UNITED STATES OF AMERICA

+ + + + +

CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD

+ + + + +

REACTIVE HAZARD INVESTIGATION HEARING

+ + + + +

Thursday,

May 30, 2002

+ + + + +

The Public Hearing was held at City Hall, 155 Market, Paterson, New Jersey, at 9:00 a.m., Board Member Gerald Poje, presiding.

BOARD MEMBERS PRESENT:

DR. GERALD POJE
DR. ANDREA KIDD TAYLOR
DR. ISADORE ROSENTHAL

ALSO PRESENT:

FORMER SENATOR FRANK LAUTENBERG
JIM GANNON
ROBERT OLIVER
ALLAN GOSS
JOHN MURPHY
KEVIN MITCHELL
LISA LONG
GIBY JOSEPH
DONALD J. CONNOLLEY
CHRIS BAGLEY
BILL ALMOND

ALSO PRESENT:

SCOTT BERGER
GLENN ERWIN
ERIC FRUMIN
MARK DUDZIC
MIKE WRIGHT
MICHAEL SPRINKER
SENATOR JON CORZINE
SAMUEL WOLFE
RICK ENGLER
REGGIE BALDINI
AMY SPENCER
DR. DAN CROWL
DR. DAVID LEGGETT
WALT FRANK
PETER HOWELL
STEVE ARENDT

I-N-D-E-X

I-N-D-E-X (Cont.)

P-R-O-C-E-E-D-I-N-G-S

(1:10 a.m.)

BOARD MEMBER POJE: My name is Gerald Poje, I'm a Board Member of the U.S. Chemical Safety and Hazard Investigation Board, more commonly known, and as will be represented throughout this meeting, as the CSB.

We want to welcome you today to CSB's public hearing on reactive chemical hazards. With me today are my fellow board members, Dr. Andrea Kidd Taylor to my right, and Dr. Irv Rosenthal to my left.

The Chemical Safety Board is an independent federal agency. We were established with the mission to save lives by preventing chemical accidents at fixed facilities. We conduct our mission by investigating serious incidents, and reporting their causes to the public.

Like the National Transportation Safety Board we issue no fines or citations. We recommend safety improvements to government, industry, and others.

Two years ago we convened in this very

same chamber in Paterson, New Jersey. We were here to review the CSB's investigation into the 1998 chemical incident at Morton International's Paterson Manufacturing Plant.

The Board found that this tragic accident was triggered by a series of uncontrolled chemical reactions. On the evening of April 8th, 1998, two relatively inert materials were combined in a reactor to produce a fuel die called automate yellow.

Unknown to the workers at the plant, if these materials were heated just a little beyond the intended temperature, highly energetic and dangerous chemical reactions would ensue.

That night the worse did occur. Less than 40 minutes after the process was initiated, and after desperate attempts to cool the reactor had failed, a violent explosion erupted from the reactor. Nine workers were injured, including two who were badly burned.

One of the injured workers, Robert Oliver, is here with us today. A massive fireball rose over the plant and hazardous material rained down on the

surrounding neighborhood.

Residents were left wondering whether a process most had never heard of may have jeopardized their health and well being. The Morton incident was, in fact, the second serious reactive incident to occur here in recent years.

The 1995 explosion at Napp Technologies, a few miles away in Lodi, killed five workers and caused massive property damage and significant job losses.

Jim Gannon, a survivor of the Napp incident, is here today, and will be speaking shortly. Through the leadership of Senator Frank Lautenberg, and others, who shared a goal of preventing more tragedies like Napp, the U.S. Chemical Safety Board was established in 1998.

While the primary mission of the CSB is to investigate individual accidents, we are also authorized by Congress to study more generalized accidental hazards that can endanger the public.

Reactive chemicals are certainly one such hazard. It is worth remembering that the 1984 Bopal disaster, in India, which killed more than 2,000, and

disabled 50,000, was itself the result of an uncontrolled chemical reaction that released the toxic gas into the community.

Today we will hear from three U.S. chemical workers who were eyewitnesses to reactive chemical incidents, in addition to Mr. Oliver and Mr. Gannon, we will hear from one of the victims of a serious incident two years ago in Pasadena, Texas.

This occurred at the very same facility where 23 workers were killed a decade earlier. That earlier incident prompted passage of the Clean Air Act, whose accident prevention provisions created this Board, and established regulatory requirements of the Occupational Safety and Health Administration, better known as OSHA, and the U.S. Environmental Protection Agency, or the EPA.

We will then hear from a CSB team who has conducted a two year investigation into reactive hazards, and they will report that, sadly, the experiences of these three workers are far from unique.

The investigators have collected

information on over 160 domestic incidents involving reactive chemicals since 1980. Together these incidents have cost over 100 workers' lives, and have caused much damage and adversity.

We will also learn that the current federal regulatory system is less than ideal in its coverage of reactive hazards. The current system developed by OSHA and EPA seeks to control the hazards of specific listed chemicals, except by happenstance, however, the combination of chemicals that can lead to reactive incidents are largely exempt from these list-based process safety rules.

Fewer than half the incidents we surveyed would likely be covered by these regulations. The process at Napp and Morton, for example, were not regulated under these standards.

Meanwhile the toll of reactive incidents continues. I was on scene at the recent building explosion in the Chelsea neighborhood in Manhattan. This incident was initially, and incorrectly, reported as a boiler explosion. The prime suspect now is an uncontrolled chemical reaction.

Dr. Rosenthal has just returned from Augusta, Georgia, where last week the Board released its report on a March 2001 polymer explosion at BP Amoco. After careful analysis this incident proved attributable to an uncontrolled reactive hazard.

In this case a slow chemical breakdown that produced gas and pressure inside a closed vessel. Three workers died when they went, unsuspectingly, to open the cover. This process, likewise, was not regulated under OSHA's process safety standard.

Today we will hear from a number of distinguished panelists from industry, labor, government, and academia. They will all address one basic question. Should the rules to control reactive hazards be changed, and if so, how?

Each witness will be allotted five or ten minutes for testimony, and each of the witnesses has agreed to take questions from the board.

After lunch Senator John Corzine will grace us with his presence, and give us his statement on this issue. And then we will have the completion, after completion of four witness panels, there will be

a period for public comment.

Each commenter will be allotted five minutes. If you wish to provide an oral comment, and you have not already registered, you may do so at the media table outside the hearing room. If you do not wish to offer a comment this afternoon, you may still comment in writing until June 30th. Instructions may be found on our website, chemsafety.gov.

At the conclusion of the hearing we will be collating and analyzing all of the information we have received. During this summer we will issue our final report on reactive hazards, including recommendations for any needed changes to regulations, codes, or practices.

With that I will yield to Dr. Taylor for any opening remarks she may have.

BOARD MEMBER TAYLOR: Thanks, Dr. Poje. I would like to welcome all of you here today, particularly our victims who come from various plants around the country, as well as our stakeholders.

First I would like to say that I'm anxious to hear from the Staff, to give their presentation on

their findings. And I would like to thank the Staff for all of the hard work that has been put into getting to this point, and hopefully from this we will hear from you, which is also very important.

I'm anxious to hear from our stakeholders so that you can give us feedback on what you feel should be the step forwards that we should take, the recommendations that should be made on such an important issue as are reactive chemicals.

And with that I would like to yield to Dr. Rosenthal.

BOARD MEMBER ROSENTHAL: Presumably this is on. I want to thank all of you for coming here. I appreciate your taking time from your busy schedules.

The thing that we are interested in arriving at is the best possible approach to this problem, and your inputs are vital for this purpose. Please, if you do not have the opportunity to submit your comments during the open session, we would welcome, and need, your inputs after the session is completed. Thy.

BOARD MEMBER POJE: Thank you, Dr. Rosenthal, and Dr. Taylor.

Today we are especially pleased to have former Senator Frank Lautenberg with us. Senator Lautenberg is truly the father of the Chemical Safety Board. After the Board was authorized in the Clean Air Act of 1990, both the Bush and Clinton administrations opposed actual establishment of the agency.

But in 1997 Senator Lautenberg prevailed on the Appropriations Committee to provide four million dollars to get the Board started in 1998. We deeply appreciate his efforts on our behalf, and his continuing support of our work.

Senator Lautenberg served three distinguished terms in the U.S. Senate. He was a member of the Appropriations, Budget, Intelligence, and Environment Committees.

Throughout his career he has been a strong advocate for a better environment for the people of New Jersey, and the entire country.

Senator Lautenberg, we welcome you, and

look forward to your remarks.

SENATOR LAUTENBERG: Thank you very much, Dr. Poje, and the other members of the Board, Dr. Taylor, Dr. Rosenthal. Someone told me that you and I served in the same war, and we will let the audience guess which war that was.

Thank you so much for coming here to Paterson, New Jersey. This place has very significant meaning for me. I was born just a few blocks from here, and I was able to witness, painfully and directly, what happens when working people are exposed to a dangerous environment.

Alexander Hamilton, just a few blocks from here, created something called the SUM, the Society for Useful Manufacture. We have a beautiful waterfall here, and in the early days power was derived from that flow of water.

And Paterson grew on to be one of the great industrial cities in this country. In the early '20s, 1920s, there were over one thousand mills in this city. It was these kinds of cities, the Patersons, Fall Rivers, all across this country, that

built this great nation.

And we sent people to work in those mills and they were so happy to have the jobs. My father was a health faddist in the '30s, it was very unusual. You couldn't smoke around my father, it was way before I wrote legislation against smoking.

But my father had no tolerance for those who would abuse their health. He worked in the silk mill. He was a handsome, wonderful, intelligent man. He died when he was 43, of colon cancer.

My father's brother was 52, he worked in the mills. He died from cancer, colon cancer. My grandfather worked in the mills, and he died when he was 56 years old.

I just celebrated an uncle's birthday, my father's brother, a hundred and a half this very day. Now, I don't want to give you the other side of this, but he had a saloon here in town, so --

But the shock, the shock to a family sending a member to work each and every day, and finding out that they weren't being protected. Learning only too late that the consequences of

exposure to chemicals, reactive, foul air in those mills, can be such a negative thing.

And so when I walked to the City Hall in Paterson and a young assistant of mine said, do you know where we are going? I said yes, we are going back to roots, as far as I'm concerned.

I love this city. It has changed a lot, but what hasn't changed is that people still work in industrial facilities. And they are still concerned about their health. Thank goodness we have organizations that are out there to protect the health and well being of these workers.

We have, I understand, a couple of survivors here today. I was at the Napp site in Lodi, very shortly, very soon after the explosion occurred, the fire engines were still there. The fire continued for a couple of days.

And then right down here, not far from where I used to play baseball in East Side Park, the Morton Company, it used to be called Morton Salt, but it is the Morton Company, another explosion. That though it didn't kill, it injured, substantially, many

people, nine I think.

And I have a prepared speech, and if the press is interested I will give it to them free of charge. But I was so moved by what I heard Dr. Poje say. The incidents that helped create this Board.

The Board, by the way, was created in 1990. And we couldn't get money for it. That is not untypical of actions in the Congress. Throw up a name, and throw up an idea, but don't give it any money. And then you can walk home, you get a lot of votes sometimes.

But we got the funding. We got the funding because the unions were there trying to protect their members. And health organizations were there trying to protect their colleagues.

So it took us almost eight years to get the funding, and it was the Napp incident, the explosion in that factory, that helped finally convince other members of the Senate and the Congress, that it was worth doing.

You said, Mr. Chairman, that John Corzine, I can't say my successor, the next occupant of the

seat, I'm very proud of him, he has done a very good job since he has been in the Senate. Envious at times, but other than that it is --

And he is going to be here confirming our interest in seeing that the Chemical Safety Board does its job, that you don't let things go by. It is something akin to the National Transportation Safety Board.

Yes, the accidents happen, and they will continue to happen unless the Chemical Safety Board does its work, or the National Transportation Safety Board does its work. Those studies, those investigations, can make a world of difference in what happens to people who are either traveling or working in unsafe sites.

And so, members of the Chemical Hazard Board, I commend you for your work, plead with you to be energetic, and diligent, and not be dissuaded, or not be convinced that what you are doing is one of those things that may be cut out.

I plead with President Bush, from this podium, to make sure that we continue to fund the

Chemical Safety Board, to make sure that we focus on those things that can help save lives and permit people to develop their lives in normal health, and enjoy things.

We have a celebration coming in this city, on Saturday. A high school classmate of mine name Larry Dobi will be honored with the establishment of two beautiful baseball fields in Eastside Park, which was the only place that we could afford to have some recreation in the days that I grew up.

And this city is a proud city. But what it needs to know, like the other industrial cities in this country, that when they go to work, that the only thing that they have to be concerned about is making the product, and getting out at the end of the day, and enjoying themselves, and enjoying their families.

And so the work you are doing is, frankly, essential. We have OSHA regulations, and I don't criticize the OSHA, at all, but those regulations don't protect everybody sufficiently. We are going to depend on you to sound the alarm, and not let things go unreviewed, or don't be deterred from finding out

what caused it; don't let the corporate world interfere.

In most cases the corporate world will not, but should anybody want to, and we saw it in a couple of these accidents, it was just neglect that killed or injured these people.

And so you move there with advanced knowledge and experience, and the imprimatur of the United States government. We thank you very much for this opportunity to be with you.

BOARD MEMBER POJE: Thank you very much, Senator.

(Applause.)

BOARD MEMBER POJE: With that we would like to ask if the next panel would appear before the Board, Mr. Jim Gannon, Mr. Robert Oliver, and Mr. Allan Goss. We would like you to come to the witness stand and give us your input.

The first witness is Jim Gannon.

MR. GANNON: Hi, I'm Jim Gannon, a victim of Napp Chemical. I would just like to echo Senator Lautenberg's comments that I have a lot of distress

and frustration because it just keeps going on and on.

But having you people sit in front of me is just a ray of hope that maybe Napp would have never existed. I just wanted to say that.

On April 21st, 1995, the day of the explosion, I woke up at 5 a.m., I got ready for work. And like any other day I said goodbye to my wife, went in the room where my kids were sleeping, and kissed them goodbye.

I arrived at work at 5:45 and went to the deli across the street for coffee, buttered roll, and newspaper. I came back, went upstairs to the locker room to change, have breakfast, and read the paper.

At 7 a.m. I went downstairs to the equipment locker in processing and blending, P&B, to get gloves and paper uniform cover. There I also found out where I was working.

Andy Mazzola, plant unit leader on the day shift, assigned me to the 20 inch number 2 room. This was directly across from the 125 PK blender that exploded. I started a routine safety and systems check.

Up to this point I had no idea that anything was wrong. After about ten minutes into the safety check, and systems check, Joe Carson came, opened the door, and told me they were evacuating the building, as somebody noticed fumes coming from the 125PK.

I left the 20 inch number 2 room and headed for the back parking lot. I now noticed the smell of rotten eggs, which I knew to be sodium hydrosulfide. When we were in the back parking lot they asked me if anybody had a full face mask. I told them I did.

