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OVERSIGHT OF THE SUPERFUND PROGRAM

HEARING

BEFORE THE

SUBCOMMITTEE ON SUPERFUND AND WASTE MANAGEMENT

OF THE

COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS UNITED STATES SENATE

ONE HUNDRED NINTH CONGRESS

SECOND SESSION

JUNE 15, 2006

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ONE HUNDRED NINTH CONGRESS

SECOND SESSION

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OVERSIGHT OF THE SUPERFUND PROGRAM

THURSDAY, JUNE 15, 2006

U.S. SENATE,
COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS,
SUBCOMMITTEE ON SUPERFUND AND WASTE MANAGEMENT,
Washington, DC.

The subcommittee met, pursuant to notice, at 9:30 a.m. in room 628, Dirksen Senate Office Building, Hon. John Thune (chairman of the subcommittee) presiding.

Present: Senators Thune, Inhofe, Jeffords, Baucus, Boxer, Lautenberg, and Obama.

Also present: Senators Cantwell and Durbin.

Senator THUNE. Today's hearing will come to order.

I would like to welcome everyone to our oversight hearing regarding the Superfund program, the program that I gained a better understanding of since joining this committee. This is the first hearing on this Superfund program in the past 4 years. So as we begin our hearing today, I would like to remind my colleagues and those who will be testifying before the committee today to be diligent in limiting your remarks to 5 minutes, so that we can ensure that we hear from all interested parties.

There also will be a 5-minute round of questioning following each panel. Any additional questions can be submitted for the record.

With that, before I make my opening statement, the Chairman is here and has to get to another meeting. So I am going to yield to him and allow him to make his opening statement.

Chairman Inhofe.

OPENING STATEMENT OF HON. JAMES M. INHOFE, U.S. SENATOR FROM THE STATE OF OKLAHOMA

Senator INHOFE. Thank you, Mr. Chairman. I have to manage the DOD Authorization bill on the floor here in just a few minutes. So I will make an opening statement.

However, I want to start by thanking the subcommittee Chairman, Senator Thune, for holding this hearing. Superfund was passed in 1980 and was at the time a step forward in dealing with environmental issues plaguing our country. We have learned a great deal since this legislation was passed and hope this hearing today will allow us to expose some strengths and weaknesses in important yet complex issues.

As most on this committee know by now, the No. 1 Superfund site is in my State of Oklahoma, Tar Creek. When I became Chairman, we started looking at this very closely. Much of the progress that we have made was due to getting the Federal Agencies to-

gether. I can remember when, Senator Boxer, it might surprise you to know that all these Agencies had never even talked to each other at the time, I am talking about DOE, DOJ, EPA, and all of that.

Well, we got them together, and as a result of that, things did work out. So things can happen. My friends across the aisle will argue the only way to ensure long-term cleanup solution would be to reinstate the Superfund tax, so that the polluter pays for the cost. I, like the Administration, support the polluter pay standard under the current Superfund law. When the polluter can be identified that can pay, then they are held liable for the damages. This has meant that about 70 percent of Superfund sites are cleaned up by the polluters without the involvement of Government revenues.

Other sites that are initially cleaned up by EPA are paid for from costs later recovered from the parties that contributed to the cause of pollution. At a marginal number of these sites, responsible parties who contributed to the contamination have gone out of business or do not have assets to contribute to the cleanup. The Government prioritizes and funds the cleanup at such sites out of general revenue funds from all taxpayers and Superfund trust fund balances to assure the protection of public health.

Some will argue that because of no tax, sites are unfunded and therefore those communities are at risk. The truth behind this statement is that local communities are not at risk. Sites are funded based on risks they pose, meaning that most unstable sites receive priority designation on funding. This is how EPA has always determined funding, regardless of the Administration. It was true in the Clinton administration and in previous administrations. EPA focuses dollars where they are needed the most. The Administration has displayed a strong financial commitment to Superfund and I support the current Superfund budget request.

I believe the reinstatement of any type of a Superfund tax would create an inequitable burden on those companies that are within the law. Various funding methods that are now working to impose such a tax on business to raise money to put into the trust fund would serve as a general inhibitor on business development throughout our country. This tax would fall on businesses already paying for their own cleanups, or that have never created any kind of a Superfund site, and would put a burden on those companies to pay for cleanups on sites.

So critics would say that those already doing their part pay twice and have the very small number of those who did contribute to the problem transfer the burden to everyone else. I think this is a subject we have gone all around and around and around on. There is a difference of opinion, certainly, that is going to come out during the course of this hearing between the left and the right side of this, Mr. Chairman. I would just say that I feel very strongly that we don't need to unnecessarily punish someone, someone who is a citizen, who has not been responsible for any kind of a Superfund problem and consequently, I believe this is a very significant, important hearing to have, Senator Thune. I appreciate your holding this hearing.

I do regret that I have to go to the floor to handle the DOD bill for about 45 minutes. If you are still in after that, I will come back.

Thank you for allowing me to go first, and thank you, Senator Boxer.

[The prepared statement of Senator Inhofe follows:]

STATEMENT OF HON. JAMES M. INHOFE, U.S. SENATOR FROM THE STATE OF OKLAHOMA

I want to start off by thanking the subcommittee Chairman John Thune for holding this hearing. Superfund was passed in 1980 and was at the time a step forward in dealing with environmental issues plaguing our country. We have learned a great deal since this legislation was passed and hope this hearing today will allow us to expose some strengths and weaknesses in this important yet complex issues.

As most on this committee know by now, the No. 1 Superfund site in the entire country is in my home State of Oklahoma known as Tar Creek. We have made significant progress at Tar Creek since I became Chairman. Much of that progress was due to getting the Federal Agencies under EPW's jurisdiction to finally work together to remove the obstructions that had stalled cleanup efforts. The lack of cooperation within the Federal family prior to my Chairmanship was simply unacceptable. In my view if the bureaucracy of these Agencies would work in a collaborate effort then the sites could be restored at a much higher rate than is currently being accomplished.

My friends across the aisle will argue the only way to ensure a long-term cleanup solution would be to reinstate the Superfund tax so that the "polluter pays" for the cost. I, like the Administration, support the polluter pays standard under the current Superfund law. When a polluter can be identified that can pay, they are held liable for the damages. This has meant that about 70 percent of Superfund sites are cleaned up by the polluters without the involvement of government revenues. Other sites that are initially cleaned up by EPA are paid for from costs later recovered from the parties that contributed to the cause of the pollution. At a marginal number of these sites, responsible parties who contributed to the contamination have gone out of business or do not have assets to contribute to the cleanup. The Government prioritizes and funds the cleanup at such sites out of general revenues from all taxpayers and Superfund Trust Fund balances to assure protection of public health.

Some will argue that because of no tax, sites are unfunded and therefore those communities are at risk. The truth behind this statement is that local communities are not at risk. Sites are funded based on the risks they pose, meaning that the most unstable sites receive a priority designation on funding. This is how EPA has always determined funding, regardless of administrations. EPA focuses dollars where they are needed most. The Administration has displayed a strong financial commitment to Superfund and I support the current Superfund budget request.

I believe the reinstatement of any type of Superfund tax would create an inequitable burden on those companies that are within the law. The various funding methods are now working and to impose such a tax on businesses to raise money to put into a trust fund would serve as a general inhibitor on business development throughout our country. This tax would fall on businesses already paying for their own cleanups or that has never created a Superfund site and would put a burden on those companies to pay for cleanups on sites they had nothing to do with.

Critics would have those already doing their part pay twice and have the very small number of those who did contribute to the problem transfer their burden to everyone. Both Democratic and Republican controlled Congresses have rejected such an unfair approach, now that the recovery scheme that enforces the polluter pays principle is fully in place and working.

I believe that with renewed commitment from the Administration in cutting down bureaucratic hurdles that are impeding cleanup and improved communication between Agencies, the Administration can make great strides in cleaning up these sites without putting great hardships on businesses not liable for these environmental damages.

OPENING STATEMENT OF HON. JOHN THUNE, U.S. SENATOR FROM THE STATE OF SOUTH DAKOTA

Senator THUNE. Let me just say by way of opening remarks that unlike other States that have numerous Superfund sites, South Dakota is relatively fortunate in that it has only two sites, the Gilt-Edge Mine, which is a 258-acre open pit cyanide heap-leaching gold

mine in the Black Hills, and the other one is Ellsworth Air Force Base, which continues to be monitored for groundwater contamination and other hazardous substances that were deposited by the military dating back to the 1940s.

The primary purpose of the hearing today is to learn more about EPA's efforts to stabilize and clean up sites on the National Priority List. We will hear from a diverse number of witnesses that will, No. 1, testify regarding potential risks Superfund sites pose to the public; No. 2, update us on what PRPs and the EPA are doing to address the clean up of contaminated sites; and No. 3, what improvements could be made to make the Superfund program operate more efficiently and more effectively, both in the short term and the long term.

It is clear to me that the EPA faces a far different universe of cleanup demands than when the Superfund program started over 25 years ago. While some have criticized the Superfund program because the annual number of site completions have dropped, I would like to make the observation that EPA is doing more today to protect human health and the environment, especially at the large cleanup sites.

Take for instance the combined impact that the following laws have had on our country over the past three decades: The Clean Air Act, Clean Water Act, RCRA, Toxic Substance Control Act and Superfund. While tremendous progress has been made to reduce human exposure to hazardous substances, I believe there is ample room for improvement, especially within the Superfund program. Hopefully following today's hearing we can come to an agreement on a handful of improvements that might be able to be made.

Last but not least, while it is not a central part of today's hearing, I would like to raise concerns about what I consider to be an attempt by some activists to regulate manure under our Superfund laws. Superfund was intended by Congress to provide for the clean up of the worst industrial toxic sites, such as Love Canal. It was never intended to apply to substances such as manure.

I have been approached numerous times in South Dakota by agricultural producers and organizations who are concerned about what attorneys might succeed in classifying manure as a hazardous substance. Manure has been safely used for centuries as a natural fertilizer all over the world. If we allow animal manure to be considered a hazardous substance under Superfund, then virtually every farm operation in the United States could be exposed to liabilities and penalties. The economic impact across the country would be devastating to American agriculture and related industries. As many of you know, Superfund claims could be brought against all sizes of operations and individuals.

The history of Superfund shows that all contributors, no matter their size, can and will be held liable. I do not believe Congress ever intended such an outcome for America's farmers, and I believe we need to address this issue in the near future.

Like other business sectors, American agriculture is appropriately regulated by a wide range of Federal and State environmental laws, including the Clean Water Act, the Clean Air Act and nuisance laws. It has never been considered to be regulated under Superfund and I don't believe it should be now.

Currently, the agriculture industry is working with the private sector, universities and Government Agencies to develop new and emerging technologies for manure management, including using excess animal manure for energy generation through methane digesters. This is exciting technology, especially as our Nation explores alternative sources of energy.

Congress should not allow the courts to legislate on this issue. We need to act to clarify that liability and reporting requirements under CERCLA and parallel reporting requirements under EPCRA do not apply to livestock manure.

With that, I would yield to the Senator from California for her opening statement.

[The prepared statement of Senator Thune follows:]

STATEMENT OF HON. JOHN THUNE, U.S. SENATOR FROM THE STATE OF SOUTH DAKOTA

Today's hearing will come to order. I would like to welcome everyone to our oversight hearing regarding the Superfund program a program that I have gained a better understanding of since I joined the EPW Committee. Also, today's hearing is important because it's been 4 years since this committee held a hearing on the Superfund program.

As we begin today's hearing, I would like to remind my colleagues and those who will be testifying before the committee that you need to be diligent in keeping your remarks to Five Minutes to ensure that we can hear from all interested parties.

Also, there will be one 5-minute round of questions following each panel. Any additional questions for today's witnesses will be submitted for the record.

With that, I will begin my opening statement and then yield to Senator Boxer, the Ranking Member of this subcommittee for her remarks—other members of the committee will be recognized based on the Early-Bird Rule.

Unlike other States that have numerous Superfund sites, South Dakota is relatively fortunate because it only has two such sites—Gilt Edge Mine which was a 258-acre open pit cyanide heap-leach gold mine in the Black Hills and Ellsworth Air Force Base which continues to be monitored for groundwater contamination and other hazardous substances that were deposited by the military dating back to the 1940s.

The primary purpose of our hearing today is to learn more about EPA's efforts to stabilize and clean up sites on the National Priority List. A diverse number of witnesses will: (1) testify regarding the potential risks that Superfund sites pose to the public; (2) update us on what PRPs and the EPA are doing to address the clean up of contaminated sites and; (3) what improvements could be made to make the Superfund program operate more effectively both in the short-term and the long-term.

It's clear to me that the EPA faces a far different universe of cleanup demands than when the Superfund program started over 25 years ago. While some have criticized the Superfund program because the annual number of site completions have dropped, I would like to make the observation that the EPA is doing more today to protect human health and the environment especially at large cleanup sites.

Take for instance the combined impact that the following laws have had on our country over the past three decades:

- The Clean Air Act,
- The Clean Water Act,
- The Resource Conservation Recovery Act,
- The Toxic Substance Control Act and,
- The Comprehensive Environmental Response, Compensation and Liability Act.

While tremendous progress has been made to reduce human exposure to hazardous substances, I believe there is ample room for improvement—especially within the Superfund program. Hopefully following today's hearing we can come to an agreement on a handful of improvements that can be made.

Last but not least, while not a central part of today's hearing, I also want to raise concerns about what I consider to be a ludicrous attempt by some activists to regulate "Manure" under our Superfund laws.

Superfund was intended by Congress to provide for clean up of the worst industrial toxic waste sites such as Love Canal. It was never intended to apply to substances such as manure. I have been approached numerous times in South Dakota

by agriculture producers who are concerned that litigious attorneys might succeed in classifying manure as a hazardous substance.

Manure has been safely used for centuries as a natural fertilizer all over the world. If we allow animal manure to be considered a hazardous substance under Superfund, then virtually every farm operation in the United States could be exposed to liabilities and penalties. The economic impact across the country would be devastating to American agriculture and related industries. As many of you may know, Superfund claims could be brought against all sizes of operations and individuals.

The history of Superfund shows that all contributors, no matter their size, can and will be held liable. I do not believe Congress ever intended such an outcome for America's farmers, and I think we need to address this issue in the near future.

Like other business sectors, American agriculture is appropriately regulated by a wide range of Federal and State environmental laws—including the Clean Water Act, the Clean Air Act and nuisance laws. It has never been considered to be regulated under Superfund, and I do not believe it should be now.

Currently, the agriculture industry is working with the private sector, universities and government agencies to develop new and emerging technologies for manure management, including using excess animal manure for energy generation through methane digesters. This is exciting technology—especially as our Nation explores alternative sources of energy.

Congress should not allow activist judges to legislate from the bench on this issue. We need to act soon to clarify that liability and reporting requirements under CERCLA and parallel reporting requirements under EPCRA do not apply to livestock manure.

OPENING STATEMENT OF HON. BARBARA BOXER, U.S. SENATOR FROM THE STATE OF CALIFORNIA

Senator BOXER. Thanks, Mr. Chairman. As you noted, the last oversight hearing was 4 years ago on this program. I happened to be the Chair of the subcommittee then. So this is long overdue.

The Superfund program should first and foremost be about protecting the health and safety of our communities, including our children, who are the most vulnerable to toxic waste. In my State, we have the second highest number of Superfund sites. I have cared a lot about this program because of that, and other States across the country. I would ask unanimous consent to place in the record a chart, two charts from the EPA's own Web site, Mr. Chairman, if I might do that.

Senator THUNE. Without objection.

[The referenced material follows on page 129.]

Senator BOXER. What I wanted to point out is the top 25 States with Superfund sites with uncontrolled exposures. Uncontrolled exposures as defined by EPA. New Jersey has 19 of these sites, Senator Lautenberg. New Jersey has 19 of the uncontrolled sites, the highest in the Nation. Illinois has second, with 12 uncontrolled sites. Washington State, I say to my colleague, Senator Cantwell, and I should have Senator Durbin, 12, Washington 10, New York 8, California 7. It goes on. Many of our smaller States are on this list.

This isn't a question of left and right, as my good Chairman said. This is a question of right and wrong. Because a lot of these States are red States, a lot of these States are blue States. It is not about this, it is about right and wrong. What are we doing to clean these sites up?

I have to tell you that clear answers have not been forthcoming from the EPA about the state of the Superfund program. It has only been with extraordinary effort, using every tool at my disposal as a Senator that I have been able to piece together information

about the program and the nature of the threats posed by Superfund sites that for years have been underfunded.

I held up the current Assistant Administrator's confirmation, it wasn't personal. It was that I wanted information. I asked for funding shortfall information and honest answers about the risks posed by these sites. To date, I have received partial answers.

But what I have learned has made it clear that we have to get to the bottom of what is going on in this program. I am especially concerned about the sites where human exposure is not under control. I read some of the States that have the greatest hazard there. I learned there were 149 of these sites when I made my request. Today, EPA is saying there are 139.

Sites where human exposure is not under control can have pathways of exposure that directly affects our children. Residential back yards, parks, playgrounds or areas where children have easy access sometimes have arsenic, lead or other contaminants, according to EPA's own documents. I understand each site has its own story. Some are worse that others. Some have documented high levels of lead in children's blood like Omaha lead in Nebraska or Bunker Hill in Idaho.

One thing is clear: EPA should have an open door policy when it comes to information on the status of these sites. People have a right to know if their children are safe and if there is a threat, there is a fundamental right to know so those affected can act. That is the American way. Secrecy is not the American way. EPA's closed door approach to Superfund is unacceptable.

We share many values in this country, and one of the most central of values is the value we place on our children. It is totally unacceptable for EPA to say that members of a community or Members of Congress cannot know what is going on at these sites in terms of risk and funding. What EPA plans to do or not do should not be a secret. There is no national security here. The limited need to protect enforcement information isn't an excuse for keeping families in the dark.

It is stunning to see the casual way EPA treats the public's right to know. Many of the documents I have asked for at these sites, especially those relating to timing of cleanup, funding shortfalls and related risks are stamped "privileged." Look at it. This is what we get back. Privileged, across the whole page. The vast majority of the documents EPA provided in response to my questions were marked this way one very single page.

To shut the people out and keep them in the dark is unconscionable, and it must change. Superfund fee has long expired, polluters have been left off the hook. The funding levels for this program in constant dollars has dropped by more than a third. It should be no surprise that a program that has been shortchanged like this cannot meet its obligations. I have a bill to restore the polluter fee. That would be an important step.

I also applaud Senator Cantwell's effort in her bill to force EPA to put together a financial assurance program for polluting companies. It is a wonderful idea. Why should Superfund information be kept secret? What is the motivation? One thing is clear: if the public knew just how long the EPA planned to take to clean up the site next door, there would be an outcry. The Administration does

not want to shift priorities to a program like this. That is clear. So to prevent the outcry, people are left in the dark. It needs to change.

I plan to work with my colleagues in an effort to make sure that EPA has transparency, respects the public right to know. I plan to introduce a bill to ensure that the public right is protected and the door will be open at EPA, not tightly shut as it is now. I will do everything in my power to ensure that the state of this program is changed for the better. I look forward to working with my chairman and the Chairman of the full committee to make sure that this program gets back on track.

Thank you very much.

[The prepared statement of Senator Boxer follows:]

STATEMENT OF HON. BARBARA BOXER, U.S. SENATOR FROM THE STATE OF CALIFORNIA

Mr. Chairman, I appreciate your agreement as well as that of the Chairman of our full committee to hold this critically needed oversight hearing on the state of the Superfund program. I conducted the last oversight hearing as Chairman of this sub-committee more than 4 years ago and oversight of the EPA Superfund program is long overdue.

The Superfund program should first and foremost be about protecting health and safety of communities, including children who are the most vulnerable to exposure to toxic waste. I have long cared a great deal about the threat posed by Superfund sites in my State. California has the distinction of being second in the Nation in the number of Superfund sites with 94, tied with Pennsylvania and only exceeded by our friends in New Jersey. People who live near these sites have a right to know exactly what is in the Superfund site next door and what measures are being taken to protect them from the risks associated with these highly toxic sites.

I am sorry to report that clear answers have not been forthcoming from the EPA about the state of the Superfund program. It has only been with extraordinary effort using every tool at my disposal that I have been able to piece together information about the program and the nature of the threats posed by Superfund sites that for years have been under-funded. I held up the current Assistant Administrator's confirmation to attempt to gain access to information on sites where human exposure is not under control. I asked for funding shortfall information and honest answers about the risks posed by these sites.

To date, I have received only partial answers to my questions from the EPA—but what I have learned has made it clear that we must quickly get to the bottom of what is going on in this program. I am especially concerned about the sites where human exposure is not under control. I learned there were 149 of these sites when I made my request. Today there are 139 according to EPA's Web site.

Sites where human exposure is not under control can have pathways of exposure that directly affect children. Residential backyards, parks, playgrounds or areas where children have easy access have arsenic, or lead or other contaminants according to EPA documents. I understand that each site has its own story. Some are surely worse than others. Some have documented high levels of lead in children's blood like Omaha lead in Nebraska or Bunker Hill in Idaho. One thing is clear. EPA should have an open door policy when it comes to information on the status of these sites. People have a right to know if their children are safe. If there is a threat, there is a fundamental right to know so those affected can act.

EPA's closed door approach to Superfund site information is unacceptable. We share many values in this country. One of the most central is the value we place on the health and safety of our children. It is totally unacceptable for EPA to say that members of a community or Members of Congress cannot know what is going on at these sites in terms of risk and funding. What EPA plans to do or not do for a site should not be a secret. The limited need to protect enforcement information is no excuse for keeping families in the dark about the future of their community.

It is really stunning to see the casual way EPA treats the public's right to know. Many of the documents I have asked for at these sites, especially those relating to timing of cleanup, funding shortfalls and related risks are stamped "PRIVILEGED" across the whole page in bright red ink. The vast majority of the documents EPA provided in response to my questions were marked this way on every page; they were given to Senator Inhofe and EPA asked that our access be limited. They talked

about not allowing us to review these documents without supervision. This program is set up and paid for by the people. To shut the people out and keep them in the dark in this way is unconscionable. This is not a national security issue. It must change. It must change quickly.

The Superfund fee has long expired and polluters have been let off the hook as a result. The funding levels for this program in constant dollars have dropped by more than a third. It should be no surprise that a program that has been short-changed like this cannot meet its obligations to communities. I have a bill to restore the polluter fee and that would be an important step. I also applaud Senator Cantwell's efforts in her bill to force EPA to put together a financial assurance program for polluting companies.

Why should Superfund information be kept a secret? What's the motivation? One thing is clear. If the public knew just how long the EPA planned to take to clean up the site next door—there would be an outcry. The Administration does not want to shift priorities, that is clear. So, to prevent that outcry people are left in the dark. This needs to change. I plan to work with my colleagues in an effort to make sure that EPA has transparency and respects the public's right to know.

Senator THUNE. Thank you, Senator Boxer.

Let me just make a couple of comments, if I might, about the documents. First, following DOJ guidelines, EPA only provides privileged or confidential documents to the committees of jurisdiction. Chairman Inhofe has made these documents available to any member of this committee to help the members and their staff with our oversight function.

In terms of providing the documents to members off the committee, my understanding is that has never been done in the past, and I understand as well that there have been consultations with the late John Chafee's former chief counsel, and that that was the policy when he was the chairman of this committee as well.

Second, my understanding as well, there is frustration that many of the documents have been labeled privileged or confidential, or that they have been mislabeled. Again, I would simply say, that is not our call to make. We have to treat the documents in accordance with their classification. If we want to challenge the classifications, then that is something that needs to be done with the Administration privately, not publicly. So these documents that have been made available to Senator Boxer and the minority for the last 6 months, there has been ample time to discuss the classifications prior to today's hearing.

What I would add is that Chairman Inhofe has requested that I object to any unanimous consent request to place any privileged or confidential documents into the record of today's hearing. So I make that statement.

OK, what we are going to do is——

Senator BOXER. Well, Mr. Chairman, excuse me. If I might, as the Ranking on this subcommittee, respond to you. We will talk to our own lawyers and we will decide how we will act here. So I just want to make that clear.

Senator THUNE. Well, that is your prerogative. All I have simply said is——

Senator BOXER. You knew my prerogatives.

Senator THUNE. Well, if you want to take it up with the Administration or take it up with legal counsel, that is certainly within your realm of options.

But in any case, I want to proceed with opening statements. We have a couple of our colleagues who want to testify this morning, but I am told that Senator Obama has an opening statement, Sen-

ator Lautenberg, Senator Jeffords, you all have opening statements. Senator Jeffords does not?

OK, let's go to Senator Obama, unless you want to defer to your——

Senator OBAMA. I will defer to my better looking colleague.

Senator THUNE. All right, Senator Lautenberg.

Senator LAUTENBERG. At least he didn't say older.

OPENING STATEMENT OF HON. FRANK R. LAUTENBERG, U.S. SENATOR FROM THE STATE OF NEW JERSEY

Thanks, Mr. Chairman. Your statement, and I know given in good faith, does raise some eyebrows here. When we talk about privileged, I think the best way to describe it would be hidden, instead of privileged. Then in a subtitle would be hidden from the public, that is what we are talking about.

When Congress created the Superfund 25 years ago, our country made a commitment: a commitment to clean up toxic waste sites in our neighborhoods and communities. A commitment to the principle that those who did the damage, the polluter, should pay for the clean up of our environment. These commitments were upheld by every Administration from both political parties until the present Administration. The Bush administration does not believe that polluters should pay.

It is nothing new that some companies don't want to clean up the pollution they caused. What is new is that the Bush administration is helping companies evade their responsibility. So not only do citizens have to live with the pollution, but they also have to pay to clean it up. So the victims get taxed a second time. First, they have to pay for it, and second, they have to breathe it and worry about their kids playing nearby.

Superfund established fees that were paid by the oil and chemical industries. These fees were used to clean up abandoned sites that had been polluted by companies that are no longer in business. These fees expired more than 10 years ago.

But for a few years, the lack of fee collection wasn't a problem, because Superfund still had a surplus of resources to clean up toxic sites. Now it is a problem. The Superfund is broke, bankrupt. Now it is taxpayers, not polluters, who get stuck with the bill for their careless behavior for cleaning up those abandoned toxic sites.

While the oil companies and others rake in profits, taxpayers get stuck with the bills. It is a bad deal for our taxpayers, a threat to the health of the people in States like New Jersey, where we have over 100 sites. We have about a dozen that are considered highest priority. But over 100 sites on the National Priority List for cleanup, those sites, 14 of them, actually, where human exposure to contaminated soil, polluted groundwater or air emissions is not under control.

It is bad enough that the Bush administration doesn't want polluters to pay to clean up these sites. But even worse, they are trying to hide from the public the information about the threats to their health. The Environmental Protection Agency, EPA, has refused, as we heard from Senator Boxer, to release information about toxic sites in communities where people live. The American people deserve the truth about threats to their health. They de-

serve a strong Superfund that makes polluters pay to clean up toxic sites. I am pleased that two of our most distinguished colleagues, Senator Cantwell and Senator Durbin, will be testifying before us today.

I would also like, particularly like to extend a welcome to Bob Spiegel of the Edison Wetlands Association, an organization in New Jersey. Bob has been fighting a good fight for many years, cleaning up polluted sites in New Jersey and protecting our citizens. That really, without any resources except that which he creates himself. So I wish that the Bush administration shared the concern, the commitment to environmental protection that Bob Spiegel and so many others across the country have demonstrated. I thank Bob Spiegel for being here today.

Mr. Chairman, thank you. I heard your opening remarks. I hope that you will understand that when the question of privilege is exerted, that it really suggests to us that this is information that, given to an enemy, might be dangerous for our well-being. This isn't dangerous. This is sleight of hand, and it is resented, and hopefully will be understood by the public across the country.

Thanks, Mr. Chairman.

[The prepared statement of Senator Lautenberg follows:]

STATEMENT OF HON. FRANK R. LAUTENBERG, U.S. SENATOR FROM THE STATE OF NEW JERSEY

Thank you Mr. Chairman for holding this oversight hearing on the Superfund program.

When Congress created the Superfund 25 years ago, our Nation made a commitment. A commitment to clean up toxic waste sites in our neighborhoods and communities. A commitment to the principle that polluters who damage our environment should pay to clean it up.

Those commitments were upheld by every Administration from both political parties—until the Bush administration. The Bush administration doesn't believe polluters should pay.

It's nothing new that some companies don't want to clean up the pollution they cause. What is new is that the Bush administration is helping companies evade responsibility. Instead of making polluters pay, they want to protect polluters. So not only do citizens have to live with the pollution, but they also have to pay to clean it up.

The Superfund established fees that were paid by the oil and chemical industries. These fees were used to clean up abandoned sites that had been polluted by companies no longer in business.

These fees expired more than ten years ago, but for a few years, the lack of fee collection wasn't a problem because the Superfund still had a surplus of resources to clean up toxic sites. But now it is a problem. The Superfund is broke. Now it is taxpayers—not polluters—who get stuck with the bill for cleaning up these abandoned toxic sites.

While the oil companies and other polluters rake in record profits, taxpayers get stuck with the bill. This is a bad deal for taxpayers—and it's a threat to the health of people in states like New Jersey, where we have 113 sites on the National Priority List for cleanup.

There are 14 New Jersey sites where human exposure to contaminated soil, polluted groundwater, or air emissions is not under control. It's bad enough that the Bush administration doesn't want polluters to pay to clean up these sites.

But even worse, they don't even want the American people to know about plans to clean up these sites that pose threats to their health. The Environmental Protection Agency has refused to release information about toxic sites in communities where people live.

The American people deserve the truth about threats to their health. They deserve a strong Superfund that makes polluters pay to clean up toxic sites.

I am pleased to see that two of our most distinguished colleagues, Senators Durbin and Cantwell, will be testifying before us today. I would also particularly like to extend a welcome to Robert Spiegel of the Edison Wetlands Association. Bob has

been fighting the good fight for many years, cleaning up polluted sites in New Jersey and protecting our citizens.

I wish the Bush administration shared the commitment to environmental protection that Bob and so many others across the country have demonstrated. Thank you, Bob, for coming down for this hearing today.

Thank you again Mr. Chairman, for holding this important hearing.

Senator THUNE. Thank you, Senator Lautenberg.

Senator Obama.

OPENING STATEMENT OF HON. BARACK OBAMA, U.S. SENATOR FROM THE STATE OF ILLINOIS

Senator OBAMA. Thank you very much, Mr. Chairman, I appreciate the time.

Let me just start, because I know my colleagues are waiting, I am going to be brief. But I do have to echo something that has been said about this assertion of documents that are privileged and confidential. I recognize that these are labels that were placed on these documents by the Administration. I hold them responsible.

I do have to note, Mr. Chairman, that if we don't hold them accountable, I don't know who does. If we get into a situation in which any time there is information that an Administration, Democrat or Republican, decides they don't want exposed publicly, all they have to do is slap on the privileged or confidential label and that's the end of the story, and we are going to be completely deferential to those determinations, then the American public is not going to be well served.

I cannot imagine a circumstance, and I will be asking the lawyers, what the circumstances might be whereby information about polluted sites somehow can't be made available for the public record. Maybe there is an answer to that. I don't know what it is.

One of the most basic roles of a congressional committee is oversight. We haven't had an oversight hearing in the past few years. But when properly done, oversight can help to figure out what aspects of agency work is moving properly and hopefully to provide a prod to the Agency if it is not attending to some important issues.

Now, during the past year and a half, I have spent quite a bit of time on children's health issues. Because of their smaller size, their developing organs and bones and their propensity to play in dirt and put things in their mouths, children are more vulnerable to environmental hazards than most adults. As a result, one of my priorities has been ensuring that Agencies such as EPA are adequately protecting our children's health.

Now, Senator Boxer, about this time last year, approached Senator Durbin and myself with a chart showing that Illinois had the highest number of Superfund sites with "uncontrolled human exposure." Just to give you one example of one of these sites, Mr. Chairman, one of them is in Ottawa, IL. Ottawa is a small town in central Illinois, about an hour and a half, 2 hours outside of Chicago. There was a plant there where mostly women worked in a factory, painting luminous clock faces. Because of the fine detail work needed, women were preferred. They were taught to roll the brush with their tongue to make a fine point. It turns out that they were licking radium-laced paint.

Now, obviously that is tragedy enough. Most of them died in their twenties. These women would now be grandmothers and

great-grandmothers. They lost their lives as a consequence of working to better the lives of their families.

The factory is closed, but the radium contamination remained. Another generation began to have uncommon cancers. Now a new generation of children is growing up in Ottawa, and they are being exposed to some of these same hazards, because the Superfund site where human exposure is uncontrolled, there is a vacant lot where children play and there is a skateboard park that teenagers use.

There are similar tales around the country. Shortly after Senator Boxer showed us this list of uncontrolled sites, Senator Durbin and myself asked the EPA to elaborate on the situation at these sites. It took 9 months to get a response from EPA. After 9 months, the response that they sent us was still incomplete. We later learned that they had provided Senator Boxer more information about these Illinois sites than they had provided Senator Durbin and I.

So you might understand our sense of frustration about this. I am sure if you had a similar situation in South Dakota, you would be similarly frustrated. We have now received some more information from EPA, but frankly, the men, women and children who live near these sites deserve better than a piecemeal release of information or a grudging release of information to the two Senators that represent this area.

So I am hopeful that, I know there is going to be a break for a vote and then we will have a chance to return to the panel, part of what I want to hear from the EPA is what is it in the culture at EPA that prevents us from getting timely, forthcoming information about these situations? We recognize that the EPA didn't necessarily create these hazardous situations, but it is part of their mandate to fix it. We have an obligation to make sure that we are well informed about what they are doing.

Thank you, Mr. Chairman.

[The prepared statement of Senator Obama follows:]

STATEMENT OF HON. BARRACK OBAMA, U.S. SENATOR FROM THE STATE OF ILLINOIS

Mr. Chairman, Ranking Member Boxer, thank you for holding this important hearing today. One of the most basic roles of a congressional committee is oversight. Unfortunately, that hasn't happened much over the past few years. But, when properly done, oversight can foster a productive ongoing dialog between the Agency and Members of Congress about what is working, what is not, and how Congress and the Agency can work together to improve the operation of government.

During the past year and a half, I've spent quite a bit of my time on children's health issues. Because of their smaller size, their developing organs and bones, and their propensity to play in the dirt and put things in their mouths, children are more vulnerable to environmental hazards than most adults. As a result, one of my priorities has been ensuring that agencies such as EPA are adequately protecting our children's health.

About this time last year, Senator Boxer approached Senator Durbin and me with a chart showing that Illinois had the highest number of Superfund sites with I quote "uncontrolled human exposure." The EPA Web site with information on these sites reads a little like a Stephen King novel.

For example, one of the sites is in Ottawa, IL. Ottawa is a small town in central Illinois where hardworking Midwestern women went to work in a factory painting luminous clock faces. Because of the fine detail work needed, women were preferred. They were taught to roll the brush on their tongue to make a fine point. Of course, we now know that they were licking radium-laced paint.

Most of them died in their 20's. These women, who would now be grandmothers and great grandmothers, gave their lives so they and their families could have a better life. The factories closed but the contamination remained and another genera-

tion began to have uncommon cancers. And now a new generation of children is growing up in Ottawa, and they're being exposed to these same hazards. You see, near these Superfund sites where human exposure isn't controlled, there's a vacant lot where children play and there's a skateboard park that teenagers use.

Unfortunately, there are similar tales at other sites around the country.

Shortly after Senator Boxer first showed us the list of uncontrolled sites, Senator Durbin and I asked EPA to elaborate on the situation at these sites. It was a reasonable request, but it took 9 months for EPA to provide an incomplete response. And incredibly, we later learned that EPA provided Senator Boxer with more information about these Illinois sites than they had provided us.

We've now received some more information from EPA. But frankly, the men, women, and children who live near these sites deserve better than this piecemeal release of information.

I hope today's hearing will impress upon EPA that we are serious about oversight in this committee. Again, I thank the Chairman and Ranking Member for examining this issue.

Senator THUNE. Thank you, Senator Obama.

Again, I will let EPA speak to the question of what they consider to be privileged and confidential. My understanding is that that is to, when they classify those things that way, it is to ensure that ongoing enforcement actions aren't compromised. But I would add, you should have had, as a Member of this committee, nobody on this committee should have been denied access to any of that information, any of that.

Senator OBAMA. Thank you.

Senator THUNE. Senator Durbin, Senator Cantwell, thank you for your patience. Please, Senator Durbin, proceed, and then we will move to Senator Cantwell.

STATEMENT OF HON. RICHARD DURBIN, U.S. SENATOR FROM THE STATE OF ILLINOIS

Senator DURBIN. Thank you, Senator Thune, for having this hearing. Thank you, Senator Boxer, for your leadership on this issue. You have really informed me and Senator Obama about things involving this Superfund issue which we couldn't find, as members of the Senate. It is an incredible situation. But I thank you for your diligence. I am glad we are talking about this.

I testified before this subcommittee before on this issue. Since then, there has been very little progress. I am really troubled that, as we learn more about the health implications of exposure to hazardous chemicals, especially threats to children, as Senator Obama has noted, our commitment to provide the funds necessary to clean up these orphaned hazardous waste sites has declined. So as we learn more about the threat, we put less into the effort to clean it up. That is exactly the opposite of what I think public service requires.

Over the years some in Congress and this Administration have resisted reauthorizing the Superfund approach which says very basically, polluters pay. Instead, the approach of the Administration is, all taxpayers pay. If someone is guilty of pollution, everyone should pay for it. Most of us feel that the ones who are responsible, the industries responsible, should be paying for the cleanup.

Sadly, if we go to the all taxpayers must pay approach, we find Superfund fighting with so many other things that need funding: cutbacks in Amtrak and health care and education. We know at the end of the day there will be very little, if any, money left to do anything necessary, anything that is necessary to clean up.

We know that these funding shortages delay cleanups and leave communities at risk. I am troubled that cleanup is still not completed, sites listed 20 years ago. Parsons Casket Hardware site in Belvedere, IL, 6,000 people live within 1 mile of this site. Twenty years ago, we said it was a problem. Nothing has been done.

My recent communications with EPA have made it clear there is another problem, and it has been highlighted this morning. The EPA doesn't want to talk about this. When they talk about it, they want to stamp "privileged" on it and suggest that we don't want the public to know.

Wait a minute. If this is a danger to the public and we have an open and transparent Government, why aren't we telling the public about this danger? Is this building up to another Erin Brockovich movie? Is that what it will take to finally get the EPA to meet their public responsibility?

Senator Obama has mentioned, last year Senator Boxer approached us with a list of 11 Superfund sites in our home State. I am sorry that we are No. 2 on the list. I wish we weren't even on the list. Senator Obama and I said, "Well, let's go to the EPA and get the information." We wrote a letter. First, tell us information about these sites. Second, analyze any threats at these sites. Third, tell us your timetable and your plan to clean them up. It was a pretty straightforward letter, when you get right down to it.

It took them 9 months to write a reply. Nine months. What a gestation period for a simple letter. The EPA then refused to provide us as much information as they already had posted on their Web site. So we wrote them back and said, Excuse me? You can't tell us, as U.S. Senators what is going on in our State at Superfund sites that you are responsible for? Meanwhile, people are asking questions, we go to their Web site, we understand there is some threat of human exposure, Senator, what can you find out for us?

Well, it turns out the EPA would tell us little or nothing. We wrote to them again and we received a second response. Unfortunately, it was still woefully incomplete. In fact, many of the responses from the EPA are confusing and misleading. How is it the Interstate Pollution Control site in Rockford was not on the July 2005 list of 11 sites with uncontrolled human exposure, then was classified as uncontrolled in their April letter to us, and then was removed from the list 2 months later in the June response? I don't think the EPA is even in communication with itself, when it comes down to some of these sites.

If you lived next to this polluted site, what would you think? If your kids were anywhere near, if your family was near, if there was a threat that some of this exposure might lead to cancer or other serious illness, wouldn't you be worried? Any responsible parent would be.

Can any of us in this committee really have confidence that the sites in our States have been accurately classified? Can we be sure the EPA designates a site today and then won't change its mind tomorrow for no obvious reason? You have to get to the bottom of it, not just for the families that are developed here, but for the reputation of the U.S. Senate. If we cannot ask the hard question and get honest answers from an Agency of this Government, we are failing in our oversight responsibility. We need answers before

there is any further damage or exposure to the communities and families that are affected.

Thank you for this hearing.

Senator THUNE. Senator Cantwell.

STATEMENT OF HON. MARIA CANTWELL, U.S. SENATOR FROM THE STATE OF WASHINGTON

Senator CANTWELL. Thank you, Mr. Chairman, for holding this crucial Superfund oversight hearing, and to the Ranking Subcommittee Member, Senator Boxer, for her leadership, and to my other colleagues for being here today.

A few weeks ago, the Wall Street Journal reported on a growing phenomenon across the West: that is, that towns and cities are struggling to ensure cleanup from decades of environmental contamination on properties formerly owned by the ASARCO Company. For over a century, ASARCO mined and smeltered and refined metals at sites across the country, leaving behind a legacy of lead, arsenic and other contamination in more than 90 sites in 22 western States. But when ASARCO, a former Fortune 500 company, filed for bankruptcy in August 2005, suddenly the American taxpayer was stuck with a billion dollar cleanup bill for the company's legacy of environmental pollution, which includes 19 Superfund sites nationwide.

I would like to explain briefly to the committee how this happened, because I think these are very important lessons that Congress can learn from in order to reinvigorate Superfund. It started in 1999 when a private Mexican mining company, Grupo Mexico, bought ASARCO. Within days of their takeover, Grupo Mexico began a fire sale of its non-mining assets to pay for the takeover costs. These actions liquidated many of the resources that ASARCO could have used to clean up its toxic legacy.

Then in the summer 2002, Grupo Mexico attempted to purchase ASARCO's stake in Peruvian mines at a price way below their market value. With EPA growing increasingly concerned over ASARCO's ability to fulfill court decrees to clean up some of the Superfund sites, the Department of Justice lawyers blocked the asset transfer, expressing concerns that ASARCO was selling off assets to avoid their liability responsibilities.

Salvaging what public value they could in 2003, the Federal Agency struck a deal with ASARCO in which they agreed to put up $100 million in funds to pay for contamination cleanup on about 30 sites. In exchange, ASARCO received a 3-year moratorium on Federal cleanup enforcement and was allowed to sell the Peruvian mines to their parent company, Grupo Mexico.

However, last August, just as the 3-year moratorium was set to expire, an asset-poor ASARCO filed for Chapter 11 reorganization, leaving taxpayers and local communities holding the bag for an estimated $1 billion in cleanup of these contaminated sites across western States. In my own State, ASARCO has two Superfund sites, including a $180 million mess on the shores of Commencement Bay, adjacent to the cities of Tacoma and Ruston.

The real world effects of ASARCO's corporate maneuvering became strikingly clear last summer when the day after ASARCO declared bankruptcy, contractors abandoned, midway through the

project, the leveling and cleaning up of local yards that they had torn up to remove contaminated dirt. This picture actually shows the sites in Tacoma where ASARCO literally walked off the job. Walked off the job when they declared bankruptcy, and left these sites just as they are there.

I wish I could say that ASARCO was just an exceptionally bad actor, but there is evidence that the company's devious practices are more common than we realized. That is why we asked for an investigation into this. I might note, we were successful in getting emergency funds from EPA, taxpayer dollars, to basically finish the cleanup in these individual yards as we continued to battle.

But that is why in 2002, when ASARCO first threatened to file for bankruptcy, I asked the Government Accountability Office to examine how corporate polluters like ASARCO might be avoiding their cleanup responsibilities under existing environmental law. I want to thank Senators Jeffords and Boxer for helping with that important investigation.

Some of you may know that that report found that EPA faces significant challenges when seeking to hold businesses responsible for their cleanup liabilities in bankruptcy and other financial distress. It is because of that report that I have filed legislation that my colleagues have supported that will help us get the financial assurances that we need earlier in the process.

The report found that EPA could make greater use of available authority and enforcement tools to pursue these hazardous waste cleanups from bankruptcy courts and financial distress businesses. So I urge my colleagues to not leave the American taxpayer on the hook for cleaning up contaminated sites or leaving residential yards unfinished but instead to do what it takes for us to provide sound and safe cleanup on Superfund sites across the United States.

I thank the Chairman and the Ranking Member.

Senator THUNE. Thank you, Senator Cantwell.

We have a vote on, and just a few minutes left to vote on the supplemental Appropriation bill. So I am going to recess, then we will come back and take it up with EPA.

[Recess.]

Senator THUNE. The hearing will resume.

I want to ask Assistant Administrator Bodine to come forward and take the witness stand. Before we hear testimony from her, we have been joined by our colleague from Montana, Senator Baucus, who would like to make an opening statement. Senator.

Senator BAUCUS. It is pretty formal here, she is taking the witness stand. That is a whole new development.

[Laughter.]

OPENING STATEMENT OF HON. MAX BAUCUS, U.S. SENATOR FROM THE STATE OF MONTANA

Senator BAUCUS. I thank the Chairman.

Mr. Chairman, as we well know, a part of EPA's mission is to protect the public health from environmental degradation. Perhaps nowhere is this challenge greater than in the town of Libby, MT. Just listen to the story of Mel and Lerah Parker. In 1993, they bought a little piece of land along the Kootenai River from W.R.

Grace and Company. This land was a site of W.R. Grace's screening plant. But to Mel and Lerah, it was the perfect spot to start their own business, Raintree Greenhouses. They worked hard, built their business. By the late 1990s, they had the largest nursery in the State of Montana.

Then in 1999, the extent of the asbestos contamination was uncovered, and the Parkers' world literally came crashing down. EPA had to tear down their outbuildings, their greenhouses and their home. The EPA even had to destroy their cars and many of their personal belongings. For several years, the Parkers rented a house. Lerah Parker was recently diagnosed with asbestosis.

Because of the huge loss they took with their business, they will never rebuild their greenhouses. But the Parkers are resolute. They hope to one day rebuild a house on a little piece of property along the Kootenai River.

This is just one story from Libby. There are hundreds of others, many of them even more tragic. Tremolite asbestos from W.R. Grace's vermiculite mine has killed some 200-area residents and sickened hundreds more. Again, killed over 200-area residents and sickened hundreds more.

Assistant Administrator Bodine, I hope to impress upon you just how important it is that EPA get the cleanup in Libby right. In all my years as an elected official, this issue of doing what is right for Libby is one of the most personally compelling things I have ever been called upon to do. I have been to Libby 18 times since the year 2000. Every time I go, the devastation is worse, and it is worse. More people are sick and dying. Helping the people of Libby is a very personal fight for me, and I want to do all I can to get Libby residents the help they need and deserve. It is the right thing to do for both the victims and for future generations that we can still protect.

That is why I was completely outraged to learn just last week that workers digging a water line discovered a patch of tremolite asbestos near the surface 8 to 12 inches thick, 6 feet wide and 20 feet long in a site that was supposed to have been cleaned up, not once but twice, the first time by W.R. Grace and the second time by EPA itself. Compounding the offense is the fact that the workers were digging a water line that was intended to serve the park that features the asbestos victims' memorial.

It is not right. It is totally unacceptable. Given such outrageous failures, I ask how can the EPA ever assure folks like the Parkers that it is safe to rebuild their homes? According to EPA's own calculations, there are 16 exposure pathways that exist in Libby, 16. Asbestos exposure can occur via the dust, soil, air, and other media at commercial and residential sites. Cleanup has not even begun at Troy, MT, which faces many of the same issues as Libby, including a school building that needs to be cleaned.

The discovery of tremolite asbestos in an area that was supposed to have been cleaned up twice calls much of EPA's work at Libby into question. What quality controls are in place to ensure that their mediation is adequate to protect the public health? How long will Troy have to wait before EPA begins their work? The Parkers deserve better. All of the residents deserve better. EPA needs to

make Libby, MT, one of its top priorities. People are sick, they are dying. They need our help.

We are the public servants, they are the employers. We are supposed to be working for them. Not some different Agency that has a different point of view. We are the employees. We are working for the people and the country who we represent. I strongly urge the EPA to do their part and help right the wrong that has been committed. It is an outrage, Ms. Bodine. I see EPA people come and go. I think to some degree they look at it just as a turn of the crank, punching the clock, it's a job. That is not what your job is. Your job is to serve the people. Your job is to clean up this Superfund site, get rid of all this asbestos, get rid of all this vermiculite, get rid of it, clean it up more quickly, not just in a turn the crank, passive way, as has been the case when this asbestos has twice been missed.

Mr. Chairman, the Parkers and hundreds of other Libby residents ought to begin rebuilding their lives. I am embarrassed it has taken this long, to be honest with you, Mr. Chairman, Ms. Bodine. All these years it has taken, you had one person working up there that was really good, for 2 or 3 years. His name escapes me right now. He was excellent. He had the confidence of people in Butte. He bled. He cared. He was an amazing guy. He lived in the community for a couple, 3 years.

You just need to, I will get his name to you. You have to find people like him, not only in Libby, but everywhere. But I am thinking more about Libby right now.

Thank you for holding this hearing, and I look forward to responses to my questions. I just want to impress upon you, Ms. Bodine, I have never experienced anything in the years I have been in the Senate, and that is 27 years, like this. These people just, it is a part of Montana that is more remote, it is a part of Montana people just don't know a lot about. These people were made sick intentionally, in my judgment, by W.R. Grace. There is a criminal suit going on right now. If you look at the documents, it is quite clear that W.R. Grace knew what it was doing, it knew it was causing this damage to the people of Libby, MT. That is why they transferred 90 percent of their assets out of reach of patients, so lawsuits couldn't attach 90 percent of their assets. That is on the record. They did that intentionally to avoid these lawsuits. They knew what they were doing.

At least you ought to know what you are doing. I don't say that personally. I say that as the Assistant Administrator of EPA, to get this done right away. Clean it up.

Thank you, Mr. Chairman.

