about cutting off the flow of that data with impending budget cuts and it would be great if the IJC could comment to the Parties on the impacts of proposed budget cuts on the Lakes such as this. We need better integration of the RAPs and the LaMPs. We need two-way flow of information. A couple of the LaMP forums are dealing with this through establishing home pages on the world wide web but we also recognize that there are a lot of folks who still aren't entangled in the web yet and we need to do some other things. One of those things is inviting members of the Areas of Concern, citizen advisory committees to participate on the LaMP Committee but we realize that it takes resources to move those people around the basin and we would hope that those resources would be provided. Here's one you haven't heard before. LaMPs need to take a true ecosystem perspective. Most, however, to date have focussed more on the critical pollutants than anything else and we hope to graduate from that to dealing with the other stressors on the ecosystem. This was brought home, particularly, for Lake Erie. There we need to be looking at the impacts of zebra mussels, on phosphorus loadings, and on habitat. In fact, one person mentioned that it may be a waste of time to do a mass balance model for Lake Erie right now because the ecology is changing so rapidly we won't be able to predict the impacts of pollutant loadings on the system for a while. There's a perception that problems between some of the multiple jurisdictions are slowing down some of the LaMP processes particularly on Lake Superior. It was suggested that the baby LaMPs, namely Erie and Ontario, need to learn from the experiences of the others so that we don't duplicate these problems. Some are concerned with the time it's taking to do a RAP. They're concerned that we're not seeing any progress in the four years since the Superior and Michigan LaMPs have been ongoing. There is also a lot of concern about our ability to measure that progress if and when it happens. All agreed that partnerships are critical to the LaMP development and implementation. A key question is how to effectively leverage those
partnerships in time of declining financial support. Although it's not specified in the Agreement, we also all stressed the need to have a prevention component in each of the LaMPs and the presentation on the long-range dioxin transport pointed up the fact that the LaMP process, in and of itself, probably is not going to restore all the beneficial uses. Now keep in mind that there are large error bars associated with these data but for each lake anywhere from 37 to 71% of the dioxin atmospheric loading to the lakes is coming from outside the basin. This points up the need for continuing on and strengthening the binational virtual elimination strategy and applying them nationwide. It also points to the need for proposed stronger regulation of medical waste incinerators in the U.S. and in preserving the ban on incinerators in Canada. Both of these efforts are under attack in the federal Parliaments and Congress and we're hoping that the IJC will weigh in again on the impacts of this for the lakes. We can't do it alone. Thank you.

A. Hurley: Finally, Steve Barg will report out for the session on Sustainable Business Practices.

Steve Barg: Thank you. We had a good, open discussion of what some leading businesses have done and some of the problems and the challenges that they've faced and overcome or are attempting to overcome in changing some of their practices to be more sustainable. We heard from five different business leaders ranging in size from small, local companies to large multinationals. People ranging from individual entrepreneurs to employees of giant companies and I'd like to give you a couple of the threads that ran through those discussions. We also had commentaries from representative of the labor movement, environmental NGOs, indigenous people and youth. The underlying feeling at the end of the meeting was that we and the IJC, I think, needs more of this; this kind of discussion because business, fundamentally, is one of the most important, if not the most important, economic decisionmaker around the Great Lakes. What business does has a very major impact and these lines of communication have to be kept open and I get the impression - I haven't been to these meetings before - that that hasn't always been the case in the past so one of the conclusions that I have from the meeting is that I would urge the Commission to have more of these sessions and to keep the discussions with business as open as possible. Two threads that ran through the discussion about the underlying motivation - why do businesses move in these directions? and remember we were hearing from people who are on the leading edge of moving their businesses towards being consist with sustainable development - one can be captured in a phrase that came out not this morning but from a woman who was the Entrepreneur of the Year a couple of years ago in Winnipeg who said, "I like to make money and I hate waste" and that fundamental economic pressure on business to reduce waste and thereby reduce costs and increase profits and increase competitiveness is one of the driving forces and more and more businesses, I think, are paying attention to that in their short-term planning. The other thread that wove through was a long-term ethical or moral approach based, fundamentally, on maintaining the planet's ecosystems for future generations. This also gets into hints of discussions about consumption and over consumption in our society; that the root of the problem lies in individual behaviour both as consumers or as all of consumers, voters and employees we all have an individual part to play in this and the fact that consensus building among individuals and ultimately, of course, among companies is essential so the other thread was this longterm moral or ethical outlook but ultimately, of course, those two come together - the short term and the long term converge and the reasons end up being the same. We have two
points to bring forward to the Commission that they should consider, perhaps, in their research work in the future - one is with respect to measurement. Companies have a serious challenge in terms of measuring their progress in this area. The IJC, of course, has been doing a lot of work on the scientific side of measurement towards environmental improvement and those two things have to come together - the two sets of measurements have to be mutually supporting and useful to each other so that you can tell on the economic and business front what is happening just as you can tell on the environmental front. So, we would urge that you consider that in your research program on measurement issues. We need - that leads to the need to development informational tools and other work that can get the message out to the public and I come back to the individual and the individual consumer and the individual voter and how their behaviour works. The final point we would make is that there's a public policy framework within which business operates and that the IJC should think about, in its own research and what it's telling to government, regulations are needed but taxation and subsidy policy can be very important in shaping the activities of business and those should be thought of in ways that can help support the move towards improved environmental situation in the Great Lakes.

A. Hurley: I'd like to thank all of the presenters for their summaries. The Commission intends to turn to the written summaries of these sessions as it compiles information for inclusion in the next Biennial Report on Great Lakes Water Quality. And now I'd like to ask Tom Baldini to make his closing remarks.

Thomas Baldini, U.S. Chair
International Joint Commission
As Commissioners we are here in Duluth, we would hear from a great diversity of people throughout the Great Lakes basin, and thus have the opportunity to consider your thoughts, concerns and ideas as we write our Eighth Biennial Report to the Governments of the United States and Canada. Approximately 1,400-1,500 people attended this meeting, over 70 of you offered public testimony to us, all of you had the opportunity to participate in and contribute to the efforts in the workshop and panel discussions. And we as Commissioners can now bring back to our respective offices your advice and your ideas, on how to best implement the noble purposes of the Great Lakes Water Quality Agreement, and that will be done.

In my opening remarks, I spoke of vision, and in particular the vision that characterizes the Boundary Waters Treaty and the Great Lakes Water Quality Agreement. I have said, that I said, "That without vision, we lack the capacity to make today's dreams, tomorrow's realities." One of the messages that I have heard very clearly — that we all heard very clearly — during our time here in Duluth, is that you also feel very strongly that we must not discard the vision so clearly articulated in the purpose and the objectives of the Agreement, if we are to choose the path that leads to the creation of a sustainable future for the Great Lakes basin, and we are going to be guided by the vision of the Agreement as we write our biennial report.

What else have I heard? One very prevalent feeling is fear, or at the very least, uncertainty. These are times of rapid political change and some of the change we are seeing baffles us, makes us angry, makes us wonder if the kind of vision contemplated in the document, like the
Boundary Waters Treaty and the Great Lakes Water Quality Agreement are being effectively abandoned. There is no question that these are difficult times for many of us and that others would like to see agencies of government that are responsible for environmental protection, agencies that are responsible for carrying out the terms of the Agreement be decimated by budget cuts. These are real concerns, and we share them as they relate to our perceived concerns and our very real concerns on the effects that they will have on the important work of the Agreement and the Great Lakes.

Now I am not a Pollyanna, but I believe that attempts to derail the kind of thoughtful programs that have been made possible by the Agreement, I believe will fail. I cannot believe that an Agreement that has been embraced by Richard Nixon and Pierre Trudeau, by Joe Clark and Jimmy Carter, by Brian Mulroney and Ronald Reagan and while not directly by Jean Chretien and Bill Clinton, but by thousands of elected and appointed officials from two countries and countless jurisdictions, and by millions of people in the Great Lakes basin, and indeed around the world, cannot be long derailed, or effectively dismantled.

Please do not forget that even in the midst of these very difficult times, we can still point to a number of accomplishments and ongoing works that are undeniable signs of progress. Things like Environment Canada’s new Toxic Substance Management Strategy, EPA’s Great Lakes Initiative and the current exercise by EPA and Environment Canada to create a binational strategy for the control of toxic substances. At the non-governmental level the Little Zero’s Campaign is truly a creative endeavour. This is an exercise where the combination of many little zero’s is greater than the sum of its parts.

We have also heard very clearly a number of other concerns. Among those concerns and please forgive me, if I leave some of those out, for purposes of these remarks, our concerns about moving on with RAP implementation, rather than endless rounds of RAP planning. Many thousands of people from around the basin have given of their time, their energy and their passion to bring about a collective vision for the future of their communities. Your good faith and work must not be allowed to become an empty exercise in the name of faulty notion of fiscal prudence. Ways have got to be found to implement these plans that will truly lead to a sustainable future for many communities in the Great Lakes basin. That also has to involve your participation and your involvement with your elected officials at the local level; they always say from the top down, this has got to be from the bottom up.

We have also heard very clearly, concerns about nuclear waste. The need to begin an effective program of making the transition to sustainability, particularly with regard to defining alternatives, to reliance that our society has placed on the use of many chemicals that are now being demonstrated to be harmful to the ecosystem and to the humans who are part of it. A successful transition is not going to achieved by only some of the stakeholders at the table, but all of them.

I was pleased that some industry representatives were here in Duluth, and in the session I was in, I heard one representative, one business representative say, he was sorry that more of his
colleagues were not here. Because it is going to take their creative resources and their participation to make sustainability and transition work. And I hope they will increase their presence in future session.

I have also heard concern about the need for increased activity and forward movement; a view endorsed by Robert Perciasepe, the Assistant Administration for Water of the U.S. Environmental Protection Agency. These concerns and many others have for me, one thing in common, we have seen and heard many young people at this meeting. They are worried that the way that past generations and the current generations treat natural resources, and the way short-term plans for equally short-term results seem to be valued — will leave them with a quality of life that is less than sustainable for the next generation and the generations that will come after them.

Congressman Oberstar put it quite well the other evening when he said in relationship to the theme of this conference, "We are talking about children, people we know and love, to whom we may leave a corporate fortune but at what price if reproductive health is diminished generation by generation, along with all other components of spiritual and physical life." There is little more than I can probably say or add to this powerful thought, and it is probably a good place for me to end my remarks and bring these proceedings to a close. But there is one quote that some of you have heard me say and I would like to just end this conference on it. It is from Adeli Stevenson, (where are the Adeli's and Hubert Humphrey's when we need them?) but it is the last speech Adeli Stevenson ever gave and he gave it to the United Nations in July of 1965, a few days before his death, he said, "We travel together, passengers on a little spaceship, dependent on its honorable reserves of air and soil, all committed for our safety to its security and peace, preserved from annihilation only by the care, the work," And I will say, ... the life that we give our fragile craft. So let us go forth and preserve this fragile craft. Thank you all, and we stand adjourned.
CONCURRENT SESSION ON
MALE REPRODUCTIVE HEALTH AND ENVIRONMENTAL
CHEMICALS WITH ESTROGEN EFFECTS:
SCIENCE AND PUBLIC POLICY CONSIDERATIONS

SUNDAY, SEPTEMBER 24, 1995
8:30 a.m.-11:30 a.m.
Welcome and Introductions

Alan Clarke
International Joint Commission

Good morning. Welcome to the concurrent session entitled, "Male Reproductive Health and Environmental Chemicals with Estrogen Effects." As most of you here today are no doubt aware, the Commission, consistent with its obligations under the Great Lakes Water Quality Agreement, has commented substantially on the question of human health and persistent toxic substances in each of its last three biennial reports. The Commission has concluded that there is a threat to the health of our children as a result of exposure to persistent toxic substances, even at very low ambient levels.

The Commission has also concluded that future generations are in danger as a result of our exposure to persistent toxic chemicals in the environment. One area of agreement between and among the various stakeholders in this debate around persistent toxic substances and human health has been the need for continuing, effective scientific research. This call for additional effective research has been strongly advocated by many representatives of business and industry, their trade associations such as the Chlorine Chemistry Council, which has offices in Washington, D.C. and maintains close communication with a broad spectrum of business and industry.

The purpose of this session is in fact to focus on current and emerging research in the area of male reproductive health and to explore the extent to which this research can be used to develop prudent governmental, research, industry and other public responses to this issue. I would note that, in addition to the panelists who are here today, and who I will be introducing during the course of the morning, we invited the executive director of the Chlorine Chemistry Council to be on our panel, or to designate a representative to present an industrial point of view in these discussions. Unfortunately, with less than a week to go before this meeting, I was informed by a spokesman who expressed his regrets that it was not possible for anyone designated by the Council to participate in this discussion.

Our session this morning has two parts. In the first part, we will hear and discuss two presentations: the first, by Jorma Toppari from Finland, and the second by Lou Guillette. Both will be speaking on current research findings and implications and on future needs, and there will then be an opportunity for some discussion with members of the audience. In the second part, Ross Hall and Bob Dekker will make initial presentations to begin our discussion of the public policy implications regarding existing research findings.

- 207 -
Let me begin then, by noting that for some time prior to September, 1994, just a year ago this month, there had been an intense public debate in the Danish news media on the possible role of environmental chemicals, such as pesticides, detergents, plasticizers and other industrial chemicals. Last September, the Danish Environmental Protection Agency, the DEPA, decided to support the preparation of a report summarizing the current knowledge on male reproductive disorders and environmental chemicals with estrogenic effects.

Our first speaker this morning was the senior author of the panel of experts who wrote the initial draft of this report. Dr. Jorma Toppari is with the Department of Growth and Reproduction of the National University Hospital in Copenhagen and with the Department of Paediatrics and Physiology at the University of Turku at Finland. May I welcome Dr. Toppari?

CURRENT RESEARCH FINDINGS AND IMPLICATIONS/
FUTURE RESEARCH NEEDS

Jorma Toppari, Department of Physiology,
University of Turku, Finland

I want to thank the organizers for the opportunity to be here, and to start by showing what happened in Copenhagen, last January. We held a one-week workshop on the issue of male reproductive health. The participants were mostly from Denmark and other European countries but also included Lou Guillette and John McLachlan from the United States.

As a result of this workshop a report was published entitled Male Reproductive Health and Environmental Chemicals with Estrogenic Effects, last March and is available from the Danish EPA. There has been much discussion about the secular trends in the incidence of male reproductive disorders and I will review some of the data showing these trends.