Me and Buster McKenzie went up to my locker to get the full face mask. Buster was asked to unload the 125PK to undo the situation that had gone wrong. As Buster was a leadsman, who usually did not work, and just drove the forklift, I told Buster I would go into the 125PK room and unload the blender, but he insisted he would go in.

I told Buster that when the coffee truck had come at 8 a.m., we would switch places. Unfortunately we never made it to 8 a.m., because the

plant exploded at 7:43. If I had won that argument it might be Buster standing here instead of me.

We went back to the back parking lot, and I was approached by Jim Gordine, who is maintenance foreman. He asked me if I was on the fire brigade, I told him I was. He then told me to come with him, and we went back inside the building to the firehouse just outside the P&B department.

He gave me instructions, two or three times, to charge the fire hose only if I heard him holler. I didn't know then, I know now, had I charged that fire hose it would have set off an alarm at the fire department.

I don't know why, if that was in Jim's mind when he kept telling me not to charge it unless he told me. But if the fire department had come, maybe that situation would have ended up a little bit different.

As I could not see Jim from where he wanted me to stay, I went around the corner into the P&B department, where I could see him standing in front of the 125PK room.

Just outside the 125PK room, Cisco Rivera was putting the tops on drums from the 125PK room. As far as I could see, from where I was standing, they had gotten four drums out of the blender. We had charged 6,000 pounds of sodium hydrosulfide, and 2000 pounds of aluminum powder.

The metal drums were, I don't know, maybe about 300 pounds a piece. So it was maybe 1,200 pounds out at the time I seen him standing there.

At this point the smell of rotten eggs was so strong that I had to wear my respirator. I had a bad feeling about the whole situation. I looked at the clock, it was now 7:40. I told myself I was being ridiculous, and soon the coffee truck would be here, and the situation would be over.

At this point I saw Jim Gordine, who was leaning on the wall of the 20 inch number 2 room. He walked towards the 125PK room pointing at something and hollering. I now heard a noise like air escaping from a tire.

Everything got quiet, and I saw Jim get stiff as a board. Then it was like the sun came into

the room, and I was flying backwards towards the back parking lot, but my arms and legs were being sucked in the opposite direction.

I could feel my hair burning off, and the skin burning off my hands. But as hard as I could try, I couldn't pull them in. I felt like I was going to die, so I relaxed because I figured it would just be easier if I just let it happen, rather than trying to fight it.

I then bounced off the back cinder block wall, and bounced onto the floor. I felt my uniform on fire, and the ceiling caving in on me. I thought if I rolled to the wall it may put out the flames while I was rolling, and stop me from getting killed from the debris falling from the ceiling.

Then everything just stopped. When I realized I wasn't going to die, I stood up and tried to make it back towards the 25PK room to see if I could help anybody who had been there.

But I could see nothing, because there was a black smoke so thick that I could feel it touching my face. After about ten minutes I had only gone

about ten feet.

This was because I was bumping into roof vents and sections of the wall that were laying on the floor. And then I started thinking about my wife and kids, and I was also losing direction, so I found my way to the door, and I figured anybody who hadn't gotten out of there probably was dead.

And that is something I live with every day today, because I heard those guys dead, I didn't see them dead. I will always wonder if there was anything I could have done for them guys.

I got out of the building, I ran around to the front. This was the first time I realized I was injured. When I was in there I felt myself get burnt but I didn't think it was that bad. When I got around to the front of the building the pain in my hands just increased ten-fold.

I guess I made the right decision getting out of the building, as I saw another explosion come through the top of the plant. I was then taken to Hackensack University Medical Center, where I was hospitalized for five days.

I should have been there, possibly, for weeks. But I have a good wife who took me home, washed me, fed me, and changed the bandages. After the explosion my family paid the price, as I could not sleep with my wife due to horrendous nightmares.

On a few occasions I struck my wife and kicked her while I was flailing in my sleep. I had a tremendous problem with short term memory, and startle response, where at the sound of loud noises I was diving for the ground.

Today the nightmares are not as terrible. I have fought against startle response by bowling once a week, which is conditioning me to loud noises. But my short term memory will probably never get any better than it is right now.

If my coming here today should save one life, or stop somebody else from going through the nightmare I have been living, then it is worth coming here and going through the pain of living it again. Thank you.

BOARD MEMBER POJE: Thank you very much, Jim. Let's hope this will be a healing process for

you, and help us all do our job of improving chemical process safety.

Next we would like Mr. Robert Oliver to come to the podium.

MR. OLIVER: My name is Robert Oliver, and thanks for having me here, first of all. And it sounds just like what happened to me, exactly. And I'm glad to be here, that is number two, I'm glad to be here, because with the explosion I was in, I never thought anybody could survive that.

It is about 8 o'clock, we all go back to work, and I always look out for my fellow workers, make sure that everybody is safe, because we had some new guys, new people, and I'm looking out for myself, because when you are working with chemicals, nothing is safe.

So I was sitting in the chair reading a paper, newspaper, and it just didn't seem right. So I looked around at the rest of the guys standing around the kettle, I said, something is wrong there. So I goes over.

If it wasn't for my warning, I don't think

nobody would have made it out of that place. And I did something else earlier. I went down and closed all the doors, because it was a cool evening, and I can't stand coldness, very cold hearted.

And I closed all the doors. And the three guys that got burnt pretty bad, they wouldn't have been here today if them doors was opened, because the explosion was so intense it blew the door open, but it saved the fire from going out, while they was going out the back door.

They was burnt, but they would have never made it, they would have been fried. And with me I warned them, and I started to leave, but they didn't take the warning like I did.

When I got to the top of the stairs, going downstairs, I heard like a -- I know what he is talking about, when you hear a blast, the air is just like something -- it scares you, and it scares me right now. I heard a blast, like an air blast, and I started running.

I ran to the first floor and warned the guys in the first floor that there was going to be an

explosion. And by that time it was three loud bang, and it blew me out of the door, about 40 feet in the air. I didn't know where I was going to fall. I was lucky I land on my hand and feet.

And when I got up I said, I looked back at the building and I said, there is no way that them other eight guys made it out of there. So when I was able to get up, because the pressure was so much on me, I couldn't move, it had me pinned against the wall for about, it seemed like forever, but it was only like a couple minute, or a couple of seconds.

And when I got up I was able to run toward the barrack to send somebody to see if they could put water on the building to save these guys, so they won't be so hot. I don't know what was going through my mind.

But, anyway, when I got up to the barracks they were all sitting in there, I was the only one back. I said, man, what a blessing. You don't know how it is. If you was never in an explosion, it is a horrible feeling. You will never forget it.

I'm still healing, just like Mr. Gannon

said, you never get over it. Any loud noise makes you nervous. So I hope this would help not the United States, but the whole world, to be more careful or get more insight on the chemical that they are working with. Thank you.

BOARD MEMBER POJE: Thank you very much, Mr. Oliver. Now if we could have Allan Goss come to the podium?

MR. GOSS: Thank you. My name is Allan Goss, I was involved on March the 27th, 2000, in a fire and explosion at the K Resin plant at the Houston Chemical Complex, for Phillips Chemical Company.

I had, at that time I had worked for about eight years as a health and safety representative for the electricians. We were doing a pre-startup safety review on some equipment that had been damaged nine months earlier in a fire and explosion at the K Resin plant, that had killed two contractors.

We were about 20 minutes into the review when a Butadiene tank exploded on us. We were about 70 feet up in the air, we were standing on grading. The area that we were standing on was, probably, about

150 feet wide by probably 250 feet long.

Most of all that area was grading. The tank blew out the bottom, it blew out the top, it killed one man. The fireball that shot out the top came over and caught us. There were four of us involved in this pre-startup safety review.

The project engineer, who worked for Phillips; the operation supervisor, who worked for Phillips; the PACE union health and safety representative; and then myself with the IBEW.

I can remember when the fireball hit, I can remember being blown through the air. I can remember the fire, I remember the pain. I can remember screaming at the top of my lungs and thinking, this sounds just like a baby crying, as I was being blown through the air.

I lost track of time. I went blank, or something. I don't know how I got out of that area. Eventually made it over to a safe corner of the structure, had to climb down a ladder. I looked down at my hands, I could not use my hands to climb the ladder.

So I had to use the rungs of the ladder and wrap my wrist around the rungs and climb down. Eventually made it to the nurse's station, where they took one look at me and said, put this man on life flight.

So they life flighted me and one other individual to Herman Hospital, where I found out that Herman hospital, the burn unit, was going to be my home for the next 101 days.

At that time I found out that I had second and third degree burns to 50 percent of my body. At first they were looking at 75 percent, and then they brought it on down to about 55 percent, and kind of settled in at 50 percent of my body was burnt.

I passed out whenever I got on the helicopter to go to the hospital. I woke up in the emergency room. I passed out, again, in the emergency room, and I didn't wake up for three and a half weeks.

Whenever I finally did wake up I asked my wife if anybody was killed. And that is when she told me that probably the finest individual I've ever known was killed in that fire.

At that time I became very upset, became very angry. I guess most of my anger was aimed towards God, because how could something like this happen to me, and how could that happen to Rodney Gott, who was killed.

When you first get brought into the hospital with burns, the first thing that they do is they clean you up. To do that they have to scrub your skin. The -- it is not a pleasant experience to go through. They give you morphine, and vicodin. That was my cocktail drink for most of the time that I was in the hospital.

So I don't have a lot of memory of that pain because I was out of it most of the time, during the time that they were cleaning my skin. They also come in with therapy and begin bending the fingers, bending the arms, the legs, trying to get you movement.

Because if you don't move those joints they will freeze up on you. And they did that for the entire 101 days I was in the hospital. Finally on July the 5th, 2000, I came home.

I was scared, I was nervous, I was also glad. I knew what kind of care I had been getting at the hospital, I wasn't sure if my wife could handle that all by herself. I could not stand, I could not walk, I could not feed myself.

We had a little instrument in the therapy that they called, I can't remember the technical name of it, I called it a gripper meter. You squeeze it and it tells you how many pounds of pressure you can squeeze.

My right hand could squeeze five pounds. The normal for a male is about anywhere from 90 to 110 pounds of pressure. My left hand I couldn't even hold the meter in my hand, it was so weak.

Today I have about 75 percent of that strength back. I got home from the hospital on July the 5th. July the 6th I'm thinking this is going to be great. We leave the house about 8 o'clock in the morning, arrive at therapy.

For the next six months I go through three hours of therapy five days a week. At the end of therapy the other three guys that were injured with

me, they had afternoon therapy, I had morning therapy, we would meet for lunch at the hospital cafeteria.

And we developed our own little support group. So it was a time that we could share our experiences together.

During that six month period of time some of those guys started getting better. And as they got better their therapy decreased, and I saw them leaving me, and I was left there eating lunch by myself.

I would get home about 1:30 in the afternoon, take me about a 15, 20 minute nap, and then my home health care nurse would show up at two o'clock in the afternoon. And for the next four hours I was in the shower getting my bandages soaked, to pull those off.

Because if you don't soak those bandages the blood has dried. And if you peel them off blood will just start flowing, so you have to soak them down real well, so that they will just gently pull off.

After the shower we would remedicated the wounds, put bandages back on. And then eventually I got into some garments that they call compression

garments, and I brought those with me today.

Because I was burned on the face I had to go around for a year wearing this mask. And you can imagine the stares that people will give you when you walk around in public with something like this on.

Because I was burned on the hands I had to wear gloves. I was also burned on the back of the arms, so they gave me a shirt with sleeves that I got to wear. And because I was burnt on the legs, gentlemen, let me tell you something, you don't want to wear these things, leave them to the women, I got to wear some pantyhose. Those are real great. Thanks a lot, Joe Namath, New York Jets, Joe Namath.

I got to wear those garments for a year. And then after a year's period of time finally got to where I was able to come out of those garments and not have to wear them again.

During the time that I was in the hospital I had 11 surgeries. Since I've gotten out of the hospital, which has been about 22 months ago, I've had seven more surgeries. A week and a half ago I had surgeries on my hand.

I'm not sure how many surgeries I have left to go. But there are at least a few more. I told you a while ago that during the time I was in the hospital I got very angry with God.

I've been reading my bible almost daily for 30 years. And while I was laying there in that bed in the hospital a verse of scripture came to my mind, and it is Roman's 8:28. And it says: All things work together for good to those that love the Lord, to those that are called according to His purpose.

Some of the things that can work together for good, I believe, is the Chemical Safety Board doing something to help the workers that are still out there in these places. Thank you.

BOARD MEMBER POJE: Thank you very much, Allan, for that moving testimony. We also hope that today's entire hearing is a demonstration of us collectively working together with all the expertise in this room to address the problems of reactive chemistry that the management needs for it.

At this point in time I would like to ask

that our Staff come before the Board and give us their presentation on the results of their two years worth of work.

John Murphy is the lead investigator for the Reactive Hazards Investigation. And, John, I trust you will introduce the team.

MR. MURPHY: Thank you, Dr. Poje, and good morning to everybody.

My name is John Murphy, and maybe I should say a little bit about myself. I've been with the Chemical Safety Board going on for two years. Previous to that I was with the Dow Chemical Company for 28 years, was senior technical management positions in process safety.

I was on Dow's reactive chemical committees for 13 years. I was chairman of the committee at one of the major Dow sites for five years. So I have been involved in the reactive chemical issues for a long time.

I have a BS in chemical engineering from Tufts University, and a Masters degree in business administration from Central Michigan University. But

that is enough about me.

This morning, this is a presentation to the Board of the findings and preliminary conclusions of the reactive chemical hazard investigation.

Board members, the Staff has concluded that reactive chemical incidents are a significant safety problem. As you have heard from others already reactive chemical incidents have resulted in fires, explosions, and toxic release.

Such events have injured people, have damaged property, and caused adverse environmental impacts.

With that I would like to briefly introduce my team. If they could stand up as I introduce them, for just a moment.

First I would like to introduce Kevin Mitchell. Kevin has been with the Chemical Safety Board going on for two years. He was involved in the BP Amoco investigation that has been discussed already, a reactive chemical incident.

He has been recently involved in the Caltech investigation that just started in New York

City. Also likely to be a reactive chemical incident.

Kevin has a BS in chemical engineering from the University of Minnesota. He has over ten years of consulting experience in process safety, management, and risk management. Thank you, Kevin.

I would like to introduce Lisa Long. Lisa Long also has been working on her second year with the Chemical Safety Board. She has been, also, involved in the BP Amoco investigation, and is currently the lead investigator on the Georgia Pacific incident investigation, another reactive chemical incident.

Lisa has a BS in chemical engineering from Virginia Tech. She has over 12 years of experience with chemical manufacturing companies in various positions, most recently a production manager with Rodia. Thank you, Lisa.

Giby Joseph is also working on his second year at the Chemical Safety Board. He has been very active in the reactive chemical hazard investigation, but he has also participated in other investigations, Bethlehem Steel, and most recently involved in the packaging incident, which has recently been started.

Giby has a BS in chemical engineering from the University of Houston. He went on to Texas A&M where he got a masters degree in safety engineering. He also has several years experience in process safety management, and risk management consulting. Thank you, Giby.