[The prepared statement of Senator Baucus follows:]

STATEMENT OF HON. MAX BAUCUS, U.S. SENATOR FROM THE STATE OF MONTANA

Mr. Chairman, thank you for holding this hearing. Part of the EPA's mission is to protect the public health from environmental degradation. Perhaps nowhere is this challenge greater than in the town of Libby Montana. Just listen to the story of Mel and Lerah Parker.

In 1993 they bought a little piece of land along the Kootenai River from W.R. Grace and Company. This land was the site of W.R. Grace's screening plant, but to Mel and Lerah it was the perfect spot to start their own business, Rain Tree

Greenhouses. They worked hard, built their business, and by the late 1990s they had the largest nursery in the State of Montana.

Then in 1999 the extent of asbestos contamination was uncovered, and the Parker's world literally came crashing down. The EPA had to tear down their outbuildings, their greenhouses, and their home. The EPA even had to destroy their cars and many of their personal belongings.

For several years the Parkers rented a house. Lerah Parker was recently diagnosed with Asbestosis. Because of the huge loss they took with their business, they will never rebuild their greenhouses, but the Parkers are resolute. They hope to one day rebuild a house on their little piece of property along the Kootenai River.

This is just one story from Libby. There are hundreds of others, many of them even more tragic. Tremolite asbestos from the W.R. Grace vermiculite mine has killed some 200-area residents and sickened hundreds more.

Assistant Administrator Bodine, I hope to impress upon you just how important it is that the EPA get the cleanup in Libby right. In all of my years as an elected official this issue of doing what is right for Libby is among the most personally compelling things I have ever been called on to do. I've been to Libby 18 times since 2000 and every time I go the devastation is worse and worse. More people are sick and dying. Helping the people of Libby is a very personal fight for me. I want to do all I can to get Libby residents the help they need and deserve. It's the right thing to do for both the victims and the future generations we can still protect.

That's why I was completely outraged to learn just last week the workers digging a waterline discovered a patch of tremolite asbestos near the surface 8 to 12 inches thick, 3 feet wide and 20 feet long on a site that was supposed to have been cleaned up, not once but twice, the first time by W.R. Grace and the second time by EPA itself. Compounding the offense is the fact that the workers were digging a waterline that was intended to serve the park that features the asbestos victims' memorial. It's not right. It's totally unacceptable.

Given such outrageous failures, how can the EPA ever assure folks like the Parkers that it is safe to rebuild their homes?

According to EPA's own calculations there are 16 exposure pathways that exist in Libby. Asbestos exposure can occur via the dust, soil, air, and other media at commercial and residential sites. And cleanup has not even begun at Troy, MT, which faces many of the same issues as Libby, including a school building that needs to be cleaned.

The discovery of tremolite asbestos in an area that was supposed to have been cleaned twice, calls much of the EPA's work at Libby into question. What quality controls are in place to ensure that the remediation is adequate to protect the public health? How long will Troy have to wait before EPA begins their work?

The Parkers deserve better—all Libby residents deserve better. EPA needs to make Libby, MT one of its top priorities. People are sick and dying and they need our help. I strongly urge the EPA to do their part and help to right the wrong that has been committed.

Mr. Chairman, the Parkers and hundreds of other Libby residents want to begin rebuilding their lives. Thank you for holding this hearing. I look forward to hearing the responses to my questions.

Senator THUNE. Thank you, Senator Baucus.

We will now proceed to our second panel. We have with us Assistant Administrator Susan Parker Bodine. Ms. Bodine, Administrator Bodine, please proceed with your testimony and then we will open it up to the panel for questions.

STATEMENT OF SUSAN PARKER BODINE, ASSISTANT ADMINISTRATOR, OFFICE OF SOLID WASTE AND EMERGENCY RESPONSE, ENVIRONMENTAL PROTECTION AGENCY

Ms. BODINE. Good morning, Mr. Chairman, members of the subcommittee. I am Susan Bodine, EPA's Assistant Administrator for the Office of Solid Waste and Emergency Response. I am very happy to appear today to talk about the Superfund program, identify the challenges, talk about where we have been in the past and where we are now that the Superfund program is in its third decade.

I will summarize my statement, but ask that the entire statement be submitted into the record.

Senator THUNE. Without objection.

Ms. BODINE. You have my written statement, and in that, I have attempted to explain the history of the program. Some of you need no explanation, some of you have been working with the program for many years. The point I am trying to make in the statement is that the Superfund program is not where it was in 1980 when it was enacted by Congress in response to situations like Love Canal or Times Beach.

At that time, there was outcry and concern over large toxic waste sites, the program got started, started investigating these sites. But a lot of time was being spent on investigation at that point, because it took a lot of time to determine what the risks were and to determine what the technological solutions were. So not a lot of progress was made in the 1980s, I think that is fair to say.

In the 1990s, in the program in its second decade, you saw more progress. Ten years had gone by, studies were completed, remedies were selected, so you did see more sites going to construction. So again, it is a natural progression of the program.

The program is now in its third decade. We are not done, by any means. What has been completed are the easier sites, the smaller sites. I know that other EPA officials have made that point. What I tried to do in my written testimony and in some of the attachments to that was provide the documentation that shows that that is the case, the vast majority of the sites that are at the construction complete stage were the low cost sites, were sites that cost EPA itself either less than a million or less than $5 million.

What we do have left are the higher cost sites, either higher in oversight costs being carried out by PRPs, or fund lead sites with multiple operable units that are more complex, or Federal facility sites, which can have up to 10 or more operable units. That is the challenge that we face in the program now.

But I also want to impress upon the subcommittee that that is not the only cleanup that is going on. There has been a huge growth in cleanup through State programs. There has been a huge growth in State cleanup programs as well as State voluntary cleanup programs, as well as brownfields programs that EPA has sponsored and supported. So what would have been listed on the Superfund National Priorities List back in the 1980s, those sites aren't even coming to the NPL any more. We are not seeing the small, low cost sites that were listed in the 1980s, and completed in the 1990s. Those sites are being done under State programs.

The sites that come to the National Priority List today are either the complex sites from a technological standpoint, or they are the sites that don't have cooperative PRPs, and that need Federal enforcement. That is the profile of our current sites, and those are the sites that we are managing today.

I would like to talk about some of the issues that were raised in earlier discussions this morning. One of the areas that I very much am personally interested in is improving management of the Superfund program. That requires good information. The program, and the Agency has been getting much better about providing information. In fact, far more data and far more information is available

about these sites than has ever been in the past. I would point out that currently, for every site, we have a site profile—I have examples of a couple of them here, that is available on our Web site.

These profiles link to documents. That is an exciting technological advance that we now have called SDMS, Superfund Document Management System. We are linking to the actual records of decisions. You can link to the risk information from ATSDR. You can link to investigation and RFS documents. There is far more information available about each NPL site than has ever been available before.

I would also like to talk about the issue of whether or not sites are exposure under control or not under control. On that issue, that is a measure that was never publicly available, never actually reviewed until 2002. In 2002, EPA began to look at the sites in terms of whether human exposure was under control or not, and make that information publicly available. So again, that is new information that had not previously been available.

The data on that, that is one thing I have been spending a lot of time on since I started in this job in January of this year, is to improve the quality of that data. I think Senator Durbin made the point, the sites have shifted. That is true. That is because we have been spending a lot of time examining those sites, talking to the regions to determine whether or not truly there is human health under control or not. By that, that definition means whether or not there is a complete exposure pathway to a chemical or contaminant above a level of concern. If there is a complete exposure pathway, it should be indicated as not under control, human health not under control. If there is no complete exposure pathway under current site conditions, it should be under control.

Based on the documents that we provided to the committee prior to my confirmation, reviewing those, it was clear that the regions were essentially all over the map in how they were interpreting that, how they were supposed to apply that definition. We are now changing our guidances, making sure everyone understands how it is supposed to be used.

We have completed review of all the sites that are not under control. We are also going back and looking at the sites that were listed as under control to make sure those were properly categorized. So when we are done, we will have a good data-set that we can rely on and use to manage the program. I wanted to make sure people understood that.

Then one point, I know I am way over my time, in terms of the risk information related to these sites, that information is absolutely public information, the risks associated with these sites. It is certainly on our Web sites, and we have links to documents. But also the information that we provided to the committee that dealt with the risks and the exposure pathways, all that information was not marked privileged. The privileged information had to do with funding and the issue of privilege was related to enforcement. The Agency is not at all claiming that any situation or any issue with respect to risk should not be a matter of public record.

Thank you.

Senator THUNE. Thank you, Administrator Bodine.

Let me ask a couple of questions and then I will turn to my colleagues to ask their questions as well. You have made reference to the human exposure not under control. Could you explain what that indicator means? Does it mean that there are NPL sites that have actual exposure going on?

Ms. BODINE. To flag a site as human exposure not under control, what that means is that under current site conditions, there is a completed exposure pathway. What we don't require are the remedial project managers to go out and prove that there is exposure, because that would be too difficult. We want to know that there is a completed exposure pathway. We consider that a problem that needs to be addressed.

So there is, I'm certain, actual exposure at some of these sites. But also, not actual exposure at some of these sites. In the information that was provided to the committee, again as part of my confirmation process, there were in many of the templates that were filled out on sites, you would have the first column saying no current exposure, and the second column saying potential exposure. Again, that is very confusing when we go back and look at it.

The remedial project manager may have said, no current exposure, but if there was a pathway, we would still say yes, that site is not under control and needs to stay on the not under control list. If there was no exposure pathway, for example, if you had contaminated groundwater but nobody was drinking it, no wells were sunk, then that site right now is under control and that is how we would track it.

That isn't to say the site is done. That isn't to say we have achieved long-term protection. That is still a site we are addressing through our remedial program. But human health exposure is under control at that site.

Senator THUNE. If you say that there is an exposure pathway, when do you then make a determination about, that there is potential for exposure when exposure actually occurs? When you say you are tracking that, if there is an exposure pathway, how do you get to the point where you make a determination?

Ms. BODINE. We are tracking the completed pathway and then when that pathway has been cutoff, and again, these are interim measures, but cutoff either by providing bottled water and alternative water supplies, on putting up a fence, just so the people are no longer exposed, then we would say human exposure is under control at that site.

The reason we don't go and actually look for actual exposure is because that would literally require you to essentially test people themselves to see whether they are exposed. We don't require that.

Senator THUNE. Let me ask you, since you have been on the job, since being confirmed as the Assistant Administrator, have you identified or been advocating or come up with any suggested improvements in the Superfund program? Obviously this is the first oversight hearing this committee has had in several years. So it hasn't been closely examined. My assumption is that having been on the job now for a few months, you have probably had an opportunity to look in some detail at the program.

Do you have recommendations that you would like to forward or things that you think can be done to improve the program?

Ms. BODINE. I certainly do believe that we can do better managing the program. That is something that I intend to do and intend to continue to work on. Again, I have spent a lot of the time in these first 6 months making sure that the data we have on exposure under control and exposure not under control are accurate. Because then, as has been mentioned by Senators here this morning, we can then be confident that we can use that data to manage the program to emphasize and to require that the data be used in prioritization. In fact, I have already made those changes that the indicator does need to be used in the funding prioritization.

The other changes again also go to having good information to manage the program, including our data bases and our tracking systems. We have a large effort underway right now to bring all of our data bases together so that a manager has access to everything at once. Again, we have made incremental steps on that. We have the documents now. We are tracking, doing a better job, we are tracking things like 5-year reviews, which had not been tracked before and following up where the reviews haven't been completed.

In addition, we are now looking at what is called the post-construction phase. A lot of the emphasis in the program to date has been on whether or not you have achieved construction completion. That was the benchmark people were looking for. But construction completion only means that the construction of the remedy is done. It doesn't mean that you have achieved long-term protection, it doesn't mean that you've got a site that's back into productive use.

We are now focusing on the post-construction phase, which has not been focused on recently. It is very important, because this is where we are really bringing the sites back to the American public, back to use. To do that, we need to make sure that we have institutional controls in place. I am placing a huge emphasis on that. We have established a new measure under GPRA, the Government Performance and Results Act, called Superfund Sites Ready for Re-Use. To be considered ready for re-use, our definition requires the institutional controls to be in place. That is a brand new effort, but again, that is to make sure that we are delivering on our promise to the American people that yes, we are constructing the remedy, but also, we are bringing these sites back into productive use.

Senator THUNE. Thank you.

Senator Obama.

Senator OBAMA. Thank you very much, Mr. Chairman. I want to thank my Ranking Member, Barbara Boxer and others, for deferring to me. I am going to have to leave, unfortunately, in just a couple of minutes.

First, any idea why it took us 9 months to get a response, Senator Durbin and myself, on this issue? I know it actually began before you were even appointed. But if a couple of U.S. Senators take 9 months to get a response, I can only imagine what the response would be like for ordinary citizens. Give me some sense of what is going on there.

Ms. BODINE. First, let me apologize personally for that. That should not have happened. What I believe happened was that people assumed that the information on the sites that was being provided to the committee was also being provided to you personally. Because the questions that you were asking were the same ques-

tions that the committee was asking. So there was a failure to follow up with you personally, and you obviously deserved a personal response.

Senator OBAMA. Well, that's fine.

Ms. BODINE. But the EPA has put in a process to track all of the correspondence, so this doesn't happen again. I apologize.

Senator OBAMA. Explain to me, if a lay person was just reading the term uncontrolled exposure, that would indicate that we don't have a handle on the exposure and that if in fact there are individuals, particularly children, who are playing on a site or near a site that is uncontrolled, that it poses a potential health risk to them. Am I misunderstanding the definition of uncontrolled? If I am not, then what active steps is the EPA taking in bringing it under control?

Ms. BODINE. In many cases, there is an interim step, you have long-term protection and you have final cleanup. But an interim step to cutoff exposure would be, for example, a fence. Another interim step could be a cap. In the skateboard park that you referred to at the Ottawa radiation site, there is 6 feet of soil between the radiation and the skateboard park. That is providing protection.

The piece where exposure is not cutoff is another area that is about 75 feet away. It is outside the skateboard park right next to a building. The owner of the building is making sure, is keeping people from that area and watching the site, monitoring the site so that it is not being trespassed upon. But that area does not have a fence at this point in time.

Senator OBAMA. So just so I am clear, it is fair to assume that if this is an uncontrolled site that it poses some potential health risk, is that an accurate statement?

Ms. BODINE. Yes, that is an accurate statement.

Senator OBAMA. OK. If that is in fact the case, how do you prioritize within the Agency to ensure that a site is considered controlled? What funding mechanisms at this point are being, are either existing or being pursued to bring these sites under control? Finally, what proactive measures are in place to inform residents who might be exposed that this is in fact an uncontrolled site?

The bottom line is, I am trying to get to a point where, if I am a parent with little kids near an uncontrolled site, (a) I know that it is an uncontrolled site; (b) that my State and local authorities are aware that it is an uncontrolled site, not that it is just posted on a Web site, but they actively know that this is the case; and (c) that there is some sort of ongoing efforts to bring it under control. Can you walk me through how that process is taking place right now?

Ms. BODINE. On the awareness of the public, every Superfund site has a community involvement coordinator. So we have a person who is assigned to work with the community and communicate to the community exactly the risks posed by the site.

On the funding priorities, up until this point, the regions have established the priorities based on their understanding of the risks at each site and are prioritizing based on risks. That has been done at the regional level. But that means that at the headquarter level, from a management level, I don't know exactly how they are establishing that.

So what I would like to do going forward is be much more clear in guidance to the regions on how they establish their funding priorities, that they do need to take into account the human exposure indicator.

Now, they have told me they already take this into account, and I believe that to be the case, but it is not formalized in terms of how you track to this particular environmental indicator. We will be doing that.

Senator OBAMA. What I would like to do, and I am out of time, I am going to work with Senator Durbin's office and with Senator Boxer to put in some more formal requests. I think we have to have some sort of formalized system so we know how priorities are being set and how these judgments are being made. So part of what I—it may be that in some cases you just don't know the answers yet. In other cases, it may be that the system has broken down in some fashion.

But I would expect, I would like to be able to say very clearly, here is how decisions are being made about controlling these sites. If it is a function of a lack of money, I want to be able to know that so that I could potentially work to get dollars for the EPA to control these sites. If it is not a question of money but just simply there are too many sites and we are prioritizing them based on risks and exposure, I would like to know what the formula is by which those decisions are being made, so that I can make some educated decisions about how I am going to proceed in terms of making sure my constituents are protected. I don't think that is too much to expect from your office.

Ms. BODINE. If I could just respond. I do want to assure you that the people who are making these decisions are the technical experts in the field, that these are not, it is not a top-down system. We have the folks that are working on the sites making these evaluations and judgments and they are very dedicated people.

Senator OBAMA. But if you, as the head of the responsible EPA office, don't know how those judgments are being made, and I don't expect you to know everything, although it would be nice if you, coming to this committee knowing that these questions were going to come up, had been fully briefed on it. But if you are having problems articulating it, I certainly don't know it. I guarantee you that the folks living in Ottawa or these other sites don't know it. I am just saying, this is something that we should know. It should be public, it should be clear, it should be transparent and people should be held accountable. That is what I am going to be looking for in the coming months.

Thank you.

Senator THUNE. Senator Boxer.

Senator BOXER. Yes, and I know Senator Obama is on his way. Before he leaves, I just want to pick up on something he said, very quickly. You said that the people who are making the decisions are in the field. Now, that is true in terms of their recommendations for how sites should be cleaned up.

Unfortunately, it is the budget crunchers who are deciding how much you are going to spend on these sites. I am not going to identify any of these, nor am I going to read them, in deference to my Chairman's remarks, which I, by the way, totally disagree with but

respect, and so I will go by his rules and will not put this in the record. But very clearly, Senator, and I am going to give you this, because you are allowed to see this, because you are on the committee, even though it said privileged, what we have here are directions sent out to people in the field saying, put together a budget, and one of them should be the least you can get by with. Not one word here about what we must do to make people safe.

So I want to give this to you, because I think you are onto something here. It seems like it should be simple, but it isn't simple where there is no commitment to this program. My belief is yes, the people in the field are committed. That's why I know what I know. But the people at the top, and I am not talking about you, Ms. Bodine, I don't know exactly what your influence is there, but I have to say, there is no interest, in my view, in this program.

So continuing, without mentioning, identifying the sites, I am going to ask my staff to give you a one-pager that was marked privileged by your people on a site I will not mention. I have gone through this with counsel. There is nothing in there, says my counsel, at all, that would have any impact on any lawsuit, as a matter of fact, in this case, the settlement funds are exhausted, and even if there is any future lawsuit, nothing in this document.

But I would say this. My gut tells me the reason this is marked privileged so people out there can't see it and people in this neighborhood can't see it is because it says that the human health risk here in this particular site, seafood consumption risk, is 40 times higher than it should be or higher in worst case scenarios, and dermal contact risk with shoreline soils, we talk about direct contact, is 4 times higher than it should be, or higher under worst case scenarios. Public and private access is a continual concern.

This deals with PCB levels that are 30 times higher than ambient water quality criteria, sediment PCB levels 10,000 times higher than ecologically safe levels. Your people are saying this. The real thing, I think, that your Administration doesn't want people to know is, you are actually considering taking 26 years to clean this up. You are considering 26 years to clean this up. You have got to be kidding. What are we here for?

So you have looked at this. What in this makes this that I can't hand it to everybody in the audience and the press? What is in here that makes it privileged?

Ms. BODINE. I would offer to sit down with you and with EPA counsel to——

Senator BOXER. No, no, no. I want you to tell my Chairman, who is defending you, what in here makes this be marked privileged, so that he has to now tell me that I can't give it out to the people, or people who aren't on this committee? What in this document?

Ms. BODINE. The issue, the areas of privilege that EPA is concerned about have to do with enforcement, which is why a document, on a document by document basis, I would be happy to sit down and determine if any enforcement——

Senator BOXER. I have already told you that our counsel has looked at this, the Senate counsel, and says there is not one thing in here that talks about enforcement. It has nothing to do with it. If you are worried about linking, we are not going to link.

So I guess I would ask you, on this particular document, so that we don't go into the range of documents, will you please have your people look at it and let me know by the end of the day if I can in fact release this to the Senators, two of whom do not sit on this committee, and to the Members of Congress, both sides of the aisle, and the people in the community? If you would get back to me, and in writing, in a privileged communication, tell me why I can't do that.

Now, I want to get some other things, and I see that my time is running out, so let me do this and ask for another round, if I can. Mr. Jim Gulliford has been nominated to be Assistant Administrator for the Office of Prevention, Pesticides and Toxic Substances. After his hearing, members of this committee asked him a series of written questions. When we received his responses, we could see that edits had been made to the document, cutting important information relating to things like whether EPA had internally sought more funds for the Omaha lead project than were formally requested by the Administration.

The fact that the answer was yes was deleted. We have, I know you probably can't see this, but I am going to read. This chart shows the deleted information. Prior to the issuance of the interim record of decision in December or initial request for funding to sample residential properties was higher than the amount received, but had virtually no impact on the actual cleanup, since we were limited in the amount of—is that what they wrote instead of—yes. So in other words, it was taken out, the simple answer, and this was what was inserted.

There were other important deletions as well. Mr. Gulliford has told us he approved the original response and headquarters asked for changes. A staff member in the Office of Congressional Affairs indicated that you made or were involved in the changes. More recently we were told by the same office that you were not involved in the changes. Were you or your staff involved in any way, directly or indirectly, in deleting the information relating to Superfund in Mr. Gulliford's responses? Did you meet with the potentially responsible parties in that case and discuss issues related to the deleted information? Do you believe Members of Congress are entitled to know the analysis of the funding needs for Superfund sites when they ask for it?

So those are three questions.

Ms. BODINE. No, I had nothing to do with any edits, nor did anyone in my office have anything to do with any edits of Mr. Gulliford's testimony.

Senator BOXER. So where were they edited?

Ms. BODINE. I do not know.

Senator BOXER. Will you find out? Because he said——

Ms. BODINE. All the responses have to go through the Office of Congressional and Intergovernmental Affairs.

Senator BOXER. I know, but you are responsible. You are the head of the Superfund program. He answered a question on a Superfund project, simply saying yes, that EPA internally sought more funds than were formally requested. You saw how that answer came back. Did that not get you upset, that Mr. Gulliford was being overturned by someone outside your office?

Ms. BODINE. I did not see those responses before they were sent to the committee.

Senator BOXER. OK. So even in your high level position, you didn't look at who in your office did?

Ms. BODINE. No one in my office looked at those responses before they were sent to the committee.

Senator BOXER. Well, where did they come from? Who delivered the responses to this committee, the answers to the questions?

Ms. BODINE. The Office of Congressional and Intergovernmental Affairs.

Senator BOXER. So the Office of Congressional Affairs deleted information that Mr. Gulliford answered, and you didn't see it, nor did you look at it before it came here?

Ms. BODINE. That is correct.

Senator BOXER. Thank you. Did you know anything about it, that they were changed?

Ms. BODINE. Only after the fact, after——

Senator BOXER. Did you do anything about it? Did you talk to anyone and say, why did you do that, why did you change Mr. Gulliford—after all, you are pushing for him. He's a good guy. He answered a question honestly and then his simple, straightforward answer is turned into gobbledygook. Did you make any—did it disturb you when you found out about it? Did it disturb you? Be honest with us. No one is going to hurt you for being honest.

Ms. BODINE. I was surprised. The emotion I felt was surprise. I guess I am not sure how to respond to your question.

Senator BOXER. Well, honestly, I wish you would just say how you felt. I feel like you're saying you were surprised. To me it is shocking that someone over at the Office of Congressional Affairs would edit someone's answers to questions that are important for this committee to know, important to know where this man stands. Now he, his whole image changes when that answer changes, a simple, straightforward question, did the EPA staff want more money to clean up that site in Omaha. "Yes," he answers, and then we get gobbledygook. It is very disturbing.

So I guess—I know my time has run out on this round. I just want to say to you, we need you to be honest with us. You are there to fight for the environment. That is what the EPA—it isn't the Environmental Pollution Agency, it is the Environmental Protection Agency. We can't seem to get that kind of passion over here. Thank you.

Senator THUNE. Senator Jeffords, we will recognize you, and Senator Boxer, I will say to you, we have people on the third panel who have a plane to catch, so we are probably going to have to submit questions for the record.

Senator BOXER. That's OK, I will submit them for the record.

Senator THUNE. OK, good. Senator Jeffords.

Senator JEFFORDS. I will put most of mine into the record. I just have questions for Susan Bodine.

The Government Accountability Office has documented that the Superfund program is operating with about 35 percent less money in inflation-adjusted dollars than it had in 1993. How has this impacted EPA's ability to clean up toxic waste sites?

Ms. BODINE. I wish I had a copy of the GAO report you are referring to. It is important, when you are looking at the numbers, to make sure that we are not comparing apples to oranges. Because in 1993, there was more in the Superfund appropriation than there is now. The appropriation was covering ATSDR and NIEHS, which received $50 million, $60 million, up to $70 million a year each. So that is one important component that we have to compare. I am not sure, since I don't have it in front of me, which two you are comparing.

But I would also ask you to understand that because we are collecting money from PRPs and we are setting up special accounts, we also have a great deal more money to spend that is not appropriated funding. Essentially, the expenditures have been relatively flat. Because we get an extra $160 million to $170 million a year that is PRP money, that is settlement money that is then put toward sites as well.

So funding has been relatively flat.

Senator JEFFORDS. The U.S. Supreme Court ruled last year that parties liable under Superfund cannot sue other liable parties for contribution unless they themselves have been sued by the Government. How has this ruling impacted the willingness of private parties to voluntarily cleanup contaminated property?

Ms. BODINE. Senator, you have asked me about how it has impacted people's willingness. I don't have that information. That is not data that you can collect. I have heard concern from parties that are interested in cleaning up sites. I have heard anecdotes that this is causing people to think twice about stepping forward and cleaning up sites.

But because we don't collect data on people's willingness, I don't have hard information for you on that.

Senator JEFFORDS. In August 2005, GAO recommended that EPA issue regulations required under the 1980 Superfund law to compel high risk facilities that manage hazardous substances, such as hard rock mining sites, to provide financial assurances of their ability to clean up their own mess, so that taxpayers are not left on the hook when these companies go bankrupt. Why has EPA not yet issued these regulations? What is EPA's schedule for proposing such rules?

Ms. BODINE. To date, EPA has relied instead on the financial assurance regulations under RCRA, the Resource Conservation and Recovery Act, which requires financial assurance for people who treat, store, or dispose of hazardous waste. We are now going back and doing an analysis of sites on the National Priorities List, and in terms of the date these sites were listed and under what regulatory programs were in effect at the time the sites were listed, to determine if additional financial assurance on the generator side is necessary. That analysis is not yet complete.

Senator JEFFORDS. Ms. Bodine, in your written testimony, you suggest that cleanup slow-down is due to increased complexity, rather than chronic funding shortfall. If this is the case, please explain why the EPA's proposed target for completing site assessments will plummet by 17 percent in just 350 in fiscal year 2007. Am I correct that the Superfund funding shortfall is constricting all phases of Superfund activities?

Ms. BODINE. We have been, as we have been directed by Congress in appropriations bills, we have heard expressions of concern on progress on the back end of what we call the Superfund pipeline, which is the remedial action construction phase, and have been focusing on that end of the program.

We are still completing a great many site assessments. In addition, through brownfields programs, States are also conducting many site assessments, in part with brownfields funding and in part under their own authorities. So if you look, again, at the universe of activity, not just at what EPA itself is doing, sites are being examined. In fact, you have to do that to determine whether you are eligible for brownfields funding, to determine if you are an eligible response site. You can look at these sites and screen them out.

I would also point out that in the site assessment program, the vast majority of sites are screened out. In fact, the States prioritize those sites based on risk and already have a good understanding of what sites need to be pushed forward, as we are working on them.

Senator JEFFORDS. Thanks, Mr. Chairman.

Senator THUNE. Senator Lautenberg.

Senator LAUTENBERG. Thanks, Mr. Chairman.

I am going to try to be very brief, Ms. Bodine, which probably would make you feel better. But the fact of the matter is that because of the shortness of time, I am going to ask you a question—is it on?

Just to repeat what I said, you hear a litany, a chorus from here, of disappointment, not just in the fact that these sites are not being cleaned up at a rapid enough pace, but the integrity of the institution, of the Department, is also at stake here. Privileged? Senator Boxer, whatever you do, unless we know that the staff has secret clearance, don't hand them that paper, because you could break the law, based on the definition we have from our distinguished Chairman, that privilege means that it is for your eyes only.

So do you think that we are allowed to give any papers to our staff that say privileged on them? Do you need a secret classification to be able to read these documents, privileged?

Anyway, it's nonsense, and everybody knows it's nonsense. It's deceptive and dishonest and really traitorous to the people we serve.

What is the quick definition of an uncontrolled site, please, Ms. Bodine?

Ms. BODINE. A site that has a complete exposure pathway, such that a person could be exposed to contaminants above a level of concern.

Senator LAUTENBERG. OK, fair enough. So in your testimony, you say, listing on the site of the NPL, the completion, construction could take, takes more than 10 years on average. So do we then go out to the people living in the community and say, get the devil out of here as quickly as you can, take your kids, cover them up and leave the site? Does EPA do any warnings like that?

Ms. BODINE. As I mentioned earlier, we have a community involvement coordinator at every site. We also——

Senator LAUTENBERG. Do you know what they do?

Ms. BODINE. For example, we take interim actions, if it is a groundwater exposure situation, we provide bottled water or we provide municipal hookups.

Senator LAUTENBERG. Do you tell them that their kids could get cancer or other diseases as a result of living there for, well, if it is 10 years or 5 years or 3 years, whatever?

Ms. BODINE. The Agency holds public meetings and they discuss the risks associated with the site.

Senator LAUTENBERG. Would it be a good idea to have a broadside mailing to say, look, this is dangerous territory you live on, you live on a site that could be worse for your children than some effects of terror, or that kind of thing?

Ms. BODINE. Yes, at many sites the EPA is very proactive at getting out to the community to tell them what measures they need to take, good housekeeping measures, to reduce exposure. So yes, that does happen.

Senator LAUTENBERG. It is so ludicrous. I think down deep you agree, you are an intelligent person, you know what you have here. Is there an impairment as a result of shortage of funds in working the Superfund program?

Ms. BODINE. We are able to manage the program and protect human health and the environment within our existing funding. That is because we are prioritizing based on risk and because as we just discussed, you take interim actions to cutoff exposure. So you——

Senator LAUTENBERG. In my State alone, there are 19 sites that are listed among the uncontrolled sites. If you had more money, could we get faster action on those sites?

Ms. BODINE. Since I have been at the Agency, one of the things, again, focusing on the human health not under control, I have gone and looked at the sites that are listed as not under control and asked, OK, what can we do? Because we should be able to take steps to cutoff——

Senator LAUTENBERG. I know, that is the same question we both asked. So now that you have asked yourself that question, could we do anything, if we had more money to get on with these sites?

Ms. BODINE. The interim actions that the regions put forward, they are doing. In some cases, they already had the money to do it. In other cases they had a PRP to do it.

Senator LAUTENBERG. If you had more money, Ms. Bodine, respectfully, if you had more money, could you accelerate the pace of cleanups? Yes or no, please. Yes or no.

Ms. BODINE. With more money, at some sites you may be——

Senator LAUTENBERG. I know it's hard to come out, but please.

Ms. BODINE [continuing]. Able to proceed more quickly, but that doesn't necessarily——

Senator LAUTENBERG. Well, is that a yes or a no? Consolidate. If you had more money, could you accelerate the pace of cleanup?

Ms. BODINE. Not at all sites. But at some sites, I am sure that you could. And that when you look at the national program——

Senator LAUTENBERG. At some sites. I would hope that it is near my grandchildren, where my grandchildren live. I would hope that it is near where everybody's grandchildren live that you could accelerate. Your denial, it's outrageous. Honestly, Ms. Bodine, for

someone who has as lofty a position as you have, for the experience you have, for the intellect that you have, the fact of the matter is, the fact that you can't answer that simple question yes or no is disturbing.

Should we, do you think that we ought to go back and ask companies to contribute to clean up or are you satisfied to ask the taxpayers in America to pay for it?

Ms. BODINE. We are asking companies to contribute to clean up. In fact pursuing them and compelling them to pay for cleanup.

Senator LAUTENBERG. Right. But would you be willing to ask companies that contribute to the pollution, I am not saying PRPs now, I am saying as it used to be, and I was instrumental in that, because I started with Superfund issues in 1983. Would you be willing to ask companies that are likely to contribute to polluting, to the pollution in sites, would you be willing now to recommend to the Administration that maybe we ought to go back and tax or put a fee on the products that are being made that could leave a trail of pollution behind?

Ms. BODINE. I don't think it is appropriate for me to express a judgment on the source of revenue. The reason is because the source of revenue for the Superfund program and the taxes that used to be collected had no relation to the amount of appropriations that was appropriated each year to run the program. That is because Superfund is an on-budget trust fund. This committee, I know, understands trust funds. It is not like the Highway Trust Fund. There are no firewalls.

So when you are appropriating money——

Senator LAUTENBERG. So technically, it had to be appropriated.

Ms. BODINE. Not only that, it is part of the unified Federal budget.

Senator LAUTENBERG. Right.

Ms. BODINE. So it is competing with health care, it is competing with HUD, it is competing with everything else.

Senator LAUTENBERG. Yes, but it is easy to earmark it based on the source of the revenue to say that any funds that derive from that situation are to be directed at, it doesn't have to be law, it can just show intent. But your unwillingness to say that more money, that we ought to get after these things, we ought to, that we—sorry. There is no current funding for continuing remedial sites at, at a particular site, if additional funding becomes available, cleanup could be accelerated by continuing the ROD determined to clean up, the cleanup of the site.

Senator BOXER. Show that if they had more money they could do a better——

Senator LAUTENBERG. No, well, that is——

Senator BOXER [continuing]. Every yellow tag——

Senator LAUTENBERG. Every yellow tag says, we would let you see this information, it is not privileged, that has, that has identified here, says if there was more money these sites could be cleaned up, in Indiana, it goes across the country. The fact that you are, in no way do you see need for more money, that you admit that more money would accelerate cleanups, then is it just that we sit and wish and hope that our kids don't get sick, that there are no problems?

Senator Obama talked about a company that made radium faces for watches. The women used to lick the brush to make them. There is a site very near my house in Montclair, NJ, three blocks away, where the neighborhood took almost $200 million to clean it up. Finally clean. Took years. But the people who worked there all died premature of cancer.

It is very disappointing, Ms. Bodine, that you can't be more forthright and say yeah, no, you know, take the response that is likely to get. We would honor you for the truth, I promise you that.

Senator BOXER. Mr. Chairman, I just have one quick, very directed question about blood testing on kids. Could I ask it before she leaves?

Senator THUNE. Let me explain our dilemma here. The third panel has planes to catch, we have two votes scheduled at noon and we have five people that need to——

Senator BOXER. Thirty seconds?

Senator THUNE. Thirty seconds.

Senator BOXER. Really. A recent National Academy of Sciences report on the site in Bunker Hill, in Idaho, recommends universal blood testing of children in the affected area. You have not requested these funds. My understanding is it is a $200,000 request.

Will you please answer the question as to why you haven't recommended that?

Ms. BODINE. I will have to get back to you for the record on that, because I believe the discussions were ongoing with ATSDR on that matter. So I will have to respond for the record.

Senator BOXER. Please.

Senator THUNE. Thank you, Ms. Bodine. I am going to ask the third panel to come forward. I want to, as soon as you get up here, recognize in this order Katherine Probst, followed by Dr. Porter, both of whom I am told have flights to catch. Then we will move to Dr. Trasande, Mr. Steinberg and Mr. Spiegel. In order to accommodate, to make sure that all witnesses have an opportunity to be heard, too, I would ask you to really try hard to stay within the 5 minutes allotted, because they will, at least the last notification I got is that they are going to call votes at noon, we are going to have a couple of votes.

I am going to ask Ms. Probst, if you would please proceed. Thank you for being here.

STATEMENT OF KATHERINE N. PROBST, SENIOR FELLOW AND DIRECTOR, RISK, RESOURCE, AND ENVIRONMENTAL MANAGEMENT, RESOURCES FOR THE FUTURE

Ms. PROBST. Thank you, Mr. Chairman, and distinguished members of the subcommittee. Thank you for asking me to testify today about the critical issues facing the Superfund program. I am a senior fellow at Resources for the Future and have conducted research on issues relating to Superfund for more than 15 years.

I am going to focus on four key issues today: cleanup funding, monitoring and enforcing institutional controls, improved data and public information, and the need for independent evaluation.

If Congress wants to hold EPA responsible for achieving cleanup in an expeditious fashion for current and future NPL sites, they need to ensure that the Agency has the funds it needs. As has been

mentioned, there has been a major decrease in the program's funding. Since 1987 there has been a 40 percent decline in real dollars.

If that funding isn't increased, it is really critical that EPA come clean about the implications of the shortfall on the future pace of cleanup and on progress at individual NPL sites. This will only happen if Congress, either in oversight hearings such as this one, or as part of the annual appropriations process, requires that EPA identify, on a site-by-site basis, the specific shortfall for each site on the NPL and specify which sites will be delayed, and by how, much if funding is not increased.

In addition, Congress should require that EPA, on an annual basis, present to this subcommittee and to the relevant appropriations committees, how much funding would be needed to fully fund cleanup.

I would like to just mention, I think that the page that Senator Boxer read is probably about New Bedford Harbor, which is a site that needs $300 million more to be cleaned up and is estimated to take another 30 years. I know that the EPA Regional Office region has asked for increased funding—the site is currently getting about $20 million a year. That is why it is going to take 30 years to clean up that site.

The second issue, which Ms. Bodine has already mentioned, is monitoring and enforcing institutional controls. Institutional controls are restrictions on the use of land, water, or groundwater that are intended to keep people from coming into contact with contamination that remains at a site after all cleanup activities are complete.

These are now a common feature of remedies at NPL sites. Almost a decade after these issues were first raised by researchers at RFF, the Environmental Law Institute, University of Tennessee and others, the Superfund program still does not have a consistent and reliable approach to tracking and monitoring these controls. As more and more site remedies rely on institutional controls to ensure protection of public health, EPA must make monitoring and enforcement of these controls a top priority.

Simply put, institutional controls work only when people know about them and comply with them. It is foolish to spend tens or hundreds of millions of dollars on a site remedy and them skimp on the monitoring and enforcement of these controls. The Love Canal site, which in many ways begat the Superfund program, is the proverbial poster child for the failure of institutional controls at a Superfund site. EPA has a choice to make: it can try to prevent future Love Canals by monitoring and enforcing these controls, or it can create a situation where the next Love Canal is just waiting to happen.

The third issue I wanted to raise, which has also been mentioned, is improved data and public information. Getting information on the progress, contamination, cost, and health risks of NPL sites is a challenge. While there is in fact some good information to be found on the Superfund Web site and the site profiles that Ms. Bodine mentioned are wonderful, it is actually very hard to find those site profiles on the EPA Superfund Web site. You actually have to know where this information is ahead of time in order to find it.

In addition, there are still major questions about the quality of much of the information in the Superfund program's two major systems, CERCLIS, which is basically their day-to-day management data base, and the Agency's financial management system (IFMS). These systems need a major overhauling, not a tweaking. Absent reliable information on site progress, contamination, and costs, it is extremely difficult to evaluate or manage the cleanup program.

The final topic I want to talk about today is the need for independent evaluation. Twenty-five years after the Superfund program began, we still do not know the answers to some very basic questions. We should know where scarce Superfund resources are going, why some sites take decades to clean up, why some sites are extremely expensive, and why there are still sites where human exposure is not under control, but we don't.

The Superfund program needs to do a better job of evaluating all major aspects of the cleanup program to identify improvements. EPA needs to create a small office that has strong policy and economic analysis capability, that is charged with conducting and sponsoring independent analysis and evaluation relating to the many aspects of the Superfund program. Once such a critical mass is created, the first task for this group should be to develop and implement a 3- to 5-year strategy for independent research and evaluation and to set aside funds for this purpose.

All of the studies and evaluations should be subject to some form of external peer review to assure credibility and all of these studies should be made public. Even though the program is short of funds for cleanup, good evaluation should help the program save money and be more effective in the future, which is certainly an investment worth making.

In closing, I would note that after 25 years, many of the same challenges remain as in the early years of the program. There is a need for better data, for independent evaluation, for a willingness to consider and make radical changes in funding and management priorities. There is a need for increased transparency in all aspects of the program.

I urge EPA to have as its goal not making the program better this year or next, but to try to ensure that 5 years from now, the program is better focused and managed, and that there is better data and information about Superfund sites available to the public. With an eye on the long term, rather than tomorrow's news, EPA can give the American public a much stronger and more effective program.

Thank you very much.

Senator THUNE. Thank you, Ms. Probst.

Dr. Porter.

STATEMENT OF J. WINSTON PORTER, PRESIDENT, THE WASTE POLICY CENTER

Mr. PORTER. Thank you, Mr. Chairman. I am going to be very brief, also.

I have had about 20 years experience in Superfund, including serving as Assistant Administrator back in the early days with Senator Lautenberg and Senator Baucus and others on this subcommittee.

What I want to do is take a little different tack today. I want to talk about how to improve the program from an efficiency standpoint. I grew up in the engineering world with a very large firm in San Francisco, where budget and schedule were critical. I think the EPA career staff has done a good job of doing the best they could under the circumstances, and made a lot of progress. Two-thirds of the sites have been completed, 400 sites are in construction, for example.

But the bottom line, after my 20 years in Superfund, including running the program for a while, sites take too long and they cost too much. I think this problem has to be attacked at the project level. It is nice to look at all these other things, like management systems, and I don't disagree with them. But Superfund is not an exact science. It takes a lot of common sense and a lot of leadership.

I want to talk briefly about three phases of the program, the study phase, the selection of remedy phase, and the construction phase. This may sound like kind of nuts and bolts stuff, but it is very important, from my experience in project management. The reason why we are talking about money here today, and talking about time is because we need to be more efficient in getting these sites finished.

On the study phase, most important is to set deadlines. Amazingly, most Superfund sites get started in with a study without any real deadline of how long it is going to take. We need to say, this is a 3-year project, or a 2-year project, or a 5-year project, and make it happen.

A little secret I will let you in on is Superfund has become something of a jobs program. One of the reasons these sites take so long, in my opinion, and I am being kind of blunt here today, is you have a lot of consultants, a lot of lawyers, a lot of governmental employees, et cetera, who are making a pretty good living off Superfund. I don't mean they are being unprofessional. Most of them are quite professional. But I do see that there doesn't seem to be much pressure to finish a site.

Also, we need to identify alternatives early. There are not hundreds of alternatives at a site. There are three or four or five. We need to focus on those early, focus the data on those and start talking about them. Because, as I sometimes tell the decisionmakers, about half of Superfund is technical, about half is "other." The other includes communications, public relations, costs, and implementability. It is also State acceptance, community acceptance, etc.

We need to streamline the deliverables. What we have in the Superfund now is what I call a culture of deliverables, where if you deliver enough products, meaning reports and documents and data bases, you are assumed to have done the job. I want to see a culture of results and a culture of completion. I think that, again, these all sound simple, but they are very important and they are not ususally being done.

Selection of remedy. I would like to move the selection of remedy up a notch to at least the regional administrator level where it was in my day. It has been put further down in the system in most cases. These are tough judgment calls. I would be more happy if

the regional administrator or someone in my old job, the assistant administrator, were making more of these decisions. Because what we have in this program is a serious of projects. It is a series of projects, and you have to run projects on a project by project basis.

The role of land use is important. We don't spend enough time on land use. What is the site going to be used for? Let me give you a quick war story from my day. At Rocky Mountain Arsenal, a huge site near Denver, the Army decided after many years of work and study and contention they were going to make this into a wildlife refuge. Once that decision was made, the whole thing flowed very quickly. It has been a great success, billions of dollars were saved at Rocky Mountain Arsenal and the public seems happy. So land use is very important.

Let me move finally to the construction phase, which I think is the main thing now, because a lot of sites are in construction. If I were you, I would look at the $1.2 billion very carefully. I say this also to Susan and her colleagues. Two billion dollars is a lot of money that the Government has given EPA for Superfund, not to mention an even larger amount of money put in by PRPs. Some 60–70 percent of all sites now are cleaned up by responsible parties.

I am concerned that not enough of that money is getting directly to the sites. EPA is a large organization. There is a lot of overhead, there is a lot of groups at headquarters that siphon a fair amount of that money off before it gets to the field. I think the people in the field, have every expectation they should get more of that money. I think that can be done.

Frankly, I would consider, if you want to do something, and I would answer yes to what Senator Lautenberg said to Susan, you could do more work with more money. I don't think we need lavish amounts of money. I am not for new Superfund taxes. But this committee and others might want to appropriate somewhat more money, directed very directly at sites that need to be finished.

Some of these sites don't need huge amounts of money. Some do, some don't. These sites were created by everybody from cities to counties to industry to individuals, and I think Federal revenues are not a bad way to fund sites where there are no viable responsible parties.

So that is what I would like to say. I think the program has great room for efficiencies, and we could do much more with sounder project management. We need to get people on the hook by name, know who is making decisions at sites. I don't want to just see a lot of data bases and other things. I want to know, because I grew up in the project world, who is responsible for finishing a project.

Thank you.

Senator THUNE. Thank you, Dr. Porter.

Let me, if I might, turn to Senator Boxer here for a minute. I understand you two both have to depart here shortly. Maybe a couple of questions for the record, then we will go to the other three panelists for your testimony. We do have two votes locked in at noon, so we have some constraints.

Senator BOXER. I will be quick.

Dr. Porter, thank you so much for being here. In your testimony, in your written testimony you say apparently EPA does not have sufficient funds to expeditiously complete all of the construction work now planned. You say something sort of interesting here. You say, and that among other things, if Congress is satisfied that EPA has done all it can do to squeeze out funding for as many construction sites as possible, then it might consider supplemental appropriations.

I find it interesting. Now, as you know, supplemental appropriations are used for emergencies. I do think if we go to Senator Lautenberg's testimony, where he went through these uncontrolled sites, and we go to the definition of what it means, that people are being exposed, notwithstanding the stuff about wipe off your feet. These are the good housekeeping things they suggest in these sites, and I think Mr. Spiegel will tell more about it. But make sure you wash yourself, don't let your kids play if it is windy, wipe your feet off, vacuum the house. That is not sufficient, to my mind. Just as a family member, you know, how do I know how much wind is too much wind and all the rest.

We have to clean up these sites. You are right. When you get a plan, clean it up. There are plans. So my question is, if we were to have support to go to supplemental, you would consider that we should pick the most urgent sites, I am assuming.

Mr. PORTER. That is right. I don't think Congress ought to frankly get in the business of earmarking individual sites or something like that. But I do think what you should do first, and I think what Susan is doing, is you should look at, and the Administrator should look at the fact that EPA has $1.2 billion, year in, year out. Admittedly, it is a little less than it used to be, but it is still a fair amount of money.

Are we really using that money effectively? Are we really using it on these sites that need it badly? There is several hundred million dollars used at headquarters.

Senator BOXER. I am asking about supplemental.

Mr. PORTER. Well, supplementals I think——

Senator BOXER. If we went to a supplemental, you would say some of those sites, you could say are emergencies. That's what a supplemental——

Mr. PORTER. I think you might be able to do that, yes.

Senator BOXER. That is what you said in your testimony.

Mr. PORTER. I don't think I used the word emergency.

Senator BOXER. You said supplemental, and that is what supplemental is.

Mr. PORTER. Yes, if you are satisfied that the $1.2 billion is being prioritized properly, then I think the next line of defense is to say, let's look at where we could spend money on sites that really need to be cleaned up.

Senator BOXER. Thank you very much. I will stop there.

Senator THUNE. Any comment on that? I guess that was directed to Dr. Porter.

Ms. PROBST. I can if you want, but you are short of time.

Senator THUNE. All right, let's proceed to our third panelist, Dr. Leonardo Trasande.

STATEMENT OF LEONARDO TRASANDE, M.D., MPP, ASSISTANT DIRECTOR, CENTER FOR CHILDREN'S HEALTH AND THE ENVIRONMENT, DEPARTMENT OF COMMUNITY AND PREVENTIVE MEDICINE, MOUNT SINAI SCHOOL OF MEDICINE

Dr. TRASANDE. Good morning, Mr. Chairman and members of the subcommittee. I am Dr. Leonardo Trasande. I am a pediatrician and the assistant director of the Center for Children's Health and the Environment at the Mount Sinai School of Medicine, the Nation's first academic policy center devoted to the protection of children from environmental threats.

Approximately 4 million children in the United States live within 1 mile of a federally designated Superfund sites. These children are at especially high risk of exposure to chemical toxicants released from these sites into air, groundwater, surface water and surrounding communities. Pound for pound, children drink more water, they eat more food and breathe more air, and so they take proportionately more of these toxins into their bodies.

They also do not metabolize, detoxify and excrete many toxics in the same way as adults. Thus, the chemicals can reside longer in children's blood streams and cause more damage.

A third reason is that children are undergoing rapid growth and development and those very complex developmental processes are easily disrupted. Superfund chemicals have been proven to cause chronic disease in children. Lead, mercury, polychlorinated biphenyls and certain pesticides have been show to cause brain damage and to contribute to learning disabilities and to disruption of children's behavior. Benzene, 1,3-butadiene and pesticides have been etiologically associated with childhood malignancies. Ambient air pollutants also have been shown to increase incidence of asthma and to trigger asthmatic attacks.

Never has cleanup of the Superfund sites become so important to the health of America's children. Over the past 30 years, chronic diseases of environmental origin have become epidemic in American children. These include asthma, birth defects, brain cancer, developmental disabilities, pre-term birth, leukemia and testicular cancer. These rapidly rising rates of chronic disease threaten the health of our children and the future security of our Nation. It may create a situation that has not been witnessed since the Great Depression, in which our current generation of children may be the first to enjoy a shorter life span than the generation before them.