I will start with semen quality, which has maybe raised most of the discussion. These are the original data from the Danish meta-analysis of 61 studies of normal males and their sperm concentrations over time. The data starts from the late 1930s and goes up to 1990. The clear message here is that there is a significant difference between the first part of the time period and the latter part of the time period. There has been criticism that we should not throw this kind of regression lines here. That is something that can be discussed but does not change the fact that there is a dramatic decrease from the '40s and '50s to later times. There has also been criticism that there are very few data points in the '60s. We can not help that; there just are not studies on healthy males and their sperm counts of that time. We can take care of future studies so that that kind of gap will not be there in the future.

Sperm concentration is not all. We know that we do quite well in the means of fertility with the mean numbers of sperm counts that we have now. If we look at the men and the proportion of men with high sperm counts, it was in the 40 and 50%. This means that men that have more than 100-million sperms per ml. And that has gone down to less than 20%. WHO (World Health Organization) has a limit for fertility problems and that is 20-million/ml., which is here. And we see that very few men were under that in the '40s; and that proportion has increased considerably.
Now we do not know if this will continue. All the data are not showing decline in sperm counts — I'm sorry you can't read the text, but this just lists the Finnish studies from the '50s up to '90s. Most of which have been published in thesis and not all of them were in the literature that was found by the met-line that was used in the Danish meta-analysis.

Now this shows again, the regression line of the Danish meta-analysis and the red triangles here, show where the Finnish sperm counts are at that time. What does this tell us? My interpretation for this is, that we all had the same high amounts of sperm counts in the '40s and '50s. In some countries and in some regions, sperm counts have really gone down, while others have maintained the high sperm counts. That is why it is difficult to interpret the latter part of this picture, too. Because it's a mixture of the regions that still have good quality of sperm and those where the adverse effects have already occurred.

These are results from the Turku area from Finland from a, over time showing that there is no change in semen volume, there is no change in sperm concentration and no change in total sperm number in that area. The same can be said from the data from the Finnish Lake area where there are record high sperm counts — 130-million/ml still. And this value is comparable with the McLeod data from the late '40s which was published in '51. There, all the figures are very similar to what McLeod published in the early '50s. So we know that Finland is one of the areas where there is no decline, but there is no doubt that there are lots of areas where there are declines.

There are several factors influencing semen variables. There's the sexual abstinence, age of the man, and the calendar year of the man's birth. There are seasonal differences in the sperm concentrations — during the summertime the sperm concentrations are lower than during the wintertime, at least in Finland.

There are studies where these variables have been taken into account very carefully. One such study was published last January in New England Journal of Medicine by Pierre Jouannet's group, the senior author was Auger. And Pierre Jouannet did not think that the Danish study was right in its conclusions. He thought there is no decline in sperm quality in French men. To his surprise he found that during the past 20 years, mean concentration of sperm of normal fertile French men in the Greater Paris area decreased by 2.1% per year; it means 40% over 20 years. On top of that, not only the sperm concentration declined, but also the number of motile sperm. The motility, which is very important for fertility also declined, clearly.

We know that human sperm morphology is the worst in the world. Rats, hamsters or any other mammals have almost 100% morphologically normal sperm, whereas human sperm at its best has always abnormal sperms in it. These are just pictures of how the the sperms look like in the microscope. If we look at the morphology and how a big proportion of the sperm are normal — this again is from the French study by Auger showing that they had 20 years ago, about 65% normal sperm. Now it's less than 60%. So if we look at the number of normal sperm, it has gone down even more dramatically, then just the sperm count. Now there are similar data from Belgium, there are similar data from Scotland also, which I do not have time to preview here.
Cryptorchidism

Another disorder which is of concern is cryptorchidism, which is maldescent of the testes. It's the most common congenital disorder in males, affecting about one to two percent of all newborns. This is just data from England, and this is not reliable numbers, this is just to illustrate things. There are very few good studies on cryptorchidism and that is because it is a difficult diagnosis and it must be done very carefully, and I would say there are three good studies available. Two of them come from England: one by Scorer from the '60s showing the prevalence of cryptorchidism at the age of three months when most of the testes that after the birth descend spontaneously, have descended. It has the number 0.9%. A similar study was repeated in the Oxford area in the '80s, showing the incidence of 1.9%. So the incidence in England had doubled during that twenty years. We have a lot of other data suggesting the same.

Now there is an American study from the New York area by Berkowitz, also from the '80s, the same size as the Oxford study showing the same number as Scorer from the '60s. However, the figures from Berkowitz contain a lot of data from Black babies, and we know that among the Blacks the incidence of cryptorchidism is only 1/3 of that of Caucasians. So the study from the English population and that from New York are not comparable. For sure we know, that the incidence has increased in English populations. We do not know about changes in the American population.

Hypospadius

Hypospadias is a congenital malformation affecting the urethra. If the urethra does not open to the end of the penis but somewhere under the penis, that is called hypospadias. And this line here is true; that's the incidence of hypospadias in England, and this just shows the same figure, and another in Hungary. Also there are problems with these data because these are based on malformation registries and there is always difficulties in ascertainment in the registry data.

These are from Scandinavia, and there I have highlighted two countries: Denmark by red and Finland by blue. And you can see that the prevalence in Finland is much lower than that in Denmark or other Scandinavian countries. That is of interest because previously we showed that there is a big difference between the sperm counts as well.

Testicular Cancer

Then we talk about a rare type of cancer, testicular cancer. We know that testicular cancer has almost invariably increased in incidence all over the world, also in this country. Now here, this line represents Denmark and this one here is Finland. Again there is a four-fold difference, but in both countries, there is an increasing trend, as well as in all countries, that are around the Baltic Sea. This includes all the countries that are around the Baltic Sea. And in Denmark the incidence has tripled during the last 50 years. Now the lifetime risk to have testicular cancer in Denmark is for men, 1%. So I would not think it is something that you could ignore.

Many of the data on the cancer incidences have been ignored and one has said, "Okay this is because of better detection, earlier detection." Testicular cancer is a cancer that hits young men about my age, in 30s, and it is a deadly disease that will kill you before you are 40, unless it gets
detected. So there is no doubt about the ascertainment in this case. All cases of testicular cancer will be detected. Very few men die at this age. For other reasons. Fortunately, the disease is well treated. Now almost nobody dies of testicular cancer, but to have a cytostetic treatment is not the thing that you want at your thirty's. And you do not go out and tell that you have been taken your other testis away, or perhaps both testes away. So that is why this is one of the diseases that is not discussed too much, because the patients do not want to make them known.

Again here the blue line is Finland and the red is Denmark. And you can see that the difference is here where the peak incidence occurs at the 30s, and the types of cancers here are the same. It is mostly germ cell tumours.

Other Cancers
Then last, a curiosity: male breast cancer, which is extremely rare. But just to show, there too Denmark has a higher incidence than Finland. Now we know that the incidence of prostate cancer is increasing as well. I don't want to talk about prostate today. We know that "more important cancers," like breast cancer in women is increasing. And I don't think detection error will explain the changes in statistics.

So in conclusion, from these trends, we can say that during the past 50 years we have seen a sharp increase in incidence of testicular cancer. We've seen a decline in semen quality in large areas and we may see increase in the incidence of maldescendent testes and hypospadias.

Causes and Mechanisms
Now the question comes: "Why is this?" Could genetic reasons explain why Finns do better then Danes? Well one must remember that, we have the same statistics 50 years ago, and our genetics have not changed during that 50 years. So something other then genetics must be behind it. And most probably they are environmental and/or lifestyle factors that play a role here.

Now if these disorders are biologically related, one would expect that, one sees some common trends in them. And we go back to Denmark and Finland and we see very consistently that they go just the one direction. Semen quality is worse in Denmark then in Finland, there are more hypospadias in Denmark, there is more testicular cancer in Denmark, but cryptorchidism we do not know, we are finding out. Now this is not just to show you facts about Finland, but to show you the distance between these two countries. Finland is here and Denmark is right there. We are close, very similar Nordic countries.

What could cause the decline in semen quality? There are several possibilities. Adult men can be hit, and there are occupational exposures where we have seen that to occur. We know that if a man is treated with cytostetic drugs with anticancer drugs, the sperm. But often this is reversible. Even the man with testicular cancer can get children later, when they recover from the treatment or the other testis that remains, recovers. But then there are effects that are not reversible and those occur during the early life, during the fetal and perinatal period and in the infants.
The master cell in the testes that is very important for spermatogenesis for the formation of semen is the Sertoli cell. Sertoli cell is in the seminiferous tubules, the long tubules inside which sperm is formed. It goes through the whole tubal wall and the spermogenetic cells that form sperm are enveloped by Sertoli cells, and the germ cells do not live without Sertoli cells. If you take out germ cells from testes, they die in two days. For 50 years, people have tried to culture germ cells without any success. If you culture them together with Sertoli cells, you get a little better results.

Now the number of Sertoli cells determines the number of sperm you can produce. Each Sertoli cell can support a fixed number of sperms at a time. Now during the fetal life, there are some key events that determine both the structure and the function of the gonad, and the key player again is the Sertoli cell. If there is white chromosome material, SRY, which is the master switch gene that turns on the male differentiation, there is a cascade of events that lead to the differentiation of Sertoli cells. Then these control their own proliferation, they control the proliferation of germ cells, they also influence the testicular descent, they influence the Leydig cells, the cells in the testes that produce androgens; mainly testosterone. And then testosterone is the hormone that is responsible for the development of external genitalia. If something goes wrong here you may end up with small testicles, low sperm counts, cryptorchidism, germ cell melplasia, testicular cancer and hypospadias.

This shows that the Sertoli cell number and the testicular size are closely correlated. And testicular size and the Sertoli cell number determine the number of sperm we are producing. So now we'll talk for awhile on the development of Sertoli cells and how they replicate in humans and, in this case, experimental animals, in the rat. Normally in the rat, Sertoli cells multiply during the latter part of pregnancy and then before puberty. And then they mature and differentiate and they don't divide anymore. The testes at this time are very small because Sertoli cells are the minority of the cells inside the testes. And then the germ cells appear and the testes increase in size. But it's the number of Sertoli cells that determines how big the testes become.

If we treat an animal with drugs which reduce replication of Sertoli cells at this time we end up with small testicles. If we induce hypothyroidism, we somehow delay the maturation of Sertoli cells and they replicate longer we end up with big testes. Of course, this is most abnormal thing and nobody would want to get hypothyroidism just to get bigger testes. In humans there are less data available because there are just a little tests available from this period. But we know basically, the same thing occurs. From this perinatal period, that at that time Sertoli cells replicate very actively and then at some time before puberty they stop maturing. And we have the same Sertoli cells to the grave and if we have not got them at this time, we won't get anymore. So nothing can be done after puberty to get the testes bigger.

Then about the testicular cancer, we know that testicular cancer is proceeded by a local cancerous premalignant change which is called carcinoma in situ and these can be found sometimes years before testicular cancer but we know that if we find these changes it will invariably lead to testicular cancer. The carcinoma inside the cells are similar to primordial germ cells, the types of germ cells that we have during our fetal life.
There is a hypothesis and there is a lot of evidence supporting this hypothesis, that during the fetal life something occurs to germs cells that transforms them to malignant cells. So they'll become a totipotent carcinomatous germ cells, that stay quiet until puberty, and then when the gonadotropins, gonadalsteroids, other factors start to influence and stimulate the testes, the tumours will grow and they will show up during the young adulthood. So we come back to this picture, we know that if something occurs at this time, by definition, we may get cryptorchidism, which is always a fetal disease, as well as hypospadias. But also testicular cancer, most probably starts at this age, and our semen quality is determined at this age.

So what are the factors behind? Yesterday, Dr. Danse said that heat could be one explanation. We have lots of experience about heat in Finland. We are having sauna baths at least once a week. We have lots of studies about the effects of sauna on semen quality. We are sitting there and the temperature is between 70-120°Centigrade. 100°C as you well know, is the boiling point. And we throw on water on the hot rocks to get it hotter. Still we know that the temperature of testes will not increase and it will not affect the spermatogenesis. So the talk about tight jeans and protective clothing is wishful thinking because it won't harm your testes, I can guarantee it. But if you sit in the hot tub where the temperature is more than 37° every day, more than 15 minutes — which I think would be a brave thing to do — then you will start to see effects on your testes. The testicles must be bathed in hot water to get the temperature inside the testes to increase. The circulation of testes is created the way that it takes care of the temperature inside the testes. It will not increase unless you really bathe the testes.

Then what about the environment? What about the drugs and diethylstilbestrol (DES) which was one of the examples, and the E pills? We know from history that DES treatment of women resulted in high incidence of hypospadias, testicular hypoplastic testes, reduced semen quality, and also in studies there is a doubling of the incidence of testicular cancer. Still it might not be significantly different from the control. We may see some increases in that. We know from the animal studies, the large series of studies done by John McLachlan's group in Research Triangle Park, showing the very same things occurring in experimental conditions in animals. We know that it's not only the DES that can affect male reproduction, the other estrogens do that as well.

Now these are some of the estrogens and xenoestrogens that have been implicated in this context. There are phytoestrogens, however like coumesterol, which is found in soya beans and in many, many plants, a metabolite of phytoestrogens, zearalenone which is a mycotoxin, but also found in grain. Some of these we can metabolize, we can readily excrete them, and the phytoestrogens are that way. So we know that we can quite safely eat a lot of phytoestrogens and we can get rid of them, but then there are a lot of man made chemicals which we cannot get rid of, we can't handle very well. Diethylstilbestrol is one very powerful kind of compound. And then there is O,p,'-DDT, it's a well know estrogenic compound which accumulates in fat. There is Kepone cannabis(?) products and recently several others like bisphenol-A, alkylphenol ethoxylates, which are present in our environment and in our diet in much higher concentrations than O,p,'-DDT.

We know, for example, from the studies done in the Edinburgh MRC unit by Richard Sharpe, that giving butyl benzyl phthalate, which is a plasticizer found in high amounts in dairy products,
can cause a decrease in testicular size when given to the pregnant rats. The same occurs with several alkylphenols. So we know that, what is spread on the fields, what is inside our diet in the dairy products and in the water has a lot of chemicals that can affect our endocrine system and have estrogentic, anti-estrogen and anti-androgenic effects.

DDE was recently reported in *Nature* having a strong anti-androgenic effect and we should remember that estrogentic and anti-androgenic effects point to the same direction, have about the same effects, so if we have mixture of anti-androgens, weak estrogens, what one would one expect to happen are just the things we are seeing happening today.