You've already heard about the Napp Technology incidents. Reactive chemical incidents can be catastrophic. The incident that took place in Lodi, New Jersey on April 21st, 1995, at Napp Technologies is an example of a catastrophic reactive chemical incident.

You've already heard a very good description of the incident from a worker. From a technical standpoint an explosion and fire occurred when Napp was conducting a blending operation to produce a commercial chemical used in gold manufacturing.

The chemical involved in this process were water reactive. During the process water was inadvertently introduced into the blender. Operators noticed an unexpected reaction taking place in the

blender, producing heat and gas.

During an emergency operation to open the blender of its reacting contents, the material ignited and an explosion occurred, which resulted in the deaths of five Napp employees and the destruction of the facility.

The most likely cause of this incident was the inadvertent introduction of water into water reactive materials. This incident is also very significant in highlighting reactive chemical incidents as an issue.

After this incident six labor unions, most represented here on the panel today, petitioned OSHA for an emergency revision of the process safety management standard stating that it failed to cover reactive hazards adequately.

OSHA and EPA also stated that reactive chemical coverage should be investigated. To date there have been no regulatory changes to address the reactive chemical issue. In fact OSHA has recently removed reactive chemicals from its current regulatory agenda.

Again, you also heard several speakers talk about the Morton incident that took place right here in Paterson, New Jersey, on April 8th, 1998. The Chemical Safety Board investigated this incident. It determined that a runaway reaction caused a fire and explosion and severely injured nine employees.

This is a significant incident because it was the beginning of the reactive chemical hazard investigation. During the Chemical Safety Board's investigation of the Morton incident, many groups raised concerns that reactive chemical problems merited a more systematic analysis by the Board.

In light of the number of incidents similar to Morton that have occurred since 1995, the Board decided to conduct a hazard investigation of reactive chemicals.

The board had the following objectives for the hazard investigation: Evaluate the impact of reactive chemical incidents. By impacts we meant the number and severity of reactive chemicals along with the nature of these kind of incidents.

Examine how OSHA and EPA address reactive

hazards. Analyze the National Fire Protection Association's reactivity ratings. These are important because they are used by the OSHA PSM standard to determine coverage as far as reactivity is concerned.

Examine non-regulatory standards and guidance, examine company policies, practices, and testing. We did this two ways. First we actually went to five chemical manufacturing facilities and discussed these issues with their process safety technology people.

In addition to that we surveyed another nine companies to determine their practices regarding reactive chemicals. Finally to develop recommendations to improve reactive chemical process safety.

This is why we are here today, to gather further input from groups that have an interest in this subject, especially the public, so the Board can develop recommendations to improve reactive chemical process safety.

There are many groups involved in this hazard investigation. They are listed in your

handouts, I think in the last page we have a detailed list. They represent academia, industry trade associations, labor unions, public interest groups, regulatory agencies. Many of these groups are represented here today. I would like to thank them for their help.

In addition to that we had several consultants and reviewers that have inputted into the hazard investigation and reviewed some of the preliminary findings and conclusions.

Again many of these people are represented here today. I won't name them specifically, but take a moment to look at this slide and see the diversity of input into the hazard investigation.

One of the first issues the team had to deal with is what is a reactive chemical incident. There are various opinions on this, and we talked to these various groups that are shown on the slide, to get their input.

The staff finally came up with this definition. A reactive chemical incident is a sudden event involving an uncontrolled chemical reaction with

significant increases in temperature, pressure and/or gas evolution, that has the potential to, or has caused serious harm to people, property, or the environment.

With that I would like to turn the podium over to Kevin Mitchell to start a review of the conclusions, preliminary conclusions of the staff. Kevin will be talking about the impact of reactive chemical incidents and gaps in existing regulatory coverage. Kevin?

MR. MITCHELL: Thank you, John, good morning.

The staff's first conclusion is that incidents involving uncontrolled chemical reactivity are a significant safety problem. This is evidenced by the following.

Limited data available to the Chemical Safety Board includes 167 incidents involving uncontrolled chemical reactivity in the United States since 1980; 48 of these incidents resulting in a total of 108 fatalities.

The data include an average of six injury

related incidents each year, resulting in five fatalities per year, on average. And finally about 50 of the 167 incidents impacted members of the public located near industrial facilities, causing death, injury, public evacuation, or shelter in place.

Board Members, be advised this is not a comprehensive examination of reactive incidents. There are numerous serious incidents that are not part of our analysis, including many that involved serious injury.

This is due to the limitations of the data sources, as you will hear shortly, which in many cases precluded us from determining whether an incident involved uncontrolled chemical reactivity.

Therefore this is but a sampling of recent reactive incidents, and the limitations preclude the Chemical Safety Board from drawing statistical conclusions concerning the number and severity of reactive incidents since 1980.

The staff identified 12 incidents, each involving the death of three or more persons. These are shown here. And as you can see, in many cases,

the death toll was much higher.

Today we will tell you about several of these incidents. Although several of these catastrophic incidents date back the better part of 20 years, reactive incidents continue to occur.

These more recent incidents are a continuing reminder that the hazards of uncontrolled chemical reactivity continue to be a significant safety problem.

Even after we finalize the analysis of the 167 incidents, reactive incidents continue to occur, such as the Pennington, Alabama incident shown here. And, indeed, the incident that Mr. Goss spoke so passionately about this morning is listed here, the Pasadena, Texas incident in the year 2000.

Our second conclusion, there are significant gaps in safety regulations designed to protect workers from the hazards of reactive chemicals. In fact over 50 percent of the 167 incidents involved chemicals that are not covered by OSHA process safety regulations.

The Napp and Morton cases you heard about

earlier are examples of this. The primary OSHA regulation covering reactive chemical hazards in industry is OSHA's process safety management, or PSM standard.

The standard has been in effect since 1992. The process safety management standard covers a range of manufacturing processes containing individually listed chemicals that present a range of hazards, including chemical reactivity, as well as a class of flammable substances.

Now OSHA selected 137 specific chemicals to be covered by the process safety management standard from a variety of chemical lists, including chemicals rated by the National Fire Protection Association, or NFPA.

NFPA has developed a chemical hazard rating system that addresses health, flammability, as well as chemical reactivity hazards. OSHA selected reactive chemicals to be covered by the process safety management standard because of their NFPA reactivity rating of 3 or 4 on a scale of zero to 4, and those were selected from the 1975 version of NFPA standard

number 49, which has been superseded.

The NFPA reactivity system, or more properly stated, instability ratings, use the following definitions: Chemicals with an NFPA reactivity rating of 4 are capable of detonation, or explosive decomposition, or reaction at normal temperatures and pressures.

An example of such a chemical would be Trinitrotoluene, or TNT, which is a chemical involved in the Chemical Safety Board's first investigation at Sierra Chemical in Nevada.

NFPA rated 3 chemicals are capable of detonation or explosive decomposition, or reaction with a strong initiating source, or heat, under confinement.

NFPA rated 2 chemicals undergo violent chemical change at elevated temperatures or pressures. An example of this type of chemical would be common household bleach.

NFPA 1 rated chemicals are normally stable except at elevated temperatures and pressures. And NFPA reactivity rating of zero is reserved for

chemicals that are normally stable even under fire conditions.

As I mentioned, OSHA selected NFPA published chemicals with reactivity ratings of 3 or 4 for their process safety management standard. However, only about 10 percent of the 167 incidents we analyzed included, involved chemicals that were rated at FPA 3 or 4.

Moreover, approximately 60 percent of the 167 incidents involved chemicals that are either not rated by NFPA, or rated zero for chemical reactivity, meaning "no special hazard".

Now, the significant gaps in coverage of reactive chemical hazards in the process safety management standard by OSHA are due to, in part, the fundamental limitations of the NFPA reactivity ratings themselves.

While the ratings are useful for initial emergency response and fire fighting purposes, they were not specifically designed for process safety purposes.

The ratings were established by a system

that relies, in part, on subjective criteria, and considerable judgement in assigning ratings. The ratings address a chemical's inherent, or self-reactive characteristics, not reactivity with other chemical substances, with the exception of water.

Nor do the ratings address processing conditions, such as elevated temperatures or pressures, which may be common in a chemical plant environment.

And, finally, NFPA standard number 49, on which the PSM listed highly reactive chemicals were taken, lists only 325 chemical substances, a small percentage of chemicals used in industry.

Furthermore, less than 40 of the 137 chemicals listed under the process safety management standard have NFPA reactivity ratings of 3 or 4.

The staff's next conclusion. Safety regulations designed to protect the public who live and work near hazardous industrial facilities have significant gaps in the coverage of reactive hazards.

This is evidenced by the fact that over 60 percent of the 167 incidents involved chemicals that

are not covered by existing process safety regulations from the U.S. Environmental Protection Agency, or EPA.

The primary safety regulation intended to protect the public from industrial chemical incidents is EPA's risk management program, or RMP rule. This regulation has been in effect since 1999, and it covers manufacturing processes containing individually listed chemicals.

When determining chemical substances which should be covered by this regulation, EPA listed chemicals based on their toxicity, flammability, but not based on their hazardous chemical reactivity.

EPA stated it could not identify or develop criteria for listing reactive chemicals due to insufficient technical information at the time.

Now, the incident that occurred on February 19th, 1999, at Concept Sciences in Allentown, Pennsylvania, was a tragic illustration of how reactive hazards can impact the public.

The Board investigated this serious incident which involved five fatalities. The incident involved the explosive reaction of a chemical being

processed at Concept Sciences at the time, known as hydroxylamine.

As I said, the explosion resulted in five deaths, included four persons from Concept Sciences, and one member of the public who was working at a business located adjacent to Concept Sciences.

In addition there were numerous off-site injuries and extensive off-site property damage. Although the chemical involved, hydroxylamine, is listed under OSHA's process safety management standard, it is not listed as a covered chemical by EPA's risk management program rule.

Board Members, as I mentioned earlier, existing process safety regulations for reactive hazards are primarily based on chemical lists.

And now I would like to turn the floor over to Ms. Lisa Long, who will illustrate the difficulty in defining such a diverse problem as reactive hazards using chemical lists alone.

MS. LONG: Thank you, Kevin. Good morning.

The reactive problem is not adequately

defined by simply placing chemicals on a list. The problem is too multifaceted. All chemicals can be reactive.

Reactivity is not necessarily an intrinsic chemical property. In fact we looked at the 167 different incidents that we gathered, to try and find if there were certain chemicals, or classes of chemicals, that were involved more often in the chemical reactive incidents.

What we found was that the incidents involved over 40 different chemicals and classes of chemicals. These were such things as acid spaces, even water, and many other chemicals.

As was the case at both Napp and Morton, hazards arise from interactions in specific conditions of the chemical process. Some do not react until they are heated, some do not react until they are pressurized. Some react only when they are mixed.

For example, you may have some cleaning chemicals around your house, such as bleach and ammonia, which on their own are relatively stable. But when they are mixed together they react to form a

poisonous gas.

Reactivity can result in an energy release, such as a fire explosion, or a toxic release. We found that in the 167 incidents toxic release occurred in 37 percent of those.

An example of an incident with a toxic release occurred on June 4th, 1999 at Whitehall Leather Company, in Whitehall, Michigan. On the day of the incident a truck driver arrived on night shift to deliver a truck load of sodium hydrosulfide.

The shift supervisor on at the time had only received what he knew as pickle acid on the night shift. And so he assumed that the sodium hydrosulfide was also pickle acid, and he directed the driver to unload the contents of his truck into the pickle acid tank.

What was commonly known as pickle acid was actually ferrous sulfate. And when the truck driver unloaded the sodium hydrosulfide into the ferrous sulfate tank the two reacted producing hydrogen sulfide, which is a poisonous gas.

The truck driver was exposed to the

hydrogen sulfide, and was killed. And another Whitehall Leather employee was seriously injured.

Many people believe that reactive incidents most commonly occur as thermal runaway reactions in vessels called chemical reactors. We looked at the 167 different incidents, and tried to determine if they commonly occur in similar types of equipment.

What we found, instead, was that the reactive incidents occurred in reactors only 25 percent of the time. The remainder of the incidents occurred in various other pieces of equipment that would be common in the chemical industry, and in other users and consumers of chemicals.

Reactive chemical incidents are not unique to the chemical manufacturing industry. In fact of the 167 incidents we found that 70 percent of them occurred in chemical manufacturing, but another 30 percent occurred in storage, handling, and consumer sites.

Whitehall Leather is an example of a facility where they weren't manufacturing chemicals,

but they were using the chemicals as a raw material in their leather tanning process.

Another example, an incident occurred on May 8th, 1997, at Bartlow Packaging, Incorporated, or BPS, in West Helena, Arkansas. BPS was repacking a pesticide called AZM50W.

The AZM was offloaded into a warehouse, when employees noticed smoke coming from the building they called the fire department. A team of four West Helena firefighters were conducting a recognizance mission to locate the source of the smoke.

They had been told that there was no explosive hazard. An explosion occurred and three of the four firefighters were struck by a collapsing cinder block wall. Three of the firefighters were killed, and another was seriously injured.

The most likely cause of this incident was decomposition of the pesticide which had been placed against the hot compressor discharge pipe. The decomposition resulted in the evolution of flammable gassage, which were ignited and resulted in the explosion.

This is also an example of a company working with chemicals without understanding the hazard involved in those chemicals.

The examples that I have given demonstrate that it is difficult to develop a list of reactive chemicals, or categorize the places or equipment where reactive incidents more commonly occurred.

This requires regulators and industry to address the hazards of chemicals in their combinations under process specific conditions. It is more important to manage reactive chemistry than it is to focus on individual chemicals.

And with that Giby Joseph will finish. Giby is going to talk a little bit about data gathering, causes of reactive chemical incidents, and also industry guidelines.

MR. JOSEPH: Thank you, Lisa, good morning.

Our next conclusion is that existing sources of incident data are not adequate to identify the number, severity, and causes of reactive incidents.

This conclusion is based on the following facts. First, there is no one comprehensive data source that you can go to, to retrieve this information. We had to search over 40 data sources to compile information on our 167 incidents.

A key learning that we made during our search was that OSHA and EPA data is not designed to identify or track reactive incidents. Also, the data that is available is very limited in terms of lessons learned, and root cause information.

This lack of crucial incident information is a major obstacle in preventing reactive incidents. Less than 40 of our 167 incidents contained causal or lessons learned information.

We felt analysis of this data subset would still give us meaningful results. This analysis led to our next conclusion, which is incidents are often caused by inadequate recognition and evaluation of reactive hazards.

We found that 60 percent of the incidents in the data subset occurred because reactive hazards were not adequately identified, or evaluated. If you

keep in mind that incidents often occur due to more than one cause, then almost 50 percent of the data subset also involved inadequate work procedures.

The key message here in this slide is that we need to improve our recognition of these hazards. The incident at BP Amoco is a good example where reactive hazards were not adequately recognized.

The incident caused three fatalities, and significant damage to the unit that produced amodel, a plastic used in products such as lawn and garden tools, and automotive parts.

The CSB investigated this incident, and we found that amodel was susceptible to thermal decomposition at processing temperatures. However, operators and technical staff at the Augusta facility were unaware that amodel could decompose and generate pressure in this vessel. Thus amodel's decomposition hazard was not adequately addressed in the process design.