Toxic exposures at Superfund sites are also costly to our economy. Four of the leading diseases of environmental origin in American children have been found to cost our Nation $54.9 billion annually. Mercury pollution has been found to cost our Nation $8.7 billion annually, as a result of lost economic productivity, not to mention the 1,566 cases of mental retardation annually that have been associated with mercury pollution. Each of these cases is associated with additional special education and health care costs, and thus the reduction of unnecessary toxic exposure to Superfund chemicals can be an effective and cost-effective approach to improving child health in America.

This subcommittee should therefore continue to assure that EPA is fully executing its duties under the Superfund program to identify and clean up hazardous waste sites in the safest and most ex-

peditious manner possible. The benefits of preventing exposure to Superfund chemicals have been proven time and time again, first with lead, then with PCBs and more recently with pesticides and methylmercury. Delays in preventing toxic exposure will lead to preventable and costly diseases in children such as developmental disabilities, birth defects and childhood cancer.

I would like to close my testimony and urge the members of this subcommittee to take two additional steps to prevent the health effects of Superfund chemicals in American children. First, the National Institute of Environmental Health Sciences Superfund Research Program has developed cutting edge technology to assess and evaluate human exposure, determine effects of hazardous substances and track their transport through various media at waste sites. The program improves the efficiency of cleanup at Superfund sites and ensures that our public health is most fully protected.

Finally in this testimony, I wish to point out the urgent need for full funding of the National Children's Study, which will unearth critical information of the health effects of chemicals found at Superfund sites. I would like to take this opportunity to thank the Chairman, Senator Thune and the Ranking Member, Senator Boxer, for their strong support. Nearly all of the 105 study sites overlap geographically with National Priority List sites, and thus the National Children's Study will provide extremely useful guidance about the health effects of Superfund chemicals and ensure that the clean up of those sites most efficiently protects their health.

Congress first authorized the National Children's Study in 2000. Since then, thousands of scientists have invested their time and energy in planning the study, and Congress has appropriated $55 million since then to design the study, complete the preparatory research and designate the seven Vanguard sites that will conduct preliminary testing. To move forward, the study will require $69 million in fiscal year 2007. By failing to provide those funds and abandoning the study at this point, we would forego all of that dedication, all of that incredible effort and all that logistical preparation, just when it is poised to do so much for our children's health and prevent toxic exposure at Superfund sites.

I thank you and I would be pleased to answer your questions.

Senator THUNE. Thank you, Dr. Trasande.

Mr. Steinberg.

STATEMENT OF MICHAEL W. STEINBERG, SUPERFUND SETTLEMENTS PROJECT

Mr. STEINBERG. Good morning, Mr. Chairman and members of the subcommittee. On behalf of the Superfund Settlements Project, I am very pleased to be here this morning. I would like to begin with a big picture comment and then move on to some specific recommendations for improving Superfund.

Superfund today is far from perfect. But we should recognize that it is a mature program. It has largely achieved its original objectives and it has largely addressed its original workload. The gaps in our environmental laws that led to the creation of so many contaminated sites have long been filled. Today, responsible parties are cleaning up most of the sites on the NPL and they are paying

the full cost of those cleanups. EPA is using Superfund to pay for cleanups at orphan sites where no responsible parties exist who can pay.

So looking ahead, perhaps the most important thing that EPA can do is to make the best possible use of its appropriation from Congress. This morning I would like to offer four recommendations, each aimed at conserving more of that appropriation for the core mission of this program: cleaning up NPL sites that have no responsible parties.

First, as Dr. Porter mentioned, a sizable chunk of the Superfund appropriation is transferred each year to other EPA offices that are not involved in cleanup work. These include the Office of Administration, the Chief Financial Officer, the Office of Inspector General. These offices provide what are essentially shared services to many EPA programs, including Superfund. Together, they receive something on the order of $200 million each year, right off the top. That is roughly a fifth of the total Superfund budget. We believe there is ample room to trim those allocations and bring them more in line with the program's current needs. Doing so will conserve more money for the core mission of cleaning up NPL sites.

Second, each new NPL site that gets listed is a long-term financial obligation for Superfund. So before a new site is listed, it is important to think clearly about why that site is being listed and what other options might be available for addressing it. It may be, for example, that the State's enforcement program was unable to secure cleanup from responsible parties. It may be that there are no responsible parties to pay for a cleanup.

Whatever the reason for listing a particular site on the NPL, what we need here more than anything else is transparency. Each proposed listing should say something about why EPA wants to list the site and what alternatives have been considered. This transparency will allow the local communities and other members of the public to submit meaningful comments on how best to handle the site. It will help us avoid listing sites that can be addressed through other programs instead.

Third, EPA headquarters should have a larger role in key decisions about cleanups. Dr. Porter alluded to this as well. I would actually take it a step further. The reason this is so important is that after the NPL listings, the next most important decisions in terms of their impact on Superfund's budget are the decisions about how to clean up the sites. Each new record of decision, or ROD, selects the cleanup plan for an NPL site. In practical terms, each new ROD is a long-term financial commitment. So it is important that the cleanups selected in these RODS are protective, practical and cost effective.

Today, most of these cleanup decisions are made in EPA's regional offices. Under an internal delegation dating back to 1994, most of the RODs are signed by division directors in the 10 regions. Now, there are advantages to this kind of decentralized decision-making. But we think it is essential that headquarters be able to manage the rate at which this program takes on new long-term financial obligations. For that reason, we recommend having Superfund program managers at EPA review the new RODs before they

are signed. This will allow program management to address any concerns they have before final decisions get made.

Fourth and last, EPA should reduce its spending on oversight of cleanup work performed by experienced private parties. All too often, as Dr. Porter mentioned, EPA hires outside contractors to perform oversight, and those contractors devote excessive time to the job. When this happens, the result is large oversight bills and money is diverted away from Superfund's other priorities. EPA has long recognized that it needs to reduce oversight. But to date, the Agency has made only very limited progress. We would encourage decisive action here, which will in turn free up money that can be used for Superfund's core mission.

Thank you, Mr. Chairman.

Senator THUNE. Thank you, Mr. Steinberg.

Mr. Spiegel.

STATEMENT OF ROBERT SPIEGEL, EXECUTIVE DIRECTOR, EDISON WETLANDS ASSOCIATION

Mr. SPIEGEL. Thank you, Senator Thune, Senator Boxer, and the committee for having me here to testify.

My name is Bob Spiegel. I am the executive director of the Edison Wetlands Association. Since 1989, we have been working to clean up contaminated sites throughout New Jersey and other States. I personally work actively to clean up, or am working on 75 sites currently. Twenty of them are Superfund.

As you know, funds have all been dried up for orphan sites, or sites with a lack of a viable responsible party. While the EPA publicly states that the cleanups are on track, it is clear at many sites that work is proceeding at a far slower pace or not at all. This is especially troubling, because many New Jersey Superfund sites are located in densely populated residential areas, and their impact to public health and environment is immediate and direct.

I want to talk about one site to illustrate the point at hand, and that would be the Cornell-Dubilier Superfund Site in South Plainfield. On the EPA's own Web site, they have a nice little icon, when they talk about those sites that are not under control, there is a little OK with a line through it. It is kind of comical, because it really doesn't give the full picture. It says that that site is not under control, the Cornell-Dubilier site. It is now called the Hamilton Industrial Park, and it is home to approximately 15 active businesses. The site is approximately 26 acres, and it sits adjacent to a working class residential neighborhood.

From 1936 to 1962, Cornell-Dubilier manufactured electronic components and capacitors, and they dumped PCB-contaminated material directly on site. As was the custom up until 1980, onsite disposal was how businesses disposed of their waste. In addition to the PCBs, there are 26 other contaminants of concern that they are worried about at the site, which impact the soil, the groundwater, both onsite and offsite, the stream sediments and the Bound Brook as well. PCB capacitors from this site were also found at another separate Superfund site nearby.

Even in the State with more contaminated sites with any other, I believe we have about 18,500, which is a pretty big record for New Jersey, Cornell-Dubilier stands out. The EPA's own risk as-

sessment has found cancer risks in excess of 3 out of 100. Three out of one-hundred. That is a very high cancer risk. That is a big number. Many residents have asked us how they can get cancer studies for the neighborhood, which also have a very high prevalence of cancer and other illnesses.

Some of the highest levels of PCBs in the State of New Jersey are caught in the fish caught adjacent to the brook at the site. Many local residents still consume the fish, they still catch them for subsistence for them and their families.

EWA first got involved with this site after we received a phone call that children were riding their bikes around the disposal areas in the rear of the property and a truck driving school was operating at one of the most contaminated areas, creating a toxic dust cloud that moved through the adjacent community. Although owners, elected officials and regulators all knew that the area was highly contaminated, no one seemed willing to take the lead.

After 21 years, after the EPA first got to the site, the scope of the contamination remains staggering. They have buildings on site where people are working inside these buildings, including women of child-bearing age, where there is dust with high levels of PCBs, lead and other chemicals. The EPA calculated the hazard index for the PCBs at about 150. To give you an idea what that means, at one they have to take an action. But they are allowing people to work in these buildings.

Local families continue to catch the fish adjacent to the site. Children continue to trespass on the site. The groundwater remains highly contaminated. Homes around the site still contain unacceptable levels of PCBs and require additional testing. There are day care centers that have PCBs as well.

Rather than waiting indefinitely for the EPA's next action, we tested the Bound Brook and we found TCE in the surface water downstream from the site at over 200 times the New Jersey surface water criteria. While EPA maintains that the cleanup is moving forward, this illusion is just a house of cards ready to collapse. The Agency is making a promise they can't deliver.

The remediation of the onsite soils at the site alone are going to cost $90 million to $100 million. The PRPs have already told the EPA that they don't have the money. So where is the EPA going to come up with the money for the cleanup? They are saying it is going to start this fall. They haven't told us yet where this $100 million is going to come from.

The ATSDR, their sister Agency, and EPA, are allowing people to continue to work in these buildings, instead of doing a simple measure which would vacuum them out or clean the dust out of them and protect public health. EPA's lone action, which—this is the most shocking—they told workers the way to protect their health is to wash their hands and wash their feet before they go home, and then provide no insight to make sure that is done.

I know my time is short, I know we are running out of time here as well. But while we look at a vast array of environmental problems, like global warming and over-development, we must not forget another inconvenient truth: without the Superfund tax there will be no funding to clean up the sites like Cornell-Dubilier. I would invite all the Senators who haven't been to a Superfund site

to come out and visit one either in New Jersey or in their own community.

Thank you.

Senator THUNE. Thank you, Mr. Spiegel.

I have a question which I will, in deference to my colleagues who have a high level of interest in this, submit for the record.

Senator Lautenberg, you are recognized.

Senator LAUTENBERG. You are very kind, Mr. Chairman, I appreciate it greatly.

I would ask two questions, one of Mr. Steinberg. As I read your testimony and listened carefully to what you said, you said the project you represent regards Superfund as a mature program that has largely accomplished its goal. I ask you, if you were in a theater and someone screamed fire and you saw the flames, but half of the people got out, would you say it was a successful evacuation?

Mr. STEINBERG. I would be concerned, Senator.

Senator LAUTENBERG. Oh, I am glad. I am glad you said that. Because to suggest that the mission is largely accomplished, I would tell you, if you want to move to 1 of 19 places in New Jersey, very cheap real estate near these Superfund sites, you could bring your family there and live there, expose your children.

Bob Spiegel is someone who is an expert because he has been hands-on, working, pushing, cajoling, you name it, to get a couple of sites cleaned up. One of them is a now infamous site that took place in Ringwood, NJ, I didn't hear whether you mentioned it in your testimony.

Mr. SPIEGEL. It was in my testimony but I didn't have time to talk about it.

Senator LAUTENBERG. They said that the site was cleaned up and it was closed off. What happened, please? Tell us very briefly if you can.

Mr. SPIEGEL. Well, this really goes to speak to the heart of why we need adequate funding. The Ringwood Mine Superfund site is a site where the Ramapough-Lenape Indian Nation has probably been poisoned as a result of the Ford Motor Company's dumping of toxic paint sludge throughout the community. EPA originally listed this as a site and de-listed it without properly cleaning it up.

What they basically did was allowed the polluter, Ford Motor Company, to come in, do the cleanup, submit the paperwork and then essentially walk away and de-list the site. As a matter of fact, this site is going to be the first site in the United States to be relisted, because of the amount of toxic waste that was dumped.

One of the biggest problems that we see with the lack of funding is, it takes away the EPA's hammer. When I say the EPA's hammer, right now they have the treble damages where they can go out, do a cleanup and then collect triple damages to a polluter. That is why we have had 70 percent of the polluters step up to the plate and do the work, because they know that if they didn't, EPA had the ability to go in, do the cleanup and then recover costs.

Well, that is not there any more. The polluters all know that EPA is not going to step in and do the cleanup, because they don't have the funds. How are they going to step in and do $100 million cleanups? They are not. As such, the processes have slowed down, the cleanups are less comprehensive and there is more interim

measures, I'm sorry, no interim measures done at sites, because EPA is afraid they will lose their places in the line. At least in Region II we have seen a very big slowdown in interim measures, because EPA tells us privately they don't want to lose their place in line for funding, even though they know that the funding is scarce.

So the site in Ringwood really speaks to a lot of troubling issues. As a matter of fact, yesterday at this time I was up in Ringwood with Bob Degroot and his wife, with their grandkids, pulling up toxic sludge out of their backyard where their kids play. It is something, if you don't see it, it is easy to just dismiss it. Thank you.

Senator THUNE. Senator Boxer.

Senator BOXER. Two brief questions. Mr. Steinberg, I found your testimony to be just—I won't characterize it. I find it unbelievable. The first thing you say is the Superfund program has done most of its work. I think Senator Lautenberg pointed that out, so I won't harp on that.

But then you say, don't do oversight, and now we hear from Mr. Spiegel that without oversight, we might have these sites listed again.

Mr. STEINBERG. To be clear, Senator, I am not suggesting that oversight is unnecessary. I am suggesting what EPA itself admitted 10 years ago, which is that far too much of their Superfund dollars go to oversight of PRPs.

Senator BOXER. OK, so you think there should be oversight, but not as much oversight?

Mr. STEINBERG. Correct.

Senator BOXER. OK. Who do you represent today?

Mr. STEINBERG. I am here today for the Superfund Settlements Project, Senator.

Senator BOXER. Who pays for that?

Mr. STEINBERG. It is an association of eight companies, and our members are listed in my prepared statement.

Senator BOXER. OK. Are they polluters?

Mr. STEINBERG. They each have a number of Superfund sites that they are involved in cleaning up.

Senator BOXER. OK, well, that puts it in context.

Doctor, would you tell us please, I cannot thank you enough for your testimony and for the work you do. Because children, that's it for me. If we can't come around and all of us say, it is our job to protect them, we have failed as human beings, let alone Government officials. So you are doing this every day. What are the effects—you said something really frightening, that we may see that there is not as long a life expectancy among our children as we had because of exposure to toxics. Am I saying it correctly?

Dr. TRASANDE. Senator, we are facing an epidemic of chronic disease in childhood. A vast array of chronic diseases are on the rise in American children and a large number of those chronic disease have their origins in environmental exposures.

Senator BOXER. OK. I also noted the other day, with shock, to see an article that our own life expectancy in this country has fallen way below where it used to be. I want to get that information put into the record if I might. I don't have it here, but it is just sinking in terms of the world.

So, we don't know why everything is happening, but certainly you have raised an alarm. Could you tell us what impacts you have seen from these toxins on our children, the lead, the arsenic, the PCB? What happens to children, in graphic terms, what happens to children when they have this exposure.

Dr. TRASANDE. Senator, there is what we know and much of what we don't know and need to learn more. But what we know is unfortunately quite frightening. We learned first 100 years ago with lead that lead caused children to have seizures, coma. Now at lower levels, we have found that children were suffering loss of IQ, behavioral problems and other neuro-developmental problems from lead exposure.

Unfortunately, that was just the tip of the iceberg. I can't say that we have gotten much deeper into understanding the effects of other chemicals.

Senator BOXER. And mercury? What does that do?

Dr. TRASANDE. Methyl mercury toxicity has affected on the order of 300,000 children in the 2,000 U.S. birth cohort, costing our Nation $8.7 billion annually in lost economic productivity.

Senator BOXER. $8.7 billion lost?

Dr. TRASANDE. Yes.

Senator BOXER. And what does it do, though, to kids?

Dr. TRASANDE. Methyl mercury is ingested by women, it enters the bloodstream, it then crosses the placenta and then causes brain damage during the prenatal period.

Senator BOXER. Brain damaged kids. And then PCBs?

Dr. TRASANDE. PCBs also cause brain damage through a number of mechanisms. Most especially the concern is that it may also displace thyroid hormone, which is so important for prenatal brain development.

Senator BOXER. OK. Well, Mr. Chairman, I will stop here. You know where I am coming from on this, it is not surprising to you, because you have known me for years. But here is the thing. When we talk about these Superfund cleanups, we are talking about protecting our children, our families and our communities. I think a lot of it gets lost in these memos that are marked privileged, where people are just told, give me the cheapest thing we can get away with, don't fess up to what we need to do.

This whole baloney we hear that you can't answer the question if you have more money you could cleanup sites, Senator Lautenberg has a document that is not privileged where that is stated clearly, in many sites after sites after sites. Yes, if we had more funding, we'd do this.

So what I would love to have is an honest debate about this. In other words, if we want to say it is not a priority, that's OK, let's have that debate. I am willing to engage in it. But let's not hide information. Let's not have this committee decide that the members of the public don't deserve to know.

I will say this, Mr. Chairman, and I know you are a reasonable person to work with, and I appreciate your allowing us to discuss these documents, although we didn't name them and identify them, we are going to pursue this with Chairman Inhofe, the Democrats. I don't know about you and the rest of my colleagues, but the Democrats that I have talked to are intent upon getting these docu-

ments out in the public. We are just going to make the fight. If we have to go all the way to wherever we have to go, we will do it.

But this is a Government of, by and for the people. If the people don't know information that they should know, it is not a national security question. As far as I can tell, by looking at these documents, a lot of them don't even refer to cases, they are nothing to do with it. It seems like it is being hidden from the public because of political reasons. I can't think of anything else.

So I am going to work—I hope we can work together on this. If not, we will just have to debate it and see where we go. I thank you so much for having this hearing. We haven't had this in 4 years. I can kind of see why some people didn't want to have for 4 years. I appreciate that we have had it.

Senator THUNE. Thank you, Senator Boxer. I will alert Chairman Inhofe that he will be hearing from you on that subject, among other subjects.

Senator JEFFORDS. Mr. Chairman?

Senator THUNE. Senator Jeffords.

Senator JEFFORDS. Dr. Trasande, thank you for reminding us about the critical role of Superfund in preserving the health of our Nation's children. In your written testimony, you mentioned a stunning funding, that environmental pollutants cost our Nation an estimated $55 billion annually. I would like to enter this study into the record of today's hearing. Could you give us a copy of that?

Dr. TRASANDE. I would be most happy to.

Senator JEFFORDS. Thank you. Dr. Trasande, could you please elaborate on this study a little bit, tell us your concerns?

Dr. TRASANDE. Certainly. My mentor and the director of the center, Dr. Philip Landrigan, led a study in 2002, published in the Journal of the National Institute of Environmental Health Perspectives, in which he looked at just four diseases for which the evidence was strongest for the relationship between environmental exposure and harm to children. Those are lead poisoning, developmental disabilities, childhood cancer and asthma.

They aggregated the economic costs of those diseases and the total morbidity of those diseases, and they assigned a conservative percentage to limit the percent of that cost that could be attributed to the environment. That is where they came up with the estimate of $55 billion annual cost to society.

Given what we don't know of the environmental exposures and their role in children's health, it is likely that that number is a gross underestimate.

Senator JEFFORDS. Mr. Steinberg, I understand you are familiar with the U.S. Supreme Court case involving the ability of private parties to seek contribution from other potential responsible parties?

Mr. STEINBERG. Yes, Senator.

Senator JEFFORDS. How has this ruling impacted the willingness of private parties to voluntarily cleanup contaminated property?

Mr. STEINBERG. I think the Supreme Court ruling has to be considered a setback in terms of the incentives for companies to perform voluntary cleanups. Often what is required to begin the cleanup process is for a company to sign up and agree to clean up a site that a number of other companies also helped to contaminate. So

you sign up for 100 percent of the cleanup, and you do that typically in the hope that you will eventually get some equitable contribution down the road from the other companies that helped or the other Government Agencies that helped to create the mess.

What the Supreme Court has done is to make that much more difficult. It is now much more uncertain whether the right of contribution will ever be available. So companies have another reason to stop and think before signing on to a new consent decree for a new NPL site.

Senator JEFFORDS. Well, this concerns me, what you are telling us. I hope that you will follow up, give us some help in trying to see what we can do.

Mr. STEINBERG. I would be glad to, Senator.

Senator JEFFORDS. Thank you.

Senator THUNE. Thank you, Senator Jeffords. I appreciate your asking that question. That is one also that it seems to me at least we ought to be able to address. There ought to be a way that legislatively we can provide a solution. We would look forward to working with you and Senator Boxer and others to make that happen.

I want to thank the panel for your testimony and for your answers in response to the questions. It has been very insightful. I would note, too, for the record, that the record will be open for another 5 days for people who want to submit additional testimony or questions. So with that, we will adjourn.

Thank you.

[Whereupon, at 12:16 p.m., the subcommittee was adjourned.]

[Additional statements submitted for the record follow.]

STATEMENT OF HON. JAMES M. JEFFORDS, U.S. SENATOR FROM THE STATE OF VERMONT

Mr. Chairman, thank you for holding this hearing.

Superfund has successfully cleaned up thousands of toxic waste sites and protected the health of millions of Americans. Thousands of communities have benefited from short-term removal actions, and remedies have been constructed at about 665 of the most contaminated sites in the Nation.

In addition, fear of Superfund liability has prompted corporate America to minimize its toxic waste generation and take extra care to prevent waste mishandling. The Nation is healthier as a result.

Yet, our work is not done. Even today, the EPA estimates that one in four Americans live within 3 miles of a Superfund site. Approximately 600 sites remain on the National Priorities List, with over 100 having "human exposure not under control."

Let me highlight four issues that must be confronted to ensure that the Superfund program is effective in protecting public health.

First, we must fully fund Superfund, which has been on life support in recent years. In real dollars, the program is operating with about 35 percent less money than it had in 1993. The result of chronic underfunding is less cleanup. In Vermont alone, we have three sites that have languished for years on the National Priorities List due to insufficient funds. In this tight budget climate, the only way to fully fund the Superfund program is to reinstate the "polluter pays" fees.

Second, we must make sure that companies that handle hazardous substances set aside enough money to meet their cleanup obligations before they cease operating. The EPA has yet to issue the regulations required in 1980 to address this problem.

Third, a GAO Report I requested last year found that 83 percent of recent Superfund remedies were designed to leave residual contamination in place. Yet, the report found that controls to minimize future exposure to this contamination were rarely properly implemented, monitored, or enforced. If the EPA cannot resolve this problem, cleanups at thousands of sites will need to be revisited.

Finally, the U.S. Supreme Court ruled last year that parties liable under Superfund cannot sue other liable parties for contribution unless they themselves have been sued by the Government. The result of this ruling is confusion and, I fear,

fewer voluntary cleanups. A wide range of stakeholders, including major corporations, environmental groups, and the National Governors Association have called on Congress to overturn this decision. I hope we are able to do so before this Congress adjourns.

Again, I thank the Chairman for holding this hearing.

STATEMENT OF HON. JOSEPH I. LIEBERMAN, U.S. SENATOR FROM THE STATE OF CONNECTICUT

Thank you Mr. Chairman. Contaminated industrial sites in this country continue to harm our children, our families, and our communities. I am disturbed by the mounting evidence that children are especially vulnerable to suffering brain damage and malignant disease as a result of exposure to the chemicals still found at these polluted sites. The Center for Children's Health and the Environment at the Mount Sinai School of Medicine points out that 3 to 4 million children and adolescents live within 1 mile of a Superfund site.

EPA concedes that there is current, actual human exposure to hazardous contaminants at two sites in my State:

In Stratford, CT, wastes containing lead, asbestos, and PCBs are found at 30 locations, including a residential parcel and a community park. Groundwater contaminated with volatile organic compounds flows beneath 120 homes in the town. Indoor air testing has confirmed probable intrusion of those compounds unto the basements of those homes.

In Durham, CT, 80 houses abut and surround a contaminated industrial site.

Children live in approximately 30 of those homes. All of the homes, in addition to three churches and a school, lie within the lateral extent of the plume of contaminated groundwater that extends from the industrial site. All of the buildings in the area get their water from wells.

Both of these sites are in the Superfund pipeline, and I deeply appreciate the ongoing work of dedicated EPA employees, State employees, and neighborhood activists to minimize harmful exposure and to clean up the waste. But the people doing that vital work need adequate funding. They are unlikely to get adequate funding if the entire Superfund program is under-funded. I believe that if the Superfund program is under-funded, the responsible officials at the U.S. EPA have an obligation to own up to that fact, so Congress can do something about it. Moreover, I believe the obligation is a moral one, because the health of children is at stake.

I am concerned, then, over indications that EPA is not divulging a significant inadequacy in this vital program's funding. I would like to rely on EPA's assurances, because I have tremendous respect for the expertise and dedication of the Agency's career employees. But I have seen enough to make me suspect that whenever a senior EPA official tells Congress that Superfund does not need increased funding, career EPA employees shake their heads in disbelief and dismay.

As Resources for the Future points out, annual appropriations for the Superfund Program have not kept pace with inflation. In fact, the program's Fiscal Year 2005 appropriation of $1.2 billion represents a 40 percent decrease in purchasing power when compared with the Fiscal Year 1987 appropriation of $1.4 billions. Meanwhile, as EPA acknowledges, highly complex and expensive mega-sites make up an increasing percentage of the program's cleanup burden.

As the tension has increased between reality and EPA's insistence that Superfund is adequately funded, EPA management has made less and less in the way of program details available to the public. That secrecy has fostered a suspicion that, in certain instances, sites have been allowed to progress through the Superfund pipeline even though their cleanup has not met the standards to which we can and must hold ourselves in order to protect Americans.

So I am proud to cosponsor Senator Boxer's bill to reinstate the polluter fee, which is justified and necessary to replenish the Superfund Trust Fund. As a government, we owe that to the children of Stratford, Durham, and countless other communities across the country.

Thank you, Mr. Chairman.

STATEMENT OF SUSAN PARKER BODINE, ASSISTANT ADMINISTRATOR, OFFICE OF SOLID WASTE AND EMERGENCY RESPONSE, ENVIRONMENTAL PROTECTION AGENCY

Good morning Mr. Chairman and members of the subcommittee. I am Susan Bodine, Assistant Administrator of the Office of Solid Waste and Emergency Response, Environmental Protection Agency. Thank you for the opportunity to appear today to discuss the Superfund program: the tremendous progress that has been

made, the challenges that remain, and what EPA is doing to address those challenges.

THE SUPERFUND PROGRAM

As the subcommittee knows, the Superfund program was established under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA or Superfund), which Congress passed in December 1980 to respond to citizen concerns over Love Canal and other toxic waste sites. Through the Superfund program, the Environmental Protection Agency (EPA) and its partners address abandoned, accidentally spilled, illegally dumped or intentionally released hazardous substances that pose current or future threats to human health and the environment.

The Superfund program has been very successful in protecting human health and the environment. To date, EPA and its State and Tribal partners have assessed 46,515 sites; the removal program has conducted 8,948 removals at 6,415 sites; and 1,612 sites have been proposed to, listed on, or deleted from the National Priorities List (NPL). Of the 1,553 final or deleted sites, 95 percent have begun construction activity, have been completed, or have been deleted from the NPL. Remedy construction is complete at 970 sites. EPA expects the Superfund program to complete cleanup construction at an additional 40 Superfund sites in fiscal year 2006.

EPA also has been very successful in leveraging Federal dollars to secure private party cleanups. In fiscal year 2005, EPA secured commitments from Potentially Responsible Parties (PRPs) to carry out cleanups worth more than $857 million and to reimburse EPA for more than $248 million in costs. The cumulative value of private party cleanup commitments and cost recovery settlements is more than $24 billion. EPA's enforcement efforts have allowed the program to focus the Agency's appropriated funds on sites where PRPs cannot be identified or are unable to pay for or conduct the cleanup.

To fully understand the status of the Superfund program today, it is important to understand the process for cleaning up toxic waste sites, as well as how the Superfund program has evolved over the past 25 years.

The Superfund Pipeline

To achieve protection of human health and the environment, the Superfund program takes each site through a process of investigation, study, and finally cleanup, commonly referred to as the "Superfund pipeline."

The Superfund cleanup process begins with site discovery or notification to EPA of possible releases of hazardous substances. Sites are discovered by various parties, including citizens, but the majority of sites are referred to EPA by State agencies. Once discovered, sites are prescreened. For example, in 2004, approximately 80 percent of sites were screened out because they posed little or no potential threat to human health or the environment. The remaining 20 percent of the sites were entered into the Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS). Next, EPA or the State evaluated the potential for a release of hazardous substances from these sites through a preliminary investigation. This stage screened out 65 percent of the remaining sites. At the sites still remaining, EPA or the State conducted a site assessment. Another 64 percent were screened out at this stage, and those that were not, received additional assessment (screening out another 13 percent of the sites that reach this stage). The data from a site assessment are used to evaluate a site under the Hazard Ranking System (HRS). Sites that score above 28.5 under this system are eligible for NPL listing and, if listed, become eligible for remedial funding.

For the sites that are listed on the NPL, EPA or PRPs, then conduct further investigation to determine the most appropriate remedy for the site (called the remedial investigation/feasibility study). This phase culminates with a record of decision, selecting a remedy for the site, following public notice and comment. EPA, or cooperating PRPs, then design and construct the remedial action. Following completion of a remedial action, often operation and maintenance activities often must continue.

In addition, at any point during the site investigation process, EPA may conduct a removal action at a site, to address an emergency situation, an immediate threat to public health, or to jump-start a remedy with an interim action. For example, EPA has provided alternative water supplies to more than 2 million people to cutoff exposure to contaminated water. During the first half of fiscal year 2006, EPA has conducted removal actions at 82 NPL sites.

EPA also conducts searches for PRPs during this process, and takes action to ensure cleanup work is conducted or paid for by those PRPs, rather than by EPA using appropriated dollars. Finally, sites that are screened out during the site investiga-

tion process are considered eligible response sites, which are sites that are eligible for funding under EPA's Brownfields Program.

Superfund Program's Early Years

In the 1980s, Superfund was a new program that was just getting started. EPA issued regulations to implement the Superfund program in July 1982, by revising the National Contingency Plan, which was first promulgated under section 311 of the Clean Water Act, to incorporate the Superfund program requirements. In September 1983, EPA promulgated the first National Priorities List (NPL), identifying 406 sites as national priorities among the known releases or threatened releases of hazardous substances, pollutants, or contaminants throughout the United States.

From listing a site on the NPL to the completion of the constructing a remedy, the cleanup process takes more than 10 years, on average. As is discussed later, simple sites may take less time, but more complex sites take considerably longer. As a result, during the early days of the Superfund program, most of the activity understandably centered on the investigation and study phase of the Superfund pipeline.

A Maturing Program

Progress continued throughout the 1980s. However, very few sites were cleaned up. In fact, before 1991, remedies were completed at only 49 sites, 16 of which required no construction. As a result, there was a public perception that the Superfund program was addressing sites too slowly. EPA addressed these issues with two initiatives. First, to leverage Federal dollars and increase the number of sites being cleaned up, EPA adopted an "enforcement first" policy in 1991 to require PRPs to perform cleanups, rather than using appropriated dollars and seeking cost recovery. Second, to help explain to the public the progress that the Superfund program had made, in 1993 EPA created the category called "construction completion," and began tracking and reporting the number of Superfund sites where the physical construction of the cleanup remedy was finished.

During the 1990s, many sites that had been placed on the NPL in the 1980s finally moved through the Superfund pipeline. Remedial investigations and feasibility studies were completed. Records of decision selecting remedies were issued. Cleanup remedies were constructed. Between 1991 and 1995, 297 additional sites reached construction completion (33 of which were determined not to need construction).

Despite this progress, the program continued to be criticized that the pace of cleanup was too slow. In response, EPA began aggressively managing the program to achieve construction completions. Between 1996 and 2000, 411 sites achieved the construction completion stage of the pipeline (16 of which were determined not to need construction). However, 162 of these sites cost EPA less than $1 million per site to achieve construction completion (including both fund lead and PRP lead sites). An additional 165 cost EPA less than $5 million. Thus, while the program was achieving on average 82 construction completions per year during this timeframe, the vast majority of those sites were smaller, low cost sites, or were PRP sites with low EPA oversight costs.

Between 2001 and 2005, an additional 209 sites have achieved the construction completion phase. If one looked only at construction completions, one could conclude that the pace of cleanup in this country declined. This would be untrue. While the number of low cost sites reaching construction completion declined, the number of costly and complex sites that have reached construction completion has increased. Moreover, cleanup has progressed significantly at the remaining costly, complex sites.

In addition, cleanup of low cost sites is continuing, just not as often through listing on the NPL. During the late 1990s, a fundamental shift in how sites are cleaned up occurred as a result of the development and growth of State cleanup programs and State brownfields programs. Today, less costly and less complex sites, and sites with cooperative PRPs, are much more likely to be addressed through a State cleanup or voluntary cleanup program or a State brownfields program than through the Federal Superfund program.

This trend was not unexpected. In fact, in November 1998, the General Accountability Office (GAO, then called the General Accounting Office) surveyed States and EPA regions regarding all sites that were then in CERCLIS and determined that, of the 3036 sites in the active CERCLIS data base in 1997, EPA or a State program identified only 232 sites as potential candidates for NPL listing. The actual number of sites listed after 1997 is 172 and an additional 59 sites have been proposed to the NPL, totaling 231.

Working with our State partners, EPA Regions now try to identify the most appropriate program to address sites that require cleanup. This may be a State pro-

gram; it may be the Resource Conservation and Recovery Act (RCRA) corrective action program; it may be the Superfund removal program or the Superfund remedial program and listing on the NPL. As a result, cleanup is continuing through a variety of programs and the NPL has become more of a list of sites that need Federal funding or Federal expertise than a list of all uncontrolled toxic waste sites.

The NPL Universe Today

At this point in the history of the Superfund program, the universe of sites not yet complete and the type of sites being listed on the NPL are very different from the universe of sites on the list 10 years ago. EPA has completed work at many low cost sites that were listed in the past, and new sites in this category are being addressed through other programs. The remaining sites are more complex.

As can be expected given the Superfund pipeline, 893 of the 970 sites that have reached construction completion to date were listed before 1991. At 61 percent of these sites, only one, or in some cases no remedy required construction. In Superfund parlance, these sites had only one "operable unit" (OU).

It is important to remember that many of the sites that have not reached the construction completion stage have been part of the Superfund program for many years, but are large, complex sites that simply take more time to address. Of the 583 sites that have not reached the construction completion state, 318 (54 percent) also were listed before 1991. That means the Superfund program has been addressing these sites for over 15 years, making progress while dealing with technically challenging issues. 367 (63 percent) of the remaining 583 sites have more than one OU. 189 of the remaining 583 sites have been identified as sites where the remedy costs will have or have the potential to exceed $50 million (32 percent). In Superfund parlance, these are called "mega-sites."

Management of Current Superfund Program

Given the complexity of many sites that remain on the NPL, EPA must carefully manage the program. First, management attention and resources are given to the sites that present the greatest risk. Second, actions are taken to protect human health and the environment while remedies to achieve long-term protection are developed and constructed. Third, to ensure efficiency in contracting, the largest sites are managed as long-term construction projects. Fourth, to turn a community blight into a community asset, EPA looks for land revitalization opportunities when developing remedies. Fifth, with so many sites reaching the construction completion stage, attention is now focused on the achievement and maintenance of long-term protection at these sites. Finally, EPA is taking steps to ensure that all Superfund resources are being put to their highest and best use.

Prioritizing Sites Based on Risk

To help EPA manage its funding decisions in a risk-based manner, sites that are ready to begin construction and will be paid for using EPA's appropriated funding are subject to a rigorous prioritization process. EPA's National Risk-Based Priority Panel reviews new cleanup construction projects as they become ready for EPA funding. The Panel prioritizes the projects based on three factors: protection of human health, protection from significant environmental threats, and potential threats based upon site conditions at the time of review. A number of factors are then used to weigh funding priorities among the sites including: human exposure risk, contaminant characteristics and stability, significant environmental risk, and program management considerations. The Panel is composed of national EPA Superfund program experts from both Regional and Headquarters offices.

Addressing Immediate Risks Through Interim Actions

Even though selection, design and construction of what are often multiple remedies at a site may take many years, EPA can and does take interim actions to address immediate risks to human health. EPA has taken removal actions at 58 percent of the sites listed on the NPL. For example, EPA did not wait to list the Omaha Lead site on the NPL before taking action to reduce the risk posed to residential communities. EPA started cleanup work in 1999 using Superfund Removal authorities. The site was listed on the NPL in 2003, and using an expedited interim remedy process, is on schedule to have completed cleanups of more than 2000 residential yards by the end of fiscal year 2006.

EPA is developing tools to identify and improve the management of risks at ongoing NPL cleanups. Beginning in 2002, EPA applied the Human Exposure Under Control Environmental Indicator to document the interim progress made toward achieving long-term human health protection by controlling unacceptable human exposures at NPL sites. This measure tracks the status of whether human health exposures are controlled under current site use. EPA considers human exposure to be

not under control if, under current site use, there are complete pathways for human exposure to contaminants at levels that present an unacceptable risk. EPA does not require documentation of actual exposure when applying this measure. A complete exposure pathway is sufficient.

As the subcommittee knows, the list of sites where human exposure is not under control is dynamic. Over time, sites are removed and new sites are added, depending on changed site conditions or new information. Since becoming Assistant Administrator, I have made it a priority to improve the quality of the data supporting this environmental indicator so that it can be used to prioritize and manage the program.

Managing "Mega-Sites"

The largest and most complex Superfund sites must be managed as multi-year construction projects. This is particularly true of the "mega-sites" with estimated costs over $50 million. EPA funded "mega-sites" consume the majority of our resources. In fiscal year 2005, approximately 50 percent of the Superfund obligations for long-term, on-going cleanup work were committed to just 11 sites. The Agency expects to have a similar situation this year. For this reason, EPA has developed long-term funding plans for a number of complex, costly, sites. These funding plans are based on the construction plans for the sites, and allow EPA to enter into contracts that provide for efficient use of resources.

Land Revitalization

The land revitalization initiative, launched in April 2003, includes all of EPA's cleanup programs as well as partners at all levels of government and in the private and non-profit sectors. The goal of land revitalization is to restore our Nation's contaminated land resources and enable America's communities to safely return these properties to beneficial economic, ecological, and societal uses. EPA is ensuring that cleanup programs protect public health, welfare, and the environment; and also ensuring that the anticipated future uses of these lands are fully considered in cleanup decisions.

Experience has taught us that one of the best ways to clean up contaminated sites and to address blighted properties in communities is to expressly consider the future uses of the land. The country has accepted the economic and ecological importance of recycling various consumer products—and our understanding of sound resource management must now also embrace the recycling of contaminated properties.

Post-Construction Completion Strategy

With so many sites now at the construction completion stage, the Superfund program also must focus attention and resources to address post-construction activities to ensure that remedies remain protective over the long term and sites can be returned to productive use.

In October 2005, to ensure that completed sites remain protective of human heath and the environment, EPA published its Post Construction Completion Strategy. The strategy was developed to improve site operations and maintenance, remedy performance tracking, institutional control implementation and tracking, and reducing barriers to beneficial site reuse. Under this strategy, EPA is ensuring that 5-year reviews are completed and any discrepancies identified in the reviews are acted upon. EPA also is developing an Institutional Control Tracking System, to document and make public the institutional controls that are needed to ensure long-term protectiveness.

In addition, EPA is developing a new post-construction completion measure for the Superfund program as part of its fiscal year 2006–2011 Strategic Plan under the Government Performance and Results Act. This new measure will track and target the number of sites that have been made "ready for reuse" by the Superfund program. These are sites that have achieved the cleanup goals and have implemented the institutional controls that ensure long-term protection and allow reuse of land.

EPA already is collecting and will continue to collect and report data on the number of acres that are "ready for reuse" at Superfund sites, even if the entire site is not construction complete, and is working on developing similar information for all of EPA's cleanup programs. Both the new GPRA measure and the ongoing information on acres made "ready for reuse" demonstrate how cleaning up waste sites to protect human health and the environment can produce the accompanying benefit of returning properties to beneficial reuse.

Managing Superfund Resources

EPA is undertaking a number of actions to ensure that Superfund resources are not expended on unnecessary activities and are available to carry out site cleanup work. For example, EPA has:

- Initiated a workforce analysis to determine if staff resources should be reallocated
- Started benchmarking studies of EPA performance
- Shared best practices among the EPA Regions
- Established the Contaminated Sediments Technical Advisory Group, comprised of Agency experts, to provide technical support to Regions with potentially high cost contaminated sediment sites
- Increased the number of sites addressed by the Remedy Review Board, which reviews high cost cleanup remedies, by lowering the threshold cost of remedies that will be reviewed from $30 million to $25 million
- Continued to optimize long-term groundwater remedies in order to reduce operating costs and restore potential drinking water sources more efficiently
- Aggressively deobligated funds from contracts, grants, cooperative agreements and interagency agreements, resulting in more than $600 million for new cleanup activities over the past five fiscal years.

These efforts are, in part, a result of several studies, including an internal review of the Superfund program, known as the 120-Day Study, which identified opportunities for the Agency to put its resources to better use.

EMERGENCY RESPONSE

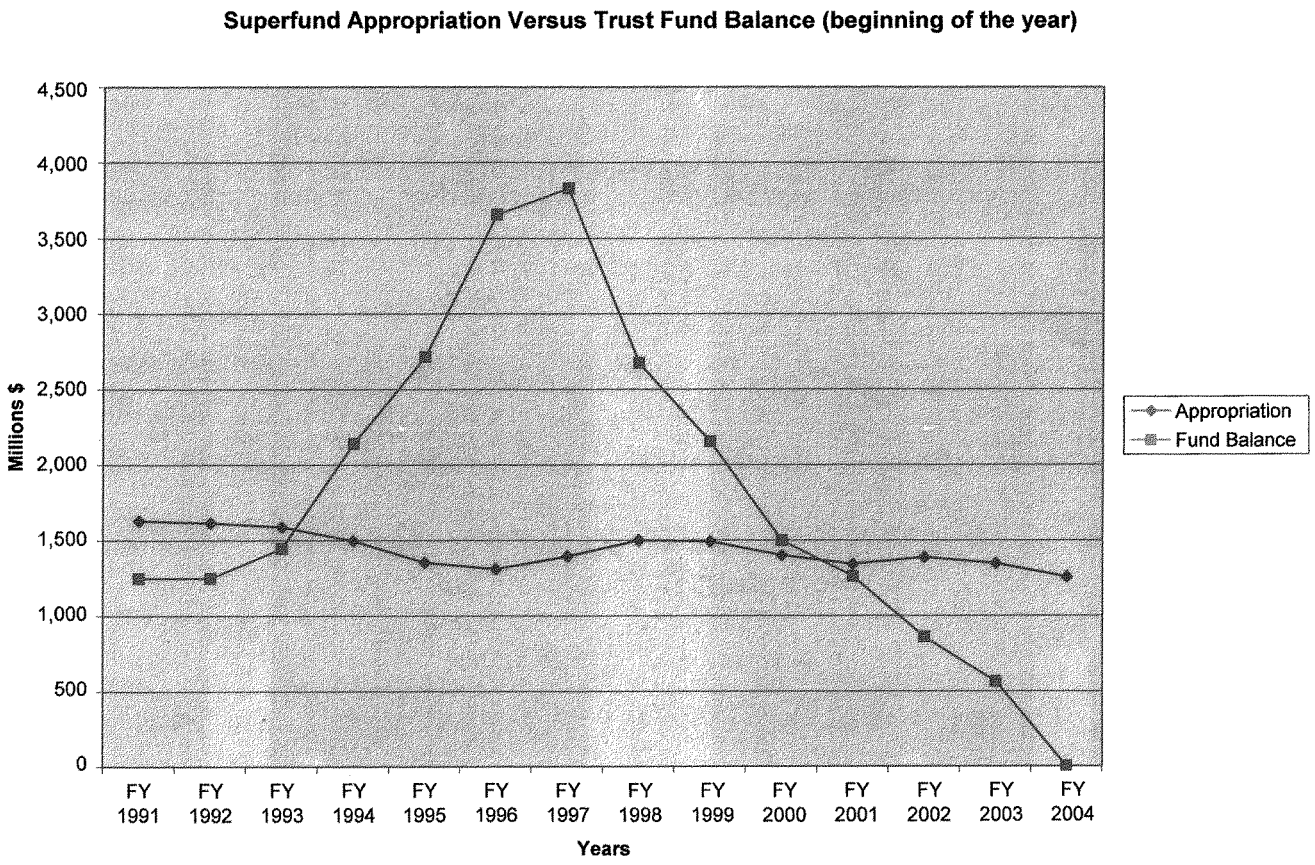
EPA's Emergency Response activities are another facet of the Superfund program. The Emergency Response program provides national leadership to prevent, prepare for, and respond to human health and environmental emergencies, including terrorist events. EPA7s Superfund Emergency Response program was actively involved in the response to the events of 9/11 and the subsequent anthrax attacks, and, most recently, in the response to Hurricanes Katrina and Rita.

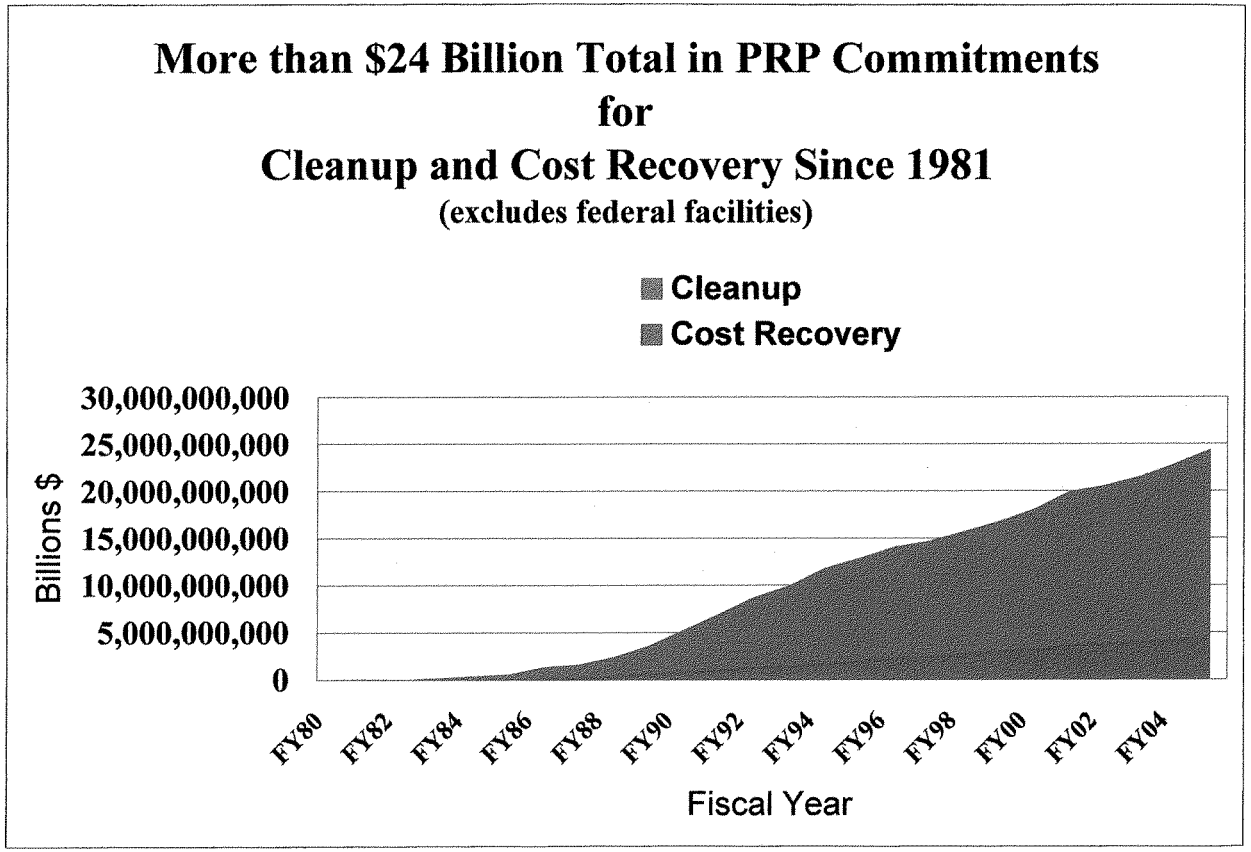
Beginning on August 25, 2005, to prepare for Hurricane Katrina, EPA deployed personnel to the Federal Emergency Management Agency (FEMA) National Response Coordination Center and sent On-Scene Coordinators (OSCs) to the Florida, Louisiana, Alabama and Mississippi Emergency Operations Centers. The OSC is the Federal official responsible for monitoring or directing responses to all oil spills and hazardous substance releases reported to the Federal Government. EPA sent additional personnel to the affected areas as soon as travel into the region was possible. In anticipation of Hurricane Rita, EPA also deployed response experts to the multiagency Regional Response Coordination Center in Denton, TX on September 20. Nearly 400 EPA staff and contractors are continuing to assist with recovery in the Gulf Coast. EPA's hurricane response related activities are being funded by FEMA under a mission assignment pursuant to the President's disaster declarations for the Gulf Coast.