I come for awhile back to this picture of a river. We know about the plant life and Lou (Guillette) will talk more about that. In English rivers, even the best ones, when rainbow trouts are analyzed in those rivers, one can see increased amounts of vitellogenin, which is a protein that is normally produced only in female fish. It is a protein that is used, or its production is used by estrogen. And therefore we know that these waters contain large amounts of estrogentic chemicals and now it's a big task for us to find out which of the chemicals do the bad things. English groups have identified some of them, and most notably alkylphenols as the prime suspects to do the thing.

In the Danish report we concluded the secular trends in male reproductive health, the data from wildlife, well-controlled experimental data, and also some data from human cohorts, and our knowledge about the hormonally-active environmental chemicals, it all points into the same direction. And this indicates the need for a vigorous research effort to understand the extent of the problem, it's etiology and also we have to develop a strategy for prevention and intervention. Thank you.

Alan Clarke: As I indicated at the beginning, there is one more presentation on current research before I open the floor for comment and discussion. I am going to introduce Dr. Lou Guillette, an endocrinologist from the University of Florida at Gainesville. Lou has undertaken a series of studies on the feminization of alligator and turtle embryos caused by maternal exposure to environmental chemicals that are estrogen or anti-estrogens. Dr. Guillette also participated in the conference in January of his year that brought together a number of experts from around the world as part of the Danish report on Male Reproductive Health and Environmental Chemicals with Estrogen Effects. Please welcome Lou Guillette.

**MALE REPRODUCTIVE HEALTH**

*Dr. Louis Guillette, Dept. of Zoology
University of Florida, Gainesville, Florida*

Good morning. I would like to thank the organizers for inviting me and I would like to thank all of you for coming and sitting here and listening to the science. I am going to try and do this really briefly, really quickly so that we can actually open it up and people can ask questions. But what I wanted to do was reiterate a couple of things that Jorma has talked about and also to give you a bit of my perspective.
One of the things that you have to realize is that if you had told me three years ago or four years ago that I would be sitting here speaking to you, I would have told you, it was highly unlikely. First, what in the world do people in the Great Lakes want to know about alligators? Secondly, the fact was, is that I am not a toxicologist. I guess I am now, but I wasn't then.

Basically I have spent about 18-19 years trying to understand the endocrine signals that are associated with embryonic development in a whole wide range of species. And the main goal is to try and understand the evolution of that system. And so I also spent a fair amount of time doing a lot of endangered species work all over the world, primarily on reptiles because they were a great model. They are the ancestors of mammals and birds, we could find some wonderful model systems, and they have some very, very unique aspects to embryonic development and hormones which are not really unique when you compare them to mammals, but they are very plastic, we can do a few things with them.

So what I want to do very, very briefly here today is to show you a little bit of that data and then to go on to explain what I think the interpretations are, what the take-home message for all of us are, and then open it up and we will discuss this a bit if people have questions.

In 1986 we started a study to understand the basic biology of the American alligator. Now the whole reason we did that is that they wanted to ranch the alligator in Florida. We wanted to be able to go out, collect eggs, collect hatchlings, be able to raise them up and sell the skins and the meat. Today, it's about a $30-million business in the State of Florida, about 50 farms and they think it can get bigger. And so one of the goals was, could we in fact figure out exactly what is going on with these beasts, how many animals can we take, etc., etc.

That is where I came into the picture. The state came to me and said, "We need good reproductive biology on this gator because what we are reading and what we are seeing in the wild, don't match." And so I studied what I thought was going to be a relatively short, fast three year, in-and-out, give them the information they need, same thing I did for the government in Botswana in Southern Africa with the Nile crocodile, and we would be out and gone and onto other things. Well, I am still here, we are still doing it, we are still figuring out what is going on.

But the point is, that we can go out pretty easily at night, and you see all these yellow dots? All those yellow dots are alligator eyes, okay? So you can go out at night and you can actually count the number of alligators on lakes and if you are really good, especially if you are one of my graduate students hanging off the front of the airboat as we are running along at 30 miles an hour, you judge how far apart the eyes are. Because it is your job to either grab it with your hands, or noose the thing. And we pull it in the boat with us and we do a general checkup. If you are not very good, you probably won't end up being a graduate student very long in my lab, or you end up having to type your dissertation with one hand. That slows down the graduate work as well.

So the point is, you can take that kind of data, you can do a really good job and we have been able to go out and capture animals and do mark and recapture studies and do these night light
counts, and we can get reasonable data. And there's just two things I want you to look at here. Juvenile alligators per linear kilometer of lakeshore, years, doesn't really matter these trends continue, three general trends: one trend is that over time, like on Lake Griffin, population increases slightly. By prediction, this should be a much steeper line, because these animals should in fact be up, historically 40, 50, 60 animals/linear kilometer of lakeshore. Today most lakes are only averaging 10-15. Why isn't this population recovering even faster than it should? Some populations like Lake Jessup are stable, and then you get these blips in the population. In fact this came right back down and went level.

And then finally you have something like Lake Apopka, in which the population crashed over a three year period by 90%. Now the important part to realize is that these lakes are all in central Florida, most of them are two hours from my home. These kind of crash and I have isolated here the Tower Chemical Company, Tower chemical spill. The Tower chemical spill is actually a Superfund site. It was a mom and pop operation, we're talking five or six pull barns, we are not talking about a major chemicals company, and that is probably part of the problem. Part of the problem is that they did not have a lot of the controls they probably should have had there. They had a retaining pond that let go, spilled God knows how much material into the adjoining marsh, which burned out a mile of marsh into the lake, ended up going into the lake. A very local spill, very local thing, reported in the local newspapers, not a big event. Until basically everything in the lake started dying and various other things started happening.

So what I am telling you, is that we actually started this study, believe it or not, we picked Lake Apopka, fourth largest lake in the state of Florida, because it had such a great alligator population the first year we started. It was much bigger than everybody else. And then the thing crashed.

The other thing we did is over the period of the last, actually I guess it's about 12 years, we have gone out and collected almost 75,000 alligator eggs, brought them back, incubated them. Now, we turn around, we incubate these eggs and most of these young then end up going back into nature. And the point being is, why are we collecting them? We are removing them from nature, so we do not have to worry about predators, raccoons, wild dogs, etc. and asking, "What's the quality of the eggs?"

And over time what you find is that when we started this study, we had about 60% hatchability, went down to an all time low of 4% hatchability and today, it is back up around 34-40% hatchability. What is going on here? Well, that was what we were wondering. And I speak to you today as a scientist, and the reason I say that, is that what we did was we sat down and we tried to figure out every single cause that could explain the observations we have. Do we have old females versus young females? Do we in fact have weird nests versus normal nests? Do we have some kind of weird composition of the water? Is there some change in the flow here? Is there some change in the population genetics? Is there some change in the temperature at which these animals are incubating, living etc.?
And to what I can tell you to date is that we have done all the studies in depth except for a complete study of population genetics, although the preliminary data tells us that there is really no difference among this population and the other populations we are studying, but we keep coming back to the fact that it appears that there are some kind of environmental contaminant factor that is involved with this system. And so what we in fact have done is we have gone out, we have collected moms, we have collected dads and to give you an idea how important graduate students are, you put them on the front of the rope, okay? There is only one prerequisite, I say this to reporters as well, is that the first thing you have to do before you go on the field with me, is we have a footrace and if I can beat you, you are allowed to come in the field. Because gators only feed about once a month, so I'm pretty safe then.

But the point is that we collect moms and dads, we are trying to figure out what the health is, of this whole population. We collect blood samples, we do general health studies, we actually bring many of these things back in, do full-blown surgery, we are trying to work from the gene to the ecosystem. We really are trying to understand the underlying mechanisms of this whole system, understand the biology. And one of the things that we have been able to focus on are the hatchlings. That is, can we expect that the young that are born, will in fact produce viable offspring for the next generation? Can we hope that 12 or 15 years from now, this beast will be the big guy on the block, that he will be capable of fertilizing females, fertilizing the eggs and being a viable male or in the case of the female, can you produce high quality offspring?

And you can look at a number of things, as Jorma has shown. And one of the things we can look at are the hormones. We know that every male and female has both estrogens and androgens; it is the ratio that is important. So all of us have elevated steroid levels of some kind, they get higher when we reach sexual maturity. But developing offspring have elevated estrogen levels and you can measure them quite easily. And we have two lakes, just briefly here, Lake Woodruff is a wildlife refuge, appears to never have had agricultural activity around it, is it modern agricultural activity, it has not had a municipality around it, the hatching of those eggs is about 85-90% compared to 50 which is the average in many of the lakes we study, or much less on Lake Apopka.

And what you can see is males look normal when you measure estrogen in their plasma. In contrast the females from Lake Apopka are super-estrogenized. If you look at the males, the story becomes even more interesting. And what here happens is that females again have normal testosterone. But what you in fact see on Lake Apopka are testosterone levels in the males which are comparable to the females. Now I do not have time to do it today, but what we have in fact, been able to show is that this gonad, that is the male testes is abnormal. It does not produce testosterone like it is supposed to.

More importantly the liver does not handle testosterone like it is supposed to. So we are talking about a multi-organ effect here. It is not as simple as, "Well you just messed up the testes." More importantly the data continues in which we can actually study these animals, we can study other animals when they are four, five, six, eight, 10 years old, this trend continues. This is not a temporary decline in testosterone production.
The other important part and I know this is a male seen here, but I think it is very important for you to realize that we are looking at both sexes. But this is a normal ovary with a normal ovule site with one egg in it, with one nucleus. But one of the main key characters in the histopathology, is that the females from these lakes, is that their follicles have many ovule sites in a single follicle. This is called a polyovular follicle syndrome. This has been described in DES mice coming out their ears. It is associated with infertility, it is associated with early embryonic mortality. And this year we have been able to replicate that, by exposing our animals to p,p'-DDE. So, we know that an environmental contaminant can cause the pathology we are seeing.

Now the other thing is and this is the one that all the reporters love, especially the ones from Europe, for whatever reason, they love the penis story. I'm just giving them a hard time, but the point is, that we can go out and study juveniles and the reason we are looking at the penis, is that it is an androgen-dependent structure. I don't care whether this animal can reproduce or not, it's not a big point, if you're only reduced by 25%. I always ask, if a human males penis was reduced by 25% could they still father children? And the answer is probably yes, if everything else is working normally. But the point is, that it is a marker that for the total life of this juvenile, it has not had normal hormones, that there is something wrong with that beast. And sure enough, you can go out to this lake and you can look at various kinds of penis morphology, you can do the fanciest statistics you want to do and what we in fact show, is that not only do Lake Apopka males have smaller penises but we can actually look at the site where the spill took place, came into the lake and they have the smallest penises of all. The reason being is that these young alligators are very site-specific. They don't swim away, they don't get up and fly away to other countries, other continents, other states. They are there.

And just to give you an idea. Here's what a normal penis in a 3'3½' male looks like. So you can see the scale, you can see the penis, the sulcus where the semen is actually extruded. Here is the smallest of what we see in males from Lake Apopka. Granted, I've shown you the smallest. The average reduction is about 25%, but we have males out there with 85-90% reductions as well.

One other story. So it is alligators, we're in the Great Lakes. Unless you are going to start a farm up here, or it gets a heck of a lot warmer up here, you probably are not going to have to worry about alligators anytime soon. But how about a mammal? Can we actually transfer this information? Remember the hormones I am talking to you about, the morphology I am talking to you about, it is universal. We are vertebrates. And whether people want to consider or not, man is not unique. We just happen to be one more mammal in the ecosystem. We just happen to have the ability to really affect the ecosystem that we live in.

But the point is that we can actually study Florida panthers, endangered species. They have a whole series of reproductive abnormalities. They have low semen volume, they have low sperm concentration. Fifteen million is the big peak here. Now remember we were just talking about 20-million being the cut-off for sub-fertility in humans? It is the same with cats. Poor motility, greater than 92% sperm abnormal. So Jorma was wrong on this point. There are a few other mammals with really lousy sperm, and cats seem to be one of them. But the Florida panthers
even worse. And we have actually had an exponential increase in cryptorchidism. There has not been a male born, a Florida panther in the last 10 years that is not at least unilaterally cryptorchid, that is, at least one testis has not descended.

Now up until about a year and a half ago, this was considered, all of these effects were considered due to inbreeding. But what a very, very nice population genetic study showed is that the Florida panthers' genetics is almost identical to the western panthers' genetics. That is, these really cannot be explained by inbreeding. And so what is the cause?

Well, Chuck Vacemeyer[sp] of the Fish and Wildlife Service and I, actually sat across from a table at a meeting one time and one of those lights went off, and we said, "Well, let's look at these guys." This is just three panthers that dropped dead for unknown reasons. One of these panthers — now I want you to look at this scale — we're talking 60 ppm in the fat for \(p,p\)-DDE. The reason this animal died is that it was in the thousands parts per million of mercury in the brain. So these animals actually die for a number of reasons but it ends up that even the smallest concentration is five or six parts per million of DDE. We have elevated levels of PCBs. These cats are feeding in the aqueous environment in Florida. They do not feed on deer. They feed on raccoons. And so what we in fact have, is a system where we have actually looked at their hormones. Similar story, males appear to be estrogenized, males appear to have low testosterone levels.

And so if you are going to summarize this story, these guys did not change their diet, they are not wearing a different kind of jockey short, and they have not sat in any hot tubs recently, although given the temperature we have had in Florida for the last seven months, it sure feels it. But the point being is, that when you look at this whole series of abnormalities, and you look at panthers, the explanation is, is that their problem appears to be an environmental problem. And it is important to note that the problem appears to be associated with the developing embryo.

And it is a point that I have tried to make over and over again. Everyone likes to say, "Well jeez, I grew up there was DDT all over my neighbourhood, I'm fine." The question is not whether you are fine, the question is whether your kids are fine or your grandkids are fine? And that is the question we're really asking folks. Not whether in fact, if I get exposed as an adult, I have a problem with my sperm count. And so I think that when we actually think about these concepts, that is endocrine-disrupting contaminants in embryos, three points that I would like you to keep in mind.

The first is a concept we call organization versus activation. Organization means how this developing embryo is put together. Now at the most extreme level, it is do you have arms and legs in the right place, and your eyes work? But it also means do you have the appropriate number of receptors on your cells? Do you have the appropriate messenger DNA, to make the right enzymes, to make the right hormones, to degrade these compounds in the correct way? That is organization too. It does not just finish when you are an embryo, as Jorma has clearly shown, it continues on, its a neonatal and perinatal life, and it may even continue in some cases, up until just before puberty, and for a lot of the reproductive system.
Activation means that the same hormones, once you are an adult may in fact play roles. Like for example, testosterone stimulates the production of the penis, but testosterone also later in life, turns on the seminiferous tubules, turns on the seminal vesicles, and the prostate to produce semen. That is an activational event, later in life. And again, if the hormone is playing like testosterone or an anti-testosterone, it can affect that level, but the likelihood may be less than a developing embryo.