Next conclusion. Existing knowledge of reactive hazards is not being effectively applied. We found that over 90 percent of the incidents in our

data had reactive hazard information such as chemical incompatibility, thermal and mechanical shop possibilities, and runaway reaction scenarios.

We gathered most of this information from tools such as Bretherick's Handbook of Reactive Chemical Hazards, and NOAA's Chemical Reactivity Worksheet.

We also found, during the investigation, that companies very rarely share with other companies reactive hazard information gathered from test data. And in certain cases reactive hazard information generated by companies' own research and testing group, does not get applied to process design, because this information does not reach the appropriate operations, or technical staff at the manufacturing site. This occurred at the Morton incident.

There are two key messages in this slide. One, we need to perform more thorough searches of literature to obtain existing knowledge about reactive hazards. Two, we need to better share and communicate reactive hazard information gathered from test data.

Our last conclusion is that industry has

published some voluntary good practice guidelines for managing reactive hazards. But these are limited and not complete.

Organizations such as CCPS and trade associations like ACC, SOCMA, and NACD, are working at providing more guidance to industry. Some areas that need more guidance are: How do you deal with hazards of inadvertent mixing of incompatible materials during storage and handling, and how do you manage reactive hazards throughout a process life cycle?

Board Members, those are our conclusions, now lead investigator John Murphy, will summarize these conclusions, and also set the stage for the rest of the day. Thank you.

MR. MURPHY: I would like to summarize our conclusions.

Reactive incidents are a significant safety problem. There are gaps in safety regulations for reactive hazards. It is not possible to identify all reactive incidents using existing data sources.

Reactive hazards are not adequately defined by list of individual substances. Chemicals

and their combinations must be considered under process-specific conditions.

Many reactive incidents could be prevented by applying knowledge that already exists about the hazards. Industry voluntary good practice guidelines need to be improved.

So what is the path forward from here? The Board needs additional information from the groups involved in the panels here today, and the public, so recommendations can be developed to improve reactive chemical hazard safety.

These are some of the questions that the Board has. Is the OSHA PSM standard adequate, does it need to improve coverage? If so, what could be used for criteria for classifying reactive mixtures? Someone suggested energy release, temperature at which the reaction begins, pressurize, these are all possibilities, alone or in combinations.

Is there a need for a minimum regulatory requirement for hazard evaluation? Are there alternative regulatory approaches? Process already under OSHA process safety management, should the

requirements be changed or added?

For example, under process safety hazard analysis, does there need to more specifically address reactive chemical hazards? Process safety information, is there a need for more explicit requirements for reactivity data?

EPA's RMP regulation, is it sufficient or not? What should be changed or added? Should OSHA and EPA take non-regulatory actions to reduce the number and severity of reactive chemical accidents?

There are other considerations, too, that I would like to briefly mention. Is there a need for additional industry initiatives regarding reactive chemicals? Is there a need for additional guidance in reactive chemical hazard management? Is there a need for sharing reactive chemical test data throughout the industry, and how could this be done?

These are other major issues that the Board would like to have input on.

That concludes our presentation, Board members, and the staff is now open to questions. Thank you for your attentiveness.

BOARD MEMBER POJE: Thank you John, and thank you to your team, yourself and your team, and the rest of our staff, for the conduct of this study, up to this point in time, and for your preparations for today's meeting.

With that I would like to open the questioning period by the Board, and I would like to offer to Dr. Taylor to offer the first questions.

BOARD MEMBER TAYLOR: Thank you, Dr. Poje. I would like to start by talking about a lot of work that has gone into this report, again.

But my question, there is a couple of questions that I have, and I will start with the first one regarding my background, industrial hygiene.

The material safety data sheets, what do they tell employers or employees, what did you find when you researched that area?

MR. MURPHY: We didn't look at the material safety data sheets in detail. But in general I think the team would conclude that they just have minimum reactivity data.

I would say that they are, in general,

inadequate to describe all the reactivity data necessary to run a chemical operation safely.

Any other input from Kevin?

MR. MITCHELL: Yes. Board Member Taylor, in addition to what John said, it should be noted that the conclusion we have that process specific conditions are important in identifying and evaluating reactive hazards, and that type of information is not something that is typically found on material safety data sheets, as they are intended for a wide range of users that may have a variety of different storage or processing uses of those chemicals.

BOARD MEMBER TAYLOR: My next question is regarding, Lisa, you mentioned that chemical listing didn't, would not be adequate to assist with listing reactive chemicals.

And can you describe that again, of why that is, or why there is such a problem?

MS. LONG: Yes. As I mentioned, it is difficult to describe them by a list because all chemicals are reactive. And it is particularly important to highlight the chemicals and their

combinations that process specific conditions, and it would really be impossible to develop a list that considered all those factors.

BOARD MEMBER TAYLOR: And my last question regards training issues for the employers who initially are using, are getting the chemicals that they are using to process, as well as from the employers to the senior staff, and down to the employees.

How is that done, is there a way, or what did you find in your research regarding that issue?

MR. MURPHY: Again, this was not a subject that we researched in depth, but we did visit five chemical manufacturing sites and discussed with them the various training programs.

We saw some very good ones from major chemical companies that made reactive chemical training a specific part of their process safety management training.

The companies we visited had reactive chemical training integrated in their process safety training. So, like I said, we didn't survey companies

in depth on this. But I think good companies are addressing reactive chemical training by getting the awareness up of reactive chemical hazards.

I think this is a key preventive for reactive chemical incidents.

BOARD MEMBER TAYLOR: So, for instance, in one incident I think it was because of water, adding water to a process. So employees are trained that this is not the procedure --

MR. MURPHY: I would say in companies that are applying good practice they are being trained. Like I said, we haven't surveyed a vast number of companies, so I'm sure some companies need to improve the training.

Any other comments from the team? Like I said, this wasn't an area of emphasis, but we saw many good practices out there.

BOARD MEMBER TAYLOR: One last question, and then this will be it.

On the evaluation side how companies decide, and perhaps I will ask the industry panel as well, when a chemical is introduced into a process,

what happens to ensure how much research is done prior?

Because, you know, there is so many chemicals that it seems to me that it would be very hard to say or identify which ones will be reactive before you actually use it in the process.

So I'm just trying to figure out how that happens beforehand, or what did you find in your research?

MR. MURPHY: Again, in our site visits we visited chemical manufacturing operations with premier programs, and we found out that many of the premier companies evaluate all chemicals as they come into the plants, looking for incompatibility issues, how they are used in the process.

I think it is important that, if you are handling chemicals, some type of reactive chemical hazard evaluation needs to be done. And then, like I said, we would like to have done a more in-depth survey, but we didn't do that.

BOARD MEMBER TAYLOR: Are they looking at it from a process standpoint of quality of the product

when they are mixing, or safety, all those considerations are taken into account as well?

MR. MURPHY: The premier companies are looking at it from the safety side, in addition to the quality side. Any other --

BOARD MEMBER TAYLOR: Okay, thank you.

MR. MURPHY: These are all good questions, and show that additional research needs to be done. So we would have done a comprehensive job, but we haven't been able to tackle all issues, and we appreciate the questions.

BOARD MEMBER POJE: Dr. Rosenthal?

BOARD MEMBER ROSENTHAL: John, if I ask a bad question will you recognize it at the end of the talk?

MR. MURPHY: There are no bad questions, Dr. Rosenthal.

BOARD MEMBER ROSENTHAL: Right. Thank you, John.

First of all I would like to complement all of you on an excellent, clear presentation. I think it is going to be valuable to everyone.

I would like to start off and look at the data issue. OSHA, under its present material safety data sheets standard, hazard communication standard, mandates that in supplying information on toxicity, certain sources must be consulted.

You noted, during the course of the presentation, that 90 percent of the incidents, I won't say could have been prevented, but data on the hazards attendant on that 90 percent of the incidents could have been found in the literature.

Could you give me some idea, from a Toledo type thing, how many references would I have to get to cover 80 percent of that 90 percent? Are we talking about 100 references that would have to be consulted?

MR. MURPHY: Something less than that. I'm going to turn this one over to Kevin Mitchell.

BOARD MEMBER ROSENTHAL: You get the good ones, right, Kevin?

MR. MITCHELL: Always. Board Member Rosenthal, when we analyzed the 167 incidents, indeed, we consulted several data sources, and concluded in the end that the vast majority of reactive incidents

involved hazards that are documented in the literature that is available to industry.

We used several sources to conclude that, one of which is well know, Brethericks Reactive Chemical Handbook has a wealth of information on reactive hazards.

We used, in addition to that, computerized tools from the National Oceanic and Atmospheric Administration, and tools from the Environmental Protection Agency, which provide information on the hazards of mixing incompatible substances.

The number, I don't have a number off the top of my head, but it is several.

BOARD MEMBER ROSENTHAL: It is several. But what I gather is that it is less than 10?

MR. MITCHELL: That would be --

BOARD MEMBER ROSENTHAL: Yes. And so it is a feasible number of publicly available sources that had they been consulted, might have supplied some inputs?

MR. MURPHY: I think this ties into Dr. Taylor's comment on training. Even the premier

company that we visited, with an exceptional reactive chemical program, they found out that 80 percent of the incidents they had, and their incidents were more of the near-miss category, that that was also a matter of having known chemistry, by getting the information to the proper people at the proper time.

So even at the premier companies this is, this continues to be a struggle.

BOARD MEMBER ROSENTHAL: Okay. So that, at any rate, if one wished, one possibility is that describe sources of literature search would add considerably to the information on material safety data sheets?

MR. MURPHY: It would, indeed, be very helpful.

BOARD MEMBER ROSENTHAL: Okay. You mentioned in the course of the talk, that there was a great deal of more specific information available in industry data bases, things that would have to do with test results, such as heater reaction, maximum pressurized onset temperatures, data such as that.

What are the barriers that would prevent

companies from making such data available? Not barriers, considerations, is this because the data is proprietary, is this because there is a fear of liability, is this because there is no mechanism for sharing it? What are your findings?

MR. MURPHY: I think all the ones you mentioned. One premier company has over 60,000 pieces of data that they are willing to share. There have been some efforts in the past, among some of the premier companies, to share reactive chemical test data more thoroughly.

And I think that this is something that needs to be explored. I think there are the liability concerns. This is a personal view. And some of the other concerns that you talked about.

But the staff feels like this would be a great improvement in reactive chemical hazard safety, to make this kind of information available to small and medium sized companies that don't have the resources to generate this kind of information.

BOARD MEMBER ROSENTHAL: Let me proceed, since you did your job well and left too much time,

that is what you get into trouble for.

MR. MURPHY: I knew there was danger in that.

BOARD MEMBER ROSENTHAL: Right, the danger. You noted, very specifically, during the course of the presentation, that NFPA criteria, in and of themselves, are not as sufficient basis for generating coverage under either the OSHA standard, or the EPA standard.

It is a two part question, I will tell you both parts so you won't be trapped, and then we will go back to the first part.

So the first part is, then, what possibilities, I know you have not arrived at any conclusions or recommendations, but what possibilities have you considered as alternative criteria?

And then the second part of the question, which I will ask separately, you have noted, and others have noted, that the expression of the hazard, the hazard reactivity giving the potential to cause injury, but the expression of that hazard is very dependent on process specific conditions.

What possibilities exist for action in that area? I know you have no conclusions, but what are some of the thoughts that have crossed the team's mind in that regard?

So first part, what are the criteria that might be used in terms of potential coverage under regulations or other things?

MR. MURPHY: Well, part one I will put to Kevin Mitchell, and I will try to answer part two.

BOARD MEMBER ROSENTHAL: Okay.

MR. MITCHELL: Dr. Rosenthal, as we mentioned in our presentation, there are significant gaps in process safety regulations and at least with respect to the OSHA PSM standard, those gaps are due, at least in part, due to the fundamental limitations of the ratings themselves.

Considerable thought has gone into what would be a suitable alternative criteria for identifying hazards that rise to the level that should be regulated under workplace safety standards.

Although we haven't identified any specific criteria we can say, generally, the concept

of the quantity of energy released, the ease and the rate at which the energy could be released, would be one area for exploration in how reactive hazards should be identified.

Also the issue of toxic chemicals should be considered. We know that in many cases in our data toxic byproducts were produced in chemical reactions. And as Lisa showed in the Whitehall Leather example, they can indeed result in injuries and fatalities.

That may be considered in terms of how to list hazardous chemical reactions for process safety standards. And, in summary, some of the issues that might need to be addressed are including the energy of reaction, the temperature at which the energy is liberated, the maximum pressure rise of a reaction, as measured in laboratory settings, or the rate of reaction, or some combination of all of those.

MR. MURPHY: I believe several of our panelists are going to speak to the same issue that Kevin just expounded on.

The second part of your question involves one of the themes of the investigation, which is, you

can't look at chemicals alone, and their intrinsic properties alone. You need to look at them in process specific conditions.

So the next step in the evaluation process would be to look at process specific conditions, are they likely to see if there could be potential catastrophic consequences.

You could look at things like loss of agitation, cooling pool, cooling off, heat on, and you can look at some likely scenarios to evaluate whether there is any catastrophic effects.

So like Kevin said, the intrinsic properties of chemicals lead you to the potential. But the manifestation of hazard has to also take into account the process specific conditions.

BOARD MEMBER ROSENTHAL: Thank you. I'm going to turn this over to Dr. Poje, who --

BOARD MEMBER POJE: Thank you, Irv. Just a couple of questions. I know we want to proceed to hear with everybody else.

But one of the things that we uncovered in the investigation of Morton is, obviously, the need

for addressing a more monumental study of reactive hazards.

Now, that wasn't based upon a thorough evaluation of all of the available data in previous incidents. I'm a little bit frustrated by the lack of comprehensiveness of those incident data sets.

Our friends at the NTSB seek to have the regulatory agencies, for which they interact with on transportation matters, build stronger data systems, so that high priority problems will be well recognized, and attentiveness can be handed to them.

So I would like to hear a little bit more about your analysis of the difficulties in pursuing pursuit of incidents, and what recommendations you might have, at this moment in time, about how to strengthen that system.

MR. MURPHY: I would like to pass this one on to Giby Joseph.

MR. JOSEPH: It is a very interesting question, Dr. Poje. Kevin and I faced this issue early on in the hazard investigation, as we searched for reactive incident data.

Like I mentioned in my part of the presentation, there was no one comprehensive data source that tracked reactive incidents. I believe we ended up searching over 40 data sources. We got real good at searching the internet, surfing it.

And I feel fairly confident that we have a fairly complete incident data for fatal incidents. But for less severe and near-miss incidents, the data is fairly conservative.

Now, recommendations for improving this process could be, you know, if someone could generate a data base that would specifically track reactive incidents, that would be a great help for industry, and also for government agencies, so they can track the progress of these incidents.

BOARD MEMBER POJE: Thank you very much. With that I think I will close the questioning for this period of time. Obviously the Board members will have access to the staff for further questions, in private.