EPA is the lead Federal Agency under the National Response Plan for Emergency Support Function (ESF) No. 10, which addresses oil and hazardous materials, and works with other agencies to provide support for a number of other Emergency Support Functions, including ESF No. 3, which addresses Public Works and Engineering. Specifically, EPA's responsibilities include preventing, minimizing, or mitigating threats to public health, welfare, or the environment caused by the actual or potential releases of hazardous materials; testing the quality of flood waters, sediments, and air; and assisting with the restoration of the drinking and waste water infrastructure. Also under ESF No. 3, the Agency works with the U.S. Army Corps of Engineers to address final disposition of the large volumes of debris from homes, buildings and other structures damaged by Hurricane Katrina. EPA, in coordination with the States, is providing information to both workers and the public about sampling test results, as well as assisting communities with debris disposal and hazardous waste issues.

CONCLUSION

Administrator Johnson and the Bush administration are fully committed to Superfund's mission, protecting human health and the environment by cleaning up our Nation's worst toxic waste sites. The Superfund program has produced significant accomplishments and EPA is continuing its efforts to manage the program efficiently and effectively in order to protect human health and the environment, and provide opportunities for reuse and redevelopment to communities across the country.

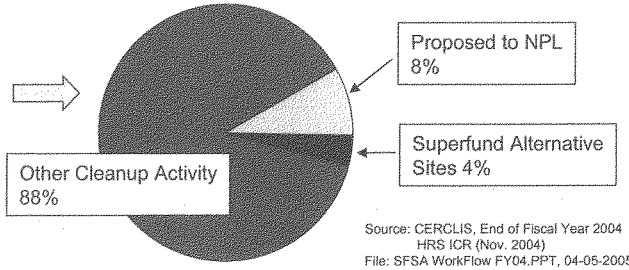

Superfund Appropriation Versus Trust Fund Balance (beginning of the year)
Millions $
4,500
4,000
3,500
3,000
2,500
2,000
1,500
1,000
500
0
FY 1991
FY 1992
FY 1993
FY 1994
FY 1995
FY 1996
FY 1997
FY 1998
FY 1999
FY 2000
FY 2001
FY 2002
FY 2003
FY 2004
Years
Appropriation
Fund Balance


More than $24 Billion Total in PRP Commitments
for
Cleanup and Cost Recovery Since 1981
(excludes federal facilities)
Cleanup
Cost Recovery
Billions $
30,000,000,000
25,000,000,000
20,000,000,000
15,000,000,000
10,000,000,000
5,000,000,000
0
FY80
FY82
FY84
FY86
FY88
FY90
FY92
FY94
FY96
FY98
FY00
FY02
FY04
Fiscal Year

Superfund Site Assessment Workflow – FY 2004

FY '04 Activity Lead [1] EPA	State	Screening Phases	Sites Remaining After Screening Phase
		Approx. 700 sites pre-screened in FY04	
25%	75%	**Pre-CERCLIS Screening** $2,400/unit; 80% screened out	20%
58%	42%	**Preliminary Assessment** $7,600/unit; 65% screened out	7%
48%	52%	**Site Inspection** $37,000/unit; 64% screened out	3%
66%	34%	**Additional Assessment** $33,300/unit; 13% screened out	2%
100%	0%	**HRS Package** $36,800/unit; 0% screened out	2%

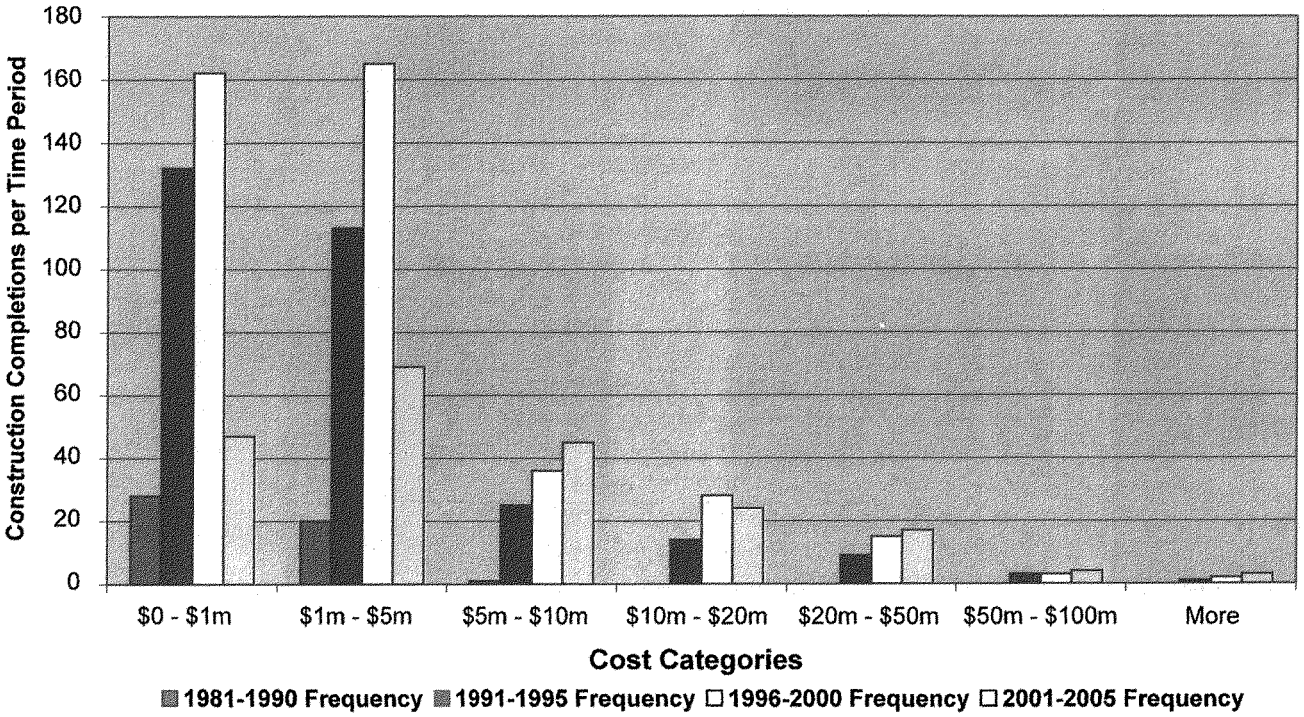
FY 2000-2004 Long-Term Cleanup Program Decisions at Universe of NPL Eligible Sites (Based on Site Inspections, Additional Assessments, or HRS Packages)



[1] Both EPA and States are using Federal Superfund dollars to perform these activities. EPA funded States through cooperative agreements.

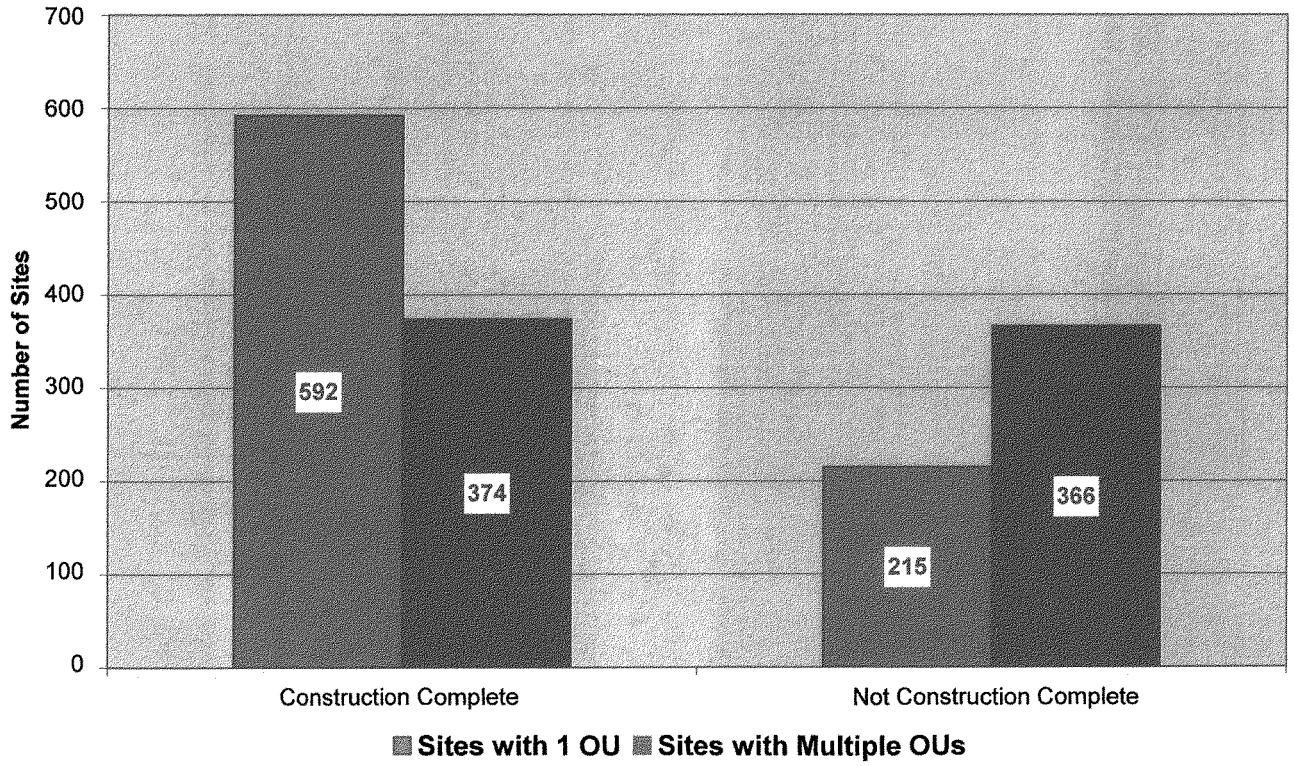
Source: CERCLIS, End of Fiscal Year 2004
HRS ICR (Nov. 2004)
File: SFSA WorkFlow FY04.PPT, 04-05-2005

Cost Frequency Distribution for Construction Complete Sites 1981-2005



Costs include obligations through EOFY 2005 of Superfund appropriation resources only

Operable Units for Final and Deleted NPL Sites



CERCLIS data as of EOFY 2005

STATEMENT OF KATHERINE N. PROBST,* SENIOR FELLOW AND DIRECTOR, RISK, RESOURCE, AND ENVIRONMENTAL MANAGEMENT, RESOURCES FOR THE FUTURE

Mr. Chairman and distinguished members of the subcommittee, thank you for inviting me to testify before you today about the critical issues facing the Superfund program. I am a Senior Fellow at Resources for the Future (RFF) and the director of RFF's Risk, Resource, and Environmental Management Division.

RFF is an independent, nonprofit 501 (c)(3) research and educational organization located here in Washington, DC. For over 50 years, researchers at RFF have been conducting research on a wide variety of issues related to energy, natural resources, and the environment. RFF does not lobby and does not take positions on legislation or regulations as an organization. The views I present today are mine alone, and do not reflect the opinions of the staff, management, or Board of Directors of Resources for the Future. I will try to keep my oral remarks brief, and I would appreciate it if you would include my full written statement in the record.

For more than 15 years, I have conducted research on issues related to the evaluation, management, and improvement of the Superfund program. I was the lead author of a Report to Congress, issued by RFF in July of 2001, titled Superfund's Future: What Will It Cost? which included estimates of the funding that would be needed by EPA from fiscal year 2000 through fiscal year 2009 to fully implement the program, assuming no change in the program's policies or regulations. I was also the lead author of a more recent report, Success for Superfund: A New Approach for Keeping Score, published by RFF in April 2004. In this report, I recommended that EPA develop a one-page "report card" for each site on the National Priorities List (NPL) that would include key information not only on site progress, but also on major site contaminants and other key site attributes. I have also directed a number of studies about other aspects of the Superfund program as well as studies of ways to improve the cleanup of sites in the nuclear weapons complex, which, as you know, are the responsibility of the Department of Energy.

In all of theses studies, in addition to addressing key policy issues, I have made specific suggestions for improving the data and management systems used by the Superfund program, an issue near and dear to my heart.

The subcommittee asked for comments regarding oversight of the Superfund program. I would like to first very briefly summarize the status of the program as it relates to progress at sites on the NPL and then focus on four key issues:

1. Cleanup funding;
2. Monitoring and enforcing institutional controls;
3. Improved data and public information; and
4. The need for independent evaluation.

A SNAPSHOT OF CLEANUP AT NPL SITES

After a site is listed on the NPL, each site is either addressed as a whole or divided into multiple projects. Each major project goes through a number of steps: the site is characterized, alternative remedies are evaluated, a remedy is selected, and then a detailed remedy design is prepared. After that, the site (or project) enters what is called the "construction" phase, which is the actual implementation of the remedy. When all remedies at a site (some sites have multiple remedies) have been fully implemented—that is, when all the construction and engineering work is done—the site is deemed "construction complete." Construction complete is one of EPA's major milestones for reporting individual site progress, and the progress of the program as a whole. It is worth noting that just because a site is categorized as "construction complete" does not mean that the cleanup goals at the site have been achieved. And, as discussed in more detail later in my testimony, at many sites where hazardous substances are left on site at levels that preclude unrestricted use of the site, restrictions on land, water, or groundwater use—referred to as "institutional controls"—are required to ensure that people do not come into contact with contamination remaining at the site.

As of the end of May 2006, there were 1,244 final sites on the NPL (this number does not include "proposed" NPL sites, nor sites that were once final NPL sites and have since been formally "deleted" from the NPL.) Just over half of these sites (665) are construction complete. That is the good news. The bad news is that the remaining 579 sites—or 47 percent—are not yet construction complete, which means that the cost of site studies and remedies lies in the future and that substantial additional funds will need to be appropriated to complete cleanup activities at many of these sites. Most of these sites are in the construction stage, but there are a large

*The views expressed herein are those of the author only, and do not represent the views of the staff, management, or Board of Directors of Resources for the Future.

number where studies are underway or have not yet begun, meaning that a sizable number of theses sites are just beginning to make their way through the "Superfund pipeline."

According to information available on EPA's Superfund Web site, a large number of these sites still present some kind of current risk to human health or the environment. Of the 579 final NPL sites that are not construction complete, there are:

128 sites (22 percent) where human exposure is not under control, and

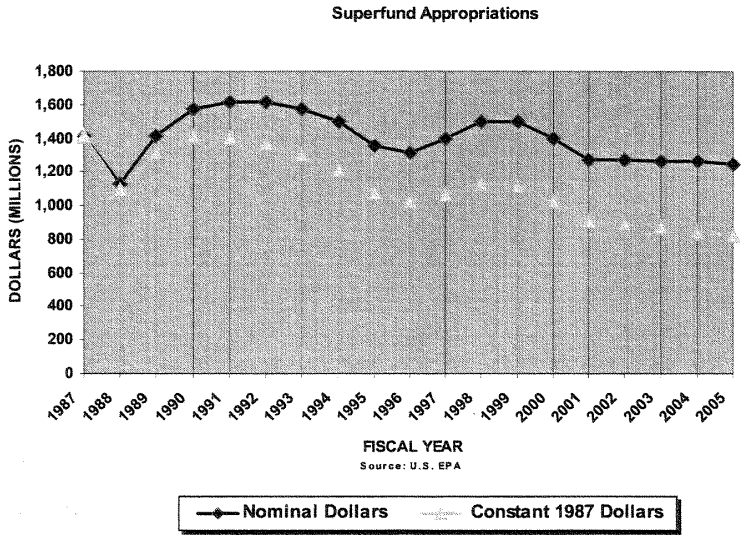
192 sites (33 percent) where groundwater migration is not under control.

Clearly, there is not enough information on the Superfund Web site (a subject I return to later in my testimony) to know exactly what this information means and how large the risks at these sites are, but it does suggest that there is more critical work that needs to be done, and in an expedited manner.

Although many would like to think that after 25 years of the program's existence, we are nearing the end of the need for the Superfund program, this appears to be wishful thinking. While fewer sites have been listed in recent years than in the heyday of the program, some of the new sites being added are large and complex, and there are still a large number of "old" sites yet unfinished. Current and future NPL sites need cleanup, attention, funding, and EPA and congressional oversight.

Cleanup Funding: Coming Clean about What Lies Ahead

Since 1987, Superfund's annual appropriations have fluctuated from a low of $1.1 billion in fiscal year 1988 to a high of $1.6 billion in FYs 1991 and 1992, as shown in the figure below. In recent years, EPA Superfund appropriations have been relatively constant at just under $1.3 billion a year, at least in what are referred to as "nominal dollars." In constant 1987 dollars, however, the Superfund's program spending power has decreased substantially since 1987, as also shown in the figure below. The program's fiscal year 2005 appropriations of $1.2 billion are the equivalent of $820 million in constant 1987 dollars—a 40 percent decrease in purchasing power when compared with actual fiscal year 1987 appropriations of $1.4 billion. Thus, the Superfund program's real purchasing power has decreased dramatically at the same time as large, complex, and expensive sites—often referred to as "mega sites" make up an increasing proportion of the program's workload. It should come as no surprise that, as predicted in the July 2001 RFF Report to Congress—and documented by many subsequent reports since then—there is a shortfall in funds needed for cleanup.



Over the past few years, the U.S. Government Accountability Office and the EPA Office of Inspector General have clearly documented that the Superfund program suffers from a funding shortfall and that EPA has had to delay cleanup actions at NPL sites as a result. One solution to this problem, of course, is to increase annual funding for the Superfund program. In fact, in the past 2 years, the Administration has included in the President's budget a request (although not with much force) for an additional $150 million targeted specifically for cleanup actions at NPL sites.

This funding request most likely represents the minimum, not the maximum shortfall, based on the work of RFF and other independent organizations. Any funding increase by Congress should be targeted specifically to clean up related activities.

If the needed funding is not forthcoming, however, it is critical that EPA "come clean" about the implications of this shortfall on the future pace of cleanup, and on progress at individual NPL sites. This will only happen if Congress, either in oversight hearings such as this one, or as part of the annual appropriations process, requires that EPA identify on a site-by-site basis the specific funding shortfall for each site on the NPL, and specify which sites will be delayed—and by how much—if funding is not increased over current appropriations.

In addition, Congress should ask EPA, on an annual basis, to present to this subcommittee and to the relevant appropriations committees how much funding would be needed to "fully fund" cleanup, assuming no change in current cleanup standards and policies. This is exactly the charge that was given to RFF in the conference report that accompanied the fiscal year 2000 VA-HUD independent agencies appropriations bill. RFF was asked to conduct this study by congressional staff because it was felt that EPA did not have the credibility to do this work.

If there is still concern about EPA's credibility, the subcommittee could require the report be subject to independent external peer review (on an expedited basis) at all stages of the project (conceptual, first set of results, final results). This would assure that the analysis and assumptions are sound. Conversely, Congress could again request that the Agency contract with an independent third-party for this information. In addition, Congress should require that EPA develop a reliable model for estimating future cleanup and other related costs and update this model annually. In fact, EPA had just such a model, called the "outyear liability model," for many years, but it is now defunct. It is critical for effective congressional oversight that EPA, and Congress, know the estimated future costs of the Superfund program.

In this era of ever-scarcer Federal dollars, the Superfund program also must take a hard look at its own budget, identify areas that are not very productive, and reprogram funds wherever possible to activities that are directly related to clean up. This does not mean cutting the enforcement program, but it does mean examining the myriad initiatives that have sprouted over the years to assess which ones are truly worthwhile. These include everything from efforts to focus on redevelopment of Superfund sites to efforts to stimulate new technologies for cleanup. While almost all the initiatives sound good, it is critical that their benefits and costs be evaluated to make sure that the best use is being made of scarce Superfund dollars. While it is unlikely that reprogramming from existing programs and initiatives will release enough funds to address the cleanup shortfall, it is important that the program be willing to undertake this kind of self-reflection and put funds where they are most needed. There is little appetite in many quarters for increased cleanup funding until EPA takes a hard look at where current funds are going and makes needed adjustments.

Monitoring and Enforcing Institutional Controls: Let's Get On With It!

Since the mid-1990s, researchers from RFF, the Environmental Law Institute (ELI), and the University of Tennessee, among others, have published a number of studies documenting the need for closer monitoring and more active enforcement of institutional controls at Superfund sites. Many in government, academia, and the private sector have written about these issues as well. What has actually been accomplished in the past 10 years? Well, a lot and not much.

In some ways, a lot has happened regarding institutional controls (now fondly referred to as "ICs"). A decade ago, few people in the cleanup field even knew what institutional controls were, and even fewer were concerned about them. Now there are frequent ICs meetings and conferences, and various Web sites and other Internet resources devoted to ICs, land use controls, long-term stewardship, call it what you will. More importantly, after many long meetings and discussions, a group of experts developed the Uniform Environmental Covenants Act (UECA), which has been enacted or introduced in more than a dozen States. This uniform law, once enacted, ensures that States would be able to implement and enforce durable environmental covenants to restrict land use. However, UECA will do nothing to solve the institutional problem of assigning responsibility to a specific entity to ensure that ICs are monitored regularly, or to clarify who will have the responsibility for bringing enforcement actions when needed.

We appear to be no closer to what is really needed: reliable information on ICs for all NPL sites and annual on-the-ground inspections and enforcement of institutional controls. The Superfund program still does not have a consistent and reliable approach to tracking and monitoring ICs, which is critical to the protection of public health and the environment at contaminated sites. More and more contaminated

site remedies rely on ICs to ensure protection of public health and environment. EPA must make monitoring and enforcement of ICs a top priority.

Ironically, the most recent major report on ICs by the U.S. Government Accountability Office (Hazardous Waste Sites: Improved Effectiveness of Controls at Sites Could Better Protect the Public, GAO–05–163, January 28, 2005) reached many of the same conclusions as the many prior studies conduced in the 1990s by RFF, ELI, and others. GAO concluded that:

• Institutional controls are increasingly part of Superfund remedies and their effective implementation is critical in ensuring protection of public health, that is, to limit exposure to contamination that remains onsite even after a remedy has been implemented.

• There is often great uncertainty regarding what level of government—local, State, or Federal—is responsible for monitoring these restrictions on land, water, and groundwater use. And, of course, without consistent monitoring, we don't really know if ICs are in place and working.

• Due to the nature of institutional controls, it is often not clear what organization has the authority to enforce institutional controls.

• Currently available information suggests that for a non-trivial number of sites, the institutional controls required to ensure a remedy is protective are not in fact being fully implemented.

The real question is, why isn't EPA moving forward aggressively to establish a robust monitoring and enforcement program now for ICs at NPL sites, which is what is really needed?

So far, EPA's main response has been to focus its resources on developing a complex (and much-delayed) data base to track institutional controls and to issue a variety of guidance documents. While these are positive actions, it is unclear whether we are any closer to having reliable information on ICs at all NPL sites. It is taking many years and untold dollars to get the data base up and running, and the guidance documents suggest that EPA will rely on 5-year reviews to monitor implementation of ICs.

Five years is a long time interval between IC inspections—to long a time—when the issue is assuring compliance with land use and other restrictions needed to protect public health. While guidance documents are nice, and EPA can get them issued without going through the Office of Management and Budget (OMB) and the White House, the reality is that they "do not have the force of law."

Simply put, institutional controls "work"' only when people know about them and comply with them. Having restrictions on the use of land, water, and groundwater only on paper is meaningless, unless these controls are actively enforced and monitored. And, if the controls are not enforced, the public can be at risk.

What then is to be done?

Ideally, EPA would make institutional controls part of the regulatory framework governing Superfund cleanups. This would require amending the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) to address how institutional controls should be developed, monitored, and enforced. When the NCP was written, EPA's policy analysts (and most of us on the outside) were focused on getting remedies selected at Superfund sites. The NCP lays out very detailed requirements, including provisions for public comment, on the process that results in the selection of a site remedy. However, the NCP is quite sparse in regard to regulatory requirements after that point. In fact, even though ICs usually are not fully developed until after a remedy is selected—typically as part of a settlement agreement—there is no provision for public input on ICs, nor is EPA required to maintain an administrative record after a remedy is chosen.

Given that ICs are a critical part of the effectiveness of many remedies, there should be clear and consistent requirements for how ICs are selected, monitored, and enforced that have the force of law. No matter how difficult it might be to get the NCP amended, we have been operating with the band-aid of IC guidance documents for long enough.

The recommendations I am making today are identical to those included in a 1997 RFF report Linking Land Use and Superfund Cleanups that I co-authored with colleagues Bob Hersh, Kris Wernstedt and Jan Mazurek:

• EPA should revise the National Contingency Plan (NCP)—the regulatory blueprint for the Superfund program—to address the role of land use in remedy selection, including incorporating the development of institutional controls into the formal remedy selection process.

• EPA should, in consultation with State and local governments, develop a strategy (for eventual codification in the NCP) to ensure effective long-term regulatory oversight of Superfund sites where contamination remains at levels that present a risk to public health after the remedy has been constructed and implemented.

Sadly, these recommendations are just as relevant today as when we made them 9 years ago. If EPA does not move forward to amend the NCP, EPA can still take action right now to implement a simple and streamlined ICs tracking system that would give the Agency the information it needs to find out if ICs are being complied with, and, if they are not, to take the necessary follow-up action. There is absolutely nothing that precludes EPA from doing this; all that is needed is senior management direction and attention.

The first step is to implement a simple and straightforward ICs tracking and compliance data base, available to all on EPA's web site. We have ample evidence that the more complex the data base, the less likely it is that the data in it will be reliable. The old adage "keep it simple stupid" is still apt. After many years, and many hours of work by EPA, consultants, and the input of many experts, we still don't have a workable ICs tracking system that is up and running and available to the public.

It is time, as economists are fond of saying, to forget about "sunk costs" and create a relatively simple ICs tracking system right now. Such a tracking system could be up and running in 3 to 6 months if it has the backing of senior management in the Office of Solid Waste and Emergency Response.

To jump-start this process, I lay out below the kind of information that should be collected by EPA for each site on the NPL that requires institutional controls. This information should be accessible on the EPA Web site.

- What is the legal basis for the IC?
- What specific kind of control is required?
- Who is responsible for implementing the IC?
- Has the IC been implemented, and if not, why?
- Who is responsible for monitoring the IC?
- When was the last time someone from EPA, the State, or one of their contractors went to the site to see if the IC is being complied with?
- If it appears that the IC is not being implemented as required, what steps have been taken to remedy the situation?
- Is specific information about the nature of the IC requirement and who to call if the IC is not being complied with for individual sites readily available on all EPA Web sites?

This is just a preliminary list of information that needs to be included in a simple ICs tracking system. EPA should, of course, review and refine this set of questions and get input from both internal and external experts. That said, I strongly recommend a very streamlined data base with perhaps 10 to 15 pieces of critical information that would give EPA, and the public, enough information to know what kinds of ICs are required at each site and if they have been fully implemented.

It is true my list of questions will not tell you everything you ever wanted to know about ICs at a given site, but it will give EPA management and the concerned public enough information to know if there is a problem that requires attention. And, this kind of data base would be relatively quick and inexpensive to develop, and easy to maintain. Perhaps most importantly, the questions are simple enough that it should be possible to have highly reliable information that can be trusted. While other more sophisticated information may be required in the future, this information should have been collected years ago, and we need to start someplace.

After this initial assessment is completed, EPA needs to develop an inspection strategy to ensure that ICs are monitored at least once a year and are implemented as required. The safety of those living near these sites depends on this, and it is hard to see what could be more important for the vast majority of NPL sites where some contamination remains on site, even after cleanup activities have been fully implemented. At these sites, ICs can be as important in protecting public health as the engineering remedy itself. It would be foolish to spend tens or hundreds of millions of dollars on a site remedy, and then skimp on the monitoring and enforcement of institutional controls. The Love Canal site—which in many ways "begat" the Superfund program—is the proverbial poster child for the failure of institutional controls. EPA has a choice to make—it can try to prevent future "Love Canals" by monitoring and enforcing ICs, or it can create an environment where the next Love Canal is just waiting to happen.

Improved Data and Public Information

Getting information on the progress, contamination, costs, and health risks of NPL sites is still a challenge. If you log on to the main Superfund site (*www.epa.gov/superfund*) and click on "sites" it is not readily apparent where to go to get different kinds of information on individual sites among the many choices, nor is it clear where to go to get the most "user-friendly" information. There is in fact some good information to be found on individual sites, but one has to be a

Superfund maven to know what is on the Superfund Web site, and how to find it. In addition, it is quite difficult to obtain information on overall program progress, that is, the number of sites that have institutional controls, or where current sites are in the "Superfund pipeline."

In addition, there are still major questions about the quality of much of the information in the Superfund program's two major systems—CERCLIS, which is the main Superfund data base, and IFMS, the Agency's financial management system. Both systems suffer from too many individual codes that are inconsistently applied, and the way the systems are organized is anything but "user friendly." It is a well-known fact that individual Superfund offices have created their own data bases to serve their needs, leading to multiple systems with multiple data, and, one can only assume, increased total cost to the program. These systems need a major overhaul, not tweaking. They also have many substantive gaps. Ideally, senior management in EPA should be able to access, on their own personal computer, up-to-date information on each and every NPL site, including future funding needs, when various site actions will be started and completed, the status of ICs, the major risks at the site, etc.

Overall, the Superfund Web site is extremely difficult to navigate. In this day and age, when so many people go "on-line" to get information, the Superfund Web site, especially as it relates to site-specific information, could be greatly improved. More attention should be paid to describing the various sources of information and to improving the graphics and user-interface of the site. In our report Success for Superfund[1], my colleague Diane Sherman and I recommended a one-page report card for all NPL sites, and a longer "NPL site scorecard." While EPA has improved the information that one can get from the main EPA Web site in recent years, it is still difficult to obtain basic information about the timing of future site actions, and what exposure pathways may be of concern.

Creating better internal systems and a more accessible and "user-friendly" Superfund Web site should be a top priority. That said, it is critical that any such effort have very strong management from EPA so that the systems created are simple, and the data is reliable. This will require working with EPA's regional offices, who are on the front line in terms of site response activities—and making sure that whatever consultant is charged with this task does not create a complex system that will only serve to ensure them full future employment for the rest of their careers.

The need for independent evaluation: The Superfund program should develop and fund a 3- to 5-year research and evaluation strategy.

Finally, the Superfund program—like many Federal programs—needs to do a better job of evaluating itself. Although there have been many mandates in recent years—requirements under GPRA, the PART analyses led by OMB, and others—to stimulate more and better program evaluation, this new culture seems not to have taken hold yet in Superfund.

The first task is for the program to create the policy and analytic capability internally to create a 3- to 5-year research and evaluation strategy, and to set aside funds to implement it. Some of these projects can and should be done internally (by EPA staff or their contractors); others studies must be done independently—through contracts assuring contractor independence or requests for proposals to the academic and nonprofit community. All of the work should be subject to some form of external peer review to assure credibility.

The goal of program evaluation should be to improve implementation in the future and to assure that funds are being spent in the most efficient and cost-effective fashion. With Superfund, everyone has an anecdote about what works, what doesn't, and what the benefits and costs are. All of these elements need to be part of a broader, credible assessment of the program's accomplishments—not simply as a "communications" initiative.

I think it is fair to say that almost every other program in EPA has a more robust capability for policy and economic analysis than does Superfund. I suspect this is because the Superfund program has never had to comply with the requirements of the various executive orders requiring regulatory impact analyses. Superfund, however, still does not have a core policy analytic capability charged with independent analysis and evaluation. A group needs to be created within OSWER that has the charge of looking at the entire program, including enforcement, as that is so crucial to Superfund, and the group needs to be protected from day-to-day fire drills and have resources to fund external research and analysis.

Once such a critical mass is created, the next step is to develop and implement a 3- to 5-year strategy for independent research and evaluation of the Superfund

[1] This report can be found at http://www.rff.org/documents/RFF–RPT–Superfund Success.pdf

program and to set aside funds for this purpose on an annual basis. This should be done with input from external experts, as well as with input from senior EPA management. Even though the program is short of funds for cleanup, good evaluations should help the program save money and be more effective in the long term. Needless to say, I think it is very important that the results of these studies be made public.

What kinds of questions would be included in such a research strategy? Below are some suggestions. These are just some of the many questions that, if asked, might lead to improvements in the Superfund program. For a program that costs the American taxpayer $1.3 billion a year, and that has been in existence for over 25 years, we should know the answers to some of these questions.

- Why does it take so long to reach "construction complete" at some sites? Are there patterns to the causes of delay that could be addressed to speed cleanup?
- Why are there still so many sites where human exposure is still not under control?
- Which remedies have been most effective, and which have not, for particular kinds of contamination?
- How accurate have EPA's initial estimates been of site costs and time to complete cleanup? What steps could be taken to improve both estimates?
- How much are responsible parties paying for cleanup actions? How does this compare to initial cost estimates?
- What makes a "mega site" a mega site? What drives the high costs at these sites?
- Are institutional controls being implemented? If not, why?
- What, conceptually, are the benefits and costs of Superfund cleanups, and do the data and methodologies exist to actually estimate them?
- What is the quality of site studies and remedy designs? Are there changes to these processes that would both improve the quality of these efforts, and decrease program costs?
- Are all Superfund moneys actually going to Superfund-related activities, or are some funds and staff siphoned off to other programs and EPA initiatives?
- How do sites listed in recent years compare to those listed in earlier years in terms of complexity, costs, and pace of cleanup?
- What are the findings of the 5-year reviews, in terms of whether site remedies are being implemented as designed and whether cleanup goals are being met?

In closing, it is clear from even a brief look at the status of sites on the NPL and the fact that new sites continue to be added each year that the Superfund program is going to be with us for some time yet. Thus, it is worthwhile to invest in improving current data and management systems, and to conduct independent evaluations of key aspects of the program in order to make improvements in how the program is managed and implemented. These investments will pay off by leading to a more efficient program, and ultimately, allow the Agency to do more with the funds it has.

EPA has a responsibility to people living on and near contaminated sites to "come clean" about what has been done at these sites, what contamination and health concerns remain at "their" sites, and when they can expect each site to be cleaned up. While "coming clean" is always scary—and carries with it the risk of disclosing problems and concerns of which Congress and the American public were previously unaware—it is a crucial first step to improved management and credibility of this important environmental program.

Lasting reform is unlikely to be the result of a series of new initiatives, or quick fixes. After 25 years, many of the same challenges remain as in the early years of the program. There is a need for better data, for independent evaluation, for a willingness to consider—and make—radical changes in funding and management priorities. And there is a need for increased transparency in all aspects of the program. I urge EPA to have as its goal not making the program better this year or next, but to try to ensure that, 5 years from now, the program is better focused and managed, and that there is better data and information about Superfund sites available to the public. With an eye on the long-term (rather than on tomorrow's news) EPA can give the American public a much stronger and more effective Superfund program.

Thank you very much for asking me to testify before you today. I would be happy to answer any questions.

RESPONSES BY KATHERINE N. PROBST TO ADDITIONAL QUESTIONS FROM SENATOR JEFFORDS

Question 1. In your testimony, you suggest that EPA should come clean about the impact of the funding shortfall on the future pace of Superfund clean ups. What specifically do you recommend?

Response. I recommend that EPA detail, for each site on the NPL, the total amount of additional funding needed to complete cleanup of each site as expeditiously as possible, and specify how much in funding would be needed each year until cleanup is complete to finish all remedial activities at each site as soon as possible.

EPA should then specify the implications, on cost and duration of cleanup, of current funding levels, i.e. for each site, EPA should detail the likely delay in each phase of the cleanup process due to the current funding shortfall, and any increase in total costs (both in discounted and undiscounted dollars), for that site as a result of the cleanup being spread out over more years than dictated by any physical or engineering constraints at the site.

It should be noted that while past evaluations have made clear that more cleanup funding would speed clean up, there are physical and engineering constraints in how quickly any individual site can be cleaned up. For example, when we completed our study of future cleanup costs, EPA staff estimated that the New Bedford Harbor site needed approximately $300 million in additional funds to complete cleanup activities. If that full amount were allocated to the Regional Office today, they could not finish that cleanup in one year.

Question 2. In your testimony, you also discussed a number of steps that EPA needs to take to ensure that institutional controls at Superfund sites are monitored and enforced. Am I correct in stating that, without proper monitoring and enforcement, EPA clean ups that rely on institutional controls are not protective?

Response. Without proper monitoring and enforcement of institutional controls there is no way to know if a site that relies on institutional controls as part of the remedy is protective. If, in fact, the required institutional are not in place, then the site remedy is not protective.

Question 3. Your written testimony notes that EPA's annual Superfund appropriations has decreased substantially when adjusted for inflation. How has this impacted the Superfund program? Am I correct that EPA could clean up more abandoned sites if it had greater resources?

Response. Many people (including myself) often say that the Superfund program has had "level funding" for the past few years, and refer to funding levels over the life of the Superfund program in what are called "nominal dollars." In so doing, we all minimize the very real "cuts" to the program that has occurred over the past 20 years. The reason to point out the decrease in appropriations when the amounts are adjusted for inflation is to make clear that the Superfund programs' purchasing power has in fact decreased dramatically over the past 15–20 years.

As noted in my response to question No. 2 above, I think unquestionably some cleanups at some NPL sites could be accelerated, and additional sites contaminated with hazardous substances could be cleaned up if annual Superfund appropriations were increased, and if these funds were targeted specifically to cleanup activities. That said, as noted in my response to question No. 2, there is a limit to how much some cleanups can be accelerated—as there are limitations on what can be done that are imposed by the physical characteristics of each site, as well as engineering constraints.

Clearly, with more funds, more sites could be placed on the NPL, or more removal actions could be completed. That said, at some point, limited EPA staffing could itself be a constraint on the number of cleanups that could be implemented.

RESPONSES BY KATHERINE N. PROBST TO ADDITIONAL QUESTIONS FROM SENATOR BOXER

Question 1. Your testimony states that "it is critical that EPA "come clean" about the implications of [a funding] shortfall on the future pace of cleanup, and on progress at individual sites", and that EPA should tell Congress on an annual basis "how much funding would be needed to 'fully fund' cleanup, assuming no change in current cleanup standards and policies."

Do you think that EPA's release of this information would help increase program accountability and efficiency, and play an important role in increasing public involvement in cleanups?

Response. I think that releasing information on the amount of funds needed to complete cleanup at each and every NPL site, whether PRP or Fund-lead would increase program accountability and efficiency and play an important role in increasing public involvement in cleanups. I would refer you to the recommendations in a report for which I was the lead author, Success for Superfund: A New Approach for Keeping Score, which us available at http://www.rff.org/Documents/RFF–RPT–SuperfundSuccess.pdf.

Question 2. Your 2001 report to Congress, "Superfund's Future", recommended that EPA "improve the management and financial systems for tracking Superfund progress and costs." Today, in 2005, you are again recommending that EPA improve their data management, but also that the Agency increase the public's access to useful information on sites.

Could you please describe the main actions that you think EPA should undertake in order to provide truly useful information to the public.

Response. Again, I would refer you to the recommendations in a report for which I was the lead author, Success for Superfund: A New Approach for Keeping Score, which us available at *http://www.rff.org/Documents/RFF–RPT–SuperfundSuccess.pdf.*

The main recommendations that we make in that report is that EPA should:

- Create a standardized NPL Scorecard for each NPL site that contains concise up-to-date information on site progress and key attributes (updated at least quarterly). The NPL Scorecard would have six sections: (1) background information, (2) site progress to date and expected future actions, (3) baseline contamination and population information, (4) risk reduction accomplishments, (5) post-construction activities, and (6) cost information.

  In our report, we detail the specific information that we recommend be included in each section of the Scorecard. The information we recommend is easy to understand and technically accurate at the same time. We recommend that EPA include in this report planned future activities at each site, as well as past and estimated future costs.
- Create a one-page NPL Report Card, which would include a subset of information from the NPL Scorecard containing the most important measures of site progress, along with a small amount of background information. A mock up of the Report Card is included in our report.
- Institute a Web-based Superfund annual report that would include summary information on site progress, as well as other indicators of program performance. This annual report would be similar to the formerly issued Superfund Annual Report to Congress. As part of this new report, EPA should include an annual (or biannual) program evaluation agenda. This agenda should identify the key issues that are ripe for an in-depth qualitative or quantitative evaluation and make public the topics and schedule for these evaluations. To develop this agenda, EPA staff would regularly solicit suggestions from states, tribes, local community representatives, environmental groups, industry, external experts, and other stakeholders.

I would note that while we do not say this explicitly in the report, our assumption was that this NPL scorecard and report card would be the first item you would see for each NPL site when logging on to the EPA Superfund Web site, i.e. it would be easy to find.

Question 3a. Your 2001 report provided low, middle and high funding scenarios for the Superfund program from 2000 to 2009.

Please provide me with a comparison, in figures adjusted for inflation to 2005, of your low, middle and high funding estimates and the amount of money appropriated to or requested for EPA between 2001 and 2007.

Response. This information is included in the figure and table below.

Question 3b. Please provide an annual and cumulative total for any amount of underfunding.

Response. This information is included in the figure and table below.

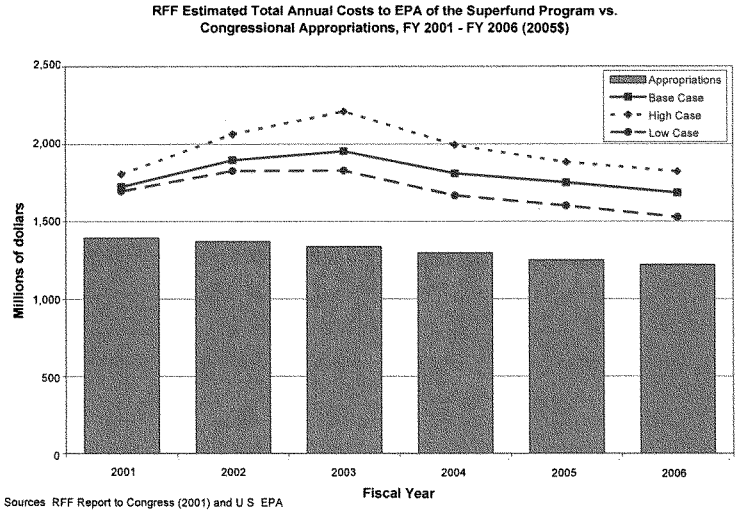


Table 1. RFF Estimated Total Annual Costs to EPA of the Superfund Program[1] and Congressional Appropriations, FY 2001 - FY 2006 (millions of 2005$)

	Fiscal Year	2001	2002	2003	2004	2005	2006	Cumulative (FY 2001 - FY 2006)
Appropriations		1,391	1,367	1,335	1,293	1,247	1,218	7,850
RFF Low Case	Estimated Costs	1,694	1,825	1,827	1,665	1,601	1,526	10,136
	Underfunding	(303)	(458)	(492)	(372)	(354)	(308)	(1,480)
RFF Base Case	Estimated Costs	1,721	1,896	1,954	1,808	1,749	1,683	10,811
	Underfunding	(330)	(529)	(619)	(514)	(502)	(465)	(1,660)
RFF High Case	Estimated Costs	1,804	2,062	2,211	1,993	1,882	1,821	11,773
	Underfunding	(413)	(695)	(876)	(700)	(635)	(603)	(1,821)

Notes:

1. RFF estimated future costs are from Probst, Katherine N. et al., *Superfund's Future: What Will It Cost? A Report to Congress*, Resources for the Future: Washington, DC, 2001.
2. FY 2007 appropriations not yet determined by Congress.
3. GDP deflator used to adjust for inflation.

STATEMENT OF J. WINSTON PORTER, PRESIDENT, THE WASTE POLICY CENTER

Mr. Chairman, my name is J. Winston Porter, and I am president of the Waste Policy Center in Leesburg, Virginia. The WPC is a private research and consulting organization which deals with management, policy, and technical issues in the areas of solid and hazardous waste management, as well as other environmental subjects. From 1985 to 1989, I was EPA's Assistant Administrator for Solid Wastes and Emergency Response.

It is a pleasure to be here today to provide testimony on the status of Superfund, particularly as it relates to the possibility of improved efficiencies in the program.

In my testimony I will draw upon some 20 years of Superfund management and consulting experience, including that with EPA, the Departments of Energy and Defense, several States, and numerous private parties. My professional background also includes the fields of chemical engineering and project management. I will start with a brief background statement, followed by my recommendations related to Superfund's study, remedy selection, and remedy construction phases.

BACKGROUND

Briefly, the current status of EPA's Superfund program is that about two-thirds of the 1,550 national priority list sites have reached the construction completed (remedy installed) phase, almost 400 sites are in the remedy design or construction phases, and approximately 150 sites are in the study phase.

In addition, many thousands of "emergency removals" have been conducted at Superfund sites in order to quickly, cost effectively, and directly deal with obvious problem areas. This program has perhaps been Superfund's biggest success.

It is also important to note that the EPA has a significant number of Superfund sites in the remedy construction phase for which both potential responsible party (PRP) and Federal funds are very limited.

In addition to the EPA, both the DOE and DOD have major Superfund-related programs underway. The DOE work primarily involves a few dozen large facilities, most of which have been components of the nuclear weapons program. The DOD sites are much more numerous and include both Superfund and base closure activities.

So, a large amount of work is underway or has been completed by a group of knowledgeable and dedicated Federal and State governmental personnel as well as PRPs and specialized private contractors. My overall assessment is that much has been achieved under the Superfund program, but much remains to be done. For this remaining work it is important to improve program efficiency in order to ensure timely and technically sound cleanups in a more cost-effective manner.

As we strive to improve the ongoing program, let me first make several general observations related to the Superfund program, which will serve as the bases for my later recommendations.

First, Superfund is not an "exact science." Science and technology are very important in addressing Superfund waste sites, but selecting a sound remedial action at a site requires a good dose of common sense and "engineering judgment" since no two sites are the same. The Superfund regulations themselves require decision-makers to consider such elements as cost effectiveness, implementability, and state and community acceptance in selecting a remedy. These are not primarily technical issues.

Second, while much has been accomplished by Superfund, site study and remediation activities generally take too long and cost too much.

Third, the trend in recent years to use the Superfund program for only the most complex and hazardous sites is sound. Most waste sites in the country can now be managed under other EPA or State programs, brownfields activities, and various voluntary cleanup processes.

Most of the following recommendations will be directed at the EPA Superfund program, but will also have important implications for other Federal agencies. My comments will be further divided into study, remedy selection, and construction phases.

THE STUDY PHASE

While the study projects related to Superfund sites are a decreasing part of the overall program, such activities are still very important to overall program success. Superfund projects usually begin with a "remedial investigation/feasibility study" (RI/FS). This complex study process is described in some detail in Superfund's primary regulation—the National Contingency Plan.

Very briefly, the RI portion calls for characterization of the site in terms of its natural features, as well as the amount and location of contamination and likely risks of such contamination to both humans and the environment. The FS part involves selection of alternative remedial actions, and then comparison of such alternatives against a set of nine remedy selection criteria.

Based on the RI/FS process, as well as substantial stakeholder input, EPA then selects a remedy for the site through a "record of decision" (ROD) process.

In general, the RI/FS process has gotten steadily more complex and lengthy over the years, for almost all types of sites. My recommendations for conducting faster, less costly, and more technically sound RI/FSs are as follows:

1. *Most importantly, timeframes for completing the study phase should be agreed to by the EPA and other key participants, such as PRPs.*—Unfortunately, at many sites the study work simply meanders around for many years without much focus or mid-course corrections, leading to wasted time and money, and ,in some cases, an unimaginative or noncost-effective remedy selection. Frankly, part of this lengthy process has to do somewhat with the fact that Superfund has become a large "jobs program" for governmental employees, as well as various consultants, contractors, and lawyers. All of these specialists are needed, but their work needs to be more directed toward results rather than complex processes.

Some complex Federal and other sites (eg., some major river sediment problems) will require longer study periods, but for most sites about 2–4 years should be adequate to produce a sound RI/FS.

So, early in the RI/FS process the EPA, PRPs, and other relevant organizations, should work together to set a clear goal to complete the study activities. This end date can be modified if necessary, but it is important for all to understand that, like almost every other type of engineering project, schedule (and budget) are key factors and should be adhered to.

There a number of examples of the success of target setting in Superfund, but perhaps the most dramatic has been the DOE Rocky Flats Closure Project, near Denver. For this site the "completion contractor," Kaiser-Hill, and the DOE agreed upon a 2005 target date for all study and remedy implementation work to be completed. If successful, the contractor was to receive a completion bonus. Not only was the project completed on time, but billions of dollars and decades of time were saved. This work, of course, required good cooperation among the DOE, EPA, the State of Colorado, local stakeholders, and the contractor. The firm completion target date greatly focused this cooperation.

Finally, this project illustrates the importance, for both study and construction work, of the site personnel developing what I have referred to as a "culture of completion."

2. *When the RI/FS process begins one of the first orders of business should be to use experienced staff and key stakeholders to quickly identify about 4–7 major remedial action alternatives.*—Where relevant, use should be made of EPA's list of "presumptive remedies" for many types of problems, as well as experience gained at similar Superfund sites.

This set of alternatives can always be modified during the study phase, but the current process which often involves "taking data" for many years before detailed focus on remedial options often leads to overly costly information, much of which is not needed, or with shortages of the data which is actually needed to compare remedial alternatives for the site.

An iterative approach should be used where information collection and analysis of remedial alternatives work cooperatively in order to achieve sound comparisons of options, leading to a good remedy selection.

Even more importantly, the identification of key options early in the study process allows the decisionmakers and stakeholders to begin their dialog on the non-technical factors which are contained in the remedy selection criteria. These include such items as cost-effectiveness, implementability, and state and community acceptance. Many times these types of factors are at least as important as the strictly technical matters.

3. *Significantly streamline the process for developing the myriad of deliverables at Superfund sites.*—While certain documents are clearly needed to guide the RI/FS activities, the long, tedious process of developing lengthy draft and final work plans, for example, should be expedited. This is also true of other "deliverables" which take so much time at Superfund sites, many of which should be quite standard by now.

There are several perverse effects which have led to such lengthy periods for document development and review. One has to do with the fact that Superfund is the only Federal environmental program where responsible parties have to pay for additional oversight beyond that which salaried regulators normally provide. Thus, if a group of companies are forced to give EPA, say, $5 million for oversight, then EPA

can retain contractors to provide hundreds of pages of "comments" on such items as the aforementioned work plans. So, we now have dueling contractors battling over many pages of detailed text, before work can even begin.