Bioaccumulation versus excretion. I think there is no excuse anymore, that we actually have things in our environment that bioaccumulate and biomagnify. I mean, there is just no excuse for it. I think the point is that if something bioaccumulates and we cannot excrete it, it is not only here for our generation, it may be here for future generations. And we have to be really concerned with that. I think that the point is, and this is something which Jorma brought up a minute ago, there is a lot of discussion about phytoestrogens, there's a lot of discussion about DES daughters.

I think that it is very important for us to remember a couple of concepts. The first is something called co-evolution. Many of these phytoestrogens, many of these phytocompounds, we can capably degrade and get rid of. Others we cannot. In fact the phytoestrogen data may be the best example of what environmental estrogens can do, xenoestrogens. And we know that they can disrupt the reproduction of wildlife, we know that they can disrupt the reproduction of domesticated farm animals. And so we should be spending more time, not debating the issue, but figuring out what the answers are. And I think it is very important for us to realize, that the one subtle difference, and not so subtle when it comes down to it, is again, most plant compounds that we eat, we degrade and readily excrete. So yes, if you eat them at the key point in pregnancy, they are going to have an effect, but it is not like they are persisting and being there for your whole life, and that you bioaccumulate them.

And finally this concept of free versus bound hormone. This is another discussion, it is really a scientific discussion, but the point is, is that the reason that most men end up becoming normal men, whatever that means, is the fact that they are not exposed to elevated levels of their mom's estrogens. Mom does not shut down her hormone production during pregnancy. We are protected as men from our mother's hormones, by proteins that bind up most of that material, or enzymes in the placenta that degrade natural estrogens. We know that that is not the case for many of the xenoestrogens. They are not bound by plasma proteins, they cross the placenta, they effectively change and affect the embryo.

And so when you actually figure out, what I call the math of EDCs, this concept that we are eating lots of phytoestrogens, and there is such an insignificant amount of these compounds out there, it just is not so. If you actually look at normal hormones, even an adult, you are talking about females having estrogens at $10^{-12}$. Now most of these environmental contaminants, we do not even measure at $10^{-12}$. We in fact, worry about them if they are a part per billion, that's part per million? That is $10^{-9}$, that is $10^{-4}$. So I think that it is very important for us to realize that we are in fact dealing with compounds that are there at adequate levels, to have an effect on the developing embryo. And that is the background that the organism is seeing which is important.
So I would like to close with a quote, and this is a discussion and hopefully it will be, but I think Rachel Carson was correct in one major, in fact a lot of major statements, but this statement is most important, "The public must decide whether it wishes to continue, but the public can only do so, if it is in possession of facts." And I mean all the facts. I think as one final note, is that we have to have a level playing field. In other words, if I have to publish my data, and it is open review and anybody can look at it, and it is not acceptable until I do, then I think that everybody who is in this forum has to do the same. And if the goal is public health then I think that it is not a partisan issue, this is not an economic issue, it is a health issue. It is a health issue for all of us, and for our kids.

And so what started off as a relatively, or what I thought a relatively simple study, has become a very complex study. One which has thrown me into some limelight and an awful lot of hot water. I don't know if it has decreased my sperm count, but at times it certainly has increased my adrenal activity and stress levels. So I thank you for your time and hopefully we can give you some feedback.

Alan Clarke: Thank you Lou and thank you again, Jorma. As I indicated at the beginning of the session, we now have an opportunity for questions and comments. There is one microphone, I ask you to go to it and identify yourself by name and organization. Members of the panel are open for questions.

GENERAL DISCUSSION
Dr. Toppari, Dr. Guillette and the Audience

Raman Nayar: My name is Raman Nayar. I am from Montreal, Canada. I would like to address this question to Dr. Toppari. There are many similarities between Canadian industry, Canadian folks and the way they live, and Finland. In fact if you go north of Lake Superior, there are many, many Finnish people who have settled there and I would like you to extend your research in that area. But the specific question I have is that, as I walk around in the exhibition halls, greet the media and talk to several environmental groups, they are suggesting a link between chlorine pulp bleaching and male sperm counts, or male semen quality. And I was wondering if I would see any of that trend in your research that you just talked about, given that pulp and paper is the largest industry in Finland, and chlorine bleaching has been used forever... they stopped using elemental chlorine only about five or 10 years ago. They still use a lot of chlorine dioxide and there are still chloro-organics going into Finnish rivers. That compared to the Danish industry or U.K. industry, which they have had very small paper industries, but they are mostly paper making and not pulp bleaching, and I was wondering if you would be able to comment on what we hear here versus what you have found in your medical research.

Dr. Toppari: What I can answer to you directly on that issue is about the vitellogenin levels in the fish in Finnish lakes and close to the place where the effluent comes to the rivers. We do not see the increase vitellogenin levels in Finnish rivers. But, still we know of our water resources that they are very huge, and we have a lot of good groundwater resources, too. So I think it is
very difficult to make any direct causal relation to paper and pulp industry and sperm concentrations.

Dr. Guillette: There is one other comment however, is that given the fact that with these compounds, for example dioxin being one of the main things coming out of this bleaching is that one would not expect vitellogenin. If the best data we have suggests that dioxin may be working as an anti-estrogen, so it would not stimulate the liver to make vitellogenin; that does not mean it does not have an effect on developing embryos. Because a lack of a signal is as important as the presence of a signal. So again it may be the limitation, at least as Jorma was mentioning for the fish, that we are not measuring the right thing yet and there is some superb work being done by Glen Van Der Kraak and others at Guelph University looking at pulp mill effluents and they are finding some pretty dramatic effects on the ability of fish, ovaries, and testes to make hormones and to actually have an effect on fish reproduction. So whether that can then be equated directly with what is going on in humans and decreasing sperm count, again it depends upon what you measure. If you measure fertility, then maybe you do not see an effect. But you can actually, as we have just seen, you can actually show quite a dramatic change in sperm count and it would not show up if you are using the "telescope" measure of whether the organism, including humans are fertile or not.

Dr. Toppari: I think Lou is right. That we should not just measure one thing, we must have several endpoints when studying endocrine disruption.

Alan Clarke: Next question?

Wayne Schmidt: Thank you, I am Wayne Schmidt, with National Wildlife Federation. In the presentations yesterday, we learned from the governments that neither the Government of the United States nor Canada have a coherent plan for responding to the issue of endocrine disrupting chemicals in the environment and the emerging research that the Commission has continued to highlight. My question is, Is anybody else doing any better? Is the government of Denmark, or any of the other Scandinavian countries responding in a more coherent manner?

Dr. Toppari: We are studying a multinational study in Europe that is funded by the EU. So there are studies starting and where the main issues are these, in Europe.

Dr. Guillette: And that is going to be addressed by, I think, the next two speakers as well.

W. Schmidt: All right, I will defer that. I am really curious about whether any screening methodologies have been put in place, and so forth, so maybe the speakers can get to that.

Dr. Guillette: If you look at the end of the Danish report, you will actually see an outline which we generated which I think has been adopted by both the DEPA and various other agencies about very specific studies. And these are not just studies in Europe; it even calls for the United States and Canada being involved as well. So that is worth looking at.
**Kathryn McKenzie:** My name is Kathryn McKenzie. I am on the Douglas County Board of Supervisors, I also teach part time at the University, at Superior, and I am on the RAP for the St. Louis River. But I am also on a toxic task force for a spill that happened three years ago, and on Friday we had a news conference. Dr. Morris came from Milwaukee from a state college of Wisconsin Medical College and he is our epidemiologist, looking at the results of that spill. A woman came, she was nine months pregnant during the spill and worked during the spill, but her child was born with a lot of difficulties. Her doctor from the Mayo clinic said, "Yes, it's from the spill." The railroad says, "No." I asked Dr. Morris, "Could we look at human reproductive health in the area after the spill?" He said, "No, there's no money." And I wonder, I know, I think it was Representative Obey said, "The money is gone, It's not there to study human reproductive health." And I say, it needs to be, more and more it needs to be.

**Dr. Guillette:** You have representatives of the ATSDR here? The Agency for Toxic Substances and Disease Registry? They are primarily associated with Superfund sites. I do not know if this was listed as a Superfund site...

**K. McKenzie:** No, it was a tank car...

**Dr. Guillette:** The other thing is the CDC (Center for Disease Control) actually has an investigative board that will go out, depending upon what goes on, to look at this, but what you are highlighting is exactly the problem not just for human reproductive health but for wildlife studies, and everything else. I think what you have to realize is that a large percentage of the work that is being done in endocrine disruption today, started off not because we were toxicologists, as I mentioned, in the field we were doing other studies, and the effects we saw were so dramatic or we could not rule them out, it ended up we came to that point. So I think the point you are making is a very important one and we have areas that we should be studying, places that we should at least... It is not just that these are going to show problems that are of the worse kind, maybe it will even help us answer the problem that this is not a problem. And I think that is the point. We are not interested — I am not interested — in standing on a stump and saying everything in the environment is bad. I want to know what is bad and what is good. I want to know the answer and I think I would like that answer backed up by good scientific data.

**K. McKenzie:** We had a farmer come at an earlier meeting, he had two herds of cattle; one was near the spill and could not get out and the other one was far enough away there was no effect. His cattle could not reproduce. But he made them into hamburger because he could not get any help.

**Dr. Guillette:** What was spilled, by the way?

**K. McKenzie:** Benzene and lots of other things, a real mix. Some of the people in the audience could tell you, but I cannot.

**Rosalie Bertell:** Dr. Rosalie Bertell, International Institute for Public Health and also IJC's
Science Advisory Board. I was struck by a very small point in the first lecture that was a connection between hypothyroidism and at least one of the pathways. And it occurs to me that there is an artificial divide in science depending on what we have been trained in, and I find that for example, radioactive chemicals in the environment are not even looked at in most of these studies. I would suspect that between Denmark and Finland, the above-ground weapon testing fallout is about the same. However, Denmark does have nuclear power and Finland does not, and I am wondering if you have looked at point sources of Iodine-131 and the other iodines, the some of the other possible contaminants?

Dr. Toppari: We do have nuclear plants. We have five of them. I think we have the largest proportion of energy produced in Europe by nuclear power and we have worse fallouts then Denmark because we are a little more north and, Novaya Zemlya nuclear testing that took place in the early sixties by Russians caused huge fallouts in Finnish Lapland, and in Norway and Sweden. But we also have the same screening system as you have here for neonates for hypothyroidism. So, no child will go undiagnosed for hypothyroidism in Finland, or I think anywhere in Europe these days. So theoretically, this thyroid connection is really interesting. We know that increasing the level of thyroid hormone will increase or quicken the maturation of Sertoli cells and hypothyroidism will slow it down. But in reality, in human life we do not allow that to occur because hypothyroidism or hyperthyroidism causes so much other problems for us.

Bill Kelly: I am Bill Kelly with the Center for the Study of Environmental Endocrine Effects in Washington, D.C. And some people might know we are working on this issue. I do not want to get too technical but I have a number of questions that were raised by both Dr. Toppari's and Dr. Guillette's presentations. I think the first one is the issue of phytoestrogens which is being debated a lot right now, and their role in this. On the one hand, some of the government health agencies have told the public to eat more of certain types of vegetables, particularly cruciferous vegetables which are rich in phytoestrogens, and big differences have been noted in breast cancer, between Asian populations and U.S. populations and incidences of breast cancer and prostate cancer. And yet some people are saying, "Well, we secrete the phytoestrogens, but we bioaccumulate the more persistent chemicals." But there is another point there, and I think that Dr. Toppari raised it. Perhaps that is not the right measure, if these chemicals are stored in body fat, they are not necessarily bioavailable to the target organ or the fetus. The question is, What is...? In the nature of the question also Dr. Toppari said, or was it Dr. Guillette, "If you are eating those on the particular day of pregnancy, then you have them circulating in the bloodstream, and is the circulating level more important than the body burden level?

Dr. Toppari: No, that is...

B. Kelly: I have another question too and that is on PCBs...

Dr. Guillette: Let us answer that really quick. And the point is, that you again are, I think, confusing what I said, and that is the following: The effect in an adult female or an adult male may be dramatically different than the effect in the developing embryo. So it is absolutely true that there are wonderful studies that show that there are protective effects of phytoestrogens, it
appears. Good Japanese studies, good Asian studies, etc. that show that it may be protective to breast cancer, but that does not mean that it is protective to the embryo. And I think it is also important to realize that although you store it in your fat, that the hormones that are associated with pregnancy mobilize fat, they mobilize energy. And there are studies that show that during pregnancy and lactation, contaminants are released from the fat and they do increase in the blood.

B. Kelly: We would have to look at what is going on there in terms of levels, at that particular point in time?

Dr. Toppari: We know that the fat is mobilized and when the woman starts to lactate, a lot of fat is mobilized. And that is why we see that the firstborns are more susceptible to many of the things that we see. They are more susceptible to testicular cancer, they are more susceptible to breast cancer. So because the first one, is the one who gets most of the load that has been there for 20 or more years, whereas the others get a minor proportion of that. That is one explanation for the finding, why the firstborns are in a bad position. So I would not feel safe to store that stuff in my fat.

B. Kelly: The second question had to do with Dr. Guillette's study. I think one of the charts referred to PCBs and dioxins which has been extensively referenced in here. I believe there is a fair amount of data showing dioxins and PCBs as anti-estrogens. Estrogens also used to treat prostate cancer. How does that fit with your findings of demasculinization?

Dr. Guillette: Absolutely. An anti-estrogen...

B. Kelly: You would think that that would have a masculinizing effect, and indeed I think we have seen some data with PCBs showing increased sperm counts, increased testes size...

Dr. Guillette: There is also data that shows that PCBs act like estrogens in reptiles. You can actually paint then on eggs and get sex reversal, which you can only do with estrogens...

B. Kelly: It can be a very confusing. I wanted to see...

Dr. Guillette: But what I am trying to explain, is that, if you look at demasculinization versus feminization, what you actually have to do is, if you have an anti-estrogen — and this goes back to the point I made — and it is, you have a mix in there, most of the studies we do are one or two or three compounds at the most. But the point being is that, if you have a signal that says "genetically in mammals, you are a male." Well, you are going to end up basically being male-like. If you actually have an anti-estrogen, we argue that this is an anti-estrogen. For example, dioxin, tamoxifen(sp.?), acts as anti-estrogens in adult females. But there is clear evidence that anti-estrogens given to a developing embryo act like an estrogen. And so, look it up, it is there. So one of the interesting parts — and this is one of the biggest points about the anti- versus hormone mimics — is that part of this anti- ability has to do with the background levels that are already in the individual, besides all of it's other problems. So tamoxifen(sp.?), given in an adult
female that has high or elevated estrogen levels, acts as an anti-estrogen. You give it to a
developing embryo that has little or no estrogen present, it appears that in many cases in the
reproductive system, it binds to the estrogen receptor, and acts as an estrogen. So again, it goes
back to this point that we need more science, granted, but the science continues to support the
hypothesis that various compounds that are in the environment act as hormonal mimics, and that
when you mess up these chemical signals, you are going to have consequences which you never
dreamed of.