But let's take our break now. And I would like to warn everybody that I will begin precisely at

11:05 a.m. So please, anybody who will be on the industry panel please be here at that point in time. Thank you.

(Whereupon, the above-entitled matter went off the record at 10:45 a.m. and went back on the record at 11:05 a.m.)

BOARD MEMBER POJE: Before we get started I just want to reiterate, once again, that we are engaged, right now, as a Board in a public comment period. And while we are most appreciative of people who are physically present today, and have offered their skills and talents, and observations to us in their formal comments, we would still welcome everybody's written comments.

And even those who have provided written comments today may want to reflect upon the hearing of today, and add additional comments to our record. We want to be as thorough and as comprehensive as we can be, and that requires input from more than just the Board and its staff.

With that I would like to bring us back into session, and ask that Don Connolley offer us his

comments on the reactive chemicals issues.

MR. CONNOLLEY: Thank you, Sir. Good morning. First I would like to introduce myself a little bit. My name is Don Connolley, I'm a manager of safety and health in the Americas for Akzo Nobel Chemicals.

I'm an active member of both American Chemistry Council Process Safety Subgroup, and it is the American Chemistry Council I'm here to represent today, as well as the Center for Chemical Process Safety.

I have a bachelor of science degree in chemistry, and a masters of science in chemical engineering, and I'm a certified safety professional. I have spent about 20, out of 23 years of my professional life, working on better and safer ways to use and manufacture chemicals.

I'm proud of the contribution the business of chemistry makes to the well being of our nation. As part of the country's critical infrastructure we make significant and sustained contributions to America's economic and national security.

We make thousands of products that make people's lives better, healthier, and safer. From medicines to medical equipment, from the space age materials used by the military in aircraft, to aviation fuel, and night vision equipment; from satellite communication systems to ensuring that the water we drink is safe and clean.

What is more, every other manufacturing industry in the United States depends, in some way, in the products of chemistry for their survival and growth.

I'm also proud of the industry's culture of safety, which goes back many years. The nature of our operations certainly requires it. This culture of safety has created what the Labor Department data reveals as one of the safest industries in the United States, and the world.

In fact, ACC was originally organized roughly 130 years ago, explicitly to improve safety of chemical distribution and production. We take safety and security of our facilities and employees very seriously, and as such are committed to working with

the Chemical Safety Board, and others, to minimize reactive chemical incidents within our facilities, and through the use of our products.

ACC agrees with many of the Board's conclusions from the recent reactive chemical hazard investigation. We would especially like to highlight the following points.

Guidance and training on management of chemicals, and potentially reactive chemistry is the best way to minimize chemical reactivity incidents. A number of documents are available that provide guidance on assessing and managing chemical reactive hazards.

A brief summary of this issue was recently published by CCPS on October 1, 2001, in a document entitled: "Reactive Material Hazards, What You Need to Know." In a dozen pages this document provides an overview of methods that can be used to identify the level of reactive hazard a facility might have.

CCPS is currently developing additional materials on this topic, including a tool to screen the processes and systems that use, manufacture,

handle, and store chemicals for potential chemical reactive hazards, and I'm proud to be a part of that effort.

These materials are expected to be available by the end of 2002. In addition other documents are available, most for the more advanced user, from CCPS, ASTM, NFPA, and others, and your group that was here a moment ago mentioned many of these, as a matter of fact.

Addressing reactive chemical hazards through a chemical list, as in OSHA PSM, or EPA R&P programs, is not appropriate. The reactivity of materials with one another is very, the very foundation of the science of chemistry.

Reactive chemical hazards do not lend themselves to chemical list-based rules. There are simply too many site specific and user specific issues that have significant impact on the level of reactive hazard present.

Moreover, the reactivity of a chemical is more frequently a function of the way the chemical is used, or what it is in contact with, rather than

innate properties of the chemical itself, as pointed out by your team.

The problem is actually not reactive chemicals, but reactive chemistry. As pointed out in a CSB document, a number of serious incidents have occurred which involve chemicals considered to be relatively low reactivity hazards.

When combined with other materials, however, these chemicals can produce very serious reaction. Thus we believe a chemical list based rule would be encyclopedic, but provide very little value in managing chemicals or reducing chemical reactivity incidents.

Another, though a less practical, alternative means to addressing reactive chemical hazards could be a performance based program. ACC believes it would be very difficult to develop a program that attempts to deal with the issue of reactive chemical hazards in a detailed prescriptive manner.

While these issues can quickly become complex, the solution may be as simple as don't mix

these chemicals together. We are not recommending the development of such a program at this time. However, if such a program is needed in the future, should one be founded on performance based systems, which are needed to address risks of reactive chemistry; two, address site specific extrinsic factors, such as sitting and proximity.

Three, address the situations that can create potentially reactive situations, rather than a list of reactive chemicals. And, four, consider the use of chemical testing only as an adjunct to the performance based program , not as a starting point.

The ACC appreciates the invitation to speak with you today, we look forward to working closely with the CSB, and others, to improve chemical safety. Thank you.

BOARD MEMBER POJE: Thank you very much, Don, and thank you for making your statement appropriate to the available time we have today. You and your members have been very helpful to our staff in the conduct of our work, so far, and we look forward to receipt of these comments, and future

comments, within the commentary period.

Now I would like to turn it to Chris Bagley, representing the synthetic Organic Chemical Manufacturers Association, and the Dan Chem Technologies, Incorporated Company. And thank you, also, for your assistance with some of the substantive field visit work for this particular study.

MR. BAGLEY: Thank you. Good morning, members of the Board. My name is Chris Bagley, and I'm the health safety and environmental manager at Dan Chem Technologies, Inc., at Danville, Virginia.

I'm appearing on behalf of the Synthetic Organic Chemical Manufacturers Association, or SOCMA, of which Dan Chem Technologies is a member.

Dan Chem is a small custom chemical company, with a single manufacturing site, employing about 110 people. SOCMA is the trade association that represents batch and specialty chemical manufacturing manufacturers, with a particular focus on the interest of small businesses.

SOCMA has 273 members, and over 75 percent of these are small businesses. I would like to turn

now, to how SOCMA and its members are addressing reactive chemicals.

SOCMA and its members have actively participated in the Chemical Safety Board's investigation. We, at Dan Chem Technologies, hosted a visit to our manufacturing site, to share our knowledge of batch manufacturing operations.

SOCMA has long recognized the importance of process safety. SOCMA's employee and process safety committee meets regularly to address important issues, and help members further improve process safety practices.

SOCMA has developed guidance to help members use the chemical industry's responsible care program to make a difference at their facilities. For example, the responsible care process safety code requires SOCMA members to identify potential process hazards, including those associated with reactive chemicals, and to assign appropriate action items to reduce risk.

This process, called a process hazard analysis, or PHA, is required for all processes, not

just those covered by EPA and OSHA regulations. Thus the process safety code reaches beyond regulations to establish practices for all manufacturing processes.

The responsible care product stewardship code recognizes that management of reactive chemicals is an issue that extends beyond the chemical industry. The product stewardship code thus requires companies to reach out and provide health safety and environmental information on all products to suppliers, distributors, and customers.

SOCMA routinely provides regulatory support, training, and workshops to its members on keep process safety issues. SOCMA also provides opportunities for members to benchmark their practices with others in industry.

For example, SOCMA and a number of other associations are currently planning a third annual PSM conference. I assure you that management of reactive chemicals will be part of this program.

SOCMA has been considering various issues identified by the Board during this hearing. SOCMA was particularly struck by a preliminary board finding

that over 90 percent of all reactive chemistry incidents involved chemicals with known chemistry.

Therefore a significant number of incidents should be prevented based on current knowledge. The key question is, how can this knowledge be used most effectively to prevent these incidents?

The CSB has asked whether expanding the existing OSHA PSM and EPA risk management plan programs would provide better protection against these types of incidents. Having considered this issue with its members, SOCMA does not believe that expanding these programs would significantly reduce the potential for future incidents.

In fact, in the Federal Register notice the CSB identified a concern, shared by SOCMA, that the list-based approach to reactive chemicals fails to address the hazards from combinations of chemicals, and process-specific conditions.

From SOCMA's perspective the goal is supporting safe use of reactive chemistry, and not further identification and listing of individual

reactive chemicals.

Efforts to reduce reactive chemistry incidents should be performance oriented, not chemical specific. What is needed is a multi-faceted analysis, such as consideration of the composition, structure, and properties of a number of substances, and their interaction in transformation by chemical reactions.

Accordingly, SOCMA believes the CSB should focus on two areas that have more immediate potential to reduce reactive chemistry incidents.

First, SOCMA recommends that industry and government agencies collaborate on improving access, by all industry sectors, to information on safe management of reactive chemistry. This effort should include both chemical specific information, and information on management of chemical combinations and processes.

As a second step, SOCMA recommends that industry and government agencies work together to promote the use of management systems that better integrate these process safety concerns into both chemical manufacturing, and use.

A central website can be used to post information and best practices. Companies could then find and use information pertinent to their own operations. Facilities could apply basic process management tools to analyze risks associated with the use of reactive chemistry at their sites.

Ultimately each situation needs individual analysis. SOCMA is committed to working together to help develop management systems, and tools, to assure that such analysis becomes an integral part of individual company operations.

I would like to conclude by assuring you that the chemical industry is dedicated to ensuring the safety of all of our processes. A failure to address health, safety, and environmental issues, can have a devastating impact on our own lives, on the lives of our neighbors, and on our business.

In a very real sense we view ourselves as being on the front lines in assuring the safety and well being of our community.

That concludes my statement, and I would like to thank the Board for this opportunity to speak

here today.

BOARD MEMBER POJE: Thank you very much, Chris.

I would also now like to introduce Bill Almond, and hear from his remarks. The National Association of Chemical Distributors has also been very generous with their time and perspective, to our staff, during the conduct of this study, and particularly welcome Bill to the podium today.

MR. ALMOND: Thank you, Jerry. Good morning, Board Members. My name, once again, is Bill Almond, with the National Association of Chemical Distributors.

We represent approximately 270 member companies across the U.S., representing about 1,000 facilities. We buy chemicals in bulk from chemical suppliers. We warehouse them. In some cases we repackage, and sell, and transport those chemicals to a customer base of approximately 750,000 customers.

A small percentage of our members do do mixtures and blendings. They are usually simple in nature. But, nonetheless, we do, we will take one or

two chemicals together, and blend them to create another product.

Most of our members do have warehouses, or bulk storage locations. As an industry we are required to report to EPA's annual toxic release inventory. The last three years that we've been required to report our totals have been 0.03 percent of the totals, or less.

We do have an industry environmental health safety and security program, known as the responsible distribution process, with a mandatory independent third party verification aspect.

Regrettably, in the last three years, we've had to terminate 20 companies due to non-compliance. We are beginning to start the third, or the second three year cycle of on-site verification, in July of this year.

It is a continuous improvement process. So whatever findings the Board concludes, we certainly would be very interested in knowing how it impacts our program, so we can update it accordingly.

We are in the midst of gathering data,

industry data, on our members, specifically with accidents, injuries and fatalities, to judge how well our program is having an impact in our companies.

We do support the Chemical Safety Board quite anxiously in its mission. Our president is Jim Colstat, he is the former chairman of the National Transportation Safety Board, under the Reagan administration. So safety is of the utmost concern to him.

Our members have lobbied Congress for additional funding of the Board so that it can fulfill its mission, its very critical mission. Most of our members do not fall under OSHA's process safety management regulation, less than 50 percent fall under EPA's risk management program.

We believe that through better collaboration with the Board we can develop safety practices above and beyond any existing or new regulations, and we certainly appreciate the time to join you today, and look forward to future work together.

BOARD MEMBER POJE: Thank you very much,

Bill. And now I would like to turn to Scott Berger, who is the senior manager for the American Institute of Chemical Engineers Center for Chemical Process Safety.

I just would like to note that in many of the Board's investigative works we use the CCPS reference material as a good practice guidance that should undergird the systems of safety and welcome you here today, Scott.

MR. BERGER: Thank you, Jerry. First a little bit about my own background. I have a BS and MS from MIT. I have been working for 25 years in industry in a variety of engineering and environment health and safety projects aimed at reducing safety accidents, and also environmental impacts.

I feel strongly about this subject, especially because I have personally witnessed, fortunately from a distance though, but witnessed two reactive chemical incidents.

The Center for Chemical Process Safety, or CCPS, which is a directorate of the American Institute of Chemical Engineers, or AICHE, is a not-for-profit

technical organization founded in 1985, in response to the incident in Bopal, India.

CCPS and its 80-plus industrial sponsors, are dedicated to improving chemical process safety across all industries. Over the past 17 years we published more than 70 books on the subject of process safety, and have also started several, and actually maintained several data bases in various aspects of process safety.

Since 1992 CCPS has undertaken several projects, which have been mentioned already, directly addressing the prevention of reactive chemical accidents, including the one project that is currently in progress, that Don Connolley has already mentioned.

This project will result in a book, before the end of the year, titled "Essential Practices for Managing Reactive Chemical Hazards".

This project, as all of our projects, are staffed and guided by people with expertise in reactive chemicals, and not only expertise, but also passion. They come from manufacturing and consulting companies across industry.

And the result is that we put together the best of the best practices available in reactive chemical hazard management. Last year we published a pamphlet which was titled "Reactive Chemicals: What you Need to Know". Copies of this pamphlet are available in the back of the room, and also on our website. I can also email copies to people who are interested.

Now, since CCPS is a technical organization, we do not normally advocate for or against regulations. But we do offer the following observations related to the questions that the CSB put in the Federal Register.

With regard to the use, or to coverage under PSM, or RMP, we also agree that the use of a list-based approach is not really appropriate for this type of a situation. We are concerned that such a list cannot be sufficiently complete or accurate.

It would be difficult to create and maintain a comprehensive list of unstable or self-reactive materials, whether it is for regulatory purposes, or otherwise.

A more effective way to identify such substances may be to define better criteria for reactivity. As difficult as it would be to create and maintain a comprehensive list of single reactive materials, it would be a virtual impossibility to maintain a list or table showing reactivity hazard with pairs, or even three way reactive hazards.

We do believe that for materials currently under the OSHA PSM standard, and also under the EPA RMP regulation, that the process hazard analysis provisions would be adequate to identify reactive chemical hazards.

Obviously materials that are not under those provisions are not required to undergo those type of techniques, but we believe they would still be useful.

In terms of additional activities that could be taken, we would recommend that OSHA and EPA, and others, conduct research on methods for anticipating unexpected reactions during process development and plant design, as well as during hazard reviews for existing facilities.

We also invite others to join us in advocating a multistep hazard identification process. Such as what will be published in our upcoming book. This management system has ten steps, it is well thought out, and will again be the best of the best practices available in industry.

We will describe the management process in our written comments. In terms of the second thing that we would advocate is additional education and training.

The American Institute of Chemical Engineers already has reactive chemical training courses available. And we believe that there is significant room for more training in this area.

So, in conclusion, I would say that there are no simple solutions to the issue of safely managing reactive chemical hazards. Companies must understand the chemistry in their processes, and that companies must have management systems to develop all the information they need to build and operate a safe process.