One near term answer would be for review periods and oversight dollars to be reduced substantially, so participants can focus more on results than elaborate processes.

4. *The PRPs should be encouraged to conduct the RI/FSs themselves with their own contractors and under EPA's overall supervision.*—While this concept has been largely accepted and successfully promoted by EPA, more could be done to encourage PRPs to do the study work, particularly where PRPs would commit to more reasonable timeframes than EPA often takes for its own studies.

5. *Finally, innovative study approaches should be developed which recognize newer technologies, as well as a quarter of a century of Superfund experience.*— An example is EPA's "Triad Approach," which promotes real time technical decisionmaking in order to move rapidly through the study and cleanup phases.

THE SELECTION OF REMEDY PHASE

The RI/FS process discussed above presents the decisionmaker with detailed comparisons of alternative remedial actions, from which this person must select a remedy, present it to the public for comment and make a final determination. The selection of protective, cost-effective remedies is, of course, a key to the overall success of the Superfund program. My suggestions in this area are as follows:

1. *The decisionmaker should be a very senior EPA official who can oversee all of the considerations which go into remedy selection.*— As noted earlier, technical factors are very important in this process, but non-technical factors are also key. For example, if there is very strong community opposition to a particular remedial action, or if a remedial option is not cost-effective, such factors must be considered by the decisionmaker.

During my tenure as an EPA assistant administrator I made a number of ROD decisions, mainly at "nationally significant sites." Most decisions I delegated to the ten EPA regional administrators (RAs). However, over the years the ROD decision responsibility has, in most cases, been delegated further down the line in the EPA regions.

My own view is that the RA should be the decisionmaker in this important process since he or she is the one who can speak for the region and has the position and stature to consider all aspects of the problem, while "pushing" the staff to provide the necessary information to complete remedy selection expeditiously.

2. *The role of expected land use should be an important factor in selecting a remedy.*—While all remedies should be protective, it does not make much sense to demand that a cleanup be sufficient for, say, a children's center, when the site is slated for use as a golf course, or a factory, or a wildlife preserve. All of these uses have their own requirements, but we do not need a one-size-fits-all approach to waste sites. The goal should be for a site to always be protective, so the remedial action may need to be modified at a later date if the site use changes dramatically.

During Superfund's history one of the better examples of the role of land use in remedy selection has to do with the DOD's Rocky Mountain Arsenal in Colorado. For this site, the DOD decided ultimately that the land use would be for a wildlife refuge. Once this decision was made the DOD, Shell Oil, EPA, and the State and local stakeholders worked together to select the remedy and move quickly into the construction phase.

Another DOD issue may also be instructive with respect to the land use issue. This has to do with the DOD's Superfund-related remediation sites versus those conducted under the base closure program. Simply stated, the base closure cleanups, including the selection of remedy, seem to proceed much faster than those related to Superfund. One of the reasons, I believe, has to do with the fact that local communities and others are usually highly motivated to finish base closure cleanups in order to bring the affected land into productive use. The same time pressure often does not exist with Superfund remedial activities.

THE CONSTRUCTION PHASE

As noted earlier the major activity these days has to do with the construction phase at Superfund sites. Almost 400 sites are in the phase where the selected remedy is being either designed or constructed. Currently, this is also the most controversial phase in that EPA apparently does not have sufficient funds to expeditiously complete all of the construction work now planned.

This is particularly true for so-called fund-financed sites where EPA must install the remedy itself as there are insufficient willing and able PRPs to conduct this

work at some sites. This issue is further compounded by the views of some that at a significant number of sites the community may not be fully protected since construction funds are not readily available.

The following are my recommendations on these construction-phase issues:

1. The roughly $1.2 billion which is annually appropriated to EPA by Congress should be looked at very carefully by EPA senior management to ensure that the highest priority is given to protecting human health and the environment. While I have not done a detailed review of the current Superfund budget, my general view is that large amounts of money are still being used for nonsite-specific activities and overheads.

2. If Congress is satisfied that EPA has done all it can do to squeeze out funding for as many construction sites as possible, then it might consider a supplemental appropriation to EPA to focus on additional construction activities.

3. The EPA might selectively revisit the ROD decisions made at these sites to see if some savings can be made based on new information or technology.

4. Although I suspect that this is already being done, that portion of the site which may provide actual, near term risk to the community should receive very high priority for funding.

5. While aiming at the highest risks is always the most important priority, I personally believe that where sites can be finished for very modest sums of money, such funding should be considered, as there are usually site "carrying charges" which can then be reduced.

6. The EPA and others should be creative in finding non-Federal funds for completing sites. In some cases, local developers or others may be so interested in having access to a completed site that they may be interested in helping financially. This type of financial driver has, of course, been instrumental in dealing with brownfields sites, which can often be very valuable when cleanup measures are completed.

7. Other creative measure should be pursued in the future to mininimize costs and to develop more creative financing. A good example is the joint EPA and Army Corps of Engineers eight pilot program referred to as the "urban rivers restoration initiative." In this program the EPA and the Corps, along with State and other agencies, work together to achieve a better and more cost-effective restoration program than by using Superfund alone.

8. Finally, it was mentioned earlier in this testimony that the removal (or early action) program has been one of Superfund's major successes. This program can deal with obvious contamination problems anytime during the Superfund process, with much less process costs than the remediation program. Given, this program's success, Congress might consider allowing EPA to spend more than the current limit on individual removal actions.

Implicit in all the above is the fact that I don't believe that the chemical and petroleum feedstock taxes should be renewed on Superfund. These taxes are unfair in that they target only two industries, which together account for much less than half of Superfund's contamination problems. Also, Superfund sites are a broad societal problem which has been created by many types of industries; local, State, and Federal agencies; and even individuals. Therefore, I believe the current process of using general revenues and funds from directly responsible parties is the right approach.

Finally, I am not convinced that EPA and the Congress have done all they can to increase Superfund efficiencies and to prioritize the use of existing funds.

Mr. Chairman, I hope my remarks will be helpful to Congress in dealing with this important program, and will be happy to answer any questions which you might have.

STATEMENT OF LEONARDO TRASANDE, M.D., MPP, ASSISTANT DIRECTOR, CENTER FOR CHILDREN'S HEALTH AND THE ENVIRONMENT, DEPARTMENT OF COMMUNITY AND PREVENTIVE MEDICINE, MOUNT SINAI SCHOOL OF MEDICINE

Good morning, Mr. Chairman and members of the subcommittee. I am Dr. Leonardo Trasande. I am a pediatrician and Assistant Professor of Community & Preventive Medicine and Pediatrics at the Mount Sinai School of Medicine. I am also the Assistant Director of the Center for Children's Health and the Environment, the Nation's first academic policy center devoted to the protection of children against environmental threats to health.

Approximately 3 to 4 million children and adolescents in the United States live within 1 mile of a federally designated Superfund hazardous waste disposal site. These children are at especially high risk of exposure to chemical toxicants released from these sites into air, groundwater, surface water, and surrounding communities.

In the face of a growing body of scientific knowledge about the preventable, environmental causes of learning and behavioral problems in our children, we must take prudent action, and today I urge the members of this subcommittee to take three important steps to prevent chronic disease in American children:

- Expeditious identification and cleanup of Superfund sites,
- Full funding for the NIEHS/EPA Superfund Basic Research Program, and
- Full funding for the National Children's Study.

THE NEED FOR IDENTIFICATION AND CLEANUP OF SUPERFUND SITES

The EPA Superfund program is especially critical to the health of these children. Rapid identification and cleanup of these sites is so important because children are especially vulnerable to many chemicals that exist at many of the Superfund sites in our Nation. There are several reasons why children are so sensitive to chemical toxins, and the research that we have undertaken in our Superfund Basic Research Program at Mount Sinai has contributed greatly to the understanding of these factors:

- One important reason why children are so vulnerable to environmental chemicals is that they have disproportionately heavy exposures. Pound per pound of body weight, children drink more water, eat more food, and breathe more air than adults, and so they take proportionately more of the toxins in water, food and air into their little bodies. Small children's exposure is magnified further by their normal behaviors—their play close to the floor, and their hand-to-mouth activity, which we pediatricians call "normal oral exploratory behavior."
- A second reason for their great susceptibility to chemical toxins is that children do not metabolize, detoxify, and excrete many toxins in the same way as adults; thus the chemicals can reside much longer in children's bloodstreams and cause more damage.
- A third reason is that children are undergoing rapid growth and development, and those very complex developmental processes are easily disrupted.
- Finally, children have more future years of life than most adults and thus have more time to develop chronic diseases that may be triggered by early environmental exposures.

Over the past 30 years, chronic diseases of environmental origin have become epidemic in American children, and are the diseases of greatest current concern. These include:

- Asthma, which has more than doubled in frequency since 1980 and become the leading cause of pediatric hospitalization and school absenteeism;
- Birth defects, which are now the leading cause of infant death. Certain birth defects, such as hypospadias, have doubled in frequency;
- Neurodevelopmental disorders—autism, dyslexia, mental retardation, and attention deficit/hyperactivity disorder (ADHD). These conditions affect 5–10 percent of the 4 million babies born each year in the United States. Reported rates of autism are increasing especially sharply—more than 20 percent per year.
- Leukemia and brain cancer in children and testicular cancer in adolescents. Incidence rates of these malignancies have increased since the 1970s, despite declining rates of mortality.
- Testicular cancer has risen by 55 percent, and primary brain cancer by 40 percent. Cancer is now the second leading cause of death in American children, surpassed only by traumatic injuries; and
- Preterm birth, which has increased in incidence by 27 percent since 1981.

These rapidly rising rates of chronic disease threaten the health of our children and the future security of our Nation. Indeed, concern is strong among the pediatric community that these rapidly rising rates of disease may create a situation unprecedented in the 200 years of our Nation's history, in which our current generation of children may be the first American children ever not to enjoy a longer life span than the generation before them.

Evidence is increasing that many environmental chemicals found at Superfund sites contribute to the causation of disease in children. Lead, mercury, polychlorinated biphenyls (PCBs) and certain pesticides have been shown to cause brain damage and to contribute to learning disabilities and to disruption of children's behavior. Benzene, 1,3-butadiene, and pesticides have been etiologically associated with childhood malignancies. Ambient pollutants—airborne fine particulates, ozone, oxides of nitrogen, and diesel exhaust also have been shown to increase incidence of asthma and to trigger asthmatic attacks. Although many of the causes of developmental problems in children are still not known, a recent National Academy of Sciences study suggests that at least 28 percent of developmental disabilities in chil-

dren—dyslexia, attention deficit disorder and mental retardation—are due to environmental causes.

Diseases of environmental origin in American children are also extremely costly to our Nation. Four of the leading diseases of environmental origin in American children—lead poisoning, childhood asthma, neurodevelopmental disabilities and childhood cancer—have been found to cost our Nation $54.9 billion annually. Mercury pollution has been found to cost our Nation $8.7 billion annually as a result of lost economic productivity, and an additional 1566 cases of mental retardation have been associated with mercury pollution. Each of these cases is associated with additional special education and health care costs that are disproportionately borne by the American taxpayer. By cleaning up toxic waste sites, we reduce toxic exposures and prevent chronic disease, and thus reduction of unnecessary toxic exposure to Superfund chemicals can be an effective and cost-effective approach to improving child health in America. This subcommittee should therefore continue to ensure that EPA is fully executing its duties under the Superfund program to identify and cleanup hazardous waste sites in the safest and most expeditious manner possible.

THE NEED FOR CONTINUED FULL FUNDING OF THE SUPERFUND BASIC RESEARCH PROGRAM

The Superfund Basic Research Program (SBRP) is equally critical if we are to understand and prevent the environmental causes of chronic childhood conditions that have now reached epidemic proportions in our Nation. The National Institute of Environmental Health Sciences' (NIEHS) Superfund Basic Research Program is a unique program of basic research and training grants directed toward understanding, assessing, and reducing the adverse effects on human health that result from exposure to hazardous substances. Grants made under this program are for coordinated, multicomponent, interdisciplinary programs. The technology within this program is on the cutting edge of assessing and evaluating human exposure, effects of hazardous substances and transport of chemicals through various media from waste sites. This program is researching and developing many innovative technologies for detecting, assessing, and reducing toxic materials in the environment.

The NIEHS/EPA SBRP had previously focused on understanding the impact of toxic environmental exposures on the health of adults. However, it has become apparent that this data base of information is not necessarily applicable to children. The program recognized this deficit early and, accordingly, has directed an increasing percentage of its diverse research efforts toward understanding the effects of environmental exposures on children's health. These studies in universities across the United States include fetal, infant, childhood, and adolescent research. Research in exposure assessment is of particular interest.

The below Table provides a snapshot of some of the previous projects that have been supported in the past by the SBRP in the area of children's health.

Program	University	Program director
Factors Modifying Behavioral Toxicity of Lead	Cornell University	Barbara Strupp
Developmental Immunotoxicologic Appraisal of DMSA	Cornell University	Rodney R. Dietert
In Utero PCB and Metal Exposures and Infant Development	Harvard University	Susan Korrick
Human Cell Culture Studies of Mutagens in the Aberjona Basin	Massachusetts Institute of Technology	William G. Thilly
Lead Mobilization during Pregnancy and Lactation in Urban Women	Mount Sinai School of Medicine	Gertrude Berkowitz
Detection, Prioritization, and Detoxification of Developmental Toxicants Associated with Chemical Wastes	Texas A&M University	Timothy D. Phillips
PCBs and the Well-being of Mohawk Children and Youth, Growth, Development, and Cognitive Behavioral Functioning	University of Albany, SUNY	Lawrence Schell
Determination of Toxic Metal Species in Environmental and Biological Matrices with High Energy Ion Beams	University of Arizona	Quintus Fernando
Cardiac Teratogenicity of Halogenated Hydrocarbons	University of Arizona	Paula D. Johnson
Dichloroacetate Kinetics, Metabolism, and Human Toxicology	University of Florida	Peter W. Stapool
Biomarkers of Cancer Susceptibility in Human Populations	University of California at Berkeley	John K. Wiencke
Biomarkers of Genetic Damage in Human Cells	University of California at Berkeley	Martyn T. Smith
Molecular Epidemiology of Childhood Leukemia	University of California at Berkeley	Patricia A. Buffler
Children's Environmental Health Network	University of California at Berkeley	Joy Carlson

While it seems that studies of adult exposures might most efficiently investigate gene-environment interactions related to the disorders that produce the greatest disability, hospitalization, and death, which occur in adults rather than children, this focus ignores the growing evidence of important and even crucial environmental contributions to adult disorders that start early in development. Because early environmental exposures are so important, a longitudinal assessment of the environment from the preconceptual period through infancy is essential to unravel the underlying susceptibility to diseases of adulthood. It is now clear that vulnerability to a particular risk factor is often determined not only by the genome acquired at conception, but also by dynamic modifications to the genome, and therefore to assess gene-environment interactions adequately, not only will the stable DNA sequence be essential but also epigenetic modifications to nuclear and mitochondrial DNA will have to be identified. Thus continued emphasis on child health studies within the Superfund Program is especially critical going forward.

THE NATIONAL CHILDREN'S STUDY—SAFEGUARDING THE HEALTH OF OUR CHILDREN

Finally, in this testimony I wish to point out the critical need for funding the National Children's Study, which will unearth so much important information of the health effects of chemicals found at Superfund sites.

The National Children's Study is a prospective multi-year epidemiological study that will follow 100,000 American children, a nationally representative sample of all children born in the United States, from conception to age 21. The study will assess and evaluate the environmental exposures these children experience in the womb, in their homes, in their schools and in their communities. It will seek associations between environmental exposures and disease in children. The diseases of interest include all those listed above. The principal goal of the Study is to identify the preventable environmental causes of pediatric disease and to translate those findings into preventive action and improved health care. The National Children's Study was mandated by Congress through the Children's Health Act of 2000. The lead Federal Agency principally responsible for the Study is the National Institute of Child Health and Human Development. Other participating agencies include the National Institute of Environmental Health Sciences, the Environmental Protection Agency, and the Centers for Disease Control and Prevention. By working with pregnant women and couples, the Study will gather an unprecedented volume of high-quality data on how environmental factors acting either alone, or in combination with genetic factors, affect the health of infants and children. Examining a wide range of environmental factors—from air, water, and dust to what children eat and how often they see a doctor—the Study will help develop prevention strategies and cures for a wide range of childhood diseases. By collecting data nationwide the study can test theories and generate hypotheses that will inform biomedical research and he

care of young patients for years to come. Simply put, this seminal effort will provide the foundation for children's healthcare in the 21st Century.

Six aspects of the architecture of the National Children's Study make it a uniquely powerful tool for protecting the health of America's children:

1. *The National Children's Study is prospective in its design.*—The great strength of the prospective study design is that it permits unbiased assessment of children's exposures in real time as they actually occur, months or years before the onset of disease or dysfunction. Most previous studies have been forced to rely on inherently inaccurate retrospective reconstructions of past exposures in children who were already affected with disease. The prospective design obviates the need for recall. It is especially crucial for studies that require assessments of fetal and infant exposures, because these early exposures are typically very transitory and will be missed unless they are captured as they occur.

2. *The National Children's Study will employ the very latest tools of molecular epidemiology.*—Molecular epidemiology is a cutting-edge approach to population studies that incorporates highly specific biological markers of exposure, of individual susceptibility and of the precursor states of disease. Especially when it is embedded in a prospective study, molecular epidemiology is an extremely powerful instrument for assessing interactions between exposures and disease at the level of the individual child.

3. *The National Children's Study will incorporate state-of-the-art analyses of gene-environment interactions.*—Recognition is now widespread that gene-environment interactions are powerful determinants of disease in children. These interactions between the human genome and the environment start early in life, affect the health of our children, and set the stage for adult disorders. The heroic work of decoding the human genome has shown that only about 10–20 percent of disease in children is purely the result of genetic inheritance. The rest is the consequence of interplay between environmental exposures and genetically determined variations in individual susceptibility. Moreover, genetic inheritance by itself cannot account for the sharp recent increases that we have seen in incidence of pediatric disease.

4. *The National Children's Study will examine a nationally representative sample of American children.*—Because the 100,000 children to be enrolled in the Study will be statistically representative of all babies born in the United States during the 5 years of recruitment, findings from the Study can be directly extrapolated to the entire American population. We will not need to contend with enrollment that is skewed by geography, by socioeconomic status, by the occurrence of disease or by other factors that could blunt our ability to assess the links between environment and disease.

5. *Environmental analyses in the National Children's Study will be conducted at the Centers for Disease Control and Prevention.*—The CDC laboratories in Atlanta are the premier laboratories in this Nation and the world for environmental analysis. Because the testing will be done at CDC it will be the best available, and the results will be unimpeachable.

6. *Samples collected in the National Children's Study will be stored securely and will be available for analysis in the future.*—New tests and new hypotheses will undoubtedly arise in the years ahead. Previously unsuspected connections will be discovered between the environment, the human genome and disease in children. The stored specimens so painstakingly collected in the National Children's Study will be available for these future analyses.

Congress has already laid a firm foundation for the National Children's Study. Between 2000 and 2005, the Congress invested more than $55 million to design the study and begin building the nationwide network necessary for its implementation. Seven Vanguard Centers and a Coordinating Center were designated in 2005 at sites across the Nation—in Pennsylvania, New York, North Carolina, Wisconsin, Minnesota, South Dakota, Utah and California—to test the necessary research guidelines—with plans to expand the program to 38 States and 105 communities nationwide. The tough job of designing and organizing is nearly complete. Funding for the Study this year will permit researchers to begin achieving the results that will make fundamental improvements in the health of America's children. To abandon the Study at this point would mean forgoing all of that dedication, all of that incredible effort, and all of the logistical preparation.

The National Children's Study will yield benefits that far outweigh its cost. It will be an extraordinarily worthwhile investment for our Nation, and it can be justified even in a time of fiscal stress such as we face today. Six of the diseases that are the focus of the Study (obesity, injury, asthma, diabetes, autism and schizophrenia) cost America $642 billion each year. If the Study were to produce even a 1 percent reduction in the cost of these diseases, it would save $6.4 billion annually, 50 times the average yearly costs of the Study itself. But in actuality, the benefits of the Na-

tional Children's study will likely be far greater than a mere 1 percent reduction in the incidence of disease in children. The Framingham Heart Study, upon which the National Children's Study is modeled, is the prototype for longitudinal medical studies and the benefits that it has yielded have been enormous. The Framingham Study was launched in 1948, at a time when rates of heart disease and stroke in American men were skyrocketing, and the causes of those increases were poorly understood. The Framingham Study used path-breaking methods to identify risk factors for heart disease. It identified cigarette smoking, hypertension, diabetes, elevated cholesterol and elevated triglyceride levels as powerful risk factors for cardiovascular disease. These findings contributed powerfully to the 42 percent reduction in mortality rates from cardiovascular disease that we have achieved in this country over the past 5 decades.

The data from Framingham have saved millions of lives—and billions of dollars in health care costs. The National Children's Study, which will focus on multiple childhood disorders, could be even more valuable. We do not need to wait 21 years for benefits to materialize from the national Children's Study. Valuable information will become available in a few years' time, as soon as the first babies in the Study are born.

Consider, for example, data on premature births. The rate of U.S. premature births in 2003 was 12.3 percent, far higher than the 7 percent rate in most western European countries. Hospital costs associated with a premature birth average $79,000, over 50 times more than the average $1,500 cost for a term birth. Just a 5 percent reduction in rates of prematurity would cut hospital costs by $1.6 billion annually. Within just 2 years, that savings would match the full cost of the Study.

The Study enjoys a broad group of supporters, including The American Academy of Pediatrics; Easter Seals; the March of Dimes; the National Hispanic Medical Association; the National Association of County and City Health Officials; the National Rural Health Association; the Association of Women's Health, Obstetric and Neonatal Nurses; United Cerebral Palsy; the Spina Bifida Association of America; and the United States Conference of Catholic Bishops, just to name a few. This broad and diverse group recognizes the overwhelming benefits this Study will produce for America's children.

Congress first authorized the National Children's Study in 2000, and has appropriated $55 million since then to design the Study, complete preparatory research, and designate the seven Vanguard sites that will conduct preliminary testing.

This has been a wise investment that should not be abandoned just as the Study is about to bear fruit. Unfortunately, the Administration has not provided continued funding in the fiscal year 1907 budget, a decision which threatens to squander the investment already made and to throw away the multi-generational benefits the Study will yield. Funding for the Study this year requires a commitment of $69 million. These funds will be used to begin enrolling children in the study. They will enable the NIH to continue establishing the 105 study sites around the country. We urge Congress to fully fund the National Children's Study. It is an investment in our children—and in America's future. The National Children's Study will give our Nation the ability to understand the causes of chronic disease that cause so much suffering and death in our children. It will give us the information that we need on the environmental risk factors and the gene-environment interactions that are responsible for rising rates of morbidity and mortality. It will provide a blueprint for the prevention of disease and for the enhancement of the health in America's children today and in the future. It will be our legacy to the generations yet unborn.

In summary, Congress is poised to take three critical steps to improve the health and economic security of our Nation. Through continued expeditious cleanup of Superfund sites and prevention of toxic chemical exposures from these hazardous waste sites, we can prevent disease before it occurs in children. We need to continue to support the Superfund Basic Research Program which provides desperately needed information about the environmental fate and toxic effects of Superfund compounds, and we need full funding for the National Children's Study if we are to develop effective methods of preventing diseases of environmental exposure among American children.

Thank you. I shall be pleased to answer your questions.

Environmental Pollutants and Disease in American Children: Estimates of Morbidity, Mortality, and Costs for Lead Poisoning, Asthma, Cancer, and Developmental Disabilities

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In this study, we aimed to estimate the contribution of environmental pollutants to the incidence, prevalence, mortality, and costs of pediatric disease in American children. We examined four categories of illness: lead poisoning, asthma, cancer, and neurobehavioral disorders. To estimate the proportion of each attributable to toxins in the environment, we used an environmentally attributable fraction (EAF) model. EAFs for lead poisoning, asthma, and cancer were developed by panels of experts through a Delphi process, whereas that for neurobehavioral disorders was based on data from the National Academy of Sciences. We define environmental pollutants as toxic chemicals of human origin in air, food, water, and communities. To develop estimates of costs, we relied on data from the U.S. Environmental Protection Agency, Centers for Disease Control and Prevention, National Center for Health Statistics, the Bureau of Labor Statistics, the Health Care Financing Agency, and the Practice Management Information Corporation. EAFs were judged to be 100% for lead poisoning, 30% for asthma (range, 10–35%), 5% for cancer (range, 2–10%), and 10% for neurobehavioral disorders (range, 5–20%). Total annual costs are estimated to be $54.9 billion (range $48.8–64.8 billion): $43.4 billion for lead poisoning, $2.0 billion for asthma, $0.3 billion for childhood cancer, and $9.2 billion for neurobehavioral disorders. This sum amounts to 2.8 percent of total U.S. health care costs. This estimate is likely low because it considers only four categories of illness, incorporates conservative assumptions, ignores costs of pain and suffering, and does not include late complications for which etiologic associations are poorly quantified. The costs of pediatric environmental disease are high, in contrast with the limited resources directed to research, tracking, and prevention. ***Key words:*** **asthma, cancer, developmental disabilities, environmental pediatrics, health economics, lead poisoning.** ***Environ Health Perspect*** **110:721–728 (2002). [Online 31 May 2002]**
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Patterns of illness among children in the United States have changed substantially in the past century (*1*). The classic infectious diseases are much reduced in incidence and are no longer the leading causes of illness and death (*2*). Infant mortality has been lowered, although not equally across American society, and life expectancy increased. Today the most serious diseases confronting children in the United States and in other industrially developed nations are a group of chronic conditions of multifactorial origin that have been termed the "new pediatric morbidity" (*1*). Examples include asthma, for which incidence has more than doubled (*3,4*); childhood cancer, for which reported incidence of certain types has increased significantly (*5,6*); neurodevelopmental and behavioral disorders (*7,8*); and certain congenital defects (*9,10*).

An important unresolved question is the extent to which chemical pollutants in the environment may be contributing to these changing patterns of pediatric disease (*11*). More than 80,000 new synthetic chemical compounds have been developed over the past 50 years, and each year 2,000 to 3,000 new chemicals are brought to the U.S. Environmental Protection Agency (EPA) for review before manufacture. Children are especially at risk of exposure to the 15,000 chemicals produced in quantities greater than 10,000 pounds per year and to the 2,800 produced in quantities greater than 1 million pounds per year. These high-volume chemicals have the greatest potential to be dispersed in air, water, food crops, communities, and homes (*11*). Only 43% of high-volume chemicals have been tested for their potential human toxicity, and only 7% have been studied for their possible effects on development (*12,13*).

Children are more vulnerable than adults to many chemicals (*14*). This susceptibility results from children's disproportionately heavy exposures coupled with the biologic sensitivity that is an inherent characteristic of early growth and development. Injury to developing organ systems can cause lifelong disability.

The burden of disease, disability, and death in American children that may be caused by pollutants in the environment is not known. Previous studies have examined the incidence and prevalence of lead poisoning (*15,16*) and of pediatric asthma (*3,4*) and have calculated the costs associated with these conditions (*17–25*). The costs of learning disabilities and developmental disorders have also been estimated (*26*), and a committee convened by the U.S. National Academy of Sciences has estimated the fraction of neurobehavioral disorders that may be attributable to environmental factors (*27*). No estimates have been developed of the aggregate incidence or prevalence of pediatric environmental disease, and no previous study has assessed the total costs of pediatric disease and disability of environmental origin in the United States.

Knowing the incidence, prevalence, and economic costs of environmental disease and disability in children is important. Experience has shown that accurate information on costs of illness can help focus preventive efforts and can put into perspective arguments that focus exclusively on the costs of preventing pollution (*28,29*). A further rationale for developing data on the costs of pediatric environmental disease is to permit direct comparison with the costs of other categories of illness, an exercise that may be useful in the setting of priorities and in allocation of resources (*30–36*).

We report estimates for the United States of the incidence, prevalence, mortality, and costs of four categories of pediatric illness that may be attributable to chemical

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pollutants in the ambient environment. We chose deliberately not to consider outcomes that are the consequence at least in part of personal or familial choice; therefore we did not include outcomes related to tobacco, alcohol, or drug abuse. We focus on lead poisoning, pediatric asthma, childhood cancer, and neurobehavioral disorders because these conditions are serious, common, and likely related at least in part to chemical pollutants in the environment. Moreover, all of these diseases are potentially preventable through public health efforts and pollution prevention.

Methodology

Overall approach. We used an environmentally attributable fraction (EAF) model as the basis for developing our estimates. This fraction is defined by Smith et al. (*37*) as "the percentage of a particular disease category that would be eliminated if environmental risk factors were reduced to their lowest feasible levels." The EAF is a composite value and is the product of the incidence of a risk factor multiplied by the relative risk of disease associated with that risk factor. Its calculation is a useful tool in developing strategies for resource allocation and prioritization in public health. The EAF model has been used previously to assess the costs of environmental and occupational disease (*28–30*). Most notably it was used by the Institute of Medicine to assess the "fractional contribution" of the environment to causation of illness in the United States (*30*).

Our general model is the following:

$$\text{Costs} = \text{Disease rate} \times \text{EAF} \times \text{Population size} \times \text{Cost per case}$$

In this equation, EAF represents the environmentally attributable fraction. "Cost per case" refers to discounted lifetime expenditures attributable to a particular disease including direct costs of health care, costs of rehabilitation, and lost productivity. The terms "disease rate" and "population size" refer, respectively, to either the incidence or prevalence of each disease as described below and the size of the population at risk.

Environmental toxicants defined. Environmental pollutants are defined in this analysis as chemical substances of human origin in environmental media—air, food, water, soil, the home, and the community. We use this definition because the exposures included within it are potentially preventable through application of the traditional approaches of public health and pollution prevention. We did not include the effects of diet, alcohol, tobacco, other drugs of abuse or other extragenetic factors such as socioeconomic status, although we recognize that all of these factors are components of the environment defined most broadly (*37*).

Disease rates and populations at risk. For lead poisoning, the relevant rate of disease is cumulative incidence up to age 5 because environmental abatement or medical treatment beyond that age will not reverse brain injury or restore lost intelligence in those children who have already been exposed to lead (*38*). For asthma, the relevant rate is current prevalence because environmental abatement can be expected to reduce the existing burden of morbidity (*39*). For childhood cancer, the relevant disease rate is incidence because it cannot be anticipated that environmental cleanup will ameliorate the morbidity of children who now have cancer (*6*). The relevant disease rate for neurobehavioral disorders is incidence (*8*).

For lead poisoning, we took as our population at risk the current cohort of 5-year-old children because the neurologic damage caused by lead is typically noticed when children enter school at about age 5, although undoubtedly it begins much earlier. A new cohort arises, of course, each year, and the total costs of lead poisoning are therefore the costs per birth cohort multiplied by the number of cohorts affected by the disease. Data on the distribution of blood lead levels and of lead poisoning were taken from reports issued by the U.S. Centers for Disease Control and Prevention (CDC) (*15,16*).

For asthma we used the current cohort of 5-year-olds as our population at risk. We selected this population because 80–90% of children with asthma have developed their symptoms by the age of 5 years (*39*). The subsequent course of the disease varies: Most children have only mild, infrequent attacks; some have repeated, severe episodes requiring emergency room visits and hospitalization; some die. Some asthmatic children remain asthmatic as adults; others "outgrow" their illness. To be conservative, our analysis ignores all asthma-related morbidity and expenses that occur after age 18. Data on the prevalence of childhood asthma were taken from the National Health Interview Survey (*40*). Data on the annual number of asthma deaths in children was taken from the CDC (*4*).

For childhood cancer, there is a broad range of age of onset among cases. Therefore, rather than select a single birth cohort for analysis, we based our calculations on the number of incident cases diagnosed among U.S. children per calendar year. Incidence of each type of childhood cancer was determined from the National Cancer Institute's Surveillance Epidemiology and End Results (SEER) database (*5*). Data on the number of deaths from childhood cancer are also taken from the SEER database.

For neurobehavioral disorders, we took as our population at risk the cohort of approximately 4 million children born each year in the United States. An estimated 3–8% (120,000–320,000) of these children have neurobehavioral problems (*7,8*), including approximately 60,500 with mental retardation, autism, and cerebral palsy (*26*). Costs attributable to these disorders were taken from Honeycutt et al. (*26*).

Population counts were taken from the 1990 U.S. Census, as updated to 1997 by the U.S. Census Bureau in the Current Population Survey (*41*).

Estimation of EAF. Data are not available on the fractions of diseases in children that may be caused by toxic exposures in the environment. Therefore, to estimate the proportion of cases of lead poisoning, asthma, and childhood cancer that are potentially attributable to toxic environmental factors, we used a formal decision-making process, the modified Delphi technique (*42,43*).

We initiated this consensus process by selecting three expert panels, one each for lead poisoning, asthma, and childhood cancer. These panels were assembled from among prominent physicians and scientists with established national reputations and extensive records of publication in relation to the diseases under study. Each consisted of three or four persons. All panelists were asked to estimate the EAF on two occasions: before the panel meeting (by mail ballot) and again at the meeting.

To give all experts equal access to the relevant literature, we sent each a description of the goals, objectives, and overall approach of the study along with an extensive collection of reprints of published articles that discussed linkages between the disease in question and toxic environmental exposures. Each panelist was asked to review this literature plus other relevant publications and then to develop an initial best estimate, from 0 to 100%, of the EAF for the disease in which they were expert. Panelists were asked further to indicate an upper and a lower bound of plausibility around their best estimate of EAF. Those initial estimates were mailed to the study team at Mount Sinai and the results tabulated. Areas of disagreement and uncertainty were noted and identified as topics for discussion at the meeting.

Each panel met for one day, and one of the investigators (C.S.) moderated each meeting. Each panel spent the day discussing the estimates of EAF that they had submitted before the meeting. The goal of the meeting was to refine initial estimates through a consensus approach and to reduce the range of uncertainty. At the end of the day, a second vote was taken. Again each panelist was asked to indicate a best estimate of EAF plus upper and lower bounds of plausibility. The arithmetic mean of these

final estimates were used as the basis for our subsequent analyses.

To develop an estimate of the EAF for neurobehavioral disorders, we relied on the recently published findings of an expert committee convened by the U.S. National Academy of Sciences (*27*). The methodology employed by that committee appeared similar to that which we used for estimating EAFs of the other three disease entities.

Disease-Specific Methodologies

Lead poisoning. All cases of lead poisoning were judged by the expert panel to be of environmental origin (*44*). The EAF is therefore 100%, and no range was calculated. The major task before the panel was to develop a model to quantify the full range of toxic effects that may result from early exposure to lead (*44–50*), including cognitive changes; behavioral changes that may produce increased rates of criminality, drug abuse, and incarceration; and cardiovascular disease.

To estimate the costs associated with the cognitive and behavorial consequences of lead poisoning, we relied heavily on an economic forecasting model developed by Schwartz et al. (*24*) and applied this model to current CDC data on prevalence of lead poisoning (*16*). In this model, blood lead levels are assumed on the basis of work by Salkever (*51*) to produce a dose-related decrement in intelligence (IQ score). Those decrements in IQ are, in turn, associated with lower wages and diminished lifetime earning power. The costs of that diminution in earning power were calculated.

We attempted to expand the scope of the Schwartz model by including the costs of adult cardiovascular disease attributable to hypertension resulting from childhood lead exposure. However, a preliminary analysis (*52*) revealed that these costs were probably minor because of the combined effects of a relatively weak correlation between childhood and adult blood pressures, the resulting modest attributable burden of increased cardiovascular disease, and the severe discounting applied to costs that will arise four or more decades after exposure to lead.

Asthma. Asthma is a major cause of morbidity among American children. It is the leading cause of admission of urban children to hospital—over 200,000 hospitalizations annually (*35*). Asthma is also the leading cause of days lost from school—over 10.1 million school days annually (*35*). Asthmatic episodes are the result of complex interactions among genetic predisposition, respiratory infection, climate change, the indoor environment at home and at school, secondhand cigarette smoke, and ambient air pollution (*39,53,54*).

To estimate the fraction of asthma that may be associated with toxic exposures in the environment, a panel of experts in environmental and pulmonary medicine first estimated the proportion of asthma episodes attributable to all extragenetic causes. Then within that broad range, they specifically examined the fraction that could be attributed to toxic exposures of human origin in the environment. Household allergens from pets, insects, and molds were not included within the panel's definition of environment; nor were secondhand cigarette smoke, infections, or climatic factors. Only outdoor, nonbiologic pollutants from sources potentially amenable to abatement, such as vehicular exhaust and emissions from stationary sources, were considered. Using this definition, the panel estimated that 30% of acute exacerbations of childhood asthma (range 10–35%) are environmentally related.

To examine the costs of childhood asthma, we considered the economic impacts that have been shown in previous studies to be associated with emergency room use, hospitalization, and death from the disease (*18–23,53–55*). Those earlier studies used data from various sources including the annual National Hospital Discharge Survey, the 1985 National Ambulatory Medical Care Survey, the annual National Health Interview Survey, the 1980 National Medical Care Utilization and Expenditure Survey, the 1987 National Medical Expenditure Survey, and a managed health care database of medical and pharmacy claims (*56*).

We then updated and extended those earlier economic estimates using more recent data on incidence rates from the NHIS (*40*), price and wage indices from the Bureau of Labor Statistics (*57*), prescription expenditure estimates from the CDC (*58*), and reports on health care costs from the Health Care Financing Agency (*59*).

We obtained data on the number of deaths caused by pediatric asthma from the CDC (*4*) and applied our estimates of EAF to that number. Then to calculate the costs of lost productivity from deaths caused by childhood asthma of environmental origin, we updated estimates of the present value of loss of lifetime earnings and household production for each such premature death, using methods described elsewhere (*60*). Briefly, the present value formula we used is similar to the one used by Rice et al. (*61–63*). We assumed that children who died would have earned what others of the same age and sex would have earned. The present value tables were calculated using average annual earnings for full-time and part-time employees (*64*), labor force participation rates (*63*), estimates of annual home production loss (*65*), and a real discount rate assumed to be 3%.

Cancer. To assess the environmentally attributable fraction of childhood cancer, we convened a panel of experts in pediatric oncology, epidemiology, and environmental medicine. This panel attempted to estimate the fraction of cases of each major category of childhood cancer that may be associated with toxic exposures in the environment.

The panel felt that no more than 10–20% of childhood cancer cases could be attributed solely to genetic predisposition and that extragenetic factors, defined broadly, therefore caused or at least contributed to the genesis of the remaining 80–90%. The panel noted that the specific causes of childhood cancer are largely unknown and that only a small number of chemical substances and physical factors have been directly linked to childhood cancer (*66–70*). Given that scarcity of etiologic information, the panel concluded that insufficient evidence exists to assign a best estimate of the fraction of childhood cancer specifically attributable to toxic chemicals in the environment (*70*). The panel agreed that the correct EAF would prove to be at least 5–10% and less than 80–90%, but could not further refine that broad range. In the face of this uncertainty, we based our computations of the environmentally attributable costs of childhood cancer on three hypothetical EAFs, all at the lower and therefore more conservative end of the range of possibilities: 2, 5, and 10%.

Data on the costs of childhood cancer are not readily available, mostly because over 80% of pediatric cancer patients are participants in randomized clinical trials. No recovery of costs occurs for these trial participants, so the costs of their care must be reconstructed from hospital and other records. To this end, we obtained the medical records of all patients treated under research protocols for pediatric malignancies at The Mount Sinai Medical Center between 1992 and 1997. Summaries of physician services, hospital charges, radiologic services, and laboratory services were abstracted and reviewed. Data on the costs of physician and hospital resources were taken from physician billing rates and hospital charges, adjusted by Health Care Financing Agency cost-to-charge ratios. Costs of laboratory services were estimated from published data on reimbursement from the Practice Management Information Corporation (*71*). Costs of childhood cancer are discounted at an annual rate of 3% based on the time after initial diagnosis at which they occur rather than on age.

We examined two delayed complications of childhood cancer that may occur as long as 30 years after initial diagnosis, and we estimated their costs.

First, we considered the possibility that children who survive cancer are at increased risk for occurrence of a second primary neoplasm. The long-term cumulative risk of second malignancy has been estimated at between 3.3% and 8% and varies according to the type of primary neoplasm and the treatment modalities employed (*72–74*). We relied on the findings of de Vathaire et al. (*75*) for our estimates of risk of second malignancy because *a*) they provided detailed information as to the time interval between first and second neoplasms (thereby facilitating discounting of future costs), and *b*) their cumulative incidence rates fell approximately in the middle of the overall range observed in other studies.

Second, we considered the effects on intelligence of cranial irradiation for treatment of childhood brain cancer. It is known that cranial irradiation is associated with decreased IQ and that the severity of the effect depends on the radiation dose and age at time of treatment (*76*). To estimate the economic impact of this effect among children with brain cancer, we assumed that the average child was irradiated at age 5, had a pre-morbid IQ of 100, and that the resulting decrement in IQ was related to radiation dose. Decrements in intelligence have been associated with diminished life-time earning power (*51*), and we calculated the costs of that diminution.

We obtained information from the National Cancer Institute SEER database on the number of deaths in American children that occur each year from cancer. We applied our estimates of EAF to that number. Then to calculate the costs of premature death from pediatric cancer of environmental origin, we calculated the loss of lifetime earnings for each such death (*56*) and discounted those projected earnings at an annual rate of 3%.

Neurobehavioral disorders. Dyslexia, attention-deficit hyperactivity disorder (ADHD), diminished intelligence, autism, and mental retardation are among the neurobehavioral disorders that affect an estimated 3–8% (120,000–320,000) of the approximately 4 million infants born in the United States each year (*7,8*).

An expert committee convened by the U.S. National Academy of Sciences (NAS) estimated in 2000 that 3% of neurobehavioral disorders in American children are caused directly by toxic environmental exposures and that another 25% are caused by interactions between environmental factors, defined broadly, and genetic susceptibility of individual children (*27*). We considered this the most authoritative published estimate of the EAF for these disorders. We therefore relied on the NAS estimate. Of the total 28% of neurobehavioral disorders thought by the NAS committee to be caused wholly or partly by environmental factors, we estimate that 10% (range 5–20%) are at least partly caused by toxic exposures, not including alcohol, tobacco, or drugs of abuse.

To develop estimates of the costs associated with neurobehavioral disorders of environmental origin, we relied on the work of Honeycutt et al. (*26*) in selecting those figures for which an annual 3% discount rate was used. Because the cost estimates developed by Honeycutt et al. (*26*) pertain only to mental retardation, autism, and cerebral palsy, our cost estimates are limited to those three conditions. Honeycutt et al. (*26*) note that 34% of children with autism and 15% of children with cerebral palsy also suffer from mental retardation. To avoid double-counting children with these two conditions, we counted them only once in our analysis. Because some neurobehavioral dysfunction is caused by lead poisoning, we estimated the fraction of cases attributable to lead poisoning and reduced our estimates of disease burden and costs accordingly.

Results

Lead poisoning. For assessing the incidence, prevalence, and costs of childhood lead poisoning, we used Schwartz et al.'s model (*24*) and applied it to current CDC data on incidence of lead poisoning (*16*).

The mean blood level in the birth cohort of children age 5 years was reported in 1997 to be 2.7 µg/dL (*16*). In that year, the estimated numbers of 5-year-old boys and girls in the United States were 1,960,200 and 1,869,800, respectively. At this age, there is no significant difference between boys and girls in blood lead level. On the basis of Schwartz et al.'s analysis (*24*), we considered each microgram per deciliter of blood lead concentration to be associated with a reduction in IQ of 0.25 points at these levels of lead exposure. Application here of an IQ reduction of 0.25 IQ points/µg/dL assumes implicitly that there is no threshold blood lead level below which cognitive effects are not seen. This assumption appears reasonable, because to date cognitive deficits have been associated with all ranges of blood lead concentration studied, and no evidence of a threshold has been found (*77*).

Salkever (*51*) has calculated that the loss of one IQ point is associated with an overall reduction in lifetime earnings of 2.39%. This corresponds to a loss of 1.61% of earnings potential for an IQ deficit of 0.675 points. Assuming an annual growth in productivity of 1% and applying a 3% discount rate, the present value of lifetime expected earnings is $881,027 for a 5-year-old boy, and $519,631 for a 5-year-old girl (*57*). Thus the present value of economic losses attributable to lead exposure in the birth cohort of current 5-year-olds amounts to $43.4 billion per year (Table 1).

Asthma. Our cost estimates for asthma were developed using the approach of Chestnut et al. (*22*). For components of cost that they do not estimate, we rely on their 1997 updated version of the costs calculated using Weiss et al.'s methodology (*23*). We estimated total medical expenses for asthma among children at $4.6 billion. Nonmedical expenses include lost school days and lost productivity due to premature death. There are 247 deaths each year from childhood asthma (*4*). Indirect costs are estimated to total $2.0 billion (*22*). Total asthma-related expenses are therefore $6.6 billion. Of these, the environmentally attributable fraction is judged to be 30% (range 10–35%). Therefore, we estimate the environmentally attributable annual cost of pediatric asthma to be $2.0 billion (range $0.7–$2.3 billion) (Table 2).

Childhood cancer. We calculated the average annual charges per child with newly incident cancer in 1998 dollars to be $35,900 for physician services, $189,600 for inpatient services, and $20,400 for outpatient services, for a total of $245,900. Laboratory services account for an additional $263,200, bringing the total costs of treatment to $509,000 per case. When lost parental wages are taken into account, based on 5 lost wage days per 7 child hospital days, the total cost rises to $583,000. Assuming the costs of treating a second primary cancer are the same as the first, adding in the present value of those future costs increases the total by 7.46% to $623,000.

Table 1. Estimated costs of pediatric lead poisoning, United States, 1997.

EAF	=	100%
Main consequence	=	Loss of IQ over lifetime
Mean blood lead level in 1997 among 5-year-old children	=	2.7 µg/dL
A blood lead level of 1 µg/dL	=	Mean loss of 0.25 IQ points per child
Therefore, 2.7 µg/dL	=	Mean loss of 0.675 IQ points per child
Loss of 1 IQ point	=	Loss of lifetime earnings of 2.39%
Therefore, loss of 0.675 IQ points	=	Loss of 1.61% of lifetime earnings
Economic consequences		
For boys: loss of 1.61% × $881,027 (lifetime earnings) × 1,960,200	=	$27.8 billion
For girls: loss of 1.61% × $519,631 (lifetime earnings) × 1,869,800	=	$15.6 billion
Total costs of pediatric lead poisoning	=	$43.4 billion

Finally, cranial irradiation will reduce IQ an average of 2.8 points in each child treated for brain cancer (*76*), corresponding to a loss of lifetime earnings with a present value of $60,471 (*51*). (Because second neoplasms occur later, we ignored the effect of irradiation in these later cancers inasmuch as the effect is substantially reduced as a child grows older.) Thus the total cost per case of childhood cancer is estimated to be $622,579.

The population to which these cost figures are applied is the cohort of incident cancer patients that arises in the United States each year. Among children under age 15, the annual overall incidence of cancer is 133.3 per million (*6*). There were 57.9 million children under 15 years of age in the United States in 1997, according to the Bureau of the Census (*41*). Therefore 7,722 cases of childhood cancer can be anticipated each year among future birth cohorts during their first 15 years of life. The annualized present value of cancer-related costs for children in future birth cohorts under present conditions is therefore $4.8 billion.

The costs of premature loss of life due to primary and secondary cancer in this cohort of children were calculated (*57*) using SEER data from the National Cancer Institute as a basis for computing age-specific mortality rates. These costs totaled $1.8 billion annually.

When we estimate the environmentally attributable fraction of pediatric cancers to be 2, 5, or 10%, the corresponding attributable costs are $132 million, $332 million, or $663 million. (Table 3).

Neurobehavioral disorders. To assess the incidence and costs of neurobehavioral disorders attributable to toxicants in the environment, we combined data on incidence of these conditions from the CDC (*7*) with cost data developed by Honeycutt et al. (*26*). We considered the assessment of the National Academy of Sciences (*27*) that 28% of neurobehavioral disorders are caused partly or entirely by environmental factors, defined broadly. Within that broad estimate, we calculated that 10% of incident cases of mental retardation, autism, and cerebral palsy (range 5–20%) are attributable to exposure to toxicants in the environment.

To avoid double-counting cases from lead exposure, we reasoned that the effect of lead in the population of current U.S. children is to lower IQ by an average of 0.25 points (*24*). Assuming that in both lead-exposed and unexposed populations, IQ has a normal distribution with a standard deviation of 15, and that mental retardation is defined as IQ below 85, we calculated the proportion of mentally retarded persons who would be found in populations with mean IQ of 99.75 (lead exposed) and 100 (unexposed). The difference between these proportions represents the lead-attributable burden of mental retardation. On this basis, we find that 97.5% of mental retardation is not attributable to lead exposure. Therefore, in calculating total costs of neurobehavioral disorders, we include only 97.5% of costs of mental retardation.

Not double-counting children with both mental retardation and either autism or cerebral palsy, we found that mental retardation, autism, and cerebral palsy not attributable to lead generate lifetime costs of $92.0 billion per annual cohort. If the environmentally attributable fraction is 5, 10, or 20%, we arrive at environmentally attributable costs of $4.6 billion, $9.2 billion, or $18.4 billion (Table 4).

Table 2. Estimated costs of pediatric asthma of environmental origin, United States, 1997.

Medical and indirect costs	U.S. dollars
Hospital care	
Inpatient	634 million
Emergency room	323 million
Outpatient	154 million
Physicians' services	
Inpatient	54 million
Outpatient	625 million
Medications	2 81 billion
Subtotal: medical costs	4 6 billion
Indirect Costs	
School days lost	1 78 billion
Premature deaths	193 million
Subtotal indirect costs	2 0 billion
Total costs of pediatric asthma	6.6 billion
EAF	30% (range 10–35%)
Environmentally attributable costs of pediatric asthma	2.0 billion (range $0 7–2 3 billion)

Table 3. Estimated costs of pediatric cancer of environmental origin, United States, 1997.