A. Clarke: We have time for one more question before we get into the policy discussion. The
other gentleman...

Alfred Strickholm: This is a technical question. I am Alfred Strickholm, I am with the Sierra
Club, the Midwest Regional Conservation Congress. I am also a professor of physiology at
Indiana University School of Medicine. So the question I have to ask is — my area is
neurophysiology — have you looked at sexual orientation? And the reason I ask that, is that
there is overwhelming evidence that one's sexual orientation, whether gay, straight, or bisexual
seems to depend, at least something happens in the last trimester and the suspicion is that there is
an endocrine imbalance of some sort. And differences occur in the prefrontal region of the
hypothalamus, different nuclei disappear. And I wonder if you have looked at the brains of these
animals? Have they been altered or changed as a consequence?

Dr. Guillette: Well, we are looking at that but, I...

Dr. Toppari: I just want to point out, that we know very well that we can change the sexual
orientation of experimental animals by hormonal manipulation. That is well-established. But we
do not have any data on humans. And it seems clear that it is not just the hormones that play a
role, it is a much more complex thing in humans, and it is very difficult to study.

A. Strickholm: There are differences in brain development now that appear, that provide for
differences in sexual orientation. For those in the public that does not know, scientifically, the
overwhelming evidence is that you are born straight or gay, or in-between or somewhere on the
curve and it has nothing to do with someone introducing you to this or that, so... thank you.

A. Clarke: Thank you very much sir. Ladies and gentlemen, the first of two presentations to
begin the second part of our session this morning, which is looking at the policy implications of
current research. The first presentation will be by Ross Hume Hall, a biochemist who has written
extensively on health and the environment. He is currently working on a book on persistent
toxics and breast cancer. He is a member of the Workgroup on Ecosystem Health, of the Science
Advisory Board of the International Joint Commission. Ladies and Gentlemen, please welcome
Ross Hall.

Ross Hume Hall
Health Sciences Faculty, McMaster University
I am going to take my cue from a remark that Dr. Guillette made, figuring out what we should
do, and I would like to put the information that has just been presented by our two previous
speakers and put it in a larger context of policy. Let me just start out by saying, "What could be
more fundamental than of human life then the continuation of human life?" Of all the biological
systems that make us living organisms and make us human beings, the reproductive system, both
male and female is perhaps the most critical, the most important to the long-term success of our
society.

So therefore, it is perhaps with some dismay that I listened to these two presentations and read
the data that they have presented. I'm sure most of you would share this with me, that there is
some dismay that we have reached the point in society when we have evidence of this damage to
the male reproductive system — also there is damage to the female reproductive system but
today we are addressing the male... So as I say, I want to put this into a broader context of
policy and I would like to speak to the policy recommendations of which the International Joint
Commission has taken a major role: the policies of virtual elimination, zero discharge and
sunsetting of certain classes of chemicals.

Those policy recommendations are based upon scientific evidence, scientific evidence which is
total scientific evidence or the weight of evidence. In other words, it is the weight of scientific
evidence that supports those particular policy recommendations. Now the information, the data
that have been presented on the damage to the male reproductive system, these data do not
subtract from that weight of evidence, they add to that weight of evidence. So why is it that
there is so much controversy? Why is there so much controversy, so much resistance to
accepting this whole idea of the weight of evidence and so much resistance to proceeding with
what seems like reasonable and prudent public policies, like virtual elimination, zero discharge
and sunsetting?

So what I would like to do now is look at the two sides of this issue; in other words there are two
views. In one view, we have the weight of evidence. The view saying that we need to have
policies such as virtual elimination, etc. And the other side, we have a view that says, "Well
there is no real connection, no real link, between the present level of toxic chemicals in the
environment and damage to human health." So we have two totally different views, and both
sides of this view, back up their views with so-called science, or scientific evidence. And that is
what I really want to address. We are looking at one side, the total use of science, and the other
side, a partial use of science.

Now if you look at science, science is a very large endeavour, a very large human endeavour and
in the house of science there has many rooms, many disciplines, and many subdisciplines. Any
one of these disciplines, whether we are talking about geology, human health statistics such as
Dr. Toppari presented, wildlife observations such as Dr. Guillette has presented, or hundreds of
other pieces of scientific information, all of this adds to our understanding of how toxic
chemicals in the environment can damage humans. It is this total weight of evidence that we
take into consideration when arriving at public policies such as virtual elimination, zero
discharge and sunsetting. So that is one view. In other words, you use any piece of scientific
information that comes by and so you just add to the total weight; that is the weight of evidence.
On the other hand, we have a view of this kind of problem from a very narrow point of view, and that is what I would now like to look at. In other words, the chemical industry in saying that there is no evidence that the present level of toxic chemicals in the environment is high enough to cause this kind of damage in human health, they are using two very small rooms in the house of science, two very small sciences — epidemiology and toxicology. So let me look briefly at these two sciences and just demonstrate why they are so limited at arriving at a sufficient level of evidence to make sound scientific decisions.

We also have to keep in mind, before I get into these two sciences, that the entire regulatory framework of the U.S. EPA and Environment Canada and associated regulatory agencies, and the laws under which these agencies operate — Toxic Substance Control Act and many other acts in the United States and, the Canadian Environmental Protection Act in Canada — this whole regulatory framework is based upon these two small sciences: epidemiology and toxicology. In other words, decisions made at the governmental level whether to proceed or not to proceed are based on whether or not these two sciences provide adequate information. So what I want to do now is address very briefly the limitations of both epidemiology and toxicology. First, epidemiology — imagine a criminal hiding in a dense woods at night. You go out with a flashlight looking for the criminal, but you do not find the criminal. Your neighbours go out with an even more powerful flashlight and they do not find the criminal. Does this mean the criminal does not exist? Just a figment of your imagination? Not at all. Epidemiology is like looking for a criminal in a dark woods. You may have a weak flashlight, you may have a strong flashlight, you may or may not find the criminal, but no luck in finding the criminal does not mean, no criminal. It merely means the search was unsuccessful. And that is the way epidemiology works. In establishing a causal relationship or association such as epidemiology does, if it is successful in establishing an association of a causal relationship, that is a big plus. And there indeed many epidemiological studies do that.

But, on the other hand, how often have you picked up the newspaper and read that some government official says, "An epidemiological study shows no link between toxic chemical A and health problem B; therefore there is no problem." And because the study does not find a link, therefore the government decision is to do nothing. So this "do nothing decision" is essentially taken by basing it strictly on this one piece of evidence, which in this case has been non-evidence. To my way of thinking this is a very restrictive way of viewing the human health problems that we have exist and relating to toxic chemicals in the environment. To me it is a grave misuse of science.

Now secondly, toxicology. Toxicology is a laboratory science in which animals are injected or fed test chemicals, and it is necessary to extrapolate the animal data to humans. Now there are weaknesses in any extrapolation. For example, how can you be sure that the toxic chemical in question that does not show any harm in the animal will not cause some problem in human beings. Well, the answer is, certainly you can't. But the science of toxicology suffers an even more serious flaw. Toxicologists study chemicals, one at a time. Dr. John Doull — and some of you in this room I am sure were present at the last biennial and heard Dr. Don Doull's
presentation — he is Professor of Toxicology, University of Kansas Medical School, and he spoke at a symposium sponsored by the Council of Great Lakes Industries at the last biennial in 1993. Dr. Doull admitted the science of toxicology is incapable of assessing mixtures. Yet in the real world, you and I, each one of us, carry hundreds if not thousands of toxic chemicals in our blood and our body tissues. The science of toxicology faced with the job of determining your risk of carrying this lifetime burden is really helpless.

So how is it that the Environmental Protection Agency and Environment Canada got locked into using these two limited sciences? Well, the answer is the following: If you get right down to it, both these sciences, epidemiology and toxicology, were developed by the chemical industry to assess safety of chemicals in the workplace. And for the most part these sciences have been successful in providing information in the context of a factory. But any one factory will produce a relatively small number of chemicals and they are all easily tracked, so that the enclosed workplace contrasts with the real world, where you and I are exposed 24 hours a day to a vast mixture of toxic chemicals in the environment.

Now the two sciences, epidemiology and toxicology that the government is relying on to detect health problems... when the government set up EPA and Environment Canada early in the 1970s, and at that time as you know, there was a tremendous ferment and concern about toxic chemicals in the environment... instead of looking at the problem in a global sense and saying, "Well, what science do we really need to address this issue?" That time if they had taken a weight of evidence approach, we would have had a very different situation today, I'm sure. But no, they did not take the weight of evidence approach — in other words, all encompassing science, the entire house of science — instead, the two agencies or more precisely the political process that created the agencies and the policies, turned to the chemical industry and said, "What have you got, what can we use?" And the chemical industry said, "Look, here's epidemiology and toxicology and these are the two sciences in which to base all your regulatory decisions." So that happened in approximately 1972.

So let me now come to the broader point here, and put this information that we just heard earlier, into this broader context. The point I would like to make is the following. If you turn to your governments --more specifically, EPA and Environment Canada — and say to them, "Well, what are you going to do with this new information?" The two agencies are going to say, "Ah! Well, we'll apply some epidemiology studies, we'll apply some toxicological studies." And that is about as far as they are prepared to go, under the present circumstances. And the answer is, they are not going to come up with any answers, because neither of those sciences are adequate or sufficient enough to arrive at an answer on which to base a public policy decision. So therefore, what you are going to get instead of any action is just delay and more delay, and more delay.

Now let me turn to some of the recommendations made by the International Joint Commission. When the International Joint Commission, the Commissioners that challenged the two governments and the chemical industry to sunset plastics and industrial chemicals and other products containing chlorine — this challenge as you know was in the 1992 and 1994 biennial reports — the IJC challenged more than just phasing out a class of chemical products. And this
is critical I think, and is perhaps one reason why the chemical industry is really raising such an enormous opposition to the idea of sunsetting. The IJC recommendation challenged more than the actual sunsetting, it challenges the fundamental way in which the chemical industry and the government agencies in both countries view the problems such as human health and environmental chemicals. In other words, it is saying to these agencies and the chemical industry, "Look, you're just not going about it in the right way. You are using a very small segment of science, you have to change, you have to take a broader view." If you look at the cover of the 1994 biennial report, there is a quotation from Albert Einstein as follows: "Everything has changed, but our way of thinking." That is on the 1994 biennial report cover. Everything has changed but our way of thinking.

The IJC sunset recommendation says a vast amount of new information has come forth — this is the weight of evidence — a vast amount of information has come forth, that has changed our knowledge about how toxic chemicals in the environment damage human health. The sunset recommendation says to the chemical industry, EPA and Environment Canada, you cannot continue to operate, you cannot continue to try to protect — and I say try to protect the public, basing your decisions — usually nondecisions — on two limited sciences — epidemiology and toxicology. Turning to society at large, if we are going to protect citizens, if we are going to protect generations yet unborn, we have got to start using all science, we have to start using the entire house of science, and we have to start basing evidence on a weight of evidence approach.

Of course, in doing that, we couple that with precautionary principle which as you well know, says, "Look we can't be 100% certain, but we can be pretty sure that there is a problem here and therefore, we should proceed." Now it is nice to have more information — and I would be all for that, the more information we can gather about any of these problems is to a great advantage — but the questions facing you and I, all of us, the entire society at this point today, is: Do we have enough weight of evidence to proceed, to make decisions? And I think a lot of us agree that we do have enough. And certainly the International Joint Commission was saying that in 1992, that we do have the weight of evidence, is now massive enough to proceed with a basic policy recommendation.

So I would suggest that the information we have now about the damage to the male reproductive system adding to the existing weight of evidence, just makes these policy recommendations of virtual elimination, zero discharge, sunsetting of specific classes of chemicals, it makes those policy recommendations all the more urgent, all the more necessary. And we need to implement that information, those policies today. Thank you.

**A. Clarke:** Our final presentation on looking at the policy implications will be given by Bob Dekker, a civil engineer who specialized at the Duff University of Technology in the Netherlands in Wastewater Treatment and Drinking Water Supply. Since 1977 he has been working with the Dutch Ministry of Transport, Public Works and Water Management in different functions in the field of water management and protection of the aquatic environment. His major duties at present involve international treaties on transboundary water pollution. He acts as
spokesman for the Netherlands in various international negotiations and was responsible for the
preparation of the strategy for the prevention of pollution by hazardous substances at the
International Conference on the Protection of the North Sea, in 1995. I should note that in this
discussion this morning, he is not speaking for the Government of the Netherlands, but in his
personal and professional capacity. Please welcome Bob Dekker.

Bob Dekker
Dutch Ministry of Transport, Public Works and Water Management

Thank you, Alan. Before I start, I have to make a confession and an apology. When I was asked
by the organizers, which I greatly appreciate, to come here from the Netherlands to Duluth to
speak about policy in Europe along the North Sea on hazardous substances, I had to consult a
map to find Duluth. But the Great Lakes they are very familiar, they are great enough to know
that. Just in case you do not know where the Netherlands is... I am sure you know, but just to
make sure, that your geographical knowledge is correct, here you have a map of this part of the
world, with a big chunk the United States and Canada and here on the other side of the Atlantic
Ocean you have the North Sea here and, very small here is the Netherlands. I am not telling you
how small the Netherlands is, but perhaps later.

I am going to tell you about the North Sea. Here you have a map of the North Sea, with the
countries surrounding it, here you have the land area, the dotted lines are how we split it up, the
sea the continental shelf for offshore purposes, and the drawn bold line is the border of the total
catchment area in the North Sea. If you compare the North Sea with the Great Lakes, we have a
volume in the North Sea of about 94,000 kilometers, which is four times the volume of the Great
Lakes; an area of 750,000 square kilometers which is three times the Great Lakes area; the
maximum depth of 1,000 meters, which is about two and a half times that of the Great Lakes; a
total population of 164 million people, which is five times the people living in the catchment
area of the Great Lakes; and our total catchment within these bold lines is 850,000 square
kilometers, which is about one and a half times the Great Lakes area.