Most importantly there must be management

commitment to allocate the resources and expertise to build and operate a safe process. And large companies, such as our sponsors, in general have the resources to develop such management systems.

And we would ask, and perhaps offer some help, in how to ensure that smaller companies become educated on this issue.

Thank you for the opportunity to comment.

BOARD MEMBER POJE: Thank you very much Scott, and thank you to all of the panelists. I would now like to open the discussion period. And Dr. Taylor, if you would want to offer your first questions?

BOARD MEMBER TAYLOR: Sure, thanks, Dr. Poje.

I think ACC and SOCMA, Mr. Bagley and Mr. Connolley mentioned that a performance based approach would be one that you would recommend. And I was just wondering if you could expound a little bit on that.

MR. CONNOLLEY: Some of the things that we do at Akzo Nobel, and I know that many other companies do, we rely fairly heavily on process hazard analysis,

tell you that you may have a problem, then you may go into some screening testing. But jumping into a testing program right away just isn't going to be efficient.

There are just so many things, as your project team mentioned very eloquently, the nature of the system that you are dealing with, and so many perturbations there, that a testing program right off the bat isn't going to be effective.

But you can do an awful lot of evaluating the system through screening techniques, through literature reviews, through a process hazard analysis. And I think that is where an awful lot of it, where we want to start.

BOARD MEMBER POJE: Dr. Rosenthal?

BOARD MEMBER ROSENTHAL: I have a couple of questions I would like to ask.

One of the things raised by the Board's investigation team, was that reactive hazards incidents occurred in both what is commonly accepted to be a process environment, you are intending to mix more than one material and create a different

material.

Or in what we would call a non-process environment, the purest stage being your storage tank intermediate between chemical producer and some of Bill Almond's customers.

Would you think that there ought to be one standard in terms of reactive hazards, if OSHA or someone were to choose to do so? Or would you need two different types of approaches, the one dealing with unintentional admixture, and the other one dealing with intentional actions? Brief comment on that?

MR. ALMOND: That is a good question, Dr. Rosenthal. And I notice that, again, 30 percent of the incidents happened with storage handling in our consumer sites. I would be interested to see a further breakout of that, to determine how much of that 30 percent is storage, how much of it is handling, how much of it is at the consumer site.

I don't know the correct answer to your question. I think that any additional guidance that we can have on mixing chemicals together,

particularly before our smaller companies, who may have five employees, would be very beneficial to making those safer.

BOARD MEMBER ROSENTHAL: Thank you. And, one more question, I've been told. So, Scott, I don't want you to feel bad. Mr. Berger.

CCPS, I think you mentioned that you were doing additional work. One of the conclusions drawn by the Board's investigation team, or two of the conclusions, had to do with the need for better data sources, and the need for better guidance.

Could you comment whether CCPS is doing anything in these regards, and briefly what the nature of those things are?

MR. BERGER: Well, as I mentioned in my remarks, we are developing a book, another book I should say, in managing reactive chemical hazards. That book will put out a ten step process for managing reactive chemical hazards, and is being contributed to by experts across industry.

When that book is complete, as we do with all of our books, we put them out for a peer review,

and perhaps the Chemical Safety Board would offer some guidance as to other sources of peer review that might want to have a look at that book.

I think the other thing that we could talk about is data bases. Now, currently CCPS has a process safety incident data base. It is not specific to reactive chemicals, and in fact, in order to protect the anonymity of the companies that participate in this project, or in this data base, we talk about classes of chemicals, rather than the specific chemical names.

However, I think that type of approach might be effective for collecting the information, and making it more available in terms of reactive chemical interactions.

BOARD MEMBER ROSENTHAL: Thank you.

MR. CONNOLLEY: May I add to that point, briefly?

One of the aspects of the book that Scott mentioned, we recognize that many of the incidents that have happened, people didn't realize that they had a potential problem. And I think that several

other members of that committee think that one of the things that is necessary is to help people recognize a potential problem.

So one of the things that are in that book, that we are working on, is a preliminary screening tool that can help answer that question, do I have in my situation a problem, here?

BOARD MEMBER POJE: If I can just ask a question, quickly.

One of the observations from our staff's presentation was that there is a significant amount of information, test data that seems to be available, maybe even membership of ACC who would be willing to, perhaps, make that more shared.

As well as the understanding that the lessons learned from past incidents are extraordinarily important to share beyond the place that had the incident, so that others might benefit from learning from that.

Any suggestions, from any of the panelists, on how we can more effectively ensure that such information is made more readily available, and

shared within the industry?

MR. CONNOLLEY: I think some of that was touched on, earlier, with the question that Dr. Rosenthal had.

Recognizing there are some potential barriers of proprietary information, concerns about liability, personally I'm all in favor of that sort of thing. I think that sharing is an excellent way. Some of our businesses participate in industry organizations where there is sharing, and some of the organizations that I participate in there is sharing.

You've just somehow got to get around the lawyers, unfortunately, especially where there is potential litigation, or is litigation, that barrier of the worry about liability is a big one.

BOARD MEMBER POJE: Okay, thank you very much, I thank you all for your comments today. And I would, again, encourage you to share them with your fellow members and your associations, and seek to have them also provide us input for their perspective on the important questions that we framed in the Federal Register notice.

BOARD MEMBER TAYLOR: Do we have written comments, have you all submitted written comments? All of you have, okay.

BOARD MEMBER POJE: Thank you all. If I could now ask for the next panel to come before the Board?

(Pause.)

BOARD MEMBER POJE: Thank you very much. I would like to now introduce Glenn Erwin, who is the health and safety coordinator with the paper, Allied-Industrial Chemical and Energy Workers International Union, better known as the PACE union.

And, Glenn, it is nice to have you here, once again, in Paterson. I believe you were with us two years ago, when we introduced the Morton investigation.

MR. ERWIN: Yes, I was. Thanks for the invitation.

I will limit my comments to the record for the problems due to the lack of information sharing within the petrochemical industry.

As the Board and the Staff found out

during the recent reactive hazards study, even the Board could not get adequate information about reactive incidents from industry, or from the industry trade groups.

And I will submit to you that without the open dissemination of information, and stricter regulations, nothing will change in our industry.

You know, it is a wise person who learns from their mistakes, but it is an even wiser person who learns from the mistakes of others. And I'm ashamed to admit to you that for the most part the petrochemical industry does not fit into either one of those categories.

Every reactive incident where people have been seriously injured, or killed, that I have investigated or reviewed, could have been prevented if, number one, the equipment had been designed to handle the worst case reaction possible.

Number two, if the information about the reactivity properties of the chemicals being used had been fully communicated, and understood by both management and the workers at the site.

And, number three, if previous incidents and near misses were investigated, and the recommendations from those investigations were followed through to completion.

First I would like to discuss the issue of equipment. All -- there are two approaches to the design of equipment associated with reactive material. The first way is to design it to contain the worst possible reaction.

The equipment must be able to withstand the greatest pressure, or temperature possible by the reaction. This is expensive, and is rarely done, but it gives the greatest measure of safety.

The second option is to design it to where it can mitigate the worst reaction if that so takes place. This would require ways to automatically vent the pressure, reduce the temperature, or to kill the reaction from taking place.

If you look at any reactive incident you will find the equipment was not designed to contain the reaction, or the mitigation systems either were not in place, or failed.

The second item is information about the reactivity properties of the chemicals. I have investigated an incident not long ago, and was informed by the chief chemist of the corporation, that he had concluded that the reactive material that was in this vessel could not have possibly have caused the explosion.

And every person at the site, without exception, was unaware of how violent reaction was possible due to that chemical that they worked with every day.

But after completing an independent investigation it was, that was conducted, it was determined that the explosion was, in fact, due to the reactive material.

You see, there is a major gap in how we analyze and understand reactive chemicals versus flammable materials. We put a lot more emphasis on the flammability of a chemical, even if it may be reactive.

And the third item is that all incidents and near misses must be investigated and the

recommendations from those investigations must be followed through to completion.

Then the lessons learned have to be shared. First we have to learn the lessons, then we have to be able to share them. But we do have some problems with this concept.

Recently I sat in a meeting room with a management team from a major petrochemical company. And I mean a major petrochemical company, discussing the concepts of investigations and information sharing.

To my amazement their position was, concerning the investigations, was to conduct as few of them as possible, because they felt that conducting an investigation on a minor or less serious incident, would only create a paper trail that when they had a more serious one, they would have -- it would increase their liability.

On the issue of information sharing, they were totally against that concept, too. Because they explained to me that there was such competition between plant sites for the corporate dollars, that

they considered anything they learned, as due of an incident there, to be of an economic advantage, even against their sister companies, and they certainly wouldn't consider sharing it with someone outside the company.

So that is the type of problems that we go up, that we are up against. They are scared to death of the legal ramifications, and also they consider it an economic advantage for any lessons that they learn.

We, at Pace, have conducted and reviewed many investigations. Every serious incident had warning signs, had we investigated the less serious incidents, or the near misses, we would have been able to have prevented the major incidents from occurring.

In summary, existing litigation must be strengthened, or new regulations must be passed to require, number one, that equipment that contains reactive material must be designed to contain the worse case reaction. If it can contain it, then we can safely operate it.

Two, all process information relating to reactives must be thoroughly communicated and

understood by all that worked from the design to the disposal face of that material.

And, number three, we suggest a depository of lessons learned from reactive incidents must be established. To learn these lessons it becomes necessary to require that all incidents and near misses associated with reactive excursions be investigated and reported to the depository. Thank you.

BOARD MEMBER POJE: Thank you very much, Glenn.

And now I would like to introduce Eric Frumin. Eric is the director of Occupational Safety and Health for the Union of Needletrades, Industrial and Textile Employees, better known as Unite. Eric?

MR. FRUMIN: Thank you very much. Unite represents about 250,000 workers in the U.S. and Canada, including about 20,000 who handle chemicals of one sort or another. And we represented the workers at the Lodi plant.

In October 23rd, 1995, along with the other unions here, and the AFL-CIO, we petitioned OSHA

to close the loopholes in the PSM standard, and the HAZWAP standard on emergency response, as well.

I won't take the time to recount the facts of that incident. Most of them have already been introduced into the record. This investigative series by the Bergen record in '95 clearly identified many of the key factors, including the uncontroverted evidence that the vice president for regulatory affairs at Napp Chemical, Fred Schafer, had a criminal history.

He was an accomplice to a guy who did time for a felony conviction for mishandling chemicals in a private business he was running on the side, and he personally stole electricity from the local utility.

He had misrepresented his credentials, and the Napp managers above him, the people who hired him, misrepresented his credentials, he lied about ever having gone to graduate school, lied about his D average and his lousy BS degree at the University of Rochester, in chemistry.

That is the kind of chemical industry management we are dealing with here today, folks, it is not just the people who appear before you.

The other obvious facts are the OSHA citations at Napp, the OSHA/EPA report, the peer review on the OSHA/EPA report. They are in the record.

Management incompetence, and unfortunately, as we've seen at Napp, even corruption are at the heart of the problem. In light of the easy availability of the information about severe reactive hazards from the chemicals used at Napp, the underlying cause of the death and destruction was the demonstrable incompetence of the managers at all levels of that company.

The management of the Napp company was small. Total employment was only about 140 people. Indeed, these associations whom you've heard from said, repeatedly in the past, they don't belong to us, they are not part of SOCMA, not part of the Chemical Manufacturers Association.

The owners of Napp were not small. The Sackler brothers, physicians both of them, own the Perdue company, at the time about a 700 million dollar corporation, today about a billion dollar corporation.

One of them was knighted by the Queen of England about a year later, for their philanthropy.

It is not enough for the Board to merely recognize the incompetence and blatant corruption in the management structure at Napp. Notwithstanding the well known best practices on reactive chemical hazards, followed by some chemical companies, and we salute those who do, we are anxiously awaiting to hear from the individual companies who carry out those best practices.

The fact is the repeated failure of corporate management throughout the nation to recognize, evaluate, and control reactive hazards, identified so vividly in the Staff's analysis, this demands that the Board adopt the most forceful position possible on this question.

The shameful record by chemical companies, large and small, requires you to act forcefully and soon. If executives as sophisticated as the Sackler brothers could construct such a horrifyingly incompetent and corruptive management structure, then we must greatly improve our vigilance against the

merely incompetent.

If these same corporate executives believe, for one minute, that airplane pilots, air traffic controllers, or mechanics, suffer the same outrageous weaknesses as plant managers in the chemical industry, the cry for new regulations would be deafening.

Second, OSHA's failure to close the loopholes for reactive chemicals in the PSM standard is completely inexcusable, and requires a forceful response from the Board.

In the interest of time I will skip the horrendous chronology that OSHA has compiled. Suffice it to say that the very associations who just left this table, both in October of '96, and in February of '97, presented these documents to OSHA, opposing any change in OSHA standards on reactive chemical hazards, until the CCPS release of their new guidance document in October, they made no useful contribution to the agency's search for ways to control this.

And now OSHA has dropped the PSM standard from their list of regulations. We know that the

chemical industry has made major political contributions to the administration. To us it is a simple question that the industry speaks out of one mouth here, and speaks out of a completely different mouth in Washington.

There is no question that the PSM standard was on the hit list of corporate management who wanted to oppose OSHA regulation. And you, the Board, have the obligation to help remedy that problem.

It is simply beyond us to believe OSHA's claim that they dropped the PSM standard because of "resource constraints, and other priorities". So the de facto repeal of the OSHA Act must stop.

OSHA has simply forgotten its mission. You have the authority to create the compelling arguments to identify and control these reactive hazards. The American people deserve to know those arguments, to hear them from you, and we implore you to advance these ideas with all the resources at your command.

And I would like to present to the Board a copy of the original Bergen record series, which I

will put into the record as well. Thank you.

BOARD MEMBER POJE: Thank you very much, Eric. Now I would like to introduce Mark Dudzic. Mark is the president of PACE local 1-149. That was the local that represented the work force of the now defunct and deceased facility here in Paterson. Mark?

MR. DUDZIC: Good morning. I want to thank the Board for again coming to Paterson. I think it is a very significant move that you chose to go out in the field to hold these hearings, and to talk first to the victims of reactive chemistry, as it is currently practiced.

I am president of local 149, we represented the Morton Plant here in Paterson, and we also represent a number of other small chemical and pharmaceutical production plants in the New Jersey area.

And I'm going to try to focus my comments on the inadequacy of the current OSHA process safety management standard. And I'm going to try to do that in the real world, not the world of what should be, and what might be.

In the real world the first thing that happens, whenever there is a reactive chemical incident in the real world, is that the companies hire lawyers. I know that one of the industry people spoke about the lawyers being a problem, but they are the ones who usually hire them.

They hire lawyers who try to convince OSHA that the process involved is not covered under process safety management. That is the first thing that most companies do. In both Morton and Napp they were successful in convincing OSHA that they had no regulatory authority under process safety management.

At Morton the two chemicals that were involved in the runaway exothermic reaction had NFP reactivity ratings of either zero, or were not covered under the NFP reactivity standards.