Costs	U.S. dollars
Medical costs (per primary case)	
Inpatient care	189,600
Outpatient care	20,400
Laboratory	263,200
Physicians' services	35,900
Subtotal medical costs	509,000
Indirect morbidity costs (per primary case)	
Lost parental wages	13,500
Loss of IQ	60,500
Subtotal indirect morbidity costs	74,000
Total morbidity costs per primary case	583,000
Morbidity costs of secondary cases[a]	40,000
Morbidity costs per case for primary and subsequent secondary cancer	623,000
Total annual morbidity costs of childhood cancer[b]	
Medical and indirect morbidity costs	4 8 billion
Costs of premature deaths	1 8 billion
Total morbidity costs	6 6 billion
Costs of environmentally attributable pediatric cancer	332 million (range 132–663 million)

EAF calculated at 2, 5, and 10%.
[a]Present value of costs of second cases, 7 46% of above, excluding effects of radiation on IQ in second cancers [b]Based on 7,722 new cases of childhood cancer per year.

Table 4. Estimated costs of neurobehavioral disorders of environmental origin, United States, 1997.

Lifetime costs per case of developmental disabilities	Mental retardation	Autism	Cerebral palsy
Physician visits	$17,127	—	$32,844
Prescription drugs	$3,121	—	$3,526
Hospitalization	$26,434	$4,437	$17,335
Assistive devices	$2,725	$116	$2,704
Therapy and rehabilitation	$11,577	$1,685	$14,421
Long-term care	$83,923	$32,846	$4,365
Home and auto modifications	$810	$571	$1,847
Special education services	$64,107	$72,399	$51,182
Home care	$907,742	$1,024,237	$882,932
Productivity losses due to morbidity	$563,869	$472,740	$467,753
Total lifetime costs per case	$1,680,000	$1,609,000	$1,479,000
Annual incident cases	44,190	4,698	11,614
Annual incident cases not attributable to lead	43,085	4,698	11,614
Total costs per annual cohort	$72.4 billion	$7.6 billion	$17.2 billion
Downward adjustment of costs for autism and cerebral palsy to account for co-existing mental retardation	— $72 4 billion	−34% $5 0 billion	−15% $14 6 billion
Total environmentally attributable costs of neurobehavioral disorders		$9.2 billion (range $4 6–18.4 billion)	

EAF estimated at 5, 10, or 20%

Discussion

This study represents the first comprehensive attempt to estimate the incidence, prevalence, mortality, and costs associated with pediatric disease of toxic environmental origin in the United States. Our analysis of disease rates is based on national data collected by agencies of the federal government. Our estimates of costs are also based largely on national data. Our methodology consists of application of an environmentally attributable proportion model.

We examined four categories of illness in children for which we hypothesize there exists some degree of environmental causation: asthma, lead poisoning, childhood cancer, and certain neurobehavioral disorders. For each disease, we sought to determine the proportion of cases that could be attributed to pollutants in the environment—the environmentally attributable fraction (EAF). We defined this environment as consisting of toxic chemicals of human origin in environmental media. We did not consider outcomes that are caused at least partly by personal or familial choice, such as asthma caused by environmental tobacco smoke or neurobehavioral dysfunction associated with the fetal alcohol syndrome. The EAF in this analysis is therefore the "percentage of a particular disease category that would be eliminated if environmental risk factors were reduced to their lowest possible levels" (*37*).

We estimate that the annual costs of environmentally attributable diseases in American children total $54.9 billion, with a range of plausible estimates from $48.8 to $64.8 million (Table 5). Of this amount, $43.4 billion is due to lead poisoning, $2.0 billion to asthma, $0.3 billion to childhood cancer, and $9.2 billion to neurobehavioral disorders. Total costs to U.S. society are annual costs multiplied by the number of years in which cases of pediatric diseases of environmental origin continue to occur.

Previous efforts to assess the extent and costs of diseases of environmental origin in children have focused principally on lead poisoning and asthma. For lead poisoning, Schwartz et al. (*24*) have developed a model for estimating lifetime costs. They calculated that the societal benefit of reducing mean blood lead levels by 1 µg/dL would be $5.1 billion per year in the United States. Mean blood lead levels have, in fact, declined by more than 10 µg/dL since 1976 (*16*), largely as a consequence of the removal of lead from gasoline. Total cost savings resulting from the removal of lead from gasoline therefore exceed $50 billion each year. Schwartz et al. (*24*) emphasize that in addition to these economic benefits, there are almost certainly large but poorly quantified social benefits that result from reductions in criminality, drug abuse, and incarceration induced by lead (*48,50,78*). These findings underscore the concept that in the information age the wealth of a nation is directly correlated with developmental health and aggregate intelligence (*79*).

For asthma, Weiss et al. (*18*) reported that total costs in 1985 were $4.5 billion across all age groups—nearly 1% of all U.S. health care costs. In children (less than 18 years of age), asthma accounted for $1.2 billion annually: $465 million in direct medical costs plus $825 million in indirect costs, of which the largest component ($726 million) was diminished productivity due to loss of school days. Weiss et al. (*23*) subsequently updated their estimates through 1994 and found that the total costs of childhood asthma had increased to $3.17 billion annually, with direct costs of $1.96 billion and indirect costs of $1.22 billion; lost school productivity again accounted for the bulk of the indirect costs ($0.96 billion).

Further studies of the costs of asthma have been undertaken by Smith et al. (*19*) and by Farquhar et al. (*20*). These studies developed estimates of total costs that were similar to those of Weiss et al. (*23*), ranging from $3.4 to $4.9 billion annually (in 1987 dollars) across all age groups; the differences between those estimates are explained principally by different approaches to calculating the costs of prescription medications (*22*). A 1999 study conducted by the U.S. EPA (*21*) developed estimates of costs by tracking asthma over a lifetime.

To update estimates of the costs of asthma to 1997, a study undertaken by Chestnut et al. (*22*) used asthma occurrence data for 1996–1998 from the National Center for Health Statistics and data on the costs of medical outcomes from Weiss et al. (*18,23*) and Smith et al. (*19*), and they adjusted these costs to 1997 dollars. The principal finding was that annual costs of asthma across all age groups in the United States in 1997 were between $10 and $11 billion—more than double the estimates for the 1980s. Of these total costs, approximately 65% are for direct medical expenses, 20% for indirect morbidity costs, and 15% for mortality costs. Approximately one-third of total costs— $3.3–3.5 billion annually—reflects the costs of asthma in children less than 18 years of age. These data provided the principal input to the analyses undertaken in the present study.

Our estimates of the costs of pediatric asthma are higher than those of previous authors. The bulk of this difference lies in our estimate for drug costs. Weiss et al.'s (*23*) estimate of drug costs is considerably lower than ours. They identified patterns of drug treatment for asthmatics by using data from the National Ambulatory Medical Care Survey (NAMCS). Because the NAMCS is filled out by busy practitioners in the course of regular medical care and has only limited space for listing medications, we believe that the NAMCS underreports drug treatment. We have instead relied on the methodology of Chestnut et al. (*22*). They began with estimates of the number of mild, moderate, and severe asthmatics, and imputed to each asthmatic child a treatment regimen consistent with the asthma treatment guidelines of the National Heart Lung and Blood Institute (*80*). It can be argued that actual practice has yet to catch up with these evidence-based recommendations and that the actual costs of treating asthma are lower than those associated with the NHLBI guidelines because not all clinicians adhere to the guidelines. However, we believe this method comes closer to estimating current prescribing patterns than a model relying on NAMCS. It is, at the least, the pattern toward which asthma treatment is moving.

Another approach to estimating the costs of environmentally related respiratory disease would be to assess the aggregate health benefits that have resulted from reductions in air pollution. Ostro and Chestnut (*54*) have calculated that reduction in fine particulate-matter (< 2.5 µm; $PM_{2.5}$) air pollution in the United States would reduce the costs of asthma and other respiratory diseases across all age groups by between $14 billion and $55 billion annually, with mean estimated annual cost savings of $32 billion. Similarly, the U.S. EPA has estimated the cost savings that resulted from implementation of the Clear Air Act (*81,82*). For 1970–1990, the EPA calculated that the annual monetary benefits of reductions in chronic bronchitis and other respiratory conditions across the entire population of the United States amounted to $3.5.billion (in 1990 dollars), with a range (5th to 95th percentile) of $0.5–$10.7 billion (*81*). If it is assumed that one-third of these costs are associated with respiratory symptoms avoided in children (*21*), then the annual reduction in costs

Table 5. Estimated costs (billions) of pediatric disease of environmental origin, United States, 1997.

Disease	Best estimate	Low estimate	High estimate
Lead poisoning	$43.4	$43.4	$43.4
Asthma	$2.0	$0.7	$2.3
Cancer	$0.3	$0.2	$0.7
Neurobehavioral disorders	$9.2	$4.6	$18.4
Total	$54.9	$48.8	$64.8

attributable to prevention of pediatric respiratory disease from enforcement of the Clean Air Act is $1.2 billion (range, $0.2–3.2 billion). Additional benefits are projected by the EPA to accrue over the years 1990–2010 as a result of implementation of the Clean Air Act Amendments of 1990 (*82*).

Our use of an EAF model is consistent with scholarly work that has used similar models to assess the costs of environmental and occupational diseases (*28–31,83–86*). Thus our work builds on a methodology described in 1981 by the Institute of Medicine of the National Academy of Sciences for assessing the burden and health costs of environmental disease in the United States through assessing the "fractional contribution" of the environment to cause of illness (*30*). It also builds on approaches that have been used to calculate the costs of occupational disease and injury for the State of New York (*29*) and for the United States (*28,86*).

The modified Delphi decision-making process that we employed in this study to estimate EAF for lead poisoning, asthma, and childhood cancer is a structured, formalized approach similar to approaches that have been used extensively over the past five decades to synthesize the opinions of experts and thus to achieve consensus in complex problems in medicine and public health (*42,43*). Since 1977, the U.S. National Institutes of Health have convened over 40 consensus panels to resolve issues relating to the safety and efficacy of new medical technologies. Similarly, researchers at the Rand Corporation have found consensus approaches very useful for assessing the appropriateness of diagnostic and therapeutic interventions against heart disease, colon cancer, and stroke (*43,87*). The CDC used a formal consensus technique to judge the appropriativeness of various treatments of isoniazid-resistant tuberculosis infection (*88*). Consensus approaches represent an efficient way to synthesize opinion in complex and rapidly developing areas of medicine and public health before developing definitive data. The Delphi process is necessarily speculative and the outcomes depend on the underlying assumption and beliefs of the consensus panel. Therefore, our panels were comprised of nationally recognized experts and all of our results are bracketed by a range of uncertainty.

Our estimates of disease burden and costs are conservative. Most important, they are low because we considered only four categories of childhood illness and only certain categories of neurobehavioral dysfunction. Additionally, in the case of neurobehavioral dysfunction, we avoided double-counting costs for children with coexisting conditions such as autism, mental retardation, or lead poisoning, although we recognize that the costs of caring for such children are certainly greater than the costs of caring for children with only one such disorder.

We were hampered in our modeling by the lack of etiologic research quantifying the possible contribution of environmental factors to the causation of many pediatric diseases, and also by the lack of knowledge of the possibly toxic effects of most chemicals to which American children may be exposed (*12,13*). In future years, as more etiologic research is undertaken and as better information becomes available on possible associations between environmental exposures and additional pediatric diseases, the model can be expanded. Our estimates are low additionally because we did not consider late complications of toxic exposures that could not reliably be attributed to exposures sustained during childhood. Thus, we did not examine the possible late cardiovascular consequences of childhood lead poisoning (*52*), nor did we consider the costs of adult asthma that might be the direct consequence and/or continuation of asthma that began in childhood. Finally, our estimates are low because we did not attempt to estimate the costs of the pain, the deterioration in quality of life, or the emotional suffering in families, friends, or affected children that are the consequences of childhood illness.

In summary, diseases of toxic environmental origin make an important and insufficiently recognized contribution to total health care costs among children in the United States. The costs of these diseases currently amount to $54.9 billion annually, approximately 2.8% of the total annual cost of illness in the United States (*89*). By comparison, the annual health care costs attributable to motor vehicle accidents are $80.6 billion, and those due to stroke are $51.5 billion (*89*). The annual costs of military weapons research are $35 billion, and the costs of veterans' benefits are $39 billion (*90*). The costs of pediatric disease of environmental origin are large compared with the relatively meager amount of money spent on all research related to children, which in 1995 was only about $2 billion—a sum less than 3% of the total research enterprise of the federal government (*32*).

The costs due to pediatric disease of environmental origin will likely become yet greater in the years ahead if children's exposures to inadequately tested chemicals are permitted to continue. Increased investment is required in tracking and surveillance (*91*), in basic studies of disease mechanisms, and in prevention-oriented epidemiologic research (*92*). Most important, increased investment is needed to prevent pollution.

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Public Health and Economic Consequences of Methyl Mercury Toxicity to the Developing Brain

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Methyl mercury is a developmental neurotoxicant. Exposure results principally from consumption by pregnant women of seafood contaminated by mercury from anthropogenic (70%) and natural (30%) sources. Throughout the 1990s, the U.S. Environmental Protection Agency (EPA) made steady progress in reducing mercury emissions from anthropogenic sources, especially from power plants, which account for 41% of anthropogenic emissions. However, the U.S. EPA recently proposed to slow this progress, citing high costs of pollution abatement. To put into perspective the costs of controlling emissions from American power plants, we have estimated the economic costs of methyl mercury toxicity attributable to mercury from these plants. We used an environmentally attributable fraction model and limited our analysis to the neurodevelopmental impacts—specifically loss of intelligence. Using national blood mercury prevalence data from the Centers for Disease Control and Prevention, we found that between 316,588 and 637,233 children each year have cord blood mercury levels > 5.8 µg/L, a level associated with loss of IQ. The resulting loss of intelligence causes diminished economic productivity that persists over the entire lifetime of these children. This lost productivity is the major cost of methyl mercury toxicity, and it amounts to $8.7 billion annually (range, $2.2–43.8 billion; all costs are in 2000 US$). Of this total, $1.3 billion (range, $0.1–6.5 billion) each year is attributable to mercury emissions from American power plants. This significant toll threatens the economic health and security of the United States and should be considered in the debate on mercury pollution controls. ***Key words:*** **children's health, cognitive development, cord blood, electrical generation facilities, environmentally attributable fraction, fetal exposure, lost economic productivity, mercury, methyl mercury, power plants.**
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Mercury is a ubiquitous environmental toxicant (Goldman et al. 2001). It exists in three forms, each of which possesses different bioavailability and toxicity: the metallic element, inorganic salts, and organic compounds (methyl mercury, ethyl mercury, and phenyl mercury) (Franzblau 1994). Although volcanoes and other natural sources release some elemental mercury to the environment, anthropogenic emissions from coal-fired electric power generation facilities, chloralkali production, waste incineration, and other industrial activities now account for approximately 70% of the 5,500 metric tons of mercury that are released into the earth's atmosphere each year [United Nations Environmental Programme (UNEP) 2002]. Elemental mercury is readily aerosolized because of its low boiling point, and once airborne it can travel long distances to eventually deposit into soil and water. In the sediments of rivers, lakes, and the ocean, metallic mercury is transformed within microorganisms into methyl mercury (Guimaraes et al. 2000). This methyl mercury biomagnifies in the marine food chain to reach very high concentrations in predatory fish such as swordfish, tuna, king mackerel, and shark (Dietz et al. 2000; Gilmour and Riedel 2000; Mason et al. 1995; Neumann and Ward 1999). Consumption of contaminated fish is the major route of human exposure to methyl mercury.

The toxicity of methyl mercury to the developing brain was first recognized in the 1950s in Minamata, Japan, where consumption of fish with high concentrations of methyl mercury by pregnant women resulted in at least 30 cases of cerebral palsy in children; exposed women were affected minimally if at all (Harada 1968). A similar episode followed in 1972 in Iraq when the use of a methyl mercury fungicide led to poisoning in thousands of people (Bakir et al. 1973); again, infants and children were most profoundly affected (Amin-Zaki et al. 1974, 1979). The vulnerability of the developing brain to methyl mercury reflects the ability of lipophilic methyl mercury to cross the placenta and concentrate in the central nervous system (Campbell et al. 1992). Moreover, the blood–brain barrier is not fully developed until after the first year of life, and methyl mercury can cross this incomplete barrier (Rodier 1995).

Three recent, large-scale prospective epidemiologic studies have examined children who experienced methyl mercury exposures *in utero* at concentrations relevant to current U.S. exposure levels. The first of these studies, a cohort in New Zealand, found a 3-point decrement in the Wechsler Intelligence Scale-Revised (WISC-R) full-scale IQ among children born to women with maternal hair mercury concentrations > 6 µg/g (Kjellstrom et al. 1986, 1989). A second study in the Seychelles Islands in the Indian Ocean found only one adverse association with maternal hair mercury concentration among 48 neurodevelopmental end points examined (prolonged time to complete a grooved pegboard test with the nonpreferred hand) (Myers et al. 2003). However, the grooved pegboard test was one of the few neurobehavioral instruments in the Seychelles study not subject to the vagaries of translation that can degrade the validity of culture-bound tests of higher cognitive function when they are applied in developing nations (Landrigan and Goldman 2003). A third prospective study in the Faroe Islands, a component of Denmark inhabited by a Scandinavian population in the North Atlantic, has followed a cohort of children for 14 years and collected data on 17 neurodevelopmental end points, as well as on the impact of methyl mercury on cardiovascular function. The Faroes researchers found significant dose-related, adverse associations between prenatal mercury exposure and performance on a wide range of memory, attention, language, and visual-spatial perception tests (Grandjean et al. 1997). The significance of these associations remained evident when

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blood levels of polychlorinated biphenyls, which are known developmental neurotoxicants (Jacobson and Jacobson 1996), were included in the analysis (Budtz-Jorgensen et al. 2002; Steuerwald et al. 2000). Methyl mercury exposure was also associated with decreased sympathetic- and parasympathetic-mediated modulation of heart rate variability (Grandjean et al. 2004) and with persistent delays in peaks I–III brainstem evoked potentials (Murata et al. 2004).

An assessment of these three prospective studies by the National Academy of Sciences (NAS) (National Research Council 2000) concluded that there is strong evidence for the fetal neurotoxicity of methyl mercury, even at low concentrations of exposure. Moreover, the NAS opined that the most credible of the three prospective epidemiologic studies was the Faroe Islands investigation. In recommending a procedure for setting a reference dose for a methyl mercury standard, the NAS chose to use a linear model to represent the relationship between mercury exposure and neurodevelopmental outcomes, and based this model on the Faroe Islands data. The NAS found that the cord blood methyl mercury concentration was the most sensitive biomarker of exposure *in utero* and correlated best with neurobehavioral outcomes. The NAS was not deterred by the apparently negative findings of the Seychelles Islands study, which it noted was based on a smaller cohort than the Faroe Islands investigation and had only 50% statistical power to detect the effects observed in the Faroes (National Research Council 2000).

Since January 2003, the issue of early life exposure to methyl mercury has become the topic of intense debate after the U.S. Environmental Protection Agency (EPA) announced a proposal to reverse strict controls on emissions of mercury from coal-fired power plants. This proposed "Clear Skies Act" would slow recent progress in controlling mercury emission rates from electric generation facilities and would allow these releases to remain as high as 26 tons/year through 2010 (U.S. EPA 2004a). By contrast, existing protections under the Clean Air Act will limit mercury emissions from coal-fired power plants to 5 tons/year by 2008 (U.S. EPA 2004b). The U.S. EPA's technical analyses in support of "Clear Skies" failed to incorporate or quantify consideration of the health impacts resulting from increased mercury emissions (U.S. EPA 2004c). After legislative momentum for this proposal faded, the U.S. EPA proposed an almost identical Utility Mercury Reductions Rule, which again failed to examine impacts on health. The U.S. EPA issued a final rule on 15 March 2005 (U.S. EPA 2005).

To assess the costs that may result from exposure of the developing brain to methyl mercury, we estimated the economic impact of anthropogenic methyl mercury exposure in the 2000 U.S. birth cohort. We calculated the fraction of this cost that could be attributed to mercury emitted by American electric power generation facilities.

Materials and Methods

Environmentally attributable fraction model. To assess the disease burden and the costs due to methyl mercury exposure, we used an environmentally attributable fraction (EAF) model. The EAF approach was developed by the Institute of Medicine (IOM) to assess the "fractional contribution" of the environment to causation of illness in the United States (IOM 1981), and it has been used to assess the costs of environmental and occupational disease (Fahs et al. 1989; Leigh et al. 1997). It was used recently to estimate the environmentally attributable costs of lead poisoning, asthma, pediatric cancer, and neurodevelopmental disabilities in American children (Landrigan et al. 2002). The EAF is defined by Smith et al. (1999) as "the percentage of a particular disease category that would be eliminated if environmental risk factors were reduced to their lowest feasible concentrations." The EAF is a composite value and is the product of the prevalence of a risk factor multiplied by the relative risk of disease associated with that risk factor. Its calculation is useful in developing strategies for resource allocation and prioritization in public health. The general model developed by the IOM and used in the present analysis is the following:

$$\text{Costs} = \text{disease rate} \times \text{EAF} \times \text{population size} \times \text{cost per case}$$

"Cost per case" refers to discounted lifetime expenditures attributable to a particular disease, including direct costs of health care, costs of rehabilitation, and lost productivity. "Disease rate" and "population size" refer, respectively, to the incidence or prevalence of a disease and the size of the population at risk.

In applying the EAF model, we first reviewed the adverse effects of methyl mercury exposure. We then estimated the costs of those effects and subsequently applied a further fraction to parse out the cost of anthropogenic methyl mercury exposure resulting from emissions of American electrical generation facilities.

Toxic effects of methyl mercury exposure. The NAS found neurodevelopmental effects in the children of women who had consumed fish and seafood during pregnancy to be the most important and best-studied end point for methyl mercury toxicity. Although the NAS identified other potentially significant toxicities resulting from methyl mercury exposure, such as nephrotoxicity and carcinogenicity, those effects were less well characterized (National Research Council 2000). We therefore limited our analysis to the neurodevelopmental impact of methyl mercury toxicity.

There is no evidence to date validating the existence of a threshold blood mercury concentration below which adverse effects on cognition are not seen. The U.S. EPA has, however, set a benchmark dose level (BMDL) for cord blood mercury dose concentration of 58 μg/L. This level that corresponds to the lower limit of the 95% confidence interval for the concentration at which there is a doubling in the Faroes study in the prevalence of test scores (5–10%) in the clinically subnormal range for the Boston Naming Test (Rice et al. 2003). It is important to note that this is not a concentration below which no observed adverse effects were found. The Faroes and New Zealand cohorts both support the conclusion that developmental effects become apparent at levels of approximately 1 ppm mercury in hair, or 5.8 μg/L in cord blood (Grandjean et al. 1997; Kjellstrom et al. 1986, 1989). The Faroes study also found that effects on delayed brainstem auditory responses occurred at much lower exposure concentrations (Murata et al. 2004). In its report, the NAS concluded that the likelihood of subnormal scores on neurodevelopmental tests after *in utero* exposure to methyl mercury increased as cord blood concentrations increased from levels as low as 5 μg/L to the BMDL of 58 μg/L (National Research Council 2000). In light of those findings, we decided in this analysis to apply a no adverse effect level of 5.8 μg/L, the lowest level at which adverse neurodevelopmental effects were demonstrated in the cohort studies.

Recent data suggest that the cord blood mercury concentration may on average be 70% higher than the maternal blood mercury concentration (Stern and Smith 2003), and a recent analysis suggests that a modification of the U.S. EPA reference dose for methyl mercury be made to reflect a cord blood:maternal blood ratio that is > 1 (Stern 2005). If the developmental effects of mercury exposure do, in fact, begin at 5.8 μg/L in cord blood, as suggested by the Faroes (Grandjean et al. 1997) and New Zealand (Kjellstrom et al. 1986, 1989) data and by the NAS report (National Research Council 2000), then effects would occur in children born to women of childbearing age with blood mercury concentrations ≥ 3.41 (ratio, 5.8:1.7) μg/L. National population data from the 1999–2000 National Health and Nutrition Examination Survey (NHANES) found that 15.7% of American women of childbearing age have total blood mercury concentrations ≥ 3.5 μg/L (Mahaffey et al. 2004).

To compute IQ decrements in infants that have resulted from these elevated maternal mercury exposures, we used published data on

percentages of women of childbearing age with mercury concentrations ≥ 3.5, 4.84, 5.8, 7.13, and 15.0 μg/L. We assumed conservatively that all mercury concentrations within each of the segments of the distribution were at the lower bound of the range. We assumed that the probability of giving birth to a child did not correlate with mercury level in a woman of childbearing age. In our base case analysis, we calculated economic costs assuming that children born to women with mercury concentrations 3.5–4.84 μg/L suffer no loss in cognition, and that successive portions of the birth cohort experience loss of cognition associated with cord blood levels of 8.2, 9.9, 12.1, and 25.5 μg/L, respectively.

Recently, the Faroes researchers reviewed their cohort data and found fetal blood mercury concentrations to be only 30% higher than maternal blood concentrations (Budtz-Jorgensen et al. 2004). In light of these findings and to avoid overestimation of the magnitude of impacts, we chose not to include children born to mothers with blood mercury concentrations between 3.5 and 4.84 μg/L in our base case analysis.

To assess the impact on our findings of a range of various possible ratios between maternal and cord blood mercury concentrations, we conducted a sensitivity analysis. In this analysis, we set as a lower bound for our estimate the costs to children with estimated cord blood concentrations ≥ 5.8 μg/L (assuming a cord:maternal blood ratio of 1) and assumed no IQ impact < 4.84 μg/L (assuming a cord:maternal blood ratio of 1.19). This estimate assumed no loss of cognition to children born to women with mercury concentration < 5.8 μg/L and assumed that subsequent portions of the birth cohort experienced cord blood mercury concentrations of 5.8, 7.13, and 15 μg/L, respectively. To estimate economic costs in this scenario, we calculated no costs for children with blood mercury concentrations < 4.84 μg/L. We calculated costs resulting from an incremental increase in blood mercury concentration from 4.84 to 5.8 μg/L in the percentage of the population with blood mercury levels between 5.8 and 7.13 μg/L, and added those costs to the costs resulting from increases from 4.84 to 7.13 μg/L and 4.84 to 15 μg/L in the percentages of the population with concentrations between 7.13 and 15 μg/L and > 15 μg/L, respectively. The result of this calculation is expressed in our analysis as a lower bound for the true economic cost of methyl mercury toxicity to the developing brain.

Impact of methyl mercury exposure on IQ. The Faroes study found that a doubling of mercury concentration was associated with adverse impacts on neurodevelopmental tests ranging from 5.69–15.93% of a standard deviation (Grandjean et al. 1999). Assuming that IQ is normally distributed with a standard deviation of 15 points, a doubling of mercury concentration would be associated with a decrement ranging from 0.85 to 2.4 IQ points. The Faroes researchers used a structural equation analysis to produce estimates of impact of methyl mercury on verbal and motor function at 7 years of age and found an association between a doubling of blood mercury and loss of 9.74% of a standard deviation on motor function and of 10.45% of a standard deviation on verbal function (Budtz-Jorgensen et al. 2002). This analysis suggests that a doubling in mercury concentration produces a decrement of approximately 10% of a standard deviation, or 1.5 IQ points. In the New Zealand study (Kjellstrom et al. 1986, 1989), the average WISC-R full-scale IQ for the study population (n = 237) was 93. In the group with maternal hair mercury > 6 μg/g (~ 4-fold higher than in the study population, n = 61), the average was 90 (Kjellstrom et al. 1989). This finding further supports our use of a loss of 1.5 IQ points for each doubling in our base case analysis. Confounders such as polychlorinated biphenyls did not cause significant confounding of the data in the Faroe Islands study (Budtz-Jorgensen et al. 2002; Steuerwald et al. 2000). As a conservative measure, we nonetheless chose to set as outer bounds for the impact on intelligence of methyl mercury exposure a range of IQ decrements from 0.85 to 2.4 IQ points per doubling, as described by the Faroes researchers (Jorgensen et al. 2004). In applying the EAF methodology, we assume that the relationship between cord blood mercury and IQ is relatively linear over the range of exposures studied (> 5.8 μg/L).

In our sensitivity analysis, we used the same linear dose–response model that was selected by the National Research Council in setting a reference dose for mercury exposure (National Research Council 2000). The Faroes researchers found that, for those children whose mothers had hair mercury concentrations < 10 μg/g, a 1-μg/L increase of cord blood mercury concentration was associated with adverse impacts on neurodevelopmental tests ranging from 3.95 to 8.33% of a standard deviation, or 0.59–1.24 IQ points (average = 0.93 IQ points) (Jorgensen et al. 2004). We also varied the cord:maternal blood mercury ratio from 1 to 1.7 in calculating IQ impact from the linear model as part of our sensitivity analysis. As an upper bound to our cost estimate using the logarithmic model, we calculated the economic cost assuming that children born to women with mercury concentrations 3.5–4.84 μg/L suffer no loss in cognition and that successive portions of the birth cohort experience losses of cognition of 1.21, 1.84, 2.55, and 5.13 IQ points, respectively. The lower-bound estimate assumed that children born to women with mercury concentrations 4.84–5.8 μg/L suffer no loss in cognition and that successive portions of the birth cohort experience losses of cognition of 0.22, 0.48, and 1.39 IQ points.

As an upper bound to our cost estimate using the linear model, we calculated the economic cost assuming that children born to women with mercury concentrations 3.5–4.84 μg/L suffer no loss in cognition and that successive portions of the birth cohort experience losses of cognition of 3.01, 5.04, 7.84, and 24.43 IQ points, respectively. The lower-bound estimate assumed that children born to women with mercury concentrations 4.84–5.8 μg/L suffer no loss in cognition and that successive portions of the birth cohort experience losses of cognition of 0.56, 1.35, and 5.99 IQ points.

Calculation of economic costs of IQ loss. To estimate the costs associated with the cognitive and behavioral consequences of mercury exposure, we relied on an economic forecasting model developed by Schwartz et al. (1985), and we applied this model to NHANES data on prevalence of mercury exposure in women of childbearing age (Schober et al. 2003; Schwartz et al. 1985). In this model, lead concentrations are assumed on the basis of work by Salkever (1995) to produce a dose-related decrement in IQ score. Those decrements in IQ are, in turn, associated with lower wages and diminished lifetime earning power. Salkever used three regression techniques to derive direct and indirect relationships among IQ, schooling, probability of workforce participation, and earnings. He estimated a percentage in lost earnings per IQ point from the percent loss of earnings for each microgram per deciliter increase in blood lead level. Salkever found a 0.473 point decrement in lost lifetime earnings for each microgram per deciliter increase among men and a 0.806 point decrement for each microgram per deciliter increase among women (Salkever 1995). Using Schwartz's (1994) estimate that 0.245 IQ points are lost for each microgram per deciliter increase in blood lead, Salkever (1995) estimated a percentage loss in lifetime earnings per IQ point among men (1.931%) and women (3.225%). We assume that this relationship remains linear across the population range of IQ.

Assuming an annual growth in productivity of 1% and applying a 3% real discount rate, the present value of lifetime expected earnings is $1,032,002 for a boy born in 2000 and $763,468 for a girl born in the same year (Max et al. 2002). The costs of the diminution in this earning power were calculated for the 2000 American birth cohort, using available data on the number of male and female births in 2000 [Centers for Disease Control and Prevention (CDC) 2002a]. We diminished our cost estimate by

0.69%, the infant mortality rate in 2000, to account for those children for whom methyl mercury exposure is unlikely to result in diminished economic productivity (CDC 2002b).

American sources of mercury emission. Mercury emissions result from anthropogenic as well as from natural sources, and we limited our analysis to methyl mercury derived from anthropogenic sources. The UNEP recently estimated that anthropogenic uses account for 70% of the 5,500 tons of mercury released into the earth's atmosphere worldwide (UNEP 2002). Therefore, to limit our analysis to anthropogenic mercury, we applied a 70% factor to convert the cost of lost economic productivity resulting from methyl mercury exposure to the cost attributable to anthropogenic methyl mercury exposure.

We next parsed out the proportion of anthropogenic methyl mercury in fish that arises from American sources and then isolated the subset of that proportion that is emitted by coal-fired electrical generating plants. In 1995, the most recent year for which federal data on the relative deposition of mercury from American and other global sources are available, 158 tons of mercury were emitted to the atmosphere by American anthropogenic sources. Fifty-two (33%) of those 158 tons were deposited in the lower 48 states, whereas the remaining two-thirds were added to the global reservoir (U.S. EPA 2004d). Also in 1995, an additional 35 tons of mercury from the global reservoir were deposited in the United States. Therefore, a total of 87 total tons of mercury were deposited in the United States in that year, of which 60% (52 of 87) were attributable to American anthropogenic sources (U.S. EPA 1996, 1997). This mercury would have been available to bioaccumulate in the marine and aquatic food chains and to enter American freshwater and saltwater fish.

Further complicating our calculations is the fact that not all of the fish sold in America is from American sources. Of the 10.4 billion pounds of edible fish supplied in the United States in 2002, 4.4 billion (42%) are imported from sources outside of the United States (National Marine Fisheries Service 2002). Because U.S. emissions account for 3% of global emissions (UNEP 2002; U.S. EPA 1996), we calculate that the mercury content of imported fish is 2% of American anthropogenic origin: 158 tons of American emissions – 52 tons of American mercury deposited on American soil = 106 tons of American mercury available to contaminate imported fish; 5,500 tons emitted globally – 87 tons deposited on American soil = 5,413 tons of mercury from all sources to contaminate imported fish; 106 tons of mercury available/5,413 tons of mercury from all sources = 0.02, or 2% of mercury in imported fish of American origin. In the remaining 58% of fish consumed in the United States, we assume that 60% of the mercury content comes from American anthropogenic sources (U.S. EPA 1996, 1997). We therefore applied a 36% factor (the weighted average of American sources of mercury content in fish, or $0.6 \times 0.58 + 0.02 \times 0.42$) to specify the economic costs of anthropogenic methyl mercury exposure attributable to American sources.

Modeling supported by the Electric Power Resource Institute (EPRI) estimates that 70% of the mercury deposited in the United States comes from foreign sources (Seigneur et al. 2004). This EPRI analysis also finds that U.S. sources are responsible for > 60% of mercury deposition in the Boston–Washington, D.C. corridor. In one of the model's selected receptor areas—Pines Lake, New Jersey—80% of the deposition originated from U.S. sources, showing that regional deposition can be higher than the 60% number we use in this analysis (Seigneur et al. 2004). In our sensitivity analysis, we varied the factor used to convert the economic cost of anthropogenic methyl mercury exposure to the economic cost attributable to American sources from 18% ($0.3 \times 0.58 + 0.02 \times 0.42$, using EPRI's modeling) to 36% (using federal data on mercury deposition) (Seigneur et al. 2004).

In 1999, the most recent year for which data on American mercury emissions are available, 48 (41%) of the 117 tons of mercury emissions from anthropogenic sources in the United States were emitted by electric power generation facilities (U.S. EPA 2003a). To calculate the economic cost of methyl mercury exposure attributable to these facilities, we applied an additional fraction of 41% in our analysis.

Results

Base-case analysis. Each year in the United States, between 316,588 (7.8% of the annual birth cohort) and 637,233 babies are born with cord blood mercury levels > 5.8 µg/L. The lower-bound estimate of 316,588 babies is based on the very conservative assumption that maternal and cord blood mercury concentrations are equal. But if the cord blood mercury concentration is on average 70% higher than the maternal blood mercury concentration, as suggested by recent research (Stern and Smith 2003), 637,233 babies, or 15.7% of the birth cohort, experience cord blood mercury levels > 5.8 µg/L. Fetal blood mercury levels > 5.8 µg/L are associated with small but significant loss of IQ. This decrement in IQ appears to be permanent and irreversible, and it adversely affects a significant portion of the annual birth cohort's economic productivity over a lifetime.

Using our base-case assumptions (impact for women with total mercury > 4.84 µg/L, cord:maternal mercury ratio = 1.7, IQ impact = 1.5 points per doubling), we calculated costs for the 405,881 children who suffer IQ decrements resulting from fetal methyl mercury exposure. Under these assumptions, 89,293 children suffered a 0.76 decrement in IQ and another 113,647 experienced a 1.15 IQ point decrement. The 5% most highly exposed children in the 2000 birth cohort suffered subclinical losses in IQ in our model ranging from 1.60 to 3.21 points. Although this diminution in intelligence is small in comparison with the loss of cognition that can result from other genetic and environmental processes, the loss resulting from methyl mercury exposure produces a significant reduction in economic productivity over a lifetime. We estimate the aggregate cost of the loss in IQ that results from exposure of American children to methyl mercury of anthropogenic origin to be $8.7 billion (all costs in 2000 US$) annually (Table 1).

Sensitivity analysis. We estimate that the cost of anthropogenic methyl mercury exposure ranges from $2.2 billion (impact only for the 316,588 children born to women with total mercury > 5.8 µg/L, IQ impact = 0.85 points per doubling) to $13.9 billion (impact for the 405,881 women with total mercury > 4.84 µg/L, IQ impact = 2.4 points per doubling). Using the linear dose–response model that was selected by the National Research Council in recommending a reference dose for mercury exposure (a model that predicts an average loss of 0.93 IQ points per 1-µg/L increase in mercury concentration) (Jorgensen et al. 2004; National Research Council 2000), we find that the environmentally attributable cost of methyl mercury exposure is $32.9 billion, assuming a cord:maternal blood mercury ratio of 1.7. Employing a linear model and assuming that the true loss in IQ resulting from a 1-µg/L increase in blood mercury ranges from 0.59 to 1.24 points, we find that the outer bounds of our estimate range from $7.0 billion (impact only for women with total mercury > 5.8 µg/L, IQ impact = 0.59 points per µg/L increase, cord:maternal mercury ratio = 1) to $43.8 billion (impact for women with total mercury > 4.84 µg/L, IQ impact = 1.24 points for each microgram per deciliter increase, cord:maternal mercury ratio = 1.7) (Table 2).

Sources of costs. After applying the 36% fraction to restrict our analysis to American anthropogenic sources, we estimate that the attributable cost of methyl mercury exposure to the developing fetus from American anthropogenic sources is $3.1 billion annually, using the logarithmic model developed by the Faroes researchers (Grandjean et al. 1999; Jorgensen et al. 2004) and assuming a 1.5-point IQ impact for each doubling of methyl mercury exposure (Budtz-Jorgensen

et al. 2002). Our sensitivity analysis, in which we also varied the attributable fraction for American sources from 18% (industry data sources) to 36% (federal data sources) (Seigneur et al. 2004; U.S. EPA 1996, 1997), suggests that the true cost of methyl mercury exposure from American emissions ranges from $0.4 to $15.8 billion annually.

To focus specifically on the costs of fetal exposure to mercury released by American coal-fired power plants, we examined the impact of the 41% of U.S. anthropogenic emissions of mercury attributable to these facilities. We estimate that the attributable cost of methyl mercury exposure from American electric generation facilities to the developing fetus is $1.3 billion. Applying our sensitivity analysis in this model, we find that the true cost of methyl mercury exposure from electric generation facilities to the American birth cohort ranges from $0.1 to $6.5 billion/year (Figure 1). Again, the major source of these costs is loss of earnings over a lifetime.

Discussion

The major findings in this analysis are *a*) that exposure to methyl mercury emitted to the atmosphere by American electric generation facilities causes lifelong loss of intelligence in hundreds of thousands of American babies born each year and *b*) that this loss of intelligence exacts a significant economic cost to American society, a cost that amounts to at least hundreds of millions of dollars each year. Moreover, these costs will recur each year with each new birth cohort as long as mercury emissions are not controlled. By contrast, the cost of installing stack filters to control atmospheric mercury emissions is a one-time expense. The high costs of *in utero* exposure to methyl mercury are due principally to the lifelong consequences of irreversible injury to the developing brain. Similar lifelong neurobehavioral consequences have been observed after exposure of the developing brain to other environmental toxicants, including lead (Baghurst et al. 1987; Bellinger 2004; Dietrich et al. 1987; Opler et al. 2004; Wasserman et al. 2000), polychlorinated biphenyls (Jacobson and Jacobson 1996), and ethanol (Lupton et al. 2004).

Because the literature has presented a range of possible consequences for methyl mercury toxicity, we have provided a range of possible public health and economic consequences. This range is meant to inform the choices that environmental and public health officials make in protecting vulnerable populations from methyl mercury exposure. Our range for the true economic costs of methyl mercury toxicity to the developing brain omits the cost of exposures to the 231,352 children born to women in 2000 with blood mercury concentrations between 3.5 and 4.84 µg/L. If the true cord blood ratio is 1.7 times the maternal blood concentration, as described in the most recent and extensive meta-analysis on the matter (Stern and Smith 2003), these children are also born with cord blood mercury concentrations above the 5.8 µg/L concentration at which adverse neurodevelopmental impact has been found. We chose not to include them in our analysis because other studies have found lower ratios and because we restricted ourselves in this analysis to the use of available, published prevalence data of maternal blood mercury concentrations. In our sensitivity analysis, we also selected low cord:maternal blood ratios so as to describe most accurately the range of values for the true cost of methyl mercury exposure to the developing fetus.

Our analysis also omits the cost of the cardiovascular impacts of mercury exposure (Grandjean et al. 2004) or the costs of mercury exposure to children in the first 2 years of postnatal life, when myelination is still continuing and the blood–brain barrier remains vulnerable to penetration by methyl mercury (Rodier 1995). We chose not to include these aspects of methyl mercury toxicity in our range of estimates at this time because there do not exist sufficient quantitative data to permit construction of a reliable model.

A limitation on our analysis is that it did not consider other societal costs beyond decreased lifetime earnings that may result from exposure of the developing brain to methyl mercury. For example, if the value of a child's social productivity is approximately $4–9 million, as suggested by studies of willingness-to-pay (WTP) estimates of a life (Viscusi and Aldy 2004), then by the WTP methodology the true cost of methyl mercury toxicity may be much higher than our estimate. We also chose not to include other noncognitive impacts. Lead, for example, has been associated with criminality and antisocial behavior (Dietrich et al. 2001; Needleman et al. 1996, 2002; Nevin 2000; Stretesky and Lynch 2001). However, because these behaviors have not been described as yet for methyl mercury, we chose not to include such costs in our estimate.

Some will argue that our range of costs fails to incorporate the role of confounding factors in quantifying the economic consequences of methyl mercury exposure. It is true that efforts

Table 1. Cost of anthropogenic mercury (Hg) exposure using a logarithmic model.

Variable	Segment of population (percentile)			
	90–92.1 Hg	92.2–94.9 Hg	95–99.3 Hg	≥ 99.4 Hg
Range of maternal total Hg concentration	4.84–5.8 µg/L	5.8–7.13 µg/L	7.13–15.0 µg/L	> 15.0 µg/L
Assumed maternal total Hg concentration	4.84	5.8	7.13	15
No effect concentration (maternal total Hg)	3.41	3.41	3.41	3.41
IQ points lost at assumed concentration	0.76	1.15	1.60	3.21
Loss of 1 IQ points = decrease in lifetime earnings				
For boys, lifetime earnings (1.931% decrease)		$1,032,002		
For girls, lifetime earnings (3.225% decrease)		$763,468		
No. of boys in birth cohort affected	45,693	58,155	91,387	12,462
No. of girls in birth cohort affected	43,601	55,492	87,201	11,891
Lost income	$1.1 billion	$2.0 billion	$4.4 billion	$1.2 billion
Total cost = $8.7 billion in each year's birth cohort				

Assumptions: EAF = 70%, main consequence = loss of IQ over lifetime

Table 2. Sensitivity analysis: cost of anthropogenic methyl mercury exposure.

Variable	Base-case cost estimate (range)[a]
Children born to women with Hg > 4.84 µg/L, effect > 3.5 µg/L	
Logarithmic model	$8.7 billion ($4.9–13.9 billion)
Linear model, cord maternal Hg ratio = 1.7	$32.9 billion ($20.9–43.8 billion)
Linear model, cord maternal Hg ratio = 1	$19.3 billion ($12.3–25.8 billion)
Children born to women with > 5.8 µg/L, effect > 4.84 µg/L	
Logarithmic model	$3.9 billion ($2.2–6.3 billion)
Linear model, cord maternal Hg ratio = 1.7	$18.7 billion ($11.9–24.9 billion)
Linear model, cord maternal Hg ratio = 1	$11.0 billion ($7.0–14.6 billion)
Range of estimates	
Logarithmic model	$2.2–13.9 billion
Linear model	$7.0–43.8 billion

Assumptions: EAF = 70%, main consequence = loss of IQ over lifetime
[a]Based on range of possible IQ decrement.increase cord blood mercury

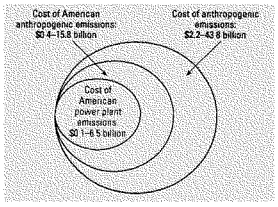

Figure 1. Portions of cost of methyl mercury exposure attributed to sources. Assumptions: 18–36% attributable to American sources; 41% of American emissions attributable to American power plants.

to delineate the potential synergistic role of methyl mercury and other chemicals in mediating neurocognitive and other effects are bedeviled by lack of knowledge about possible interactions and synergies among chemicals or between chemicals and other environmental hazards, even though the environment of a child includes mixtures of chemical and biologic toxicants. Only a study of the magnitude of the National Children's Study will facilitate simultaneous examination of the effects of multiple chemical exposures, of interactions among them, and of interactions among biologic, chemical, behavioral, and social factors (Trasande and Landrigan 2004). However, we note that loss of cognition resulting from methyl mercury exposure in the Faroe Islands study remained evident when blood levels of polychlorinated biphenyls, which are known fetal neurotoxicants (Jacobson and Jacobson 1996), were included in the analysis (Budtz-Jorgensen et al. 2002; Steuerwald et al. 2000).

We note the U.S. EPA's recent success in minimizing mercury emissions from medical waste (U.S. EPA 2004e) and municipal incinerators (U.S. EPA 2004f, 2004g), actions that resulted in a decrease in total mercury emissions by at least 80 tons per year from 1990 to 1999 (U.S. EPA 2003b). Although data are not available on blood mercury concentrations over the past decade that followed from those actions, the impact of these reductions is likely to have been substantial.

Some commentators have used data from the Seychelles study to argue that methyl mercury is not toxic to the fetus at low concentrations and to suggest that fear of mercury exposure is needlessly preventing women from ingesting fish and thus denying them access to beneficial long-chain polyunsaturated fatty acids (LCPUFAs), especially docosahexaenoic acid (DHA). We do not dispute that DHA and other LCPUFAs are important for optimal development of the fetal visual and nervous systems (Innis 1991). The human fetus has a limited ability to synthesize DHA's precursor, α-linolenic acid, and therefore it must be largely supplied from maternal sources (Carnielli et al. 1996; Larque et al. 2002; Szitanyi et al. 1999). We also note a report that associated an average monthly decline in fish consumption of 1.4 servings among Massachusetts women with a U.S. Food and Drug Administration advisory on the health risks of mercury (Oken et al. 2003). Nonetheless, the American Heart Association, a strong advocate for the cardioprotective effects of LCPUFAs, recommends that children and pregnant and lactating women avoid potentially contaminated fish (Kris-Etherton et al. 2002). Fish advisories should not recommend that consumers abstain from fish, but they should assist in choosing the best kinds of fish to eat. Lists of fish that are safe and unsafe from the perspective of mercury exposure have been published and made widely available to consumers (U.S. EPA 2004h).

Early reports of disease and dysfunction of environmental origin in children have on repeated occasions failed to produce proactive response to protect children. The long history of lead use in the United States provides a chilling reminder of the consequences of failure to act on early evidence of harm. It is important that we not repeat this sequence with mercury. Within the last century, as a result of increased industrial activity, mercury emissions worldwide have increased 2- to 5-fold, and anthropogenic emissions now surpass emissions from natural sources (Nriagu 1989).

The data from this analysis reinforce the results of recent epidemiologic studies and indicate an urgent need on economic grounds for regulatory intervention at the federal level to minimize mercury emissions. Our analysis captures the cost of methyl mercury exposure for only 1 year's birth cohort, but the cost of mercury exposure will continue to accrue in each succeeding year if power plants fail to install flue gas filters (U.S. Department of Energy 2004) or to implement other technologies to reduce mercury emissions. The cost savings from reducing mercury exposure now will provide savings in improved productivity and enhanced national security for generations to come.

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Mental Retardation and Prenatal Methylmercury Toxicity

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Background *Methylmercury (MeHg) is a developmental neurotoxicant; exposure results principally from consumption of seafood contaminated by mercury (Hg). In this analysis, the burden of mental retardation (MR) associated with methylmercury exposure in the 2000 U.S. birth cohort is estimated, and the portion of this burden attributable to mercury (Hg) emissions from coal-fired power plants is identified.*

Methods *The aggregate loss in cognition associated with MeHg exposure in the 2000 U.S. birth cohort was estimated using two previously published dose-response models that relate increases in cord blood Hg concentrations with decrements in IQ. MeHg exposure was assumed not to be correlated with native cognitive ability. Previously published estimates were used to estimate economic costs of MR caused by MeHg.*

Results *Downward shifts in IQ resulting from prenatal exposure to MeHg of anthropogenic origin are associated with 1,566 excess cases of MR annually (range: 376–14,293). This represents 3.2% of MR cases in the US (range: 0.8%–29.2%). The MR costs associated with decreases in IQ in these children amount to $2.0 billion/year (range: $0.5–17.9 billion). Hg from American power plants accounts for 231 of the excess MR cases/year (range: 28–2,109), or 0.5% (range: 0.06%–4.3%) of all MR. These cases cost $289 million (range: $35 million–2.6 billion).*

Conclusions *Toxic injury to the fetal brain caused by Hg emitted from coal-fired power plants exacts a significant human and economic toll on American children.* Am. J. Ind. Med. 49:153–158, 2006. *© 2006 Wiley-Liss, Inc.*

KEY WORDS: methylmercury; mercury; cord blood; mental retardation; power plants; electrical generation facilities; environmentally attributable fraction

INTRODUCTION

Methylmercury (MeHg) is a developmental neurotoxicant [Goldman et al., 2001]. Maternal exposure results principally from consumption of seafood contaminated by mercury (Hg) released from anthropogenic (70%) and natural (30%) sources [United Nations Environmental Programme, 2002]. Coal-fired electricity generating plants account for 41% of annual mercury emissions in the US (48 tons) [U.S. EPA, 2003].