We have a meeting every three or five years of Ministers on the problems in the North Sea.
There are nine countries involved; these are Belgium, Denmark, France, Germany, the
Netherlands, Norway, Sweden, Switzerland and the U.K., and also European Commission
Switzerland might surprise you because it is a landlocked state, but Switzerland is lying on the
Rhine and the Rhine River is one of the main inputs to the North Sea. We discussed the
integrated policy on the North Sea. — not only the pollution but also shipping, fisheries, nuclear
problems, nutrients, habitats and species. What we do is to have a political impetus via a
meeting of Ministers to the regulatory bodies, international treaties — like for instance the IMO,
International Maritime Organization when it is about shipping; the IEA, International Energy
Association on the nuclear industry; the EC, the European Commission when it is on the
fisheries; and we have the North Atlantic Ocean Treaty, the AUSPARTreaty when it is about
hazardous substances, nutrients and habitats.

We started our ministerial conferences in 1984 when the German government made a report on
the state of the North Sea and came to the conclusion that although there are a lot of international
treaties dealing with all of these problems on the North Sea, no real progress was apparent. So then we started in Bremen in 1984, with the first discussion on the preliminary precautionary principle, where it was stated that a strict limitation at source of hazardous substances was necessary for safety reasons, even if there is not enough scientific evidence. This principle of precautionary action was stressed in London in 1987, where it was also established that we need a 50% reduction of the inputs of all hazardous substances based on this precautionary principle.

In 1990, in Hague we went one step further, and again stressed that the discharge reduction of 50% was still necessary. But we also made a list of 36 specific substances. We also established that 50% was the minimum; we needed 50% or more. We also needed 50% reduction of atmospheric emissions and for certain substances we agreed on a 70% reduction — like dioxins, mercury, cadmium and lead. Also it was established that this 50% reduction which was to be reached in 1995, between 1985 and 1995, was not the endpoint. It was agreed in Hague, that discharges should be reduced to levels not harmful to men and nature before the year 2000.

In Copenhagen in 1993, the Ministers agreed to establish a strategy to reach this goal for the year 2000, to reach these levels of inputs not harmful to man and nature. And it was in Ellsberg in June this year, where the Netherlands was the lead country to develop this strategy, that we agreed on a strategy for reducing discharges to no harmful levels in the environment. What is important then for the definition of hazardous substances and the content of this longterm strategy, and I will present this to you: “We have agreed that the objective is to ensure sustainable and healthy North Sea ecosystem, and the guiding principle to achieve this objective is the precautionary principle.” So that is the starting point, the precautionary principle.

What does this imply? “It implies the prevention of pollution of the North Sea by continuously reducing, — so you must not stop, you must continue to reduce discharges — that is discharges to the aquatic environment, emissions to the air and losses all kind of disuse sources of hazardous substances and thereby moving toward the target of their cessation, which is the elimination of discharges, within one generation.” So here we have established a time limit of 25 years to reach this goal of cessation. And the ultimate aim is to reach concentrations in the environment near background values for naturally occurring substances like mercury and cadmium, and close to zero concentrations for all the manmade synthetic substances like PCBs and so on.

We also agreed on a definition of hazardous substances: Define the groups or substances that are toxic, persistent and liable to bioaccumulate— that is normal — but also we take into account to include chronic effects, carcinogenicity, mutagenicity, teratogenicity and also adverse effects on the function of the endocrine system. So these substances are included in the definition of hazardous substances. Well these are beautiful text of course, agreed by ministers, by governments — but they must be implemented. So how are we going to do that?

First we must establish who should do things. Industry of course — the chemical industry, oil, petrochemical or any type of manufacturing industry. But also the users: farmers, drycleaners, the garages, and all those citizens — you are using hazardous substances in your households, in
your gardens. All these people are involved and should do what they must do. But then the question is, what must they do?

Industry must apply BAT, best available technology — but not once — best available technology must be improved. We agreed on a ten-year revision of all of our BAT notes. We must have clean production in our industry and include lifecycle analysis of all of our products, and strive for a close-looped production. Also for the users like agriculture we must apply best environmental practice (BEP), how to use pesticides, which types of pesticides. And of course you must substitute our hazardous products or hazardous substances by environmentally friendly substances. That is what we want to do. But then, how to achieve it?

We can achieve it by regulatory measures; discharge permits; prohibition on placing on the market of certain substances, or applications, or voluntary agreements, confidence with branches of industry — like we have in the Netherlands, we have voluntary agreements with the chemical industry, with the basic metal industry, with the offshore industry. But important also, financial instruments: tax deductions for environmentally friendly investments or cars, levies and charges on emissions, and also levies on use — like we are contemplating a levy on the excess use of fertilizer and pesticides.

Now the last question: Where do we apply these measures? We can apply them nationally of course. Every government has the power to apply all these measures in the national legislation. It is also important to apply these measures regionally. We have it in the region of the North Sea, but there is also this UNECE program, for instance on the long range transport of hazardous products. We have several transboundary river and lake Commissions — like you have the International Joint Commission here — also various river commissions in Europe on the Rhine, on the Alps, on the Muz, on the Skelts. We also have international conventions like the AUSPAR treaty I mentioned already, on the northeast Atlantic; we have in Helsinki, convention on the Baltic Sea; we have the Barcelona Convention on the Mediterranean; and we have regional seas programs of UNA. But we should not forget the global issue.

At the UN Conference on Environment and Development in 1992, we adopted the Rio Declaration, where also the precautionary principle was involved; we adopted Agenda 21 which will be discussed regularly in the Commission of Sustainable Development, and in the near future we have a UNEP Program, it is a global program of action on the protection of the marine environment against landbased activities, and also in this global program, the issue of hazardous substances will be addressed. The meeting will take place in Washington at the end of October, where a lot of governments will be present to adopt this program of action. At the same time there will be a discussion on a United Nations Global Convention on persistent organic pollutants. I think here also, it is important to come together with all the governments to agree on this convention. And perhaps here I could ask the Governments of the United States and Canada to support the initiative of the Nordic countries to have this global convention on the reduction and the sunsetting of all these hazardous substances. Thank you.

A. Clarke: Thank you, Bob. As I did in the first half on current research, the floor is open for
questions and comments. Please go to the microphone, identify yourself by name.

**Jack Weinberg:** My name is Jack Weinberg, I am with Greenpeace. First of all, I want to thank the organizers of this session. I think this session was clearly the highlight of this biennial meeting. I think it had very important information. I think the policy framework just given us was also incredibly important.

One area however, that I am very disappointed about, and it is not with the organizers of the session or the session itself, but unless I have it wrong, looking around the room, I have not seen the participation of any of the Commissioners in this session. And I hope that was not a signal. One of the reasons I believe that the last set of Commissioners we had were able to do such profound things is because, not that they came to this job with environmental concerns or environmental agendas, but they immersed themselves in the issues. They were not scientists but they immersed themselves in the science, they immersed themselves in the feelings of the people and the injury and they reached above themselves. And I am very concerned — and we still have an opportunity for this to be rectified -- I am very concerned that up to now the current set of Commissioners have not similarly immersed themselves in the issue. I hope this is an oversight and I hope the staff can reflect to them in not just a technical way, but in a human and emotional way as well, what happened here.

**A. Clarke:** From my perspective, there have been for a good part of the discussion, two Commissioners in the room, and I see one now.

**J. Weinberg:** I'm sorry. Then maybe I am only referring to the American Commissioners and I stand .... and, these are new Commissioners and they have not had an opportunity to immerse themselves — and I stand corrected; I just don't know you as well. But I still will reflect that to the American side. I would like to make two points if I may, as quickly as I can.

One is, that I believe that the Commission will prove itself in the next biennial report. And I hope that biennial report will take forward and not just reflect the current priorities that we saw before us, but actually take the sunsetting recommendations, the zero discharge recommendations forward, begin a discussion of how to do it, take up the transition planning plea that we have raised before you.

The second thing and this is more immediate, this October conference that was told to you, it is Washington, D.C., it is a two-week conference. The IJC in 1992 and again in 1994 called for global bans on these substances. For the first time there is a serious effort to begin the negotiation of them. I very much hope that the IJC finds a way to participate formally in that conference. There is no, as I understand it, legal or technical reason they cannot get observer status or participant status. It has not happened yet. I would like to see that happen in the next month. And I also would hope that the IJC can attempt to tell the governments — since twice the governments accepted the recommendation on bans of international source of these substances — that the governments now, U.S. and Canada participate at the meeting in Washington, October 23-November 4, I think it is, where they are negotiating these protocols.
and they follow the excellent lead of the Nordic countries and some South Pacific countries and some African countries, to begin this process now. Thank you.

Barbara Knuth: Hi, my name is Barbara Knuth, I am from Cornell University. I also sit on the Science Review Panel for the review of a proposed uniform fish consumption health advisory for the Great Lakes. This is an effort to develop some uniform protocols for both developing fish consumption advice and communicating that. The Science Review Panel has pretty much, as I think you folks would agree, identified that the fetus is the most sensitive unit to be protective of. One of the controversies though, within the Science Review Panel — and I would like to get perhaps Dr. Guillette and Dr. Toppari's advice on this — is the kind of advice to communicate to breastfeeding mothers. We have heard some information about mobilization of contaminants, we also certainly know that there are some benefits associated with breastfeeding in terms of transferred immunity, in terms of bonding... what is in your best scientific opinion — What is the advice that we ought to be giving to breastfeeding mothers who are fisheaters, or who have reason to believe that they do have contaminants?

Dr. Toppari: Well, I think that at least, in most of the places the benefits outweigh the risks in breastfeeding. But there may be exceptions to that. Those who have known high exposure to these chemicals, there the risks may be high. That risk assessment is very difficult to make. But at least, for example in the developing countries, it is even more important to advocate for breastfeeding still, because there are huge risks when they start to use the substitutes. And we do not know whether the substitutes are any safer, because they are not free of these compounds.

Polly Mann: I am Polly Mann, I'm from St. Paul, Minnesota. I am a member of the Women's Cancer Resource Center. I was very moved yesterday by the presentation of some of the original inhabitants of this country who left us with a charge, that for thousands of years they had protected this country and that we Caucasians have really messed it up. So I want to talk about U.S. public policy today, because basically this is political policy. And when somebody stands here and says there is not money enough to conduct a study or do the research that is necessary to clean up this country, that is disgusting. We have a military budget in which the Congress is allocating to the military at least half of the money that it can put its greedy little fingers on. And we have a government does not listen to us, that listens instead to the big money interests that buy it off, and that is the majority of the people in our Congress. So what we lack — and I was able to understand some portion of the comments that were made here and I am very appreciative of them — but it is political will that we need right now in this country to change the system and to take back our government from the corporations which are running it. Thank you.

Beverley Thorpe: Hello, my name is Beverley Thorpe, I live in Montreal, Quebec. I do clean production consultancy work, and I work for various NGOs including World Wildlife Fund. I have a question for Mr. Dekker from the Netherlands regarding the North Sea Conference and the whole accent now, or the continuing development of the precautionary approach. And I noticed you had a slide on clean production methods, redefining best available technology to reflect clean production methods. Could you briefly explain how you are going to move forward
regarding implementation of safer and clean, and perhaps nontoxic materials.

Before you answer that, I just also want to make an announcement that World Wildlife Fund does have a video called "Hormone Copycats," which is available, and actually we did find a VCR downstairs to show it. It is downstairs in the exhibit, World Wildlife Fund just recently produced a video called "Hormone Copycats," so it available for screening. But if you could answer a little bit on your way forward on the implementation of how we are going to move to safer production processes.

Mr. Dekker: I think we are in a process. Ten, fifteen years ago we started with uniform emission standards for industry and then we have to apply that, that was more or less straightforward. But that is not enough.

The second concept is the concept of best available technology where you describe not only the emissions but you also describe the whole production technique, and the cleanup and the end of pipe treatment. But that is also not enough. You have to go a step further after that.

And in practice it means that you have to develop best available technology to a certain level where you have closed-loop production. And how we are going to do that in practice for the North Sea is through the instrument of the AUSPAR Convention, this treaty on the protection of the northeast Atlantic against pollution, by writing this BAT note, by updating them regularly and then by implementing and asking every country to report on the results of this implementation.

Bob Golden: Hi, my name is Bob Golden, I'm with Environmental Risk Sciences. As a practicing toxicologist, I have to take issue with what Dr. Hall said about the disciplines of toxicology as well as with epidemiology, as somehow not being adequate of providing the kinds of answers we need. I think when you talk about the making weight of the evidence evaluations, what we are talking about making weight of the scientific evidence, and I think that a weight of the evidence evaluation is only as good as the underlying science that you are going to weigh. And so I think that the idea that we cannot get good science into this process, is incorrect. Lou Guillette I think, makes the point very eloquently, that the science is what we need to focus on, and only once we have the science, can we start collecting the weight of the science.

Dr. Guillette: I think there is enough science right now speaking, that we have to have a discussion.

Dr. Hall: Well, I would like to just respond directly. There is no question about it, that toxicology and epidemiology do provide useful information. I am not suggesting that they do not. My point is simply this: that the policies of the chemical industry and the policies of the EPA in the United States and Environment Canada in Canada, these policies are based on toxicology and epidemiology; two sciences of the entire spectrum of sciences that we have. And that is my point. It is not that the information is not useful, it is useful. But it is only part of the total information that could be available. And that is my concern — the limitation trying to
make a public policy based on two limited sciences — and that is all I am saying.

Dr. Toppari: I have come across some of the reviews on this issue that have been produced by Washington-based institutes. One which I got yesterday, coming from the Center for the Study of Environmental Endocrine Effects, and an overview of the state of scientific knowledge and uncertainties. The other one was by the Environmental Risk Sciences, the group that the previous speaker represented. Both of these I was honestly surprised to read how one can misuse the scientific knowledge, because both of these reviews presents line by line, half of the truth. And you end up with the biggest lie by only presenting only half of the truth, or presenting the scientific facts in a wrong context. So I would warn to use this kind of commercial institutions to get counsels on these issues, and I would more base the decisions on the university-based research and in the real independent research such as EPA.

John Festa: John Festa, American Forest and Paper Association. I just wanted to come back to Dr. Golden's question because I had a similar question. If you write off epidemiology and toxicology in the study of the potential effects of toxic substances, what sciences would you rely on to arrive at a weight of the evidence; I'm confused.