Although a later step of the same manufacturing process, a step that involved the use of xylene was covered under process safety management, the company was able to demonstrate to OSHA that the step that caused the explosion was not technically covered.

So what happened? OSHA ended up issuing a citation under the general duty clause, and levying a small fine of 7,000 dollars to this company, which had no effect, I would submit, on the entire industry in terms of the need to regulate reactive chemistry.

Now, to OSHA's credit, they did understand that the real need in the Morton case was to utilize PSM methodologies in all phases of the manufacture of this product. And they did insert an unenforceable abatement note in the OSHA citation.

And I want to read this to you, because it is really illustrative of what OSHA, on the ground, understands is the limitations of the current standards.

They wrote in an abatement note: A comprehensive process hazard analysis designed to identify, evaluate, and control the hazards involved in the process, is recommended. This analysis should include an emphasis on the potential for uncontrollable exothermic reactions.

The results of the process hazard analysis should be reflected in the standard operating

procedures used by operators to manufacture the product.

Members of the Board, I submit to you that when the agency that is in charge of enforcing regulations to protect American working people, in their work lives, is reduced to using the words like recommend and should, in their citations, there is something horribly wrong with the regulatory process.

Now, this is not the first time in my own local that a company has attempted to wiggle out of the process safety management standard. In 1996 an uncontrolled exothermic reaction involving calcium carbide and water at a BOC acetylene plant in Middlesex, New Jersey, created a fireball that sent two workers, members of my local, to the hospital.

In that case the company claimed that on the actual day of the explosion, that they had less than the threshold amount of the covered chemical on site.

Any approach to reactive chemistry that relies on lists of chemicals, NFPA ratings, and threshold amounts is flawed. Under current conditions

many chemical reactions can produce catastrophic consequences.

OSHA regulations must be broadened so that all reactive chemistry is covered. The second point I would like to make, quickly, is that even if a reactive process is covered under PSM, the standard itself is inadequate to protect the workers from the consequences of uncontrolled reactions.

Again, in the Morton incident, despite the fact that the company claimed it wasn't covered under OSHA, the company did attempt to do a process hazard analysis. That analysis did not require a literature search, didn't require pilot testing under actual conditions, or more effective understandings of reactivity.

It didn't even require them to go back to earlier studies that the company themselves had undertaken in this area. And without this crucial information, the committee that did the process hazard analysis, which included members of my union, who received some significant training in this, that committee had no way of knowing that the process was

always, from the very beginning, in eminent danger of becoming a runaway reaction.

And the operators who followed the instructions on the batch sheet, had no way of knowing that they were following a recipe for disaster.

We heard about best practices today, best practices are great. But I would submit to you that they are not a substitute for effective regulation. And in light of the conclusions on reactive chemical safety that were reported today by the Safety Board, here, OSHA's recent decisions to remove reactive chemical safety from its regulatory agenda, is unconscionable.

My union today calls on OSHA to expand and develop standards that will protect workers from all reactive chemical incidents. Thank you.

BOARD MEMBER POJE: Thank you very much, Mark. Now we would like to hear from Mike Wright, who is the health and safety director for the United Steel Workers of America. Mike?

MR. WRIGHT: Thank you, Dr. Poje. Let me say a couple of things about the union. We represent

600,000 workers in the United States and Canada, mostly not working in the steel industry.

As many as 50,000 work in plants where a catastrophic chemical accident could threaten their lives, or the lives of their neighbors. And, in fact, that has happened on several occasions.

We are the union that represented workers who were involved in the Charleston, South Carolina incident in 1991. We had another incident involving a runaway fire, and a strong oxidizer, which we had not thought of as a reactive chemical incident, but it certainly meets the definition that was put forward on the board today.

That killed two workers. We've had a number of other near misses. So it is not just a potential risk, it is a risk that has actually caused death and disability.

Happily the risks, over the years, have been reduced by OSHA's chemical process safety standard, and by work by unions, and by the industry itself. Yet as the Board's own report, other testimony today, and most recently the Chelsea

accident, have shown much remains to be done on the issue of reactive chemicals.

We are very grateful to the Board for addressing this issue, and I think your work on this really shows the fact that the Board has great promise, and can do great things.

My own involvement with process safety began in 1980, when our union negotiated comprehensive contract language aimed at preventing the release of lethal levels of carbon monoxide in the steel industry.

Based on past rates that language has probably saved about 50 lives. We didn't call it process safety management, but all of the elements were there.

USWA was also active in the attempt to, in the successful attempt to establish the OSHA chemical process safety standard, even before that standard was proposed we did extensive training on the issue for workers and managers, in our work places.

We've also been involved with work with the ILO, and the OACD on what those organizations

call, in european lingo, major hazards.

Early in 1984 I was part of a trade union team that traveled to India to help investigate the Bopal catastrophe. Of course Bopal remains the greatest industrial accident in history, and one that continues, with victims continuing to die at a rate of one or two per week.

It is important to remember that the Bopal release was caused by chemical reactivity, in this case a reaction between a process chemical, methyl lysicionate and water. Methyl lysicionate is now, of course, covered by OSHA's chemical process safety standard, they wouldn't dare not to.

But it is questionable whether it would have made the list on which the standard is based, had not the Bopal accident occurred. It is also important to remember that Union Carbide, the company responsible for Bopal, has charged that water got into the MIC through an act of sabotage.

Our investigation, and others, concluded that a line washing operation, coupled with un-evaluated changes to the plant piping, is a much more

likely cause. However, Union Carbide did succeed in showing that sabotage would have been relatively easy for a determined terrorist.

So addressing this issue of chemical reactivity is also important in the effort to protect Americans from a terrorist attack.

Since time is short I would like to talk just about two points, about the kind of action the Board should take. Others, of course, argued eloquently for the need to take action.

First, it will not be enough to simply transmit a general recommendation to OSHA. History has shown that OSHA needs a great deal, let me say this politely, encouragement, instead of pressure, to act.

OSHA's two most important chemical safety standards are hazard communication and chemical process safety. In neither case did the agency set those standards voluntarily. In 1981 OSHA withdrew a draft HAZCOM standard, and removed the issue from its regulatory agenda. Sound familiar?

They reversed their position only after a

dozen states had passed chemical information laws, and only after those conflicting laws showed the need for a uniform federal standard.

The Bopal accident, and several chemical accidents in the United States, clearly showed the need for an OSHA chemical process safety standard as early as 1984. But OSHA began serious work on that standard only after Congress ordered them to, six and a half years later, in the 1990 amendments to the Clean Air Act.

Today, of course, the agency is justly proud of both those standards, and they've done a generally good job of enforcing both. Some day OSHA will, no doubt, be proud of their new provisions on chemical reactives.

But for that to happen the Board and others will have to keep up the pressure, forgive me, encouragement. And it may be necessary for the Board to work with Congress, as well as the Labor Department and EPA.

Second, the Board should be prepared to craft a specific detailed recommendation on how

reactives might be covered in regulation. I have great respect for the staff of the OSHA standards office.

But the expertise on chemical reactives lies with the Board, and with your staff. Of course it would be very useful for the board to promptly transmit a recommendation to OSHA and EPA, that they add chemical reactives to their regulatory agendas and begin work.

But the Board must stay involved in this process, working directly with the agencies, labor and industry, if possible. But if OSHA and the EPA do not wish to work with the Board, then the Board should write and recommend a standard, on its own, including the Congress, if necessary.

That concludes my remarks. Thank you, again, for your attention to this issue.

BOARD MEMBER POJE: Thank you very much, Mike. And now I will turn to the last mike on the panel. Michael Sprinker is the health and safety director for the International Chemical Workers Union Counsel, part of the United Food and Commercial

Workers International Union.

The Board has had some exposure to the work force represented by the Chemical Workers Union Council, in our investigation into the Candia Vista incident. Mike, it is nice to have you here.

MR. SPRINKER: Yes, thank you for the opportunity to appear before you today.

One of the things, in addition to being the health and safety director for the Chemical Workers, is I did spend 8 years at Oregon OSHA on the enforcement side, and went through all of OSHA's process safety management training, including team leader training back in '93, being the first class to have done that.

Which gives me, certainly, some appreciation for the quality of folks who are out there enforcing those rules. And also the massive job it is to do that. Plus, of course, some of the pitfalls in the rules, too.

I had planned to address the issues of EPA's regulation of reactive chemicals, but I think the report of the staff pretty much says it all.

Preliminary conclusions number 4, EPA states that it could not identify or develop criteria for listing reactive chemicals.

And in the second part of that, over 60 percent of the incidents were not covered by these EPA process safety regulations. As I was digging through things, I noticed the '96 letter, which the Chemical Workers had sent to EPA asking about how reactives were covered.

And as I recall the answer is fairly minimal. But that lays out most of the problems of the EPA risk management planning rule. And I won't get into the apparent lack of enforcement, or advisory activities on the part of the EPA.

You just basically have to go to the EPA office of solid waste emergency response website to see that. And I also won't dwell on the lack of worker protection against discrimination for any workers, or union folks, who participate in EPA R&P inspections, whenever those things actually happen.

And the fact that there are no walk-around rights for workers, either. And to be involved in

those inspections. Certainly two glaring problems with EPA risk management planning rules.

And while EPA, while R&P was meant to protect the public, you also have to look at the fact that -- in fact, you take a look around Paterson, or any industrialized area, and you will see that the nearest public to a lot of the plants are workers in another plant.

And their rights for information about hazards in those plants is pretty minimal. R&P is also meant to protect emergency responders who in a large number of states have no protection under OSHA standards, because in most states emergency responders are second class citizens when it comes to worker protection.

But we strongly believe that in addition to changes under, that OSHA needs, you know, EPA had the same legal charge under the Clean Air Act amendments, to address catastrophic chemical incidents.

And it certainly didn't meet that charge when it came to reactive chemicals. So strongly

recommend the Board make a very strong recommendation. And as brother Wright has said, and other folks here too, it needs to be in some detail, that R&P be adjusted to deal with the hazards of reactive company.

In fact, you only need to take a look, as one example with what the health and safety executive has done in the United Kingdom, with their document in designing and operating safe chemical reaction processes. It is a very good guideline. It shows that things can be done.

We've suffered, our members have suffered injuries, loss of life, and loss of employment due to reactive incidents. And I will just briefly mention a few of those.

As you mentioned Condia Vista, just a few hours down the road, down I-95 here, in Baltimore we had aluminum chloride, water, and steam reaction, releasing hydrogen gas, and hydrochloric acid in a reactor during cleaning, and trying to free up a bunch of gunk in that, causing an explosion.

And one of my members said that if he had been a little bit faster getting some work reports

out, there would have been two or three people right out in the blast zone. So he said he was very happy he was a little bit slow that day.

And that was a reaction which was really caused, in fact the company did a pretty decent investigation, along with the union. One thing it did point out, though, was a lack of staffing, a lack of not enough engineers, technical support, or workers.

Which is a big problem in industry these days, with downsizing. In fact, that is one reason why we couldn't have one of our folks here today, was because of that.

Let me jump over to another case, one of the major corporations in this country, used to be an operator at a Department of Energy weapons facility in Oakridge, had a release of sodium potassium alloy.

Followed what their procedure was, put some kerosene on it, let it sit around for a while. Unfortunately it formed a superoxide, which was a hazard the company knew about in other parts of the facility.

And resulted in one horribly serious burn,

and eventually one suicide. Again, a lack of data sharing, even within the same company.

I'm going to bring this to a quick close, but just one other major point is that, you know, we agree that a list of chemicals aren't really the answer. We are looking at, it is really understanding the reactions of multi-component systems.

Unfortunately employers, both small and large, won't do anything unless they are regulated. I have personally seen some very great improvements in management cooperation with hourly workers on process safety.

But that came after the PSM standard mandated worker involvement. You see that in the paper industry in the northwest, where I spent a lot of time, chemical plants throughout this company.

And plant managers themselves have told me that basically they started doing that because of the standard, and it really worked out. There is also a need for something like a reactive data sheet. I was happy to hear industry talk about this.

It may not address all the hazards, but it

needs to certainly be structured to ensure that it leads the users, which includes chemists, engineers, workers, supervisors, and so on, to investigate further, and to find those problems.

Since neither OSHA and Department of Labor administration, or EPA administration seem to be willing to work on this issue, it is really critical that the Board does push this. If you don't push it, it is going to go nowhere.

So with that I will leave you with time for questions.

BOARD MEMBER POJE: Thank you, Mike. We have time for, I think, one question. Andrea, would you like to --

BOARD MEMBER TAYLOR: I just have one question. Thanks for the panelists, and your comments. I appreciate all of them.

The one question that I have, and it is regarding, several of you addressed the issue of OSHA removing the PSM standard from its regulatory agenda. Let's say if OSHA added the PSM standard back to its regulatory agenda, given the conclusions that have

been made by our staff regarding the NFPA ratings, the lists, limited lists, inadequacy and all, what would you recommend to the Board that we recommend to OSHA?

And that would be the same for EPA. And I know that is sort of like a broad -- but that is what I'm looking for. And it may take a long time, but maybe -- I know these people can be long.

MR. FRUMIN: We are prepared to provide to the record, following all the testimony today, a more detailed set of recommendations. We've already done quite a bit of work looking at how, for instance, the health and safety executive document fits, how it interlaces with the existing PSM standard, to close some of those loopholes.

So you can expect to see a recommendation for us that takes some of the good work that the health and safety executive has done, and fit it into the PSM standard.

I think Mike Wright's point is essential, that you have to give OSHA a very simple draft regulation. Short of that, even when they develop the political will, whether it is because of congressional

action, or other reasons, they need your guidance.

And we will be providing additional detail.

BOARD MEMBER POJE: Thank you all, thank you very much for you -- one more response.

MR. SPRINKER: I think one critical thing in this, too, will be the need to ensure that the scope is not so narrow as the PSM standard scope is. Because we can clearly see that we've got incidents in warehousing, and so on, things that would never have been covered under the scope of the PSM standard.

So I think that needs to be a clear charge to OSHA that the reality of the scope needs to be broader on the reactive chemicals.

BOARD MEMBER POJE: Thank you all for your time and your presentation. Again, we welcome the written comments, as well, more detailed comments than you presented here.

We will convene, once again, promptly at 1:10 this afternoon. Senator Corzine will start off the afternoon sessions. Thank you.

(Whereupon, at 12:13 p.m. the above-

entitled matter was recessed for lunch.)

A-F-T-E-R-N-O-O-N S-E-S-S-I-O-N

1:10 p.m.

BOARD MEMBER POJE: If I could call everybody to attention, please? We are going to begin this afternoon's session with a slight change in the agenda.

Something very unusual has happened here in northern New Jersey, that Senator Corzine is encountering some traffic difficulty getting here, and we are, therefore, going to switch the New Jersey panel to come on first, and then we will hear from the Senator when he arrives.

I would like to, before they come to the table, also announce that the Chemical Safety Board is webcasting this hearing, it is being webcast live. But the archive of the webcast will also be prepared, and up on our website, we believe, within two days from today.

So those of you who wanted to share it

with other people, or give people access to the information, let them know. We hope to have a webcasting availability of this hearing for other people to see after the hearing.