Throughout the 1990s the Environmental Protection Agency (EPA) made steady progress in reducing industrial Hg emissions. Recently, however, EPA has proposed to slow

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this progress. In January 2003, the EPA announced a proposal to reverse strict controls on emissions of mercury from coal-fired power plants. This proposed "Clear Skies Act" would slow recent progress in controlling mercury emission rates from electric generation facilities and would allow these releases to remain as high as 34 tons per year through 2010 [U.S. EPA, 2004a].

A recent analysis of the impact on children's health of industrial Hg emissions calculated that 316,588–637,233 US babies are born each year with cord blood Hg levels >5.8 μg/L. [Trasande et al., 2005] These infants suffer mercury-related losses of cognitive function ranging from 0.2 to 24.4 IQ points. The authors' best estimate was that 89,294 children suffered a 0.76 decrement in IQ, while another 113,647 experienced a 1.15 IQ point decrement. The 5% most highly exposed children in the 2000 birth cohort suffered subclinical losses in IQ in this model ranging from 1.60 to 3.21 points [Trasande et al., 2005]. The present study extends upon previous work, and estimates the number of cases of mental retardation (MR) that result each year from prenatal exposure to MeHg. Calculations are based on the 2000 US birth cohort, and include cost estimates.

MATERIALS AND METHODS

Mental retardation is defined as an IQ below 70 [American Association on Mental Retardation, 2002] and IQ was assumed to be normally distributed with a SD of 15. The relationship between cord blood mercury and IQ is assumed to be relatively linear over the range of exposures studied [>5.8 μg/L; Trasande et al., 2005]. MeHg exposure shifts the distribution of IQ in an exposed population downward without a change in the kurtosis or skew of the distribution, such that that the number of children with an IQ score below 70 is increased (Fig. 1).

Cohorts in the Faroe Islands [Grandjean et al., 1997] and New Zealand [Kjellstrom et al., 1986, 1989] both support the conclusion that developmental effects become apparent at levels of approximately one part per million mercury in hair, or 5.8 μg/L in cord blood. The Faroes study also found that effects on delayed brainstem auditory responses occurred even at much lower exposure concentrations [Murata et al., 2004]. In a given subpopulation born with cord blood Hg >5.8 μg/L, the base-case IQ decrement [Trasande et al., 2005] was applied, and the difference in MR cases between the two scenarios is estimated as the number of excess MR cases. The number of excess MR cases was summed among children born with cord blood Hg >5.8 μg/L.

To compute IQ decrements in infants that have resulted from these elevated maternal mercury exposures, we used published data on percentages of women of childbearing age with mercury concentrations at or above 3.5, 4.84, 5.8, 7.13, and 15.0 μg/L [Mahaffey et al., 2004]. We assumed conservatively that the percentage of the population with mercury concentrations of 3.5–4.84 μg/L all had a mercury concentration of 3.5. Likewise for each successive portion of the population (4.84–5.8, 5.8–7.13, 7.13–15.0, and >15.0 μg/L), we assumed all mercury concentrations to be at the lower bound of the available range. In the base-case analysis, a 1.7 cord/maternal Hg ratio was applied, in light of a recent metaanalysis, which suggests that cord blood levels may be at least 70% higher than maternal blood [Stern and Smith, 2003]. Therefore, in the sensitivity analysis, a range of 1–1.7 was applied for the true cord/maternal Hg ratio, given that the meta-analysis found a range of 1.0–3.4 [Stern and Smith, 2003].

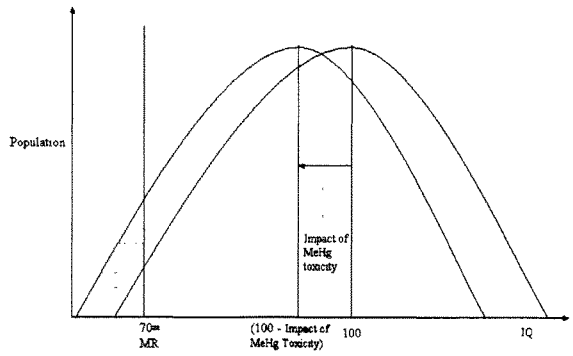

FIGURE 1. Impact of methylmercury exposure on highly exposed populations (hatched area = cases of MR attributable to methylmercury exposure).

Linear and logarithmic models were also applied with a range of IQ decrements as part of the sensitivity analysis, applying 0.59–1.24 IQ points per μg/L increase, and 0.85–2.4 IQ points per doubling, respectively [Grandjean et al., 1999; Budtz-Jorgensen et al., 2002; Jorgensen et al., 2004]. The outer and lower range of possible IQ decrements for each subpopulation was applied again to produce a range of excess cases of mental retardation in the 2000 U.S. birth cohort. The lower bound estimate assumed that children born to women with mercury concentrations below 5.8 μg/L suffer no loss in cognition, and that children born to women with concentrations of 5.8–7.13, 7.13–15.0, and >15.0 μg/L experience losses of cognition of 0.22, 0.48, and 1.39 IQ points, respectively. The upper bound assumed that children born to women with mercury concentrations below 4.84 μg/L suffer no loss in cognition, and that children born to women with concentrations of 4.84–5.8, 5.8–7.13, 7.13–15.0, and >15.0 μg/L experience losses of cognition of 3.01, 5.04, 7.84, and 24.43 IQ points, respectively [Trasande et al., 2005].

of those 158 tons were deposited in the lower 48 states, while the remaining two-thirds were added to the global reservoir [U.S. EPA, 2004b]. In that year, an additional 35 tons of mercury from the global reservoir were deposited in the United States. Therefore, a total of 87 tons of mercury was deposited in the United States in that year, of which 60% (52/87) were attributable to American anthropogenic sources [U.S. EPA, 1996, 1997]. This mercury would have been available to bioaccumulate in the marine and aquatic food chains and to enter American fresh- and saltwater fish.

Further complicating our calculations is the fact that not all of the fish sold in America is from American sources. Of the 10.4 billion pounds of edible fish supplied in the U.S. in 2002, 4.4 billion (42%) are imported from sources outside of the United States [National Marine Fisheries Service, 2004]. Since U.S. emissions account for 3% of global emissions [U.S. EPA, 1996; United Nations Environmental Programme, 2002], we calculate that the mercury content of imported fish is 2% of American anthropogenic origin:

$$\frac{\begin{array}{c}158 \text{ tons of American emissions} - 52 \text{ tons of American mercury deposited on American soil} \\ = 106 \text{ tons of American mercury available to contaminate imported fish}\end{array}}{\begin{array}{c}5{,}500 \text{ tons emitted globally} - 87 \text{ tons deposited on American soil} \\ = 5{,}413 \text{ tons of mercury from all sources to contaminate imported fish}\end{array}}$$

$$= 106/5{,}413 = 2\% \text{ of mercury in imported fish of American origin}$$

To obtain percentages of MR attributable to Hg pollution sources, the number of cases of mental retardation attributable to each source was divided by 49,030, the number of mentally retarded children in the 2000 U.S. birth cohort, based on a 1.2% prevalence rate [U.S. Centers for Disease Control and Prevention, National Vital Statistics System, 2004a,b].

To estimate the percentage of these excess cases attributable to industrial Hg pollution sources, an environmentally attributable fraction model was applied. The United Nations Environment Programme recently estimated that anthropogenic uses account for 70% of the 5,500 tons of mercury released into the earth's atmosphere worldwide [United Nations Environmental Programme, 2002]. Therefore, to limit our analysis to anthropogenic mercury, we applied a 70% factor to convert the cost of mental retardation resulting from methylmercury exposure to the cost attributable to anthropogenic methymercury exposure.

We parsed out the proportion of anthropogenic methylmercury in fish that arises from American sources, and then isolated the subset of that proportion that is emitted by coal-fired electrical generating plants. In 1995, the most recent year for which federal data on the relative deposition of mercury from American and other global sources are available, 158 tons of mercury were emitted to the atmosphere by American anthropogenic sources. Fifty-two (33%)

In the remaining 58% of fish consumed in the United States, we assume that 60% of the mercury content comes from American anthropogenic sources [U.S. EPA, 1996, 1997]. We therefore applied a 36% factor (the weighted average of American sources of mercury content in fish, or $(0.6 \times 0.58) + (0.02 \times 0.42)$ to specify the economic costs of anthropogenic methylmercury exposure attributable to American sources.

Modeling supported by the Electric Power Resource Institute (EPRI) estimates that 70% of the mercury deposited in the US comes from foreign sources. This EPRI analysis finds also that US sources are responsible for more than 60% of mercury deposition in the Boston–Washington, D.C. corridor. In one of the model's selected receptor areas, Pines Lake, New Jersey, 80% of the deposition originated from US sources, showing that regional deposition can be higher than the 60% number we use in this analysis [Seigneur et al., 2004]. In our sensitivity analysis, we therefore varied the factor used to convert the economic cost of anthropogenic methylmercury exposure to the economic cost attributable to American sources from 18% [$0.3 \times 0.58 + 0.02 \times 0.42$, using EPRI modeling; Seigneur et al., 2004] to 36% [using EPA data on mercury deposition; U.S. EPA, 1996, 1997].

In 1999, 48 (41%) of the 117 tons of mercury emissions from anthropogenic sources in the United States were emitted by electric power generation facilities [U.S. EPA,

2003]. To calculate the burden of mental retardation attributable to these facilities, we therefore applied an additional fraction of 41% in our analysis.

To obtain percentages of MR attributable to Hg pollution sources, the number of cases of mental retardation attributable to each source was divided by 49,030 [U.S. Centers for Disease Control and Prevention, National Vital Statistics System, 2004a,b].

To estimate the costs of MR due to each pollution source, previously published estimates [Honeycutt et al., 2000] were used and a 3% discount rate was applied to obtain present value in 2000; this yielded a cost per case estimate of $1,248,648, including direct medical costs. Indirect costs such as lost economic productivity due to morbidity were excluded from this analysis.

RESULTS

Downward shifts in IQ resulting from prenatal exposure to MeHg of anthropogenic origin are associated with 1,566 excess cases of MR annually, or 3.2% of MR cases in the US (Table I). The costs of caring for these children amount to $2.0 billion/year. After incorporating uncertainties in the relationship of IQ loss with increases in blood mercury levels and applying a conservative range of 1–1.7 for the true cord/maternal Hg ratio [Trasande et al., 2005], between 376 and 14,293 excess cases of MR, or 0.8%–29.2% of MR cases in the US are associated with MeHg toxicity. Applying the sensitivity analysis, the true cost of caring for children with MeHg-associated mental retardation ranges between $0.5 and $17.9 billion.

After applying base-case assumptions and incorporating a 36% factor to specify the burden of anthropogenic MeHg exposure attributable to American sources, mercury emissions from American anthropogenic sources are associated with 564 cases of mental retardation, or 1.1% of MR cases in the US. In our sensitivity analysis, the factor used to convert the economic cost of anthropogenic MeHg exposure to the economic cost attributable to American sources was varied from 18% (incorporating industry modeling of mercury deposition) to 36% (using federal data on mercury deposition). After incorporating these assumptions, 68–5,145 (0.1%–10.5%) of MR cases in the US are associated with MeHg toxicity. The base-case estimate of the social cost associated with these excess cases is $0.7 billion; after applying a sensitivity analysis, this cost ranges between $0.1 and $6.4 billion.

After applying an additional fraction of 41% in this analysis to convert the burden of mental retardation attributable to all American emissions to the burden attributable to American electric power generation facilities, Hg from American power plants accounts for 231 cases of MR/year (range: 28–2,109), 0.5% (range: 0.06%–4.3%) of all MR cases in the US (Table II). The total annual costs of MR in children damaged in utero by Hg from US power plants amount to $289 million (range: $35 million–2.6 billion).

CONCLUSIONS

The major findings in this analysis are: (1) that exposure to MeHg emitted to the atmosphere by American electric generation facilities is associated with clinically significant mental retardation in hundreds of American babies born each year, and (2) that this excess burden of mental retardation exacts a significant economic cost to American society, a cost that amounts to at least hundreds of million dollars each year. If the IQ distribution is slightly bimodal, with a hump at the very lowest levels, corresponding to children with very low IQ, then the number of mercury-associated mental retardation cases may be an underestimate.

In contrast to the costs of controlling pollution, which are one-time expenditures, these costs last a lifetime and will recur in each year's birth cohort until emissions are reduced. The cost savings from reducing mercury exposure now will

TABLE I. Base-Case Analysis, Excess Cases, and Costs of Mental Retardation Attributable to Methylmercury Toxicity, 2000 U.S. Birth Cohort

Percentile of blood mercury in total population	90%–92.1%	92.2%–94.9%	95%–99.3%	>99.4%
Range of maternal total Hg concentration (μg/L)	4.84–5.8	5.8–7.13	7.13–15.0	>15.0
Assumed maternal total Hg concentration	4.84	5.8	7.13	15
Level of maternal blood; no effect concentration	3.41	3.41	3.41	3.41
IQ points lost at assumed concentration	0.76	1.15	1.6	3.21
Number of boys affected	45,378	57,754	90,756	12,376
Number of girls affected	43,300	55,109	86,599	11,809
Number of excess MR cases	178	353	793	241
Per case cost of MR	$1,248,648	$1,248,648	$1,248,648	$1,248,648
Cost of excess MR cases (millions)	$222	$441	$991	$302
Total cost	$2.0 billion			

TABLE II. Sensitivity Analysis of Excess Mental Retardation Cases and Associated Costs Attributable to Mercury Emission Sources

Source of mercury emissions	Attributable excess MR cases	Cost of attributable excess MR cases	Percent attributable of MR (%)
All anthropogenic sources (base-case estimate)	1,566	$2.0 billion	3.2
Highest estimate	14,292	$17.8 billion	29.2
Lowest estimate	376	$0.5 billion	0.8
American anthropogenic sources (base-case estimate)	564	$0.7 billion	1.1
Highest estimate	5,145	$6.4 billion	10.5
Lowest estimate	68	$0.1 billion	0.1
American coal-fired power plants (base-case estimate)	231	$289 million	0.5
Highest estimate	2,109	$2.6 billion	4.3
Lowest estimate	28	$35 million	0.05

provide savings in improved productivity and enhanced national security for generations to come.

ABBREVIATIONS

μg/L	micrograms per liter
EAF	environmentally attributable fraction
EPA	Environmental Protection Agency
IQ	intellectual quotient
MR	mental retardation
MeHg	methylmercury
Hg	mercury

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RESPONSES BY LEONARDO TRASANDE TO ADDITIONAL QUESTIONS FROM SENATOR BOXER

Question 1. If EPA is stretching out timelines for cleanups and using institutional controls that have been shown to be of questionable effectiveness, could this result in increased risks of cancer and other disease?

Response. Yes, Senator, delays in cleanup can most definitely increase risk for chronic diseases, especially in children. Uncontrolled chemical exposures pose special dangers to children for the reasons that I have described in my oral testimony. As I stated in my oral testimony, the benefits of preventing exposure to Superfund chemicals have been proven time and again—first with lead, then with PCBs and more recently with pesticides and methylmercury. Delays in preventing toxic exposure will lead to preventable and costly diseases in children such as developmental disabilities, birth defects and childhood cancers.

Question 2. Mr. Trasande, Mr. Spiegel's testimony described a situation where EPA was recommending that people wipe off contaminated dust from their shoes as a way of reducing exposure.

How effective is this type of activity to reducing potentially harmful exposures to chemicals such as PCBs?

Response. This approach is ineffective at best, and not an adequate substitute for removing the offending agent or preventing contact. For example, in our Pediatric Environmental Health Specialty Unit, we advise parents who work with asbestos, lead or other chemicals to keep their work clothes at work, and change into new clothes there so that they do not needlessly track toxic dusts into the home. Once they deposit in the home, chemical dusts can be extremely difficult to remove, and can easily be ingested in hand-to-mouth behavior. Once ingested or even inhaled in some cases, lead and other chemical dusts can harm the brain and other developing organs in children.

RESPONSES BY LEONARDO TRASANDE TO ADDITIONAL QUESTIONS FROM SENATOR OBAMA

Question 1. Based upon your experience observing the effect of toxic chemicals on children, do you believe children may potentially be at risk of cancers and other medical conditions at lower exposure levels than we previously believed?

Response. Thank you for asking this important question, Senator. Yes, our Nation's children are at increased risk of cancers, respiratory illness, developmental disabilities and a host of other chronic childhood conditions as a result of chronic, low-level exposures that are currently considered "safe." Genetics cannot explain the massive epidemic of chronic childhood diseases we are experiencing in America. Unfortunately, we still do not know which chemicals contribute most significantly to this epidemic because we have limited data about the toxicity of many widely used environmental chemicals. Our effort to understand the role of environmental chemicals in chronic childhood disease is further complicated by the reality that many of these chemicals also cause harm without leaving a permanent and detectable fingerprint to which to trace exposure.

Our current regulatory process for chemicals also presumes safety, and allows a dangerous natural experiment to ensue. Of the 2,800 high production volume chemicals, of which more than one million pounds are produced annually, fewer than half have undergone any toxicity testing at all, and fewer than one-fifth have had any previous testing for developmental toxicity. Among those chemicals that have been studied, the little we know suggests that chemicals are likely to be harmful to children. In the past few years, we have learned that even one microgram per liter of lead can stunt a child's cognitive development. Ten micrograms per liter is the current action threshold according to the Centers for Disease Control. The American Academy of Pediatrics has called for major changes of outdoor air quality standards because studies have found that particulate matter, sulfur dioxides and other pollutants harm lung development, may precipitate asthma, and may pose increased risk of cancer. Levels below the EPA's Reference Dose for mercury have been associated with abnormalities on behavioral evoked auditory response tests. This is unfortunately just the tip of the iceberg, and in the absence of adequately toxicity testing, families are unknowingly placing their children in harm's way.

Question 2. Should we be looking more closely at the risks posed to children by these sites than to adults?

Response. Yes, Senator, the standard for environmental abatement at Superfund sites should always be set to protect our Nation's most valuable resource, our children. This standard was most recently set in the 1993 Food Quality Protection Act,

which was passed unanimously by both houses of Congress. This law codified the scientific reality that our children are especially vulnerable to toxic chemical exposures, and that special consideration should always be taken to protect children, even when the scientific evidence has not confirmed the certainty of chemical toxicity.

We also desperately need to determine child safety thresholds for many chemicals, and if there is one study that can provide insight into the risks that chemicals pose for children, it is the National Children's Study. A study of its magnitude is desperately needed because so many factors complicate understanding the role of chemicals in childhood disease—genetic variability, social factors and other chemical exposures make teasing out the role of individual toxicant extremely difficult. To date, small epidemiologic studies have provided piecemeal knowledge about chemicals, but often we have so little information that Superfund cleanup efforts are based on toxicity to adults or hypothetical, unseen risks. Superfund cleanup could thus be made more cost-effective and efficient through the National Children's Study.

STATEMENT OF MICHAEL W. STEINBERG, ON BEHALF OF THE SUPERFUND SETTLEMENTS PROJECT

EXECUTIVE SUMMARY

Superfund today is a mature program that has largely accomplished its goals. Private parties are cleaning up most of the sites on the NPL and paying the full cost of those cleanups. Superfund has also addressed most of its original workload; construction of the remedy has already been completed at most of the sites on the NPL.

Despite Superfund's accomplishments, there is still considerable potential for improvement. In particular, EPA can do more with the Superfund appropriation it receives from Congress each year.

Specifically, EPA can take action to conserve more of its annual appropriation for the core mission of the Superfund program—completing long-term cleanup at sites on the NPL. Among the steps EPA should take are the following:

- revisiting the amount of money transferred each year to EPA offices other than OSWER;
- providing greater transparency on key decisions, such as adding sites to the NPL;
- exercising greater management authority over remedy selection decisions, which increase Superfund's long-term financial obligations;
- reducing spending on oversight of work performed by experienced private parties; and
- reducing spending on non-emergency removal actions.

STATEMENT

The Superfund Settlements Project ("the Project") appreciates the opportunity to share with the subcommittee some industry perspectives on the Superfund program as it operates today. The Project is a not-for-profit association of eight major companies from various sectors of American industry.[1] It was organized in 1987 in order to help improve the effectiveness of the Superfund program by encouraging settlements, streamlining the settlement process, and reducing transaction costs for all concerned.

INTRODUCTION

The members of the Project share an extraordinary degree of practical, hands-on experience with the Superfund program. These companies have been involved at hundreds of Superfund sites across the country over the last 25 years. Representatives of the Project have testified before Congress on many occasions regarding various aspects of the Superfund program. The Project has also played an active leadership role in the national policy debate over many Superfund issues, and has been a strong supporter of EPA's Superfund Administrative Reforms since they were announced in 1995.

Collectively, these eight companies have spent well over $6 billion on site cleanups and site studies since 1980. That spending covered not only the companies'own shares of liability, but also sizable shares attributable to other parties that were

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[1] The current members of the Project are Chevron, Ciba Specialty Chemicals Corporation, the DuPont Company, FMC, General Electric Company, Honeywell International Inc., United Technologies Corporation, and Waste Management, Inc.

defunct, insolvent, or otherwise unable to pay their fair shares. On top of that, these eight companies also paid out hundreds of millions of dollars more in Federal Superfund taxes during the first 15 years of the program's life. All told, these companies have paid far more than any fair or equitable measure of their actual responsibility for the contamination at these sites.

The Project regards Superfund as a mature program that has largely accomplished its goals (albeit at a cost that was not always justified by the risks being addressed[2]). The gaps in environmental regulatory programs that led to the creation of many Superfund sites have been filled by the Clean Water Act, the Resource Conservation and Recovery Act, and the Toxic Substances Control Act. Today, private parties are cleaning up most of the sites on the National Priorities List ("NPL"), and they are paying the full cost of those cleanups. The Superfund Trust Fund is paying for cleanups at the "orphan" sites where no responsible party exists.[3]

Superfund has also largely addressed its original workload. Significantly, construction of the remedy has already been completed at most of the sites on the NPL. Today, Superfund is working on the remaining NPL sites, which include some of the largest, most complex, and most challenging sites.

OVERVIEW

In this statement, we address several key aspects of the Superfund program's past, present, and future. First, we describe the evolving partnership between EPA and industry that has enabled the program to achieve notable successes, particularly since EPA's announcement of the administrative reforms in October 1995.

Second, we describe the current need for EPA to do more with the Superfund appropriation it receives each year from Congress.

Third, we note that a significant fraction of EPA's Superfund appropriation is transferred every year to other EPA program offices that are not involved in actual cleanup work. We recommend that EPA conserve more of its appropriation for the core mission of the Superfund program—completing long-term cleanup at NPL sites.

Fourth, we urge that the process of listing sites on the NPL be focused and transparent. The NPL should continue to be "the tool of last resort." EPA should also begin explaining to the public why it is listing on the NPL sites with viable Potentially Responsible Parties ("PRPs").

Fifth, we recommend that EPA Headquarters have a major role in making the key decisions about cleanups, in order to achieve more effective management of Superfund's long-term costs.

Sixth, we urge EPA to reduce spending on oversight of work performed by experienced private parties and to redirect this money to the program's core mission.

Seventh, and last, we propose refocusing the removal action program on its original purpose of addressing "emergency" threats to human health or the environment.

I. Superfund Today Represents a Highly Successful Partnership Between EPA and Industry

Although the Superfund program has generated extraordinary levels of controversy and criticism, EPA has, over time, developed institutional capability and expertise, solved problems, improved relationships, and ultimately established a program that operates relatively effectively and performs a critical function in society. To be more specific:

- tens of thousands of contaminated sites have been evaluated;
- short-term removal actions have been taken at several thousand of those sites;
- longer-term remedial actions have been completed at most of the non-Federal sites on the NPL; and
- construction is underway at most of the remaining NPL sites.

Superfund—once a topic of intense public concern, dominated by controversy and emotion—has fundamentally achieved its objectives and accordingly has receded in the public focus. Today a general public recognition exists that at most sites, the actions which should be taken are being taken.

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[2] Superfund does consider "cost-effectiveness" to a limited extent. After EPA develops a list of remedial alternatives that are protective, meet applicable or relevant and appropriate requirements (ARARs), satisfy the statutory preferences for treatment and permanence, etc., then Superfund asks whether the cost of each alternative is "proportional to" its effectiveness. 40 C.F.R. § 300.430(f)(1)(ii)(D)(2005). But the more fundamental questions—such as the benefits of meeting ARARs and satisfying the statutory preferences in the first place—are not asked.

[3] This includes "orphan" sites where the responsible party is insolvent, or has been exempted from liability by Congress. The Trust Fund is also paying for general informational and outreach programs such as technical assistance to community groups, research and development, remedial and brownfields policy development, and public participation.

In the process and in recent years, EPA has also worked to improve relationships with Potentially Responsible Parties ("PRPs") and has minimized its previously confrontational approach to private parties. For the most part, there now exists an atmosphere of cooperation and mutual respect. EPA should be commended for its accomplishments in this field.

It should also be recognized that industry has made major contributions to the success of this program. Perhaps unfairly, industry initially bore the brunt of criticism for past disposal practices that in essence reflected the values and scientific knowledge of society in an earlier era. Stung by such criticism and offended by a liability system that many regarded as totally unfair, much of industry initially protested and resisted the obligations imposed on it by the Superfund statute.

By the mid to late 1980s, however, those attitudes had changed, and most national corporations accepted the imperative that they must participate constructively in addressing this national problem. At site after site across the country, those companies rose to the challenge. They organized PRP groups, established committees within those groups, investigated the conditions of contamination, and developed action proposals. Once EPA selected the remedies, those companies carried out remedial actions, and today they are managing long-term operation and maintenance at most sites. They provided the leadership, the technical resources, and the funding to perform required work at an ever-increasing percentage of contaminated sites. That percentage is now greater than 70 percent of NPL sites.

Welcoming the more cooperative spirit that EPA has demonstrated since adoption of the administrative reforms in 1995, those companies have themselves taken pride in the results of this program. They have earned the right to be regarded as constructive partners in the achievement of success under Superfund. They will continue to be constructive partners in addressing other sites through other cleanup programs.

Despite Superfund's notable successes, however, the program still has considerable room for improvement. In particular, EPA can and should do more with the money it receives each year from Congress. Accordingly, in the spirit of constructive criticism, we describe below several ways in which EPA can direct more of its annual Superfund appropriation to the core mission of completing long-term cleanup at NPL sites. Importantly, all of the measures that we recommend here are steps that EPA can take without the need for legislative action or rulemaking.

II. EPA Can Do More With the Money it Receives Each Year from Congress

The Superfund program today faces a variety of challenges relating to financial management. The central theme that connects all of these issues is the pressing need for EPA to manage its annual appropriation more effectively.

Currently, the Superfund program:

- transfers a significant fraction of its appropriation each year to other EPA offices that are not involved in cleanup work;
- takes on new long-term financial obligations each year with little transparency and limited management review; and
- spends money each year on projects that are not high priorities and activities that are not essential.

In sum, EPA is not yet managing either its Superfund "income" or its Superfund "expenses" as well as it can.

We offer below a series of recommendations aimed at helping EPA address these challenges. In particular, EPA should:

- conserve more of its annual Superfund appropriation for the program's core mission—completing long-term cleanup work at NPL sites;
- provide greater transparency for key decisions;
- exert greater management control over the key decisions that increase Superfund's long-term financial obligations; and
- reduce unnecessary spending wherever possible.

We address each of these topics below in greater detail.

III. EPA Should Conserve More of Its Superfund Appropriation for Cleaning Up NPL Sites.

Currently, some $200 MM/yr of EPA's annual Superfund appropriation is directed not to the Office of Solid Waste and Emergency Response ("OSWER"), but to other EPA offices that provide varying degrees of indirect support to the Superfund program. These other offices include:

- Office of Research and Development ("ORD");
- Office of Administration and Resource Management ("OARM");
- Office of the Chief Financial Officer ("OCFO");
- Office of Inspector General ("OIG");

• Office of Policy and Environmental Information; and
• Office of General Counsel ("OGC").

The net effect of these transfers is that nearly one-fifth of the total Superfund appropriation is diverted "right off the top" to other EPA offices that are not actually involved in cleaning up any Superfund sites. This is significant for several reasons.

First, the amount of money involved here is large, particularly in comparison to the total amount that EPA actually spends on cleanup work. For example, the amount transferred to these other offices in fiscal year 2003 was about the same as the total amount that EPA spent that year on Remedial Design and Remedial Action at NPL sites, which is the core mission of the Superfund program. To put it another way, Superfund has been spending about as much on indirect support in non-Superfund offices as it spends on actual cleanup of NPL sites.

Second, the dollar amounts of these annual transfers to other offices were established years ago. These amounts apparently have not been revisited in light of the current level of program support that is actually needed from these other offices. Thus, it is not clear that these allocations reflect Superfund's current needs, or that they reflect sound management decisions about the wisest use of public funds.

Third, we know of no policy reason why the Superfund program should pay for the support of OARM, OCFO, and OIG, among others. These support offices provide shared services to EPA's many programs, and these offices are directly funded by Congress as part of EPA's annual appropriation. The current practice of having the Superfund program pay for these shared services is a glaring departure from the normal practice, both at EPA and throughout the Federal Government.

Finally, apart from the magnitude of these transfers to other offices, the transfers are open-ended, in the sense that any funds not actually used by the offices receiving the transfer apparently remain available for their use in subsequent fiscal years. Any funds not actually used in a given year should be returned to OSWER at the end of that year, so that they may be used on cleanups. In sum, we recommend that EPA carefully scrutinize its use of its Superfund budget so as to conserve more for the core mission of the Superfund program.

IV. The NPL Listing Process Should be Focused and Transparent

Each new site listed on the NPL effectively imposes long-term financial obligations on the Superfund budget for many years to come. We believe that new sites should be listed on the NPL only after (1) a finding that they require Federal intervention because no other options will work ("the tool of last resort"), and (2) a transparent process that allows the public to comment on these issues. We address these two points in turn.

A. The NPL Should Remain the "Tool of Last Resort"

In thinking about the purpose and scope of the NPL, it is helpful to bear in mind the lessons learned during the past 25 years in three main areas:

• the universe of contaminated sites;
• the alternatives available for addressing those sites; and
• the strengths and weaknesses of the Superfund program.

We briefly address each of these points below, before explaining why the NPL is, and should remain, the "tool of last resort."

First, experience has dramatically changed our knowledge about the number and character of contaminated sites throughout the country, as well as the risks associated with them. Rather than facing a few hundred sites, each of which was initially believed to pose severe threats to public health, it now is clear that we have a great many sites, most of which pose relatively small, if any, risks. For example, one EPA count of potential Brownfield sites indicated over 600,000 sites perceived to be impacted by contamination, the great majority of which either are being addressed through State programs or pose no severe or immediate risk to human health or to the environment. These factors mean that contaminated sites should be managed by leveraging all appropriate private and public resources. The framework for response should emphasize State, local, and private efforts, rather than "making a Federal case" out of each site.

Second, the choices available to society to address contaminated sites are far greater today than those in existence when Superfund was enacted in 1980. Virtually all states have developed their own "mini-Superfund" programs and voluntary cleanup programs that have achieved success. In addition, at the Federal level, EPA's RCRA corrective action program governs thousands of operating facilities, and another program covers underground storage tanks.

Third, Superfund's strengths and weaknesses as a cleanup program can be seen more clearly today based on 25 years of experience. As to its strengths, Superfund has focused attention on the need to remediate sites contaminated due to the inad-

equacies of pre-1980 disposal requirements. It has galvanized cleanup efforts, and it has achieved cleanups at most of the roughly 1,500 sites listed on the NPL. Superfund has also performed many successful emergency removal actions, most of them at non-NPL sites.

As to its weaknesses, Superfund has attached a lasting stigma to some sites and the communities that surround them. In many cases, Superfund has also imposed excessive operational, legal, and financial restrictions on these sites that will interfere with their future reuse or redevelopment. Moreover, the cost at which Superfund has achieved results—some $35 billion in EPA appropriations alone since 1980, and at least that much more in private sector spending—is widely viewed as far higher than necessary or justified in light of the risks being addressed.

In hindsight, at least, it seems clear that many sites addressed under Superfund did not present major risks to human health or the environment.[4] Instead, sites were listed on the NPL based on fairly crude assessments of their potential risks. Once a site is listed on the NPL, however, the focus shifts from risk reduction to "cleanup," where progress is much slower and completion is maddeningly elusive. Ironically, this focus on "cleanup" often delays or limits the risk reduction that should be Superfund's focus.

In light of this experience, it is clear that the NPL should continue to be the tool of last resort—a tool that because of its unique nature should only be used in those situations that require such a high-cost, inefficient mechanism. EPA adopted this term—"the tool of last resort"—as its unofficial policy some years ago, but then failed to communicate this policy clearly in its actual NPL listings. As we show below, the resulting lack of transparency makes it difficult for the local communities or other interested parties to understand why some sites are listed and others are not.

The circumstances warranting use of the Superfund NPL as "the tool of last resort" might include sites that:

- are severely contaminated; and
- pose immediate or severe risks; and
- have no near-term prospect of cleanup by viable PRPs.

But apart from the sites that meet the above criteria for NPL listing, nearly all other sites should be managed under other programs. This would include the RCRA corrective action program and the full range of state cleanup programs. If those other programs are viewed as deficient in some respects, then those programs should be improved rather than shifting sites to Superfund and thereby removing the incentive to remedy the perceived shortcomings of those other Federal and State programs.[5]

It is fully expected that PRPs—mostly private companies, as well as governmental departments and agencies—will continue to perform and fund cleanups, either individually or in conjunction with regulatory agencies, at sites they have contaminated. The point here is simply that Superfund is not the proper mechanism to address most of these sites.

We now turn to the process used to list sites on the NPL, with a focus on the need for greater transparency regarding the reasons why sites are being listed.

B. NPL Listings Should Be Transparent

When it comes to transparency in government, more is better. Yet for a process with such high stakes, EPA's NPL listing decisions are somewhat opaque.

EPA adds sites to the NPL each year. It does so without offering any public explanation of what other options EPA considered for addressing those sites, or why EPA decided that the other options were inadequate.[6] This means that the local communities and other interested parties have no way, as a practical matter, to submit

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[4] See, e.g., U.S. General Accounting Office, Environmental Protection— Meeting Public Expectations With Limited Resources 17–18 (1991) (GAO/RCED–91–97) (risks from contaminated sites ranked relatively low by EPA scientists, but relatively high by the public).

[5] This same approach should also govern NPL delistings or deletions. The core idea is that if the studies and cleanup work performed at an NPL site have brought it to the point where the remaining risk would no longer justify application of "the tool of last resort," then EPA should find a way to remove that site from the NPL so it can be addressed in a more appropriate way. Whatever the criteria for NPL listing, it makes little sense to keep a site in the NPL universe once it no longer meets those criteria.

[6] EPA's Federal Register notices provide the names of the sites that are proposed to be listed, but no explanation of what EPA hopes to accomplish by listing them on the NPL. See, e.g., 71 Fed. Reg. 20052 (April 19, 2006) (proposing to list 6 sites on the NPL without explaining what EPA hopes to accomplish by listing them).

meaningful comments on proposed NPL listings, because EPA has never said why it wants or needs to list the sites.

To address this deficiency, EPA should include a brief statement along with each proposed NPL listing. In that statement, EPA should note any other approaches it has considered for addressing the site (e.g., state voluntary cleanup program). EPA should also explain why it believes the NPL is the best approach for this particular site.

Based on EPA's brief statement, the public could then submit comments that address these issues. Such comments might point out the availability of other approaches to getting the site cleaned up. EPA would then consider those comments before making a final decision on whether or not to list the site. The net result would be a huge increase in transparency.

In sum, two aspects of the NPL listing process present room for improvement. First, strong Headquarters management of the NPL listing process will help insure that the NPL remains "the tool of last resort." Second, greater transparency in the listing process is also critically needed.

V. EPA Headquarters Should Have A Major Role in Making the Key Decisions About Cleanups

After NPL listings, the next most important decisions in the Superfund program are the selection of final cleanup plans for those NPL sites. Each year, EPA issues new Records of Decision ("RODs") selecting remedies for NPL sites around the country.

As a practical matter, each of these new RODs effectively imposes financial obligations on the Superfund budget for years to come. If a site has no viable PRPs, or if the PRPs fail to step forward, then EPA eventually ends up paying for the cleanup. In this way, each new ROD effectively controls some of Superfund's future spending.

Because the RODs are so important to Superfund's budget, it would seem important to have Superfund management at EPA Headquarters review them closely in advance before the final decisions are made. But that is not the norm today. Instead, EPA's Regional Offices usually have the final say on these cleanup decisions.

Under a delegation of authority dating back to 1994, most new RODs are signed by Division Directors in EPA's Regional Offices. Review by Superfund program management at EPA Headquarters is typically very limited. For all practical purposes, then, EPA Headquarters does not actively manage the rate at which the Superfund program takes on new financial obligations each year.

We recommend that EPA take several actions to address this problem:

- EPA should revise its delegation of authority so that Superfund managers at Headquarters review all, or virtually all, new RODs before they are signed;
- EPA should expand the National Remedy Review Board so it can review more sites and help insure that future remedy decisions are both technically sound and also (as required by section 121(a) of CERCLA) cost-effective; and
- EPA should expand its use of the Fund-balancing ARAR waiver, the "inconsistent applications of state standard" ARAR waiver, and the Technical Impracticability ARAR waiver to facilitate the selection and prompt implementation of cost-effective remedies.

VI. EPA Should Reduce its Spending on Oversight of Work Performed by Experienced Private Parties

A decade ago, then-EPA Administrator Carol Browner recognized that EPA devotes excessive contractor dollars and excessive FTEs to monitoring the studies and cleanup work performed by private parties ("oversight"). In a 1995 Administrative Reform, and again in guidance a year later, Administrator Browner pledged a 25 percent reduction in oversight at sites with capable and cooperative PRPs.

Despite that 1995 proclamation, however, EPA has yet to implement the necessary across-the-board reduction in oversight spending. In fact, EPA has yet to embrace the general policy of tailoring oversight levels to reflect the experience of the private party and its contractor, the complexity of the site, the nature and strength of any public concern, etc.[7]

Moreover, EPA does not separately track its own spending on Superfund oversight, thereby limiting the potential for sound financial management. What is clear is that EPA could free up additional resources for remedial construction by fulfilling its 10-year-old pledge to reduce its oversight of work performed by experienced pri-

[7] EPA's RCRA corrective action program, on the other hand, embraced the policy of tailored oversight some years ago. See 65 Fed. Reg. 58,275 (Sept. 28, 2000) (announcing release of guidance document entitled "Results-Based Approaches to Corrective Action: Tailored Oversight").

vate parties. Accordingly, we recommend that EPA take the necessary actions to reduce its oversight spending.

VII. The Removal Program Should be Refocused on Its Original Purpose of Addressing Emergency Situations

The Superfund removal action program was designed primarily to address emergency situations. Yet today, emergencies account for barely one-fourth of all removal actions taken by EPA. The other three-fourths consist of "time-critical" actions, where EPA believes work should be commenced within 6 months, and "non-time-critical" actions. Of the 2,440 removal actions commenced during the period from FY 1992 through fiscal year 1999, a total of 1,892 (77.5 percent) were either "time-critical" or "non-time-critical" actions.[8]

Many of these non-emergency actions are undoubtedly beneficial. But it is unclear why a continuing $250 MM/yr Federal program is needed to perform primarily non-emergency actions. Superfund removal actions should focus on those sites, orphan or otherwise, that need immediate action to address an actual emergency.

The point here is not to launch a debate over the precise contours of the term "emergency." Rather, the idea is to limit the removal program to sites that present an emergency under some reasonable definition of that term. Most Superfund removal actions today, by EPA's own definition, do not involve emergencies in any sense of the term. Accordingly, the removal program should be refocused on its original purpose. As with all of the measures that we are recommending today, EPA can accomplish this change as a matter of policy, without the need for legislative action or rulemaking.

STATEMENT OF ROBERT SPIEGEL, EDISON WETLANDS ASSOCIATION

Thank you for the opportunity to testify here before you. I am here to tell the committee about how the funding shortfall in the Federal Superfund program is putting people in danger and hurting our shared environment. Since 1989, I have worked as the founder and executive director of Edison Wetlands Association (EWA), the only non-profit organization in New Jersey working to get toxic sites cleaned up in a thorough and timely manner. I personally have worked actively to ensure the remediation of over 75 toxic sites in New Jersey, including over 20 Federal Superfund sites. With EWA's increasing success, we have also been brought in to help on toxic sites in other States, including New York, Nebraska and California.

As you know, funds have all but dried up for Orphan Sites, or sites that lack a viable Responsible Party. While the U.S. Environmental Protection Agency (USEPA) publicly states that their cleanups are on track, it is clear at many sites I work on that work is proceeding at a far slower pace or not at all. This is especially troubling because many of New Jersey's Superfund sites are located in densely populated residential areas, and thus their impacts to public health and the environment are immediate and direct.

The residential factor makes the Superfund program all the more vital. As home to the industrial corridor that helped build the entire Nation, New Jersey holds approximately one-eighth of all Federal Superfund sites, despite being the fourth smallest State in the Nation. In fact, we can claim a number of unfortunate titles. New Jersey is No. 1 in its 18,000 known contaminated sites, No. 1 in population density, and No. 1 in the prevalence of cancer. As a parent and lifelong resident of New Jersey, I cannot help but wonder how much these factors are related.

To illustrate the problem at hand, I would like to talk about one site in particular, less than a mile from my home: the Cornell-Dubilier Superfund Site in South Plainfield, New Jersey. On the USEPA's own Web site, Cornell-Dubilier is listed as a site where public exposure is not under control. Now called Hamilton Industrial Park and home to approximately 15 active businesses, the site is approximately 26 acres and sits in a working-class residential and industrial area.

From 1936 to 1962, Cornell-Dubilier manufactured electrical components and capacitors, and they allegedly dumped PCB-containing materials directly onsite. In addition to PCBs, there are still 26 other contaminants of concern onsite, including metals and trichloroethene. The contamination impacts onsite soil, groundwater both onsite and offsite, and stream sediments in the Bound Brook, which flows into the Raritan River and ultimately Raritan Bay. PCB capacitors labeled "Cornell-Dubilier" were also found buried in the nearby Woodbrook Road dumpsite, which is now a separate National Priority List Superfund Site.

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[8] K. Probst, et al., Superfund's Future—What Will It Cost? at 25, Table 2–4 (2001).

Even in the State with more contaminated sites than any other, Cornell-Dubilier stands out. The U.S. EPA's own risk assessment found a cancer risk in excess of 3 out of 100. At public meetings for this site, we are constantly approached by residents living nearby who ask how they can get cancer studies for their neighborhoods, which have very high prevalence of cancer and other illnesses. Likewise, some of the highest levels of PCBs in the State are found in fish caught in the Bound Brook adjacent to the site. Many local residents still unknowingly fish these waters, primarily low-income residents who fish to feed their families. Some cannot read the few signs warning of the dangers of fish consumption, which are posted in English only.

EWA first got involved at this site after we received a phone call that children were riding their bikes around the disposal areas in the rear of the property. We also learned that a truck driving school was operating on one of the site's most contaminated areas, creating toxic dust clouds that moved through the adjacent community. What amazed us is that it seemed to be common knowledge by the site owners, elected officials and regulators that this area was highly contaminated. Yet no one seemed willing to take the lead to protect the children or relocate the truck driving school.

We walked the site with USEPA personnel, who recognized the site's public exposure and wanted to work with us to have a fence installed and urge the Township to relocate the truck driving school. Yet 21 years after USEPA first got involved with the site, the scope of the contamination remains staggering. Following are some of the current exposures at the site:

• People still work inside the contaminated onsite buildings, including women of child-bearing age. Dust inside the building is contaminated with high levels of PCBs, lead and other chemicals. The USEPA calculated the Hazard Index for PCBs alone at 150. To give you an idea of what that means, anything above 1 requires USEPA action—and PCBs alone are 150!

• Local families continue to consume fish caught from the adjacent Bound Brook, even though they contain the some of the highest levels of PCBs in the State of New Jersey.

• Children continue to trespass on the site regularly, due to poor site security and a lack of adequate sign postings.

• Groundwater remains highly contaminated with chlorinated solvents, PCBs and many other chemicals. USEPA still does not know the extent of the groundwater plume, its direction or how much of an impact it has on public health.

• Homes around the site still contain unacceptable levels of PCB and require additional testing and remediation. Daycare centers and other buildings around the site were found to be contaminated enough to require remediation.

These public health risks are even more sobering when you realize that the USEPA has had 21 years to address them. Yet after all this time, the best plan USEPA could come up with was to leave the majority of PCB contamination onsite, while ignoring large amounts of soil that New Jersey considers a residential hazard. We believe the USEPA has refrained from planning a more comprehensive cleanup because of their lack of funds.

Our engineering expert, Richard Chapin of Chapin Engineering, holds over 25 years experience in remediating contaminated sites. On our behalf, he has reviewed USEPA plans and the underlying contamination issues at this site. His review of the Agency's Record of Decision (ROD) has noted the following problems:

• The ROD addresses approximately 278,000 cubic yards of PCB-contaminated onsite soil. Yet the only soil that will definitely be removed is 7,500 cubic yards of soil with PCBs at greater than 500 parts per million. Less than one-half of the balance will be treated, if possible, to reduce the PCB level to below 500 parts per million. The overwhelming majority of the soil will simply be left onsite under a "cap." Since the estimated cost of this "cleanup" is over $90 million, it certainly seems like a lot of money to do little more than covering the site.

• The ROD assumes the cap will be maintained for a 30-year period by an undefined person or corporation, and assumes that entity will readily take responsibility for a massive deposit of PCB contamination. After that 30-year period is over, the site simply falls into an undefined void. In essence, the USEPA is creating a major PCB landfill.

• Site buildings are highly contaminated with PCBs, and demolition and offsite disposal is the preferred long-term solution. Yet nothing has been done to clean up the immediate hazards to current workers in the buildings.

• Highly contaminated groundwater is not delineated and offsite contamination of the Bound Brook has yet to be addressed. Given the potential magnitude of these problems, an additional $50 million could easily be required to complete the cleanup.

Rather than wait indefinitely for the USEPA's next action, EWA recently tested the Bound Brook both upstream and downstream of Cornell-Dubilier. Our findings were alarming, to say the least. While no PCBs or volatile organic compounds were found in surface water upstream, TCE was found in surface water downstream of the site at over 200 times the New Jersey Surface Water Quality criteria. Cornell-Dubilier's contaminated groundwater is uncontrolled and apparently discharging significant amounts of TCE into the Bound Brook. Finally, we also found PCBs in the soil of a publicly accessible bank of the Bound Brook downstream of the site at a concentration exceeding State criteria. This area is not even addressed by USEPA's proposed cleanup.

While USEPA maintains that the cleanup is moving forward, this illusion is just a house of cards ready to collapse. As the following concerns indicate, the Agency is making a promise they cannot deliver.

• The remediation of the onsite soils and building alone is estimated to cost $90 to $100 million. With the site cleanup in final design, the USEPA has publicly stated that they expect to begin work this fall, and that funding is available to cover the costs. Yet the Potential Responsible Parties have already indicated to the Agency that they do not have such funds. So where will the funds come from to begin a nearly $100 million cleanup? Privately, the USEPA acknowledges that they are unsure where those funds will come from, let alone the additional millions needed to address the groundwater and offsite contamination.

• USEPA and their sister Agency, the Agency for Toxic Substances and Disease Research (ATSDR), continue to allow people work in the onsite buildings despite the extremely high levels of contaminated dust in the building. If the cleanup must be delayed, USEPA and ATSDR should at least protect public health by immediately closing down the building.

• Instead of this common-sense solution, USEPA has relied on cheap, unregulated institutional controls, putting the health of the workers and their families at risk by letting operations continue in these toxic buildings. USEPA's lone action to address the public health concerns was to direct the property owner to have the workers wash their hands and clean their shoes before leaving the buildings. They implemented no oversight, and to this day, the Agency has not checked with the tenants to ensure their recommendations are being followed. As a result, USEPA is continuing to allow unsuspecting workers to track toxic dust out of the buildings to potentially contaminate their homes.

• With USEPA's glaring lack of transparency about the funding for Cornell-Dubilier's cleanup, we can only wonder how many communities around the country are being led to believe there is funding available, when the Agency clearly knows funds are scarce.

My organization is not sitting back and waiting for USEPA to win a $100 million lottery so the cleanup of Cornell-Dubilier can begin. We are closely monitoring the cleanup process for this disgusting nightmare of a site, and working with the New Jersey Department of Environmental Protection, local community groups and other non-profits like the Work Environment Council to ensure USEPA protects public health here, as we do at other sites across New Jersey. At the Ringwood Mines/Landfill Superfund Site, we have been successful in jump-starting the cleanup and re-listing of this Ramapough Mountain Indian Tribe community and a State Park where Ford Motor Company dumped toxic lead paint sludge, but this only occurred because Ford is a viable Potential Responsible Party. And at the former Chemical Insecticide Corp. Superfund Site (CIC) in Edison, where children once played in contaminated creeks and "green rabbits" once roamed with fur tinged green by a herbicide manufactured onsite, our advocacy and a successful USEPA cleanup now has the site so clean it is slated to become a community park.