Dr. Hall: To repeat, I am not writing off either epidemiology or toxicology. These are both very useful sciences, and as I said in my little analogy of looking for a criminal in the dark with a flashlight — if you find an effect, that's great, but if you do not find an effect, that does not mean there is not an effect. So both sciences do provide useful information, in no way am I suggesting they do not. What I am suggesting again, is that they are only part of the many sciences, part of the many ways in which you can look at these issues of how toxic chemicals in the environment can harm human beings, and that we have to use all the sciences which is....

J. Festa: So you are not writing off epidemiology...

Dr. Hall: No, not at all.

J. Festa: ... and toxicology as not being useful sciences?

Dr. Hall: Yes, they are part...

Dr. Guillette: I think it is important to realize that this whole issue of endocrine disruption came out of partly wildlife research, comparative endocrinology, general biology, general ecology. We are not saying that we have to throw out science. What we are saying, is that we have to include all of science, and all of the issues, and we have to take all of the data and try to come up with a reasonable outcome. That is all we are asking. All we are asking is to do something which is, I guess, right. And worry about people, more than maybe just other issues and political expediency.

Tracey Easthope: Hi, my name is Tracey Easthope, I'm with the Ecology Center in Ann Arbor, Michigan. I have a question and then a brief announcement. I am wondering — and perhaps
you already addressed this, I came in a little late — but I’m wondering if the scientists could specifically speak to the question of whether we are talking about a mother’s lifetime exposure or brief exposure while a fetus is developing. This obviously has a lot of policy implications.

And then the brief announcement I want to make is, we are holding a conference on hormone disruption and its effects on women, children and men in Ann Arbor on December 2nd and we invite people to come. There will scientists and activists. The idea is to educate the general public about this issue.

Dr. Toppari: Both are important, lifetime exposure and that which occurs during the pregnancy. During the pregnancy you can be hit badly even with those substances that do not bioaccumulate. But those that bioaccumulate will have an effect throughout your life.

Dr. Guillette: That is one of the whole concepts here of why persistent biomagnified, bioaccumulated compounds have to be zero discharged; we have to get rid of them. The point being is, that if you accumulate them, it is not just what you pick up once you are born but you actually carry part of the load from your mom — and that is this whole concept of multigenerational effects of bioaccumulated, biomagnified compounds.

T. Easthope: It seems that this has implications for fish advisories which often tell women of childbearing age that they should watch what they are eating and also women that are pregnant, but it does not recognize that a person’s lifetime loading impact the children that they have.

Nan Stockholm: I’m Nan Stockholm, I’m an environmental lawyer and consultant from California. I would like to ask the panellists, particularly those from the Netherlands and the Scandinavian countries, why they believe there has been more success in achieving a consensus among the government and industry and moving ahead on a policy direction that is quite specific there, as compared to here.

Mr. Dekker: Well, it is a difficult question, because I do not know exactly the situation here in the United States and Canada but, I can tell you something about the situation in Europe and the Netherlands. When we developed in the Netherlands, this strategy for zero discharge for the North Sea we discussed several papers before we put a final paper before the ministers. And in preparing this paper we had discussions with industry — also with environmental organizations — but intensive discussions with industry. They were involved in this process of getting a date, getting this cessation of discharge, and the final aim to have zero concentrations or background values in the environment.

I think when you look at the earlier agreements we had in the Ministerial Conference — about a 50% reduction within 10 years, for instance — it appeared that the industry, they did the job, they could reduce their input with 50%; but not for instance, the farmers where we talk about pesticides. The industry were able to reduce their discharges from manufacturing with more than 50% in many cases, but not the farmers. So we have I think, a pretty good relationship with the industry. We think also that the voluntary agreements with industry are working. Of course we
keep the regulatory instruments in the background if necessary. We have now this confidence with the chemical industry; where they have to reduce before the year 2010 a lot of chemicals by 70% and 90% — and then of course, now you have the next step to reduce to zero in 25 years. Perhaps that is the difference between Europe and the United States — the working together with industry in Europe is going okay, the industry takes their own responsibility, they have this Responsible Care Program, and I think that is working in practice. Of course as governments we must patrol, we must check, we have this compliance everyday, but we are not opposed to each other.

Dr. Toppari: The legal systems and traditions are different too. We do not have the litigation in Europe in the sense that it is here.

John Mahan: John Mahan, I'm a writer focusing on the Great Lakes ecosystem with my wife. I have a background in the health sciences prior to my present profession. A couple of things really hit me, and they began to crystallize something that I have been working on in my own mind to understand: Where we go and how we change as we go through these processes we are talking about. One is the many houses of science and the other is right, which also goes along with wrong. I would suggest that, as Dr. Hall has said, all sciences are valuable. I would also suggest that as we go through the process, some sciences though they are still valuable and still necessary as toxicology and epidemiology most certainly are, and we need to continue gathering the best data in those areas and the other areas we can, once we are at the level we are at now, where we know that the potential for harm exists — we are proving that real harm is occurring in alligators and other species and there is very good evidence to suggest from Dr. Daly, and there are other things that have not come out yet in this conference, but there is harm occurring at least at the higher exposed populations of humans — once we are at that level of scientific knowledge, I would suggest that the science of ethics which is for lack of a better description, the science of right and wrong, must come forward. When we are talking about policy decisions, we cannot make policy decisions based only on epidemiology, only on toxicology, or only on the other houses. We are now into the area of value judgements and that is the science of ethics. I would commend the IJC for essentially bringing that in with reverse onus. But I would suggest that we need to think in a more open and clear fashion about how we proceed now with the science of ethics, and think of it in that context because we are still in the public mind, way back in the early stages of toxicology and epidemiology; which is not the truth of the state of foreknowledge. Thank you.

Mary Hegan: Mary Hegan from the Great Lakes Health Effects Program in Canada. I am really going to build on the last speaker's comments and ask the panellists to elaborate a bit more on this spectrum of science that you suggest, not only for the weight of evidence approach, but I think you have also suggested for the implementation of policy. Maybe you could give us some examples of what you would draw on from other sciences. I am also curious to know whether that spectrum of science includes some of the social sciences, and could you elaborate on that. The other question I have is: How would you build specifically into the public policy process these other sciences?
Dr. Toppari: I think that we need research on many levels from very basic science, from molecular biology up to social sciences and all in between. We need epidemiology, we need monitoring what is going on, we need wildlife studies, biology, we need toxicology, we need endocrinology, and then we need these kinds of workshops to bring these data together—because I cannot do any social science and I would not dare to touch the alligator. So we need each other.

Dr. Guillette: I would reiterate what Dr. Toppari said, we do not have time here to go over very specific studies. There are certainly studies that need to be planned for the next ten/fifteen/twenty years. In other words, we need to continue to monitor things like sperm count, breast cancer, etc. But at the same time, those studies are only going to document what is going on. They are not going to prevent the health problems that exist. And those studies require some very good basic creative research. We built the Science Foundation for the world basically, for the last 20th century based upon Western science. We are supposedly the most creative society on earth. Why do we feel that we have to now hunker down and stay the way we have been for the last 25 or 30 years? So, it is a roundabout answer to your question. I think the scientists have a pretty good idea what they need. I think we have even had discussions with policy people, like for example when we met in Denmark with the EPA and with their health ministries, which those people said, "We need the following kind of data." That is easy, we can solve those kinds of questions in the short term and the long term. So I think that what Dr. Toppari has said and what we all feel, is we have to have more science. But I think that from the comments that were made here today, it is clear that we have enough science to probably demand change; that we have to have enough science so that we can actually look to the future at the alternatives. Are they in fact going to create as many problems, or more problems than the things we are using now? So the science has to continue, but the whole science of ethics and society has to address this as well. I think that your comment of social sciences—sociology, psychology, anthropology—those fields have to come into play as well, because to be honest, we are—as was so eloquently put by the last speaker—we are part of the problem. We are not the only problem. But we have to get citizens educated, and we as a group of people have to make the decision to change, and we have to force the government and the industries and the rest to do it, if that is what it is.

Dr. Hall: I would like to just comment on what Mary Hegan was saying. I have been involved in the university level and with other sciences and other disciplines, and it is sometimes very hard to bring people from different disciplines together. Certainly you can get each person from each discipline will give their presentation, but in terms of synthesizing the information, this seems to be where the difficulty lies. Many times I think we are just like in a table of billiard balls, you get as much interaction between different scientists, as between two billiard balls. But, I think this is where government could take a lead, that in synthesizing the information from the various scientific disciplines. Many scientists are very uncomfortable when it comes to dealing with issues and other disciplines. Nevertheless, synthesis— and Gordon Durnil in his book, and I am sure many of you have now had a chance to have a look at it—you see when you look at Gordon's book, you will find in there, quite eloquent comments for the need for synthesis. When you look at the weight of evidence, that is really what it is—it is synthesis of
all of the information. The social sciences would definitely be a part of this, information from any source, whatever it is. The ethics that John Mahan has just brought out, the ethical questions, is certainly part of this too. So we need synthesis, and that is when we can have these international meetings and other meetings like this one, and we bring people together from different perspectives and different points of view. We need to try to work out synthesis, and that is as I say, what the weight of evidence is all about. The decisions have to flow from that point of view.

Jamie Harvie: I am Jamie Harvie, I am an engineer, artist and currently working on a two-year project in the Great Lakes basin to help eliminate the use of lawn pesticides. I heard a lot of talk this morning about weight of evidence. I am real excited that finally an approach that seems to make sense -- it has been talked about in the last couple of reports... Last night I had a lot of hope when I heard a young girl sing at the pubic hearings, and it is kind of exciting to see some of our younger people getting involved. But sometimes I have a lot of cynicism, and it comes about from a lot of dialogue with this weight of evidence - especially relating to a pesticide, one that we are all familiar with, DDT. We have done a great job in banning that, I think no one here can argue about the evidence out there as to its effects. But somehow it seems that the government in the United States cannot or believes that south of the border or south of the equator, those effects are no longer apparent. Here we are making DDT, banned in the States and we can sent it out across the world. I guess I would like to address this more to the Commissioners then to the panellists that I implore you to recommend to the government to stop the export of DDT.

Bill Kelly: Bill Kelly again with the Center for the Study of Environmental Endocrine Effects. I felt I had to stand up again because Dr. Toppari specifically addressed the discussion draft paper we had put out. And I just want to clarify something. And that is, that we are not as he said, a commercial organization. We are nonprofit, 501C3 Educational Foundation; we do not have any funding from industry. He also suggested that we should work with academic experts and you will note from the discussion draft that we are working with a distinguished panel of academic experts on this issue. I would also like to point out, that is a discussion draft and we certainly welcome specific comments on the content of the paper. It has been distributed on a limited basis, but we will make it more widely available in the exhibit hall, I think. I think everybody has to recognize that the presentations that are being made on this are fairly necessarily somewhat simplistic, and I do not think that anybody is going to be happy with any single presentation. But we do welcome, if somebody thinks there is significant information left out, or if there are half-truths as was mentioned, or things like that, those should be specifically pointed out to us. If those are warranted, we certainly will make corrections. Thank you.

Dr. Toppari: That is good when it is like that. But I wonder what makes some of these independent reviews so misleading. Still you can read from the first lines what is the scope there, the scope to deny that there is any problem. You go line by line refusing to believe that there might be something out there.
B. Kelly: I thought that where we ended up with is not that different from your report actually.

Shirley Thompson: Shirley Thompson and I was very interested in your discussion of the need for fish restrictions based on reproductive hazards, and also your discussion of perhaps in some cases, a need for warnings around breastfeeding. I am also very interested in the links that were made in the discussions around plasticizers in milk and bioaccumulation in the foodchain for Florida panthers, which I assume they are not a fisheating species.

Dr. Guillette: No they eat raccoons, which eat fish.

S. Thompson: So I am wondering if there is also a need for warnings and restrictions, perhaps either pointing to a need for warnings and restrictions around meat, where meateaters do bioaccumulate one thousand times organochlorines than vegetarians, and with the concern around the plasticizers in milk, warnings and restrictions around that. And maybe this would spearhead public outrage.

Dr. Guillette: I do not think there is any question that we need to do better analysis of what is in the food, and we have to do specific analyses of what is in the food. Part of the problem is again, one of these financial things. If you really want to do full-depth analysis you are talking — it costs me somewhere between $200 and $300 just to do some basic organochlorines per sample. If I want congener specific stuff, it gets higher, and I am getting a great price, but if you want congener specific stuff, it is $2000-$2500. How many apples can you do in a bushel for $2500? You cannot do many. So I think that you are right. At the same time, one of the reasons that we pinpoint fish is that we know, and there is excellent background information that they bioaccumulate and they filter the water systems. It is the classic thing; what you put on your lawn and what sprays in the streets, and what is put on your roof is going to run off in the next rainstorm and eventually accumulates in our wetland systems. The fish are high enough on the foodchain that they are going to bioaccumulate or just keep a lot of these persistent stuff for a period of time. Remember, we talk about bioaccumulation and biomagnification, but there is also a concept of biopersistence, that is how long it stays in the system. There are a lot of compounds which everyone will tell you, and everyone up here on this panel will admit, that do not biomagnify, do not bioaccumulate in fat very easily, but biopersist and are there for months, is in our drinking water and it is going to be there all of the time in the drinking water, different levels, different times. But you are right, there are a whole series of questions here. But I think that, at least for the fish, we have very, very good information on what is going on. It has been done for years by the wildlife biologists. The other things are questionable, and I think a lot of it has to do with how the meat or the milk or whatever the food product you have, has been grown or raised, or where it has been grown or raised. It is something for discussion. It is certainly something we should talk about. But I think that certainly we need to continue to focus on fish. I would just bring one little other item in here. That is the Intertribal Commission for the Columbia River — which is a whole group of Native American Indian Commissions — have in fact done a wonderful food study looking at Native Indian food habits on the Columbia River. The standard EPA and the standard U.S. documents about how much fish is eaten, what quality of fish is eaten, is completely inappropriate for judging their diets. Their children are eating...
much, much higher levels of fish. So therefore, they are getting much higher concentrations of these contaminants from a fishborne source. So, it goes back to the social science issue: we also have to ask, what are the ethnic differences, the neighborhood differences in this country? We need to protect everybody in this country, not just the average person in this country.

**S. Thompson:** Thank you very much. I agree with the concentration on fish, but without the exclusion of meat, because it does bioaccumulate as well. Could you just briefly address plasticizers in milk because that is something you had a slide on, Dr. Toppari, but you did not really go into it.

**Dr. Toppari:** Yes, actually there is a study by Sharman, published one or two years ago, which is cited in the report, where they measured the concentrations of phthalates in the dairy products and most of the phthalates are considered to come from the packaging of the dairy products—not from the cow—but from the plastics are on every sheet that butter is wrapped in or where the margarine is stored in. We get lots and lots of chemicals from these packages.