The CIC cleanup, I should note, occurred just before the Superfund ran dry. Since then, we have noticed an alarming trend within USEPA for slower and less protective cleanups, along with fundamental and institutional changes within the Agency. Among them are:

• *A Shroud of Secrecy.*—USEPA appears to have gone into a bunker mentality when it comes to limiting public access to documents with information that impacts public health. My organization submitted a Freedom of Information request for a list of sites in Region 2 where exposure is not under control, but USEPA failed to comply. While USEPA continues to mislead the public about the funding shortfall that is affecting sites across New Jersey and the Nation, my organization works to protect health around other Superfund sites, such as Imperial Oil in Marlborough, Martin Aaron in Camden, and Horseshoe Road in Sayreville. But with so many other Superfund sites across the State, we simply cannot serve as watchdog for all of them.

• *Institutional Failure.*—USEPA insiders have told us that, except under the most egregious situations, the Agency no longer utilizes interim remedies at Superfund sites. While interim remedies often protect human and environmental health in the short-term, USEPA fears that taking an interim action will lower their chances of receiving funding for their final remedies. In addition, no matter how bad the contamination levels or the public exposure, USEPA no longer finds an imminent health threat on their sites, as that would force immediate remediation for which there is no real funding.

• *Misleading the Public.*—As the Cornell-Dubilier case indicates, Agency's public stance has become one solely based on crisis management. From speaking to a number of USEPA case managers, while they say whatever is necessary to pacify members of the public and elected officials, privately they admit that the funding source for all of these pending site cleanups is one giant question mark.

While we look at the vast array of environmental problems like global warming and overdevelopment, we must not forget another inconvenient truth. Without the Superfund tax reinstated, there will not be funding available to clean up all the Cornell-Dubiliers, and the Ringwoods, and the Omaha Leads, in the United States. I invite you to join us in touring these sites to see their first-hand impact on children and families, or even to tour similar Superfund sites in your State.

It is a real shame that in a country as wealthy as the United States, we cannot protect the health of our children, our most valuable resource. With the recent record profits for the ultra-wealthy chemical and oil industries, it is not asking too much for polluters to pay for the cleanups of their contamination.

Superfund was a promise the Federal Government made to clean up toxic nightmares left by industry. I come before you today to ask that you keep that promise. Without that tax and a strong commitment from you, our Nation's trusted leaders, the promise is broken again and again—one community at a time.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 2
290 BROADWAY
NEW YORK, NY 10007-1866

MAR 1 6 2006

Mr. Robert Spiegel
Executive Director
Edison Wetlands Association, Inc.
2003 State Hwy. 27
Edison, New Jersey 08817

Dear Mr. Spiegel:

This is in response to your letter of February 27, 2006 to Alan J. Steinberg, Region 2 Administrator, U.S. Environmental Protection Agency (EPA), concerning the Cornell-Dubilier Electronics (CDE) Superfund site.

Your letter states that the conditions in the buildings at the CDE site, located in South Plainfield, New Jersey constitute an emergency situation that must be dealt with immediately. EPA believes the conditions at the site do not warrant an emergency response based on the following information.

In response to a February 3, 2003 letter from Edison Wetlands Association (EWA) regarding the on-site buildings, EPA informed you that the Agency for Toxic Substances and Disease Registry (ATSDR) is required to conduct Public Health Assessments for all Superfund sites. The purpose of the Public Health Assessment is to find out if people are being exposed to hazardous substances and, if so, whether that exposure is harmful and should be eliminated or reduced.

At EPA's request, ATSDR has conducted two Public Health Assessments (PHAs) for the CDE site, one in May 1997 and one in March 2001. ATSDR used the data that EPA collected in the on-site buildings during the remedial investigation for its PHAs. As a result of ATSDR's evaluation of these data, ATSDR concluded that short-term effects are not likely to occur given the levels of contamination. However, ATSDR did conclude that the site does pose a potential long term threat to workers.

After each health consultation, EPA met with the tenants at the industrial park to discuss the results and distributed ATSDR fact sheets that provided information on reducing exposure to chemical contaminants detected in the buildings. In addition, at EPA's request, the U.S. Department of Labor Occupational Safety and Health Administration (OSHA) conducted air and wipe sampling in one of the buildings at the industrial park. Based on this

sampling, OSHA determined that worker exposure to polychlorinated biphenyls (PCBs) was at a level below the OSHA permissible exposure limit (PEL). However, the exposure levels were in excess of the recommended exposure limit (REL). As a result, OSHA required the posting of signs within the building. A copy of each health consultation was provided to you on March 11, 2003.

On September 30, 2004, EPA issued a Record of Decision to address the contaminated buildings at the industrial park. EWA submitted comments on the Proposed Plan on August 3, 2004, and as part of the responsiveness summary for the selected remedy, EPA responded to each of your comments. A copy of the Record of Decision, including the responsiveness summary, was also provided to you.

A review of your recent letter reveals no new information that has not been previously evaluated by EPA. Furthermore, your letter predominantly refers to information extracted from EPA's Record of Decision. As such, EPA is aware of the conditions at the site and is in the process of performing the remedial design for the demolition of the on-site buildings. EPA believes that the current schedule for the remedial design and remedial action is consistent with the recommendations of ATSDR and the Record of Decision, and therefore, the conditions at the site do not warrant an emergency response.

In addition to providing EWA with periodic updates for this site, EPA is also providing the South Plainfield Environmental Commission with monthly updates regarding the status of remedial activities at the site. EPA will continue to provide you, and the community, with more information regarding the status of the remedial design as it becomes available.

If you have any additional comments, please feel free to call Pete Mannino, the remedial project manager, at 212-637-4395.

Sincerely yours,

George Pavlou, Director
Emergency & Remedial Response Division

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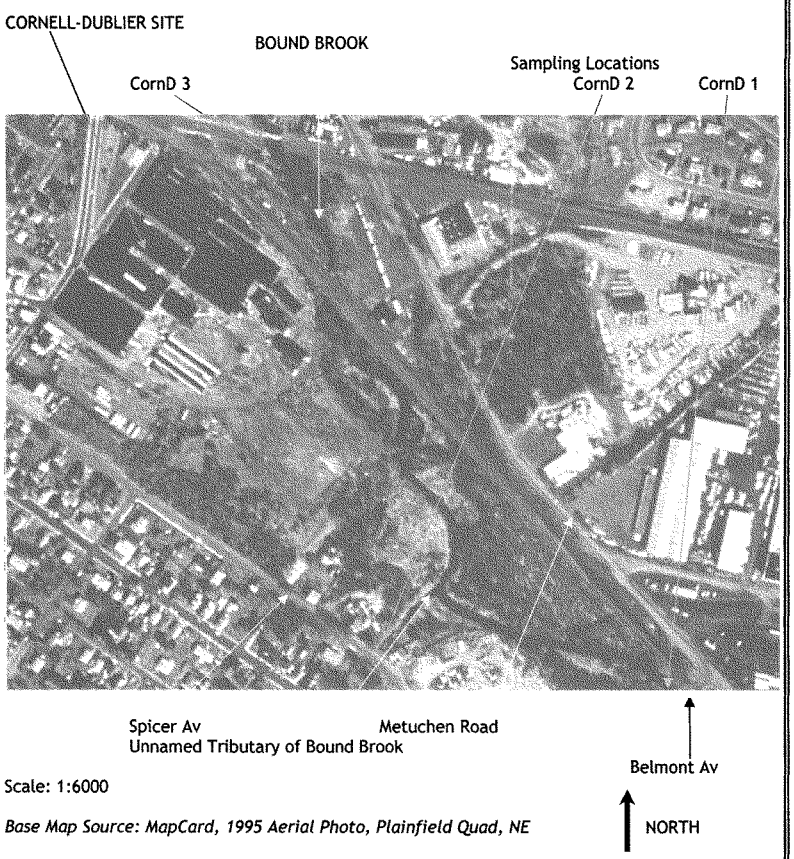

FIGURE A
SAMPLING LOCATION & KEY FEATURES
BOUND BROOK/CORNELL-DUBLIER LANE SITE
SOUTH PLAINFIELD, NJ

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MEMO

To: Robert Spiegel, Executive Director
Edison Wetlands Association, Inc.

From: R.W. Chapin, P.E.
Date: February 22, 2006
RE: Cornell-Dubilier Electronics Superfund Site, S. Plainfield, NJ
Operable Unit 2 (OU-2): On-site Soils and Buildings
Contamination of Building Interiors

Pursuant to your request Chapin Engineering is providing these comments on the levels of contamination within the interiors of buildings at the referenced Cornell-Dubilier site ("CDS").

EWA has a USEPA summary of sources of contamination not under control, whereon the USEPA summarizes the "current actual human exposure" to contamination at the CDS. The exposure of current workers at the Site, which is currently an active industrial park, to contaminated dust within the CDS buildings is defined by the USEPA as an existing, site-specific exposure pathway. The EPA lists building interior dust contaminants as PCB (up to 8,300 ppm) and Lead (up to 61,700 ppm). A copy of the USEPA summary is attached.

The USEPA's Record of Decision (ROD, Sept. 2004) for OU-2 presents the selected cleanup for the Site, which includes demolition of 18 Site buildings with off-site disposal of the building debris. As a contingency, decontamination and encapsulation of "certain buildings that may not need demolition", along with institutional controls on those buildings, is included in the selected cleanup. The ROD does not identify which buildings may be decontaminated nor the level of decontamination required before residuals are encapsulated.

The ROD also presents a summary of the Baseline Human Health Risk Assessment (BHHRA) of the Site contaminant levels. This includes calculating the Hazard Index (HI) for non-cancer human health hazards. An HI less than one(1) indicates that non-carcinogenic health effects are unlikely to occur, while an HI greater than one(1) indicates the "likelihood that site-related exposures may result in noncarcinogenic health effects." The USEPA used an "exposure point concentration" (EPC) to assess exposure to Site contaminants. The EPC for PCB in building interior dust (specifically Aroclor 1254) was 2100 ppm, while the EPC in building interior dust for Arsenic was 19 ppm. No EPC was defined for lead in the building interior dust, despite acknowledging the presence of lead as high as 61,700 ppm.

Using their data, the USEPA calculated an HI of 150 for PCB's in the building interior dust associated with the "Reasonable Maximum Exposure" (RME). The RME is neither defined nor is its relationship to the EPC provided. The "eye/immune system" is defined as the "primary target organ" for the PCB exposure. There does not appear to have been an evaluation of the exposure of Site workers to lead contaminated dust in the building interiors. Lead data is not present on any of the eight (8) BHHRA tables that are appended to the ROD.

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MEMO

To: Robert Spiegel, Executive Director
Edison Wetlands Association, Inc.

From: R.W. Chapin, P.E.
Date: February 22, 2006
RE: Cornell-Dubilier Electronics Superfund Site, S. Plainfield, NJ
Operable Unit 2 (OU-2): On-site Soils and Buildings
Contamination of Building Interiors

The USEPA has defined current health hazards to workers at the CDS and proposed a remedy that will occur at some time in the future. That time is currently undefined. The projected cost of the onsite remedy is approximately $70,000,000. Given the current Superfund program's dramatic shortage of funds the CDS's remediation will undoubtedly languish for years once the remedial design is complete. **In the meantime, workers at the CDS are being continuously exposed to a PCB health hazard that the USEPA has stated is 150 times an acceptable level.** This is not acceptable and must be corrected immediately. Site conditions indicate the USEPA should implement an emergency removal action to remove the contaminated dust. Additionally, the workers and companies that occupy the buildings need to be informed of the risks posed by the dust. To date, the response from USEPA, DOH and ATSDR have not been protective of the health of onsite workers who are being exposed to site-related contaminants.

An important point: The contaminated dust can get on workers clothing and shoes, and be transported to their homes. This transport into the homes can create an exposure to children, particularly young children who crawl. The USEPA summary indicates the dust exposure pathway of OU-2 is "irrelevant" to children, and I strongly disagree. The USEPA needs to explain the basis for their conclusion that offsite transport of contaminated dust is not occurring. According to the Record of Decision, there is no data to support this conclusion.

The USEPA should remove contaminated dust from the buildings at the Cornell-Dublier Superfund site, and I recommend this action be taken immediately to protect Site workers and their families.

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R.W. Chapin, P.E.
President

MEMO

TO: Bob Spiegel, Edison Wetlands Association
FROM: R.W. Chapin, P.E.
DATE: May 15, 2006
RE: Cornell-Dublier Site, South Plainfield, NJ
Summary of April 2006 Sampling Results

This memo presents the results of sampling at three locations that are in close proximity to the former Cornell-Dublier Superfund in South Plainfield, NJ. Those sampling locations are shown on the attached figure. Each of these locations is fully open, with no restrictions on access. Samples were collected on April 12, 2006 by Chapin Engineering.

Two sampling locations were upstream of Cornell-Dublier. Location CornD-1 was located on the main stem of the Bound Brook, roughly ½ mile upstream of Cornell-Dublier. The Bound Brook was relatively wide (approx. 50 ft) and shallow (12 inch deep at center channel), with a rapid flow. A significant population of fresh water mollusks inhabits this area. Location CornD-2 was located on an unnamed tributary that flows into the Bound Brook from the southwest. This location was relatively narrow (approx. 8 ft) and had a very shallow (4 inch deep at center channel) rapid flow.

Location CornD-3 was located immediately downstream of the Cornell-Dublier site. The Bound Brook at this point was approximately 25 ft wide with a deep (estimated to be greater than 10 ft) channel and tranquil flow.

A surface water sample and a solid sample were collected at each location. Sediment samples were collected at CornD-1 and CornD-2, as the sediments were readily accessible. A soil sample of the stream bank (south west side) was collected at CornD-3 due to the depth of flow. This sample was collected from the stream bank just above the water line. Samples were collected pursuant to the NJ Department of Environmental Protections *Field Sampling Procedures Manual*, including collection of a Trip Blank. Water samples were collected directly into laboratory supplied glassware and dedicated, disposable sampling equipment (i.e., a wooden tongue depressor) was used for collection of the sediment and soil samples. Consequently, a Field Blank wasn't needed. Samples were sent under proper chain of custody to GeoLabs, Inc., a NJ Certified Laboratory, to be analyzed for PCB and Volatile Organic Priority Pollutants (VO)

There were no PCB or VO detected in the upstream water samples. There were no PCB or VO detected in either upstream sediment sample.

The water sample from CornD-3 had 263 µg/L (micrograms per liter, or parts per billion) of the Trichloroethene (TCE), a primary contaminant of concern at the Cornell-Dublier site. The New Jersey Surface Water Quality Criteria for TCE is 1.09 µg/L, which is based on the human health effects of TCE, a human carcinogen. As an additional point of reference, the NJ Groundwater Quality Criteria for TCE is 1 µg/L.

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MEMO

TO: Bob Spiegel, Edison Wetlands Association
FROM: R.W. Chapin, P.E.
DATE: May 15, 2006
RE: Cornell-Dublier Site, South Plainfield, NJ
Summary of April 2006 Sampling Results

The stream bank sample at CornD-3 had a PCB concentration of 9.12 mg/kg (milligrams per kilogram, or parts per million). No other VO was detected in that sample. The NJ Residential Direct Contact Soil Cleanup Criteria for PCB, which is based on human health, is 0.49 mg/kg.

Given the complete absence of contaminants upstream of the Site, Cornell-Dublier is the source of the contaminants found at the downstream sampling location.

Sampling data from April 2006 indicates the Cornell-Dublier site is discharging TCE to the Bound Brook at concentrations significantly exceeding (by a factor greater than 200) New Jersey's Surface Water and Groundwater Criteria. Groundwater at the Cornell-Dublier site is known to be highly contaminated by TCE and is seen as the source for the TCE found in the Bound Brook. Clearly, actions to control this discharge are required. We understand the groundwater is still being "studied"; however, this data indicates action is required now to initiate control of groundwater discharge to the Bound Brook.

PCB contamination is present along the stream bank down stream of the Cornell-Dublier site at a concentration that is 18 times greater than the NJ Criteria. As noted above, the area of sample CornD-3 is fully open and easily accessible. The presence of a significantly elevated level of PCB a this randomly selected location raises concern for more widespread PCB contamination in this section of the Bound Brook.

Immediate action to restrict access to location CornD-3 should be instituted.

A comprehensive sampling program to delineate the extent of downstream migration of the PCB should be implemented.

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EWA

February 27, 2006

Mr. Alan Steinberg
Regional Administrator
USEPA Region 2
290 Broadway
New York, NY 10007-1866

Dear Mr. Steinberg:

As the information contained in the following memo demonstrates, the emergency situation at the Cornell-Dubilier Electronics Superfund Site in South Plainfield, New Jersey must be dealt with immediately. We urge the United States Environmental Protection Agency (USEPA) to take an expedited approach to corrective action on this site, where the Hazard Index for PCBs is 150 times the level deemed protective of human health by USEPA.

Despite this elevated health risk, women of child-bearing age continue to work alongside this contamination, and employees continue to track home lead dust and other contaminants to their homes, where the most vulnerable – young children – may come into regular contact with these harmful contaminants. I look forward to your timely response on this critical issue.

Respectfully,

Robert Spiegel
Executive Director
Edison Wetlands Association

CC: Governor Jon Corzine
US Senator Frank Lautenberg
US Senator Robert Menendez
Congressman Frank Pallone
State Senator Barbara Buono
Lisa Jackson, NJDEP Commissioner
Joe Retola, USEPA Region II
Greg Ulirsch, ATSDR-DHAC

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United States Government Accountability Office

GAO

Testimony

Before the Subcommittee on Superfund and Waste Management, Committee on Environment and Public Works, U.S. Senate

For Release on Delivery
Expected at 9:30 a.m. EDT
Thursday, June 15, 2006

SUPERFUND

Better Financial Assurances and More Effective Implementation of Institutional Controls Are Needed to Protect the Public

Statement for the Record by
John B. Stephenson, Director
Natural Resources and Environment

GAO-06-900T

GAO
Accountability·Integrity·Reliability
Highlights

Highlights of GAO-06-900T, a testimony before the Subcommittee on Superfund and Waste Management, Committee on Environment and Public Works, U.S. Senate

Why GAO Did This Study

Under the Environmental Protection Agency's (EPA) Superfund program, parties responsible for pollution bear the cost of cleaning it up. However, these parties sometimes no longer exist, leaving the problem for others, typically the federal government, to address. Furthermore, many sites' cleanup remedies leave some waste in place, relying on institutional controls—legal or administrative restrictions on land or water use—to limit the public's exposure.

GAO was asked to summarize the findings of its August 2005 report, *Environmental Liabilities: EPA Should Do More to Ensure that Liable Parties Meet Their Cleanup Obligations* (GAO-05-658) and its January 2005 report, *Hazardous Waste Sites: Improved Effectiveness of Controls at Sites Could Better Protect the Public* (GAO-05-163). GAO's statement addresses the actions EPA could take to better ensure that parties meet their cleanup obligations and the long-term effectiveness of institutional controls in protecting the public. GAO's reports recommended, among other things, that EPA (1) implement a financial assurance mandate for businesses handling hazardous substances; (2) enhance its oversight and enforcement of existing financial assurances and authorities; (3) ensure that the frequency and scope of monitoring of controls sufficiently maintain their effectiveness; and (4) ensure that information on controls reported in new tracking systems accurately reflects actual conditions.

www.gao.gov/cgi-bin/getrpt?GAO-06-900T.

To view the full product, including the scope and methodology, click on the link above. For more information, contact John B. Stephenson at (202) 512-3841 or stephensonj@gao.gov.

June 15, 2006

SUPERFUND

Better Financial Assurances and Mor Effective Implementation of Institutional Controls Are Needed to Protect the Public

What GAO Found

EPA faces significant challenges in seeking to hold businesses responsible for their environmental cleanup obligations. These challenges often stem from the differing goals of environmental laws, which hold polluting businesses liable for cleanup costs and other laws which, in some cases, allow businesses to limit or avoid responsibility for these liabilities. For example, businesses can legally organize or restructure in ways that can limit their future expenditures for cleanups. They can do this by separating their assets from their liabilities using subsidiaries, for example. While many such actions are legal, transferring assets to limit liability may be prohibited under certain circumstances. Such cases, however, are difficult for EPA to identify and for the Justice Department to prosecute successfully. Notwithstanding these challenges, EPA could better ensure that bankrupt and other financially distressed businesses meet their cleanup obligations by making greater use of existing authorities. For example, EPA has not implemented a 1980 statutory mandate under Superfund to require businesses handling hazardous substances to demonstrate their ability to pay for potential environmental cleanups—that is, to provide financial assurances. Also, EPA has done little to ensure that businesses comply with the agency's existing financial assurance requirements in cleanup agreements and orders. Moreover, greater use of other existing authorities—such as tax offsets, which allow the government to redirect tax refunds it owes businesses to agencies with claims against them—could produce additional payments for cleanups from financially distressed businesses.

EPA also faces a number of challenges in ensuring the long-term effectiveness of institutional controls—legal or administrative restrictions on land or resource use to protect against exposure to residual contamination—at Superfund sites. Institutional controls were applied at most of the Superfund sites GAO examined where waste was left in place after cleanup. However, documentation of remedy decisions often did not discuss certain factors called for in EPA's guidance. Relying on institutional controls as a major component of a site's remedy without carefully considering all key factors—particularly whether controls can be implemented in a reliable and enforceable manner—could jeopardize the remedy's effectiveness. In addition, EPA faces challenges in ensuring that institutional controls are adequately implemented, monitored, and enforced. For example, EPA often does not verify that institutional controls are in place at Superfund sites where cleanup has been completed but residual contamination remains. At the time of GAO's review, EPA had begun implementing a tracking system to improve the agency's ability to ensure the long-term effectiveness of institutional controls in the Superfund program. However, the tracking system being implemented included data that were essentially derived from file reviews. These data may or may not reflect institutional controls as actually implemented, leaving in question whether the public is adequately protected from health and environmental risks

Mr. Chairman and Members of the Subcommittee:

We are pleased to have the opportunity to present the results of our recent work on the Environmental Protection Agency's (EPA) Superfund Program and, in particular, with regard to environmental liability issues and controls at sites where contamination remains in place after remediation. To protect the public's health, the Congress passed the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, which established the Superfund program to clean up the most seriously contaminated hazardous waste sites in the nation. CERCLA requires that parties statutorily responsible for pollution bear the cost of cleaning up contaminated sites. In many cases, liable parties have met their cleanup responsibilities. However, parties responsible for cleaning up some Superfund sites include businesses that no longer exist, having been liquidated through bankruptcy or otherwise dissolved. Under these circumstances, companies that caused environmental contamination have left the problem for others, typically the government, to address. In addition, at many of the sites addressed under Superfund, EPA has selected cleanup remedies that leave at least some waste in place because the agency believes it is impossible, impractical, or too costly to clean up the contaminated property so that it can be used without restriction. Cleanups at such sites often rely on institutional controls—legal or administrative restrictions on the use of land or water at the site—to limit the public's exposure to residual contamination.

This statement, which is based on two recent reports on hazardous waste cleanup,[1] addresses (1) actions EPA could take to better ensure that bankrupt and other financially distressed businesses meet their cleanup obligations and (2) the long-term effectiveness of institutional controls in protecting the public against residual contamination left in place at hazardous waste sites, including Superfund sites.

Summary

In August 2005, we reported that EPA faces significant challenges in seeking to hold businesses responsible for their environmental cleanup obligations. These challenges often stem from the differing goals of environmental laws, which hold polluting businesses liable for cleanup

[1]GAO, *Environmental Liabilities: EPA Should Do More to Ensure That Liable Parties Meet Their Cleanup Obligations*, GAO-05-658 (Washington, D.C.: Aug. 17, 2005), and GAO, *Hazardous Waste Sites: Improved Effectiveness of Controls at Sites Could Better Protect the Public*, GAO-05-163 (Washington, D.C.: Jan. 28, 2005).

costs and other laws that, in some cases, allow businesses to limit or avoid responsibility for these liabilities. For example, businesses can legally organize or restructure in ways that can limit their future expenditures for cleanups. They can do this by separating their assets from their liabilities using subsidiaries, for example. While many such actions are legal, transferring assets to limit liability may be prohibited under certain circumstances. Such cases, however, are difficult for EPA to identify and for the Justice Department to prosecute successfully. Notwithstanding these challenges, EPA could better ensure that bankrupt and other financially distressed businesses meet their cleanup obligations by making greater use of existing authorities. For example, EPA has not implemented a 1980 statutory mandate under Superfund to require businesses handling hazardous substances to demonstrate their ability to pay for potential environmental cleanups—that is, to provide financial assurances. Also, EPA has done little to ensure that businesses comply with the agency's existing financial assurance requirements in cleanup agreements and orders. Moreover, greater use of other existing authorities—such as tax offsets, which allow the government to redirect tax refunds it owes businesses to agencies with claims against them—could produce additional payments for cleanups from financially distressed businesses. Therefore, our report recommended, among other things, that EPA (1) implement the financial assurance mandate for businesses handling hazardous substances and (2) enhance its oversight and enforcement of existing financial assurances and authorities. EPA generally agreed with many of the recommendations, stating its intent to further evaluate some of them.

Furthermore, in January 2005, we reported that EPA faces a number of challenges in ensuring the long-term effectiveness of institutional controls at Superfund sites. For example, institutional controls were applied at most of the Superfund sites we examined during our review where waste was left in place after cleanup. However, documentation of remedy decisions often did not discuss certain factors called for in EPA's guidance. Relying on institutional controls as a major component of a site's remedy without carefully considering all key factors—particularly whether controls can be implemented in a reliable and enforceable manner—could jeopardize the effectiveness of the remedy. In addition, EPA faces challenges in ensuring that institutional controls are adequately implemented, monitored, and enforced. For example, EPA's monitoring of Superfund sites where cleanup has been completed but residual contamination remains often does not include verification that institutional controls are in place. At the time of our review, EPA had recently begun implementing an institutional controls tracking system for

its Superfund program to improve the agency's ability to ensure the long-term effectiveness of institutional controls. However, the tracking system being implemented included data that were essentially derived from file reviews. These data may or may not reflect institutional controls as actually implemented, leaving in question whether the public is adequately protected from health and environmental risks. To ensure the long-term effectiveness of institutional controls, our report recommended, among other things, that EPA ensure that (1) in selecting controls, sufficient consideration was given to all key factors; (2) the frequency and scope of monitoring efforts are sufficient to maintain the effectiveness of controls; and (3) the information on controls reported in a new tracking system accurately reflects actual conditions. EPA generally agreed with GAO's recommendations.

Background

Under the Superfund program, EPA may compel parties statutorily responsible for contaminated sites to clean them up or to reimburse EPA for its cleanup costs. In some cases, however, parties responsible for the contamination cannot be identified or the parties do not have sufficient financial resources to perform or pay for the entire cleanup. In the latter case, EPA often settles environmental claims with businesses for less than the cleanup costs if paying for the cleanup would present "undue financial hardship," such as depriving a business of ordinary and necessary assets or resulting in an inability to pay for ordinary and necessary business expenses. Furthermore, when parties file for bankruptcy protection, EPA's recovery of cleanup costs may be reduced or eliminated, particularly when there are few other parties with cleanup liabilities at the Superfund site.

In implementing the Superfund program, EPA uses risk management approaches, such as requiring that certain responsible parties—generally businesses—provide the agency with evidence of their ability to pay their expected future cleanup costs because the cleanups often take many years and the financial position of liable businesses can change during that time. Financial assurances are meant to assure EPA that the businesses will have the money to finish the cleanups in the future. Thus, when negotiating Superfund cleanup agreements with EPA, businesses generally agree to provide financial assurances aimed at demonstrating their ability to meet the requirements of the agreements. These financial assurances include bank letters of credit, trust funds, and, under certain conditions, guarantees that businesses or their parent corporations have the financial wherewithal to meet the obligations.

Institutional controls can be a critical component of the cleanup process at Superfund sites and may be used to ensure short-term protection of human health and the environment during the cleanup process itself as well as long-term protection once cleanup activities at the site are complete. EPA defines institutional controls as "non-engineered instruments such as administrative and/or legal controls that minimize the potential for human exposure to contamination by limiting land or resource use." In December 2002, EPA issued draft guidance setting out, among other things, the key factors to be considered when evaluating and selecting institutional controls at Superfund sites and responsibilities for implementing, monitoring, and enforcing institutional controls at these sites. Under this guidance, EPA generally—although not always—requires that institutional controls be put in place at Superfund sites where total cleanup is not practical or feasible. If deemed necessary, these controls may be combined with engineering controls—such as capping or fencing—to limit exposure to residual site contamination. For example, the remedy selected for a hazardous waste landfill may include engineering controls, such as placing a protective layer, or "cap" made of clay or synthetic materials, over the contamination and also institutional controls to prohibit any digging that might breach this protective layer and expose site contaminants.

EPA Should Do More to Ensure That Liable Parties Meet Their Cleanup Obligations

While more than 231,000 businesses operating in the United States filed for bankruptcy in fiscal years 1998 through 2003, the extent to which these businesses had environmental liabilities is not known because neither the federal government nor other sources collect this information. Information on bankrupt businesses with federal environmental liabilities is limited to data on the bankruptcy cases that the Justice Department has pursued in court on behalf of EPA. In that regard, the Justice Department initiated 136 such cases from 1998 through 2003.

In seeking to hold liable businesses responsible for their environmental cleanup obligations, EPA faces significant challenges that often stem from the differing goals of environmental laws that hold polluting businesses liable for cleanup costs and other laws that, in some cases, allow businesses to limit or avoid responsibility for these liabilities. For example, businesses can legally organize or restructure in ways that can limit their future expenditures for cleanups by, for example, separating their assets from their liabilities using subsidiaries. While many such actions are legal, transferring assets to limit liability may be prohibited under certain circumstances. However, such cases are difficult for EPA to identify and for the Justice Department to prosecute successfully. In

addition, bankruptcy law presents a number of challenges to EPA's ability to hold parties responsible for their cleanup obligations, challenges that are largely related to the law's intent to give debtors a fresh start. Moreover, by the time a business files for bankruptcy, it may have few, if any, assets remaining to distribute among creditors. The bankruptcy process also poses procedural and informational challenges for EPA. For example, EPA lacks timely, complete, and reliable information on the thousands of businesses filing for bankruptcy each year.

Notwithstanding these challenges, we found that EPA could better ensure that bankrupt and other financially distressed businesses meet their cleanup obligations by making greater use of existing authorities. For example, EPA has not implemented a 1980 statutory mandate under Superfund to require businesses handling hazardous substances to demonstrate their ability to pay for potential environmental cleanups—that is, to provide financial assurances. EPA has cited competing priorities and lack of funds as reasons for not implementing this mandate, but its inaction has exposed the Superfund program and U.S. taxpayers to potentially enormous cleanup costs at gold, lead, and other mining sites and at other industrial operations, such as metal-plating businesses. Also, EPA has done little to ensure that businesses comply with its existing financial assurance requirements in cleanup agreements and orders. Greater oversight and enforcement of financial assurances would better guarantee that cleanup funds will be available if needed. Also, greater use of other existing authorities—such as tax offsets, which allow the government to redirect tax refunds it owes businesses to agencies with claims against them—could produce additional payments for cleanups from financially distressed businesses.

We made a total of nine recommendations in our August 2005 report intended to help EPA in five areas: (1) closing gaps in financial assurance coverage that expose the government to significant financial risk for costly environmental cleanups; (2) ensuring that the financial assurances EPA requires under the Superfund program provide sufficient funds for cleanups in the event liable parties do not fulfill their environmental obligations; (3) ensuring that EPA holds liable parties responsible for their cleanup obligations to the maximum extent practicable; (4) ensuring that EPA identifies relevant bankruptcy filings to pursue and bankruptcy actions to monitor; and (5) more clearly identifying some actions needed to better protect the government's interest. We specifically recommended that EPA (1) implement the financial assurance mandate for businesses handling hazardous substances and (2) enhance its oversight and enforcement of existing financial assurances and authorities. EPA

generally agreed with many of our recommendations and said that the agency will further evaluate others.

Improved Effectiveness of Controls at Superfund Sites Could Better Protect the Public

Institutional controls were applied at most of the Superfund sites we examined where waste was left in place after cleanup, but documentation of remedy decisions often did not discuss key factors called for in EPA's guidance. For example, while documents usually discussed the controls' objectives, in many cases, they did not adequately address when the controls should be implemented, how long they would be needed, or who would be responsible for monitoring or enforcing them. According to EPA, the documents' incomplete discussion of the key factors suggests that site managers may not have given them adequate consideration. Relying on institutional controls as a major component of a site's remedy without carefully considering all of the key factors—particularly whether the controls can be implemented in a reliable and enforceable manner—could jeopardize the effectiveness of the remedy.

EPA faces challenges in ensuring that institutional controls are adequately implemented, monitored, and enforced. Institutional controls at the Superfund sites we reviewed, for example, were often not implemented before the cleanup was completed, as EPA requires. EPA officials indicated that this may have occurred because, over time, site managers may have inadvertently overlooked the need to implement the controls. EPA's monitoring of Superfund sites where cleanup has been completed but residual contamination remains often does not include verification that institutional controls are in place. In addition, EPA may have difficulties ensuring that the terms of institutional controls can be enforced at some Superfund sites: that is, some controls are informational in nature and do not legally limit or restrict use of the property, and, in some cases, state laws may limit the options available to enforce institutional controls.

In our January 2005 report, we found that EPA had begun implementing an institutional control tracking system for its Superfund program in order to improve its ability to ensure the long-term effectiveness of institutional controls. The agency, however, faced significant obstacles in implementing this system. The institutional control tracking system being implemented tracked only minimal information on the institutional controls. Moreover, as configured, the system did not include information on long-term monitoring or enforcement of the controls. In addition, the tracking system being implemented included data that were essentially derived from file reviews. These data may or may not reflect institutional

controls as actually implemented, leaving in question whether the public is adequately protected from health and environmental risks. While EPA had plans to improve the data quality for the Superfund tracking system—ensuring that the data accurately reflected institutional controls as implemented and adding information on monitoring and enforcement—the first step, data verification, could take 5 years to complete.

In order to ensure the long-term effectiveness of institutional controls, our January 2005 report recommended that EPA: (1) clarify agency guidance on institutional controls to help EPA site managers and other decision makers understand in what cases institutional controls are or are not necessary at sites where contamination remains in place after cleanup; (2) ensure that, in selecting institutional controls, adequate consideration is given to their objectives; the specific control mechanisms to be used; the timing of implementation and duration; and the parties responsible for implementing, monitoring, and enforcing them; (3) ensure that the frequency and scope of monitoring at deleted Superfund sites where contamination has been left in place are sufficient to maintain the protectiveness of any institutional controls at these sites; and (4) ensure that the information on institutional controls reported in the Superfund tracking system accurately reflects actual conditions and not just what is called for in site decision documents. EPA agreed with the recommendations in the report and provided information on the agency's plans and activities to address them.

GAO Contact and Staff Acknowledgments

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States with The Largest Number of Superfund Sites and The Largest Number of Superfund Sites Where Human Exposure is Not Under Control

Top 25 States with Superfund Sites

1	NJ	113	**13**	OH	30
2	CA	94	**14**	IN	29
2	PA	94	**14**	VA	29
4	NY	86	**16**	MO	26
5	MI	66	**16**	SC	26
6	FL	50	**18**	MN	24
7	WA	47	**19**	NH	20
8	TX	43	**20**	CO	17
9	IL	41	**20**	MD	17
10	WI	37	**22**	GA	16
11	MA	32	**23**	CT	14
12	NC	31	**23**	DE	14
			23	KY	14

Top 25 States with Superfund Sites With Uncontrolled Exposures

1	NJ	19	**11**	UT	4
2	IL	12	**12**	CO	3
3	WA	10	**12**	GA	3
4	NY	8	**12**	ID	3
5	CA	7	**12**	MT	3
6	FL	5	**12**	NC	3
6	IN	5	**12**	TX	3
6	MA	5	**12**	WI	3
6	MI	5	**21**	AL	2
6	MO	5	**21**	CT	2
11	NH	4	**21**	KY	2
11	PA	4	**21**	MD	2
			21	NE	2

139 Superfund Sites with Uncontrolled Human Exposures

State	Site Name	City	County	NPL
AL	INTERSTATE LEAD CO. (ILCO)	LEEDS	JEFFERSON	F
AL	USARMY/NASA REDSTONE ARSENAL	HUNTSVILLE	MADISON	F
CA	FORT ORD	MARINA	MONTEREY	F
CA	LAVA CAP MINE	NEVADA CITY	NEVADA	F
CA	MCCORMICK & BAXTER CREOSOTING CO.	STOCKTON	SAN JOAQUIN	F
CA	MONTROSE CHEMICAL CORP.	TORRANCE	LOS ANGELES	F
CA	OMEGA CHEMICAL CORPORATION	WHITTIER	LOS ANGELES	F
CA	SULPHUR BANK MERCURY MINE	CLEARLAKE	LAKE	F
CA	UNITED HECKATHORN CO.	RICHMOND	CONTRA COSTA	F
CO	CALIFORNIA GULCH	LEADVILLE	LAKE	F
CO	CAPTAIN JACK MILL	WARD	BOULDER	F
CO	CENTRAL CITY, CLEAR CREEK	IDAHO SPRINGS	CLEAR CREEK	F
CT	DURHAM MEADOWS	DURHAM	MIDDLESEX	F
CT	RAYMARK INDUSTRIES, INC.	STRATFORD	FAIRFIELD	F
DE	KOPPERS CO., INC. (NEWPORT PLANT)	NEWPORT	NEW CASTLE	F
FL	AMERICAN CREOSOTE WORKS, INC. (PENSACOLA PLANT)	PENSACOLA	ESCAMBIA	F
FL	ESCAMBIA WOOD - PENSACOLA	PENSACOLA	ESCAMBIA	F
FL	MRI CORP (TAMPA)	TAMPA	HILLSBOROUGH	F
FL	STAUFFER CHEMICAL CO. (TARPON SPRINGS)	TARPON SPRINGS	PINELLAS	F
FL	TOWER CHEMICAL CO.	CLERMONT	LAKE	F
GA	CAMILLA WOOD PRESERVING COMPANY	CAMILLA	MITCHELL	F
GA	MARZONE INC./CHEVRON CHEMICAL CO.	TIFTON	TIFT	F
GA	WOOLFOLK CHEMICAL WORKS, INC.	FORT VALLEY	PEACH	F
ID	BUNKER HILL MINING & METALLURGICAL COMPLEX	SMELTERVILLE	SHOSHONE	F
ID	EASTERN MICHAUD FLATS CONTAMINATION	POCATELLO	POWER, BANNOCK	F
ID	MOUNTAIN HOME AIR FORCE BASE	MOUNTAIN HOME	ELMORE	F
IL	BELOIT CORP.	ROCKTON	WINNEBAGO	F
IL	DEPUE/NEW JERSY ZINC/MOBIL CHEMICAL CORP.	DEPUE	BUREAU	F
IL	INTERSTATE POLLUTION CONTROL, INC.	ROCKFORD	WINNEBAGO	F
IL	JENNISON-WRIGHT CORPORATION	GRANITE CITY	MADISON	F
IL	KERR-MCGEE (KRESS CREEK/WEST BRANCH OF DUPAGE RIVER)	DUPAGE COUNTY	DUPAGE	F
IL	KERR-MCGEE (RESIDENTIAL AREAS)	WEST CHICAGO	DUPAGE	F
IL	KERR-MCGEE (SEWAGE TREATMENT PLANT)	WEST CHICAGO	DUPAGE	F
IL	LENZ OIL SERVICE, INC.	LEMONT	DUPAGE	F
IL	OTTAWA RADIATION AREAS	OTTAWA	LA SALLE	F
IL	OUTBOARD MARINE CORP.	WAUKEGAN	LAKE	F
IL	PARSONS CASKET HARDWARE CO.	BELVIDERE	BOONE	F
IL	SOUTHEAST ROCKFORD GROUND WATER CONTAMINATION	ROCKFORD	WINNEBAGO	F
IN	BENNETT STONE QUARRY	BLOOMINGTON	MONROE	F
IN	CONTINENTAL STEEL CORP.	KOKOMO	HOWARD	F
IN	HIMCO DUMP	ELKHART	ELKHART	F
IN	LEMON LANE LANDFILL	BLOOMINGTON	MONROE	F
IN	NEAL'S LANDFILL (BLOOMINGTON)	BLOOMINGTON	MONROE	F

139 Superfund Sites with Uncontrolled Human Exposures

State	Site Name	City	County	NPL
KS	CHEROKEE COUNTY	GALENA	CHEROKEE	F
KY	NATIONAL SOUTHWIRE ALUMINUM CO.	HAWESVILLE	HANCOCK	F
KY	PADUCAH GASEOUS DIFFUSION PLANT (USDOE)	PADUCAH	MCCRACKEN	F
LA	MARION PRESSURE TREATING	MARION	UNION PARISH	F
MA	BLACKBURN & UNION PRIVILEGES	WALPOLE	NORFOLK	F
MA	INDUSTRI-PLEX	WOBURN	MIDDLESEX	F
MA	IRON HORSE PARK	BILLERICA	MIDDLESEX	F
MA	NEW BEDFORD	NEW BEDFORD	BRISTOL	F
MA	NYANZA CHEMICAL WASTE DUMP	ASHLAND	MIDDLESEX	F
MD	ABERDEEN PROVING GROUND (EDGEWOOD AREA)	EDGEWOOD	HARFORD	F
MD	ORDNANCE PRODUCTS, INC.	NORTH EAST	CECIL	F
MI	ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER	KALAMAZOO	KALAMAZOO	F
MI	NORTH BRONSON INDUSTRIAL AREA	BRONSON	BRANCH	F
MI	SHIAWASSEE RIVER	HOWELL	LIVINGSTON	F
MI	SOUTHWEST OTTAWA COUNTY LANDFILL	PARK TOWNSHIP	OTTAWA	F
MI	STATE DISPOSAL LANDFILL, INC.	GRAND RAPIDS	KENT	F
MO	ANNAPOLIS LEAD MINE	ANNAPOLIS	IRON	F
MO	BIG RIVER MINE TAILINGS/ST. JOE MINERALS CORP.	DESLOGE	ST. FRANCOIS	F
MO	MISSOURI ELECTRIC WORKS	CAPE GIRARDEAU	CAPE GIRARDEAU	F
MO	OAK GROVE VILLAGE WELL	SULLIVAN	FRANKLIN	F
MO	WELDON SPRING FORMER ARMY ORDNANCE WORKS	ST. CHARLES COUNTY	ST. CHARLES	F
MT	ANACONDA CO. SMELTER	ANACONDA	DEER LODGE	F
MT	LIBBY ASBESTOS SITE	LIBBY	LINCOLN	F
MT	UPPER TENMILE CREEK MINING AREA	HELENA	LEWIS AND CLARK	F
NC	BARBER ORCHARD	WAYNESVILLE	HAYWOOD	F
NC	RAM LEATHER CARE SITE	CHARLOTTE	MECKLENBURG	F
NC	SIGMON'S SEPTIC TANK SERVICE	STATESVILLE	IREDELL	F
NE	CLEBURN STREET WELL	GRAND ISLAND	HALL	F
NE	OMAHA LEAD	OMAHA	DOUGLAS	F
NH	BEEDE WASTE OIL	PLAISTOW	ROCKINGHAM	F
NH	DOVER MUNICIPAL LANDFILL	DOVER	STRAFFORD	F
NH	OTTATI & GOSS/KINGSTON STEEL DRUM	KINGSTON	ROCKINGHAM	F
NH	SYLVESTER	NASHUA	HILLSBOROUGH	F
NJ	AMERICAN CYANAMID CO	BOUND BROOK	SOMERSET	F
NJ	ATLANTIC RESOURCES	SAYREVILLE	MIDDLESEX	F
NJ	BRIDGEPORT RENTAL & OIL SERVICES	BRIDGEPORT	GLOUCESTER	F
NJ	CALDWELL TRUCKING CO.	FAIRFIELD	ESSEX	F
NJ	CORNELL DUBILIER ELECTRONICS INC.	SOUTH PLAINFIELD	MIDDLESEX	F
NJ	CPS/MADISON INDUSTRIES	OLD BRIDGE TOWNSHIP	MIDDLESEX	F
NJ	DIAMOND ALKALI CO.	NEWARK	ESSEX	F
NJ	HERCULES, INC. (GIBBSTOWN PLANT)	GIBBSTOWN	GLOUCESTER	F
NJ	HORSESHOE ROAD	SAYREVILLE	MIDDLESEX	F

139 Superfund Sites with Uncontrolled Human Exposures

State	Site Name	City	County	NPL
NJ	LANDFILL & DEVELOPMENT CO.	MOUNT HOLLY	BURLINGTON	F
NJ	MARTIN AARON, INC.	CAMDEN	CAMDEN	F
NJ	MAYWOOD CHEMICAL CO.	MAYWOOD/ROCHELLE PARK	BERGEN	F
NJ	METALTEC/AEROSYSTEMS	FRANKLIN BOROUGH	SUSSEX	F
NJ	MIDDLESEX SAMPLING PLANT (USDOE)	MIDDLESEX	MIDDLESEX	F
NJ	U.S. RADIUM CORP.	ORANGE	ESSEX	F
NJ	UNIVERSAL OIL PRODUCTS (CHEMICAL DIVISION)	EAST RUTHERFORD	BERGEN	F
NJ	VENTRON/VELSICOL	WOOD RIDGE BOROUGH	BERGEN	F
NJ	VINELAND CHEMICAL CO., INC.	VINELAND	CUMBERLAND	F
NJ	WELSBACH & GENERAL GAS MANTLE (CAMDEN RADIATION)	CAMDEN AND GLOUCESTER CIT	CAMDEN	F
NV	CARSON RIVER MERCURY SITE	DAYTON	LYON	F
NY	CAYUGA GROUNDWATER CONTAMINATION SITE	UNION SPRINGS	CAYUGA	F
NY	CONSOLIDATED IRON AND METAL	NEWBURGH	ORANGE	F
NY	HUDSON RIVER PCBS	HUDSON RIVER	WASHINGTON	F
NY	LAWRENCE AVIATION INDUSTRIES, INC.	PORT JEFFERSON STATION	SUFFOLK	F
NY	ONONDAGA LAKE	SYRACUSE	ONONDAGA	F
NY	PETER COOPER	GOWANDA	CATTARAUGUS	F
NY	RICHARDSON HILL ROAD LANDFILL/POND	SIDNEY CENTER	DELAWARE	F
NY	SINCLAIR REFINERY	WELLSVILLE	ALLEGANY	F
OH	FIELDS BROOK	ASHTABULA	ASHTABULA	F
OH	LAMMERS BARREL FACTORY	BEAVERCREEK	GREENE	F
OR	HARBOR OIL INC.	PORTLAND	MULTNOMAH	F
OR	TAYLOR LUMBER AND TREATING	SHERIDAN	YAMHILL	F
PA	HAVERTOWN PCP	HAVERFORD	DELAWARE	F
PA	PALMERTON ZINC PILE	PALMERTON	CARBON	F
PA	PRICE BATTERY	HAMBURG	BERKS	F
PA	RYELAND ROAD ARSENIC SITE	HEIDELBERG TWP.	BERKS	F
RI	CENTREDALE MANOR RESTORATION PROJECT	NORTH PROVIDENCE	PROVIDENCE	F
RI	STAMINA MILLS, INC.	NORTH SMITHFIELD	PROVIDENCE	F
SC	LEONARD CHEMICAL CO., INC.	ROCK HILL	YORK	F
TN	MILAN ARMY AMMUNITION PLANT	MILAN	CARROLL	F
TN	TENNESSEE PRODUCTS	CHATTANOOGA	HAMILTON	F
TX	ALCOA (POINT COMFORT)/LAVACA BAY	POINT COMFORT	CALHOUN	F
TX	JONES ROAD GROUND WATER PLUME	HOUSTON	HARRIS	F
TX	LONGHORN ARMY AMMUNITION PLANT	KARNACK	HARRISON	F
UT	DAVENPORT AND FLAGSTAFF SMELTERS	SANDY	SALT LAKE	F
UT	EUREKA MILLS	EUREKA	JUAB	F
UT	JACOBS SMELTER	STOCKTON	TOOELE	F
UT	MIDVALE SLAG	MIDVALE	SALT LAKE	F
VA	FORT EUSTIS (US ARMY)	NEWPORT NEWS	NEWPORT NEWS CITY	F
WA	BANGOR NAVAL SUBMARINE BASE	SILVERDALE	KITSAP	F
WA	COMMENCEMENT BAY, NEAR SHORE/TIDE FLATS	PIERCE COUNTY	PIERCE	F

139 Superfund Sites with Uncontrolled Human Exposures				
State	Site Name	City	County	NPL
WA	FAIRCHILD AIR FORCE BASE (4 WASTE AREAS)	SPOKANE	SPOKANE	F
WA	FORT LEWIS LOGISTICS CENTER	TILLICUM	PIERCE	F
WA	HAMILTON/LABREE ROADS GW CONTAMINATION	CHEHALIS	LEWIS	F
WA	HARBOR ISLAND (LEAD)	SEATTLE	KING	F
WA	JACKSON PARK HOUSING COMPLEX (USNAVY)	KITSAP COUNTY	KITSAP	F
WA	LOWER DUWAMISH WATERWAY	SEATTLE	KING	F
WA	MIDNITE MINE	WELLPINIT	STEVENS	F
WA	PALERMO WELL FIELD GROUND WATER CONTAMINATION	TUMWATER	THURSTON	F
WI	ASHLAND/NORTHERN STATES POWER LAKEFRONT	ASHLAND	ASHLAND	F
WI	MOSS-AMERICAN CO., INC. (KERR-MCGEE OIL CO.)	MILWAUKEE	MILWAUKEE	F
WI	SHEBOYGAN HARBOR & RIVER	SHEBOYGAN	SHEBOYGAN	F
WV	BIG JOHN SALVAGE - HOULT ROAD	FAIRMONT	MARION	F

Source: EPA (http://cfpub.epa.gov/supercpad/cursites/srchsites.cfm) (Last checked on June 15, 2006).

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