**S. Thompson:** Is there any work to regulate that, regulate the use of plastics around that?

**Dr. Toppari:** Well, I guess there is but, and this is what I wanted to add what to what Lou just said. We do measure pesticides, we measure the well-known toxic substances. But we have out there tens of thousands of chemicals which we do not measure which go still unidentified as endocrine disruptors, and as the search goes on, we find more and more of these chemicals to have endocrine effects, such as bisphenyl-A. Most of these have been found by accident, not by systematic screening. That gives us an idea how much there is that we still do not know—which we do not measure at all.

**David LaRoche:** My name is David LaRoche, and I am with the International Joint Commission. Most of you I think have touched on this a bit, but I wanted to ask the question explicitly. You have all been in different ways on the cutting edge of this issue, and the question I have is: Based on what you know and what you feel you can reasonably conclude, if public policy around this issue were yours to make, what would some specific components of it be? If each of you would like to try your hand at that, it would be appreciated.

**Dr. Guillette:** I am going to continue to speak as a scientist as well, because that is what my background is. I think it is clear if I am being asked to do policy, the things that biopersist and biomagnify, have to go. There has to be zero discharge. There has to be zero accumulation. There is no question about that. Whether it has an endocrine effect today or whether it is going to have some effect that we cannot even measure in the future, if these things bioaccumulate and are stored in our body, it is inappropriate. I mean, the best example for me right now is ppDDE. For years we have assumed that this breakdown product of DDT is completely innocuous. We could not really measure any real bad effect. We now know it is one of the most potent anti-androgens that we have, almost as potent as hydroxyfludomide which is used to treat prostate cancer. So that has to go. I think that there is no question for agencies like yours and others, is a policy has to demand that the science continues, it has to demand that the funding is in place to
support complete science. I do not mean just science that is one-sided. I mean really understand what is going on at the different levels — the basic biology, as well as the tools to let us assess effects in the environment and the effects in populations. So I think at least from my science it is clear already, that we have the data to suggest that those kinds of changes must take place, and that we actually have to have much more concerted discussion. I think the other thing, that as a policy issue, is that we have to have a major educational event. We have to continue to get this kind of material to the public, and we have to continue to support a discussion. Just as a final note for me. You know, it is much better to debate an issue and not come to a firm conclusion than it is to have no debate and just make a decision.

Dr. Toppari: I very much agree with what Dr. Guillette said and I really think that what we know now, if we identify a substance as persistent and a toxic one, we must get rid of it, but the search must go on.

Dr. Hall: Well, if I was a czar, the first thing I would do is certainly shift the focus away from chemicals, or the chemical industry and their perspective, to the human health perspective and all of nature for that matter; look at the problems from that perspective. So the first practical thing we could do, and this was already said by the first two gentlemen here, is phase out all persistent toxic chemicals and those that bioaccumulate. But I have to point out to you, that we know a lot of these chemicals, they appeared on various lists, but only know them because of the sciences of toxicology and epidemiology. So there is a plus for those two sciences. But, and this is a great big but, that is only a relatively small list. And as Dr. Toppari has just said, there is literally thousands, tens of thousands, hundreds of thousands of substances that we do not have any information on yet, could fall in this category of persistent toxic substances and to bioaccumulate. We just do not have the information. Therefore as a czar, I would immediately implement the recommendation put forth in the 1992 and again in the 1994 IJC biennial reports, the sunset recommendation, phaseout an entire class of chemicals — in this case the organochlorines — by virtue of the fact that it is absolutely impossible to determine each substance. There are something like 11,000 products I understand, in that class. You will never find out in detail what each one does. And indeed, many of these substances may be quite benign; that is quite possible. But you will never know. And therefore the only prudent thing, is to start out immediately to phaseout these substances, and accelerate that phaseout.

Dr. Dekker: I think for many of the substances, we have been discussing the eleven on the list of the IJC, but also other substances we have agreed on in Europe. There is no need for further science to have information on their effects. What we need is research where are these substances still, how to get rid of them, and perhaps which substitutes are there that are less harmful to the environment. So, no more research on PCBs and DDTs. We know what we must do with them. Get rid of them. A program for governments is not to fund research on their effects, but research in how to find the last drops of these substances in the environment, in industry and find a substitution.

Liane Clorfene Casten: My name is Liane Clorfene Casten. I have two things to say. I mentioned this last night when we were open for public comment. If we are going to talk about
education, you are going to have to face the unhappy reality, the media is not going to cooperate. I did some channel cruising last night when I got home to the hotel — even the Duluth people, the Duluth reporters, talked about the IJC meeting and immediately switched to David Obey and his fight on Medicare. Not one word was mentioned about the environment on two Duluth stations. And it is going to be like this because of a whole bunch of issues which I am not prepared to get into right here. So just be aware. The issue is to get the word out and to not rely on the media to do it, because the media has already made its priorities quite well established. That is number one.

Now I am going to go off a cliff. Alright? My cliff is, you mentioned, people have mentioned social studies, and as soon as I get into social studies, I get into the issues of behavior, and as soon as I get into the issues of behavior, I am reminded of the fact that I used to teach in the inner city. And I am also reminded of the fact that the Center for Disease Control has already established violence as a health issue, a public health issue. We also have to know that in the inner city, there are lots of areas where schools are profoundly old, filled with asbestos, filled with lead and a lot of these inner city schools, whatever they are, are also downwind of lots of incineration. And I am proposing because I am no scientist that we might also start connecting the possibility of chemical exposures and violent behavior. Is there any information on this at this point?

**Dr. Guillette:** Helen Daly sitting in the audience, is probably the expert on behavior and these compounds. That was my understanding of the literature. But basically there is no definite study that you can point to at this point. But again, I reiterate that no data, does not mean no effect.

**L. Casten:** That is right and I really urge whoever is here to start thinking in terms of behavioral effects as well as reproductive effects.

**Bob Soderstrom**  
Bob Soderstrom, with the Genesee County Medical Society, in Flint, Michigan. Just a comment as to when one might act on a public policy basis. I think there are some parallels out there, and a good one is probably the lead debate that went on for decades back in the 1920s and 30s, people started first pointing out that perhaps lead was a problem. There was a lot of fighting about that — petroleum companies saying that we could not drive our cars without lead and gasoline. Back in the 40s and 50s when these came to policy levels we erred on the side of lead as opposed to our children. Finally as you know, in the mid-70s action was taken. But in my community today we still pick up 50 to 100 kids who are lead toxic, and I'm sure it is true here in Duluth. You can multiply it across the country. We pick up 50-100, and unfortunately by the time we pick them up, a little bit like organochlorines, these kids have already suffered their deficits. So we leave them as lesser individuals than they would have been for the rest of their lives. You know, I think again as we look at these issues — is it going to take us 50 or 60 years to make this decision on organochlorines, and if we are going to error as the information piles up, do we error on the side of organochlorines or do we error on the side of our children?
Dr. Guillette: Can I make one comment to that? You know it is an interesting phenomenon in this country that pharmaceuticals are considered dangerous until proven innocent. In contrast, the stuff that we spray in the environment usually is considered innocent until proven guilty. In fact the pressure on people like Dr. Toppari and myself sitting up here, is the pressure for us to prove that the compounds that we are dealing with cause the effects we see; not the fact that the release of those compounds in the environment are innocent. And I think that is partly also a societal question, that we have to address. And that is, if things are released into the environment and they end up in our food and our water and our air and they ultimately end up in us and our kids, should not we be assured that those things are safe before they are released — not after they are released! And that it is basically now scientists, who must then go out and prove that they are safe.

Julie O'Leary: Julie O'Leary, I work with the Sustainable Farming Association in northeast Minnesota. I have a comment and a question. The comment is that often when industry is defending their position on the products that they are making, the argument that they are using is us. They are saying, people want these products, we are providing people jobs by making these products, and the reason why we cannot change what we are doing is because the American public wants it, and more and more we hear the argument that we in the United States stopped making it, well, we are in a global economy and it will just come in from elsewhere. So I would just encourage people — we are a consumer society, we have immense power in our money and our choices — and to use that to a great deal more than we do today, to impact the behavior of industry. Because I think that we can do that. Unlike the political realm where we often feel like we do not have a lot of power, in the consumer realm we have a great deal of power.

My question has to do with synthetic bovine growth hormone. There has been a lot of discussion of this in the past couple of years and a lot of controversy in the Midwest. One of the arguments we have heard is that it is chemically the same as the natural hormone, and that there is no effect on the milk because of that. I just wonder if you have any thoughts on whether or not this could be an endocrine disruptor because it is being given to animals in doses above what their normal hormone production would be.

Dr. Toppari: It will be an endocrine disruptor for the cattle, but not for the people. But I would care for the cattle too.

Dr. Guillette: The other thing to realize is that it has been in milk forever, it is a natural product that is actually secreted during lactation. But again as Dr. Toppari said, there is no question that it is an endocrine, it is a hormone. And there is probably, I would be surprised if it did not interact with some kind of growth factor receptor in a developing organism. But the studies that have been done, suggest right now that there does not appear to be a major effect on offspring, that it is a more of an effect on the cow. But again, I think that there is questions there that have to be addressed, they have to be looked at. But in some ways, we go back to reiterate the point, that if it is a natural hormone, it is much more likely that you can break it down and get rid of it, then if it was some synthetic which your body really does not know how to handle. So I am not advocating one way or the other. I am just trying to give you some of the basic background that I perceive it, as an endocrinologist.
A. Clarke: We will take the final question for the panel.

Robin Finesmith: I am Robin Finesmith and I report for Living on Earth. My question to you has to do with the crossroads of science and politics, and how it is that your research is received, your perceptions about how it is received, and how we are looking at making a case for having that research make a difference in terms of policy questions. It seems to me that there is a really big change in paradigm that is being addressed here in terms of zero discharge and virtual elimination that runs directly counter to the climate of risk assessment. How will it be that you have got that big hill to climb that you are going to be able to get people to think in terms of clusters of contaminants, synergistic effects, things that are not necessarily traceable to a particular substance in many instances, how do you begin to convey some of those effects, to the people who are making the policy decisions and try to get them to see the way you are? What it boils down to is, how do you predict the future of having your research count with the people who are making the decisions, compared to what has gone before?

Dr. Hall: What you are getting at is a very critical question here. The risk assessment, which is a basic policy or the basic tool of EPA in the United States and Environment Canada in Canada, and other government agencies, works on a single chemical — one chemical at a time. What the International Joint Commission and certainly many others have done, is challenge that by going to classes of chemicals. You do not make a risk assessment on a single chemical, you start to look at the entire class. You cannot use the traditional methods that are now being used by EPA and other government agencies. You have to start looking in again at this weight of evidence, which is the entire weight of evidence. It is a different philosophy, it is a different approach, a different view of the issue. I would agree with you, this is a difficult concept to get across to government leaders, politicians and policy leaders partly because many of these people have a vested interest. Certainly the chemical industry has a vested interest in continuing to make certain products, even though as Dr. Guillette has made --- and I would like to say just as aside --- I started out my professional career as a synthetic organic chemist; I just made chemicals by the hundreds, thousands to be exact, some of these wound up as commercial products, but most of them just went up on a laboratory shelf. So the thing is, the chemical industry is extremely creative, and this creativity is perhaps not being promoted or not being used as much as possible. But I am answering your question in a rather roundabout way. I do not really have a good answer how to get this change in philosophy, which is what is really necessary; that a the difficult question.

R. Finesmith: It seems many times, what gets political play are antidotes, in a particular place, in a particular time. And those play to specific substances in a particular time, in a particular place. If what you are talking about is synergistic effects and I am interested perhaps in the comments of some people who are actively doing the research, how then do you get forth the idea that the synergistic effects are having as profound an effect as might be found antidotally elsewhere?

Dr. Guillette: You know antidotes are wonderful things because actually we use them to teach, and I think that Superfund sites have been a wonderful antidote. In other words, they basically
teach us everything that can go wrong. I mean we show everything from death to everything else in a Superfund site, or a highly toxic site. Lake Apopka for us is our positive high dose control. There is no such thing as a control because there is no population that we have been able to find which has not had some kind of contaminant exposure. So what we do is we try to go to a low, low dose control and we compare the two and we hope that our low dose control is somewhat normal, and we use populational measure at that level. We say, can this animal reproduce, can it fight off infection, does it appear to have normal behavior, does it have a normal neurological system? So it does not matter if we are talking about rodents in a laboratory or wildlife in the field, that is our low dose control.

We then take the knowledge that we have — and that is what we are in the middle of doing right now; we understand Lake Apopka and all of its intimate details — to other lakes and we say, do nonpoint source pollution, does a nontoxic chemical site have the same kind of effects? And what you find in many cases — and we are starting to find this is happening lots of places and I am aware of a lot of studies that have not been published yet, they are all in the review process or being done — it is quite clear that for example, vitellogenin in male fish is not just an English problem. We have the problem here in the United States, we have in Canada. That data should be coming out here in the next few months to a year. It is no question that the problems I am seeing on Lake Apopka do not just occur on Lake Apopka. That data is going to be coming out soon as well. So I think that to answer your question directly, what a scientist does is you try and understand what kind of measurement you need to make to understand the system. So in my case, as I mentioned, I looked at penis size as an indicator of lifetime exposure, or a synthesis of testosterone. We use those as markers. The EPA loves biomarkers, I mean that is their big thing. At lot of it has been, let's go out and have a magic number. And that falls into the second category to answer your question. And that is... you know, people want me to say --, this is black and white, yes and no, that under 100% of cases, if you expose an organism to blank, you will in fact get phenomenon Y. The problem is, that we are talking about biological systems, and if there is nothing else that we have learned about biological systems, is that diversity and variation is the key. That is what evolution works on. So we play a numbers game. How many animals do we have to look at before we have an effect? How many animals is it safe to expose to this chemical before some number get breast cancer? So, I think that the risk assessment is a fundamentally perception of the weight of evidence approach. What we are now arguing is — Fine, do your risk assessment for a single chemical, but understand, that is not the end to mark all ends, and that just because you come up with a magic number, does not mean that that magic number is going to protect the majority of the population, or even a small part of the population. So the argument as a scientist, is that we try and take all the tools we have and get all the data we can. Many of us, or some of us are asked to then come into the political arena, or the public arena and help transfer that knowledge to you all. But ultimately it is you all working with us, that is going to have to make the difference.

A. Clarke: Ladies and Gentlemen, we are overtime. Last night, when I met these gentlemen, I believed I saw the emerging civil society where scientists and professionals could talk in a way that helps us all to understand. If you agree with me, will you join in thanking a remarkable panel.