I would also like to remind people that we are taking public comment after the panels today. And if you want to, please sign up outside of the room.

With that I would like to ask Samuel Wolfe, the Assistant Commissioner for Environmental Regulations for the State of New Jersey, and Mr. Rick Engler, to come to the table.

We are very thankful to be granted the hearing room from the city of Paterson. But we are also quite thankful for the leadership in the State of New Jersey, for working diligently on issues of chemical safety and for trying to build a strong community across the management, labor, and governmental sides, to improve the way we ensure our public health and safety, and occupational health and safety, from chemical management.

If we could have Mr. Wolfe offer us his comments now?

MR. WOLFE: Good afternoon. My name is Sam Wolfe, and I'm the Assistant COmmisioner for Environmental Regulation at the New Jersey Department of Environmental Protection.

I would like to thank the Board for holding this hearing, and for giving me the opportunity to present the DEP's views on regulatory options for the safe handling or reactive chemicals.

New Jersey is the nation's most densely populated state. We also have a large number of facilities that produce or use highly hazardous chemicals. As a result we have to be especially diligent in protecting the public against the threats that are posed by these substances.

We've heard the Board's key findings this morning about the shortcomings in current efforts to regulate hazards from reactive chemicals. We agree that we need to do better.

We need to start filling the regulatory gaps, the gaps in the EPA's rules for preventing accidental releases, and in OSHA's rules for assessing the risks of using reactive chemicals in manufacturing

processes, and in evaluating alternatives for reducing those risks.

We need additional safeguards to protect workers, and the public, from accidents caused by uncontrolled chemical reactivity.

In New Jersey we also have an opportunity to do more to protect workers and the public under our own program, the Toxic Catastrophe Prevention Act, or TCPA. TCPA was enacted in 1986, shortly after the tragic accident in Bopal, India.

More than 15 years later TCPA is the basis for the nation's most comprehensive program to prevent accidental releases. Our TCPA rules are due to be reviewed in a little bit over a year, in June of next year.

We now have to review those rules, determine whether they are still necessary and appropriate, and figure out exactly what changes we need to make.

So the ability to regulate reactive chemicals is at the top of our agenda, as we look at the changes that we need to make.

Starting this summer we are going to be asking the regulative community, labor representatives, and environmental organizations, to join a workgroup to explore the most viable options to minimize the risks that are associated with reactive chemicals.

This type of workgroup process has brought us excellent results in the past, and I think you are seeing something similar in the panels that you've convened today. When we first established the TCPA program, and whenever we've made major changes to the program, we've reached out to the regulative community, and to labor and environmental groups, so that we can tap into the expertise that is there, the technically expertise, the operational expertise, and the practical on the ground day to day expertise.

This kind of cooperative approach I think has brought us much better rules than we could have gotten if we didn't do this kind of outreach. So extending that approach to the implementation of our program, has also brought us better results.

We found it very effective to use our

inspections to emphasize compliance assistance. A typical TCPA inspection will be performed over the course of an entire week, where we work with a facility to examine alternatives, in many cases involving the use of innovative technology to bring the facility into compliance, and reduce risks.

What often happens is a side benefit, is that implementing the changes that are needed shows the possibility of yielding some efficiencies that can pay off with increased profits for the facility.

In other words, doing what makes sense from the standpoint of protecting public health and safety, also shows the opportunity to do things that make economic sense.

Now, given our cooperative approach, both to getting our rules right, and to implementing our program, I'm not going to try to prejudge where we are going to end up with our workgroup efforts. But at this point I do know some of the questions that we are going to need to be asking ourselves.

As I think you've heard from everybody who has sat at this table, today, the key issue is going

to be determining what must be regulated. The success of any process, safety or accidental release prevention program, depends on what criteria, or what methods are used to identify the substances that are to be regulated.

Now, OSHA is already regulating some reactives under its process safety management program. The EPA's risk management plan program currently doesn't address reactives.

But what the history is showing us is that neither set of rules is yet doing enough to protect the public, and workers, from explosions caused by reactive substances.

Now, in deciding how to regulate reactive chemicals we have a number of choices that we have to make. We've talked about the limited universe covered by OSHA's PSM program. We've also heard some discussion about the limitations of the NFPA category 3 and 4 lists, which the State of Delaware is already using in its accidental release prevention program.

We have other lists that we can refer to. We can also look to the U.S. Department of

Transportation list, or tables of hazardous materials. But everybody has said, again earlier today, all these lists have their shortcomings.

Most importantly, they are based on the reactive properties of the individual listed substance. They don't include the reactive hazards of chemical mixtures, which brought us both the Napp and the Morton incidents.

In addition to Napp and the Morton incidents involved reactive chemicals that were not listed as an NFPA 3 or 4. So that is just, again, the need to go beyond those lists.

Now, where this is leading is just a recognition that anything that we are going to do to try an expand our TCPA program to cover reactive chemistry is going to be an incredible challenge.

And I have to ask what should be the goal that we set. What we've heard today is showing us that getting a comprehensive program that is going to address every kind of risk that is out there, is probably going to be beyond our reach.

But what I'm not ready to say is the fact

that it is impossible to do everything should stop us from doing anything. We have to get started somewhere. And so that is why I'm hoping that this process that we are kicking off soon is going to bring us some, at least, some steps towards regulating reactive chemicals.

Now, aside from the open questions about what substances should be regulated, I would also like to talk about some practices that we have under our TCPA program, that should be considered for implementation at the federal level.

One practice is conducting periodic audits. In New Jersey we have internal and external audits to determine if a facility is in compliance with its risk management plan, and the compliance of the RMP with the applicable regulatory requirements.

Risk reduction efforts resulting from these periodic audits have been an important contribution in New Jersey to the prevention of catastrophic incidents.

Another important feature is risk assessment. TCPA requires risk assessments, where

facilities perform consequence and likelihood analyses to evaluate the need for additional risk reduction measures.

The risk assessment is an important extension of the process hazard analysis that is already provided for in the federal rules. One area where we would also like to see some improvement on the federal level, and this is something that could be promoted by the Board, is the sharing of test data and lessons learned from incidents that were created from reactive hazards.

And at the same time if the Board has the ability to critique the codes and standards that already apply to chemical hazards, toxic, flammable and reactive, that is something that is also going to be an enormous help in moving both state and federal programs forward.

So aside from these recommendations, I'm really looking forward to the Board's own findings and recommendations that are coming out of its investigation, and out of this hearing today. We are hoping that we will see those recommendations in time

so that we can consider them for use in our TCPA rulemaking, which is going to be coming up shortly.

In closing I would like to thank you, again, for the opportunity to come before you and discuss this topic. As there is an opportunity for questions a little later on, I've got Reggie Baldini, of the TCPA program, and both of us would be pleased to answer any questions that you have for us. Thank you.

BOARD MEMBER POJE: Thank you Commissioner Wolfe, and thank you for also bringing Mr. Baldini to the table with you.

We now would like to hear from Mr. Rick Engler. He is the Director of the New Jersey Work Environment Council.

MR. ENGLER: Thank you very much, and thank you to the Board for coming to Paterson. We very much appreciate your return to this community, a community where within miles there are chemical facilities that process and store hazardous substances, including those located in extremely densely populated urban neighborhoods.

Facilities that you can literally walk down the street, reach particularly through a chain link fence, and be in contact with chemical drums of hazardous material.

It is an appropriate place to meet, not just because of the proximity to the -- to the incidents where Morton and Napp occurred, but because of the continuing set of facilities in an older setting, in the context of where new investment is not being put in.

Not because of regulation, but because essentially in the smaller industrial capacity, the industry has decided to divest investment from New Jersey, which is a contributing factor to some of these incidents.

Industry has never seen a regulation that it liked. And that is clear, again, from the industry testimony of this morning. We support, as did the labor panel, the strengthening of both the process safety management standard, and the risk management reporting and procedures issued by EPA.

And we would urge the Board to approach

this issue with the greatest possible specificity, so that the work of the Board is actually used by the regulatory agencies, without having to go through multiple steps to develop the appropriate regulatory approach. And I will come back to that.

The organization I represent, the Work Environment Council is an alliance of 55 labor, community, and environmental organizations representing a wide range of groups from labor unions, and many industrial facilities, to down the street, to Paterson Task Force for Community Action, to one of the state's largest environmental groups, the New Jersey Environmental Federation.

And it is because of this collaboration of organizations in New Jersey, not particularly us, but the whole effort over the last more than a decade, we have been able to pass path breaking laws that have been a model for the nation.

Not only the Toxic Catastrophe Prevention Act in 1986, but also the Worker and Community Right to Know Law of 1983, and the Pollution Prevention Act in 1991. And these preceded federal action.

And we would argue that part of the value of this hearing today is a spur to the state to move forward on the regulation of reactive processes, as well.

The Toxic Capacity Prevention Act, in particular, has been an enormous success. For example, particularly in the public sector, not so much in the private sector, facilities that have used chlorine, because of the requirements of TCPA, have stopped using chlorine, have gone to safer substitutes, such as sodium hypochlorite.

So you see a direct impact on prevention, on reducing inventories of highly dangerous materials, and we think that New Jersey is a place that we can also potentially pioneer some of the use of the Board recommendations.

And, in fact, on December 14th, before our new Governor, Jim McGrieve even took office, 75 organizations asked him to do just what we are talking about today, to regulate reactive chemistry. And formal recommendations made by a wide range of labor, environmental, community organizations, too.

And then on May 14th, again, we asked the DEP to take such action. We look forward to working with the DEP. I'm not sure I look forward to a workgroup based on past experience, but we do look forward to working with the DEP to try to move forward on this issue.

Now, it was also suggested this morning that voluntary efforts by industry would be enough, and that better information sharing would be a nice thing to do. Well, last night at 11 o'clock I got an email from a local union that we work very closely with, representing hundreds of workers at one of the state's largest chemical facilities, attaching a copy of a letter from this company, denying the union information under the Toxic Capacity Prevention Act.

Now, that information by the TCPA statute, is accessible to workers. That information, by National Labor Relations Act precedent, is accessible to the union. And instead we get a letter from a major company saying to the union, you can't have this information.

And this is in the context of a joint

effort by this local union, which is not all that far away, and our organization, and community based organizations, to take steps to prevent a major catastrophe.

This is a major facility, uses millions of pounds of various toxic substances, in a highly congested area, and it is only -- I would be happy to name the company, except that I only received this last night at 11 o'clock, and I would like to discuss with the local union leadership the appropriate protocol of how we are going to proceed, whether there is going to be a formal complaint to DEP, Labor Board charges, whatever.

But the notion that this is going to all be done voluntarily, perhaps, there is some reason to think because of the success in Right to Know, that that is all, you know, going to proceed.

But the reality is that we are still engaged in those kind of struggles to get that kind of basic information, even the information clearly guaranteed by at least two statutes. So we cannot depend on voluntary efforts.

And then I would also like to point out that I think the hope that the federal EPA is going to take strong action on this one is an illusion. If all you need to really do is look at the role of the current EPA administrator on this issue.

When the Napp explosion happened, and five people were killed, and the community was evacuated, and small businesses were shut, and I'm not going to say what Jim Gannon can say, far, far better, the Governor came to the bedside of those workers, and consoled them, and got a nice photo op.

Then she went out on the street and blamed the workers for causing the accident. Within a week 40 of those workers, in coordination with their union, Unite, wrote a letter, along with the Industrial Union Council, to the Governor.

And Christine Todd Whitman said she was too busy to meet with these workers. And I would suggest to you that the likelihood of the current EPA administrator actually taking up this issue is remote, at best. I would be happy to be proven wrong.

And it seems to me that that increases the

moral weight, the urgency for action by this Board. And, again, we urge you to not only make recommendations, but to put those recommendations in a form that can be immediately go through a process by OSHA, and by EPA, that could be adopted in the future.

Not that we are saying that OSHA and EPA shouldn't act promptly after receiving your recommendations, but we would like to hasten the process and we think you could help do that by putting the recommendations in a specific form that would accelerate the regulatory procedure.

And, finally, we would like to invite you back. Because you can contribute a great amount, both on the federal scene, to putting together a formal regulatory protocol, and to also spurring action in New Jersey.

So on behalf of the Work Environment Council we would like to invite you to come back here within a year, especially if there has been no action by EPA, or by OSHA in particular, and to hold a public hearing on a specific rule proposal.

If you want to call it not a rule proposal, because you don't have legislative authority to call it a rule proposal, you can call it a watermelon, you can call it whatever you want. But we think it would move the process forward, and continue to open the process to public debate and discussion, as you've done so well today, to come back in a year, and to share the recommendations in that particular form.

And we hope that you will do so, and urge you to do so, and be interested in any responses to that request.

Thank you very much for the opportunity to testify today.

BOARD MEMBER POJE: Thank you very much, Rick. Now we will open it up to questions. Andrea?

BOARD MEMBER TAYLOR: Thank you, Dr. Poje.

I have a question, one for Mr. Wolfe, and also for you, Mr. Engler. The first question regarding some of the practices on the TCPA program that are going to be changed, or improved.

Do you already conduct periodic audits at

facilities who are required to be, under this rule?

MR. WOLFE: Yes, we do.

BOARD MEMBER TAYLOR: And you were saying that you will be making a recommendation that there be additional audits conducted? Or how does that work, exactly?

MR. WOLFE: I was making a recommendation that some practices that were already in the TCPA program be reflected in the programs at the federal level.

BOARD MEMBER TAYLOR: I see. So this is something that you are recommending to us, that could be a recommendation?

MR. WOLFE: That is right.

BOARD MEMBER TAYLOR: Great. And then the second was give me a little bit more about the critiquing of the hazard, what do you mean by that, exactly? And that would be an addition that they could be doing, OSHA and EPA.

MR. WOLFE: I would like to defer to Mr. Baldini for a more helpful response on that.

BOARD MEMBER TAYLOR: Great.

MR. BALDINI: There are many codes and standards employed throughout the nation. And I will give you an example.

In the handling of chlorine in the West Coast, there was a requirement that firemen when they arrive at a scene, at a fire, be able to shut off the source of chlorine before they send their staff in.

And so in the West Coast they have an automatic shutoff, a remotely operated shutoff valve, and a man presses a button, and the valve is closed, and the firemen can go in.

Well, on the East Coast states there was no requirement like that. But we became aware of the West Coast standard, and we recommended that it be applied in New Jersey, in a case by case basis.

So there are many codes and standards that are used throughout the nation, and they don't all reflect the most up to date practices, the most risk reduction practices. And the Board is in a position to review those codes and standards, and critique them.

BOARD MEMBER TAYLOR: One last question to

Rick. One of the things that I asked the panel previously was regarding strengthening the PSM standard or the RMP standard.

What, specifically, should we be telling the OSHA or EPA that they should do in strengthening the standard?

MR. ENGLER: Well, I think that there are many things already in the recommendations, and that is why we are urging you to put them in particular form that would expedite that process.

I would say that there are things that are instructive from TCPA, in that regard, as well. And that, and some of those things focus on worker participation.

For example, the TCPA provides for really complete access to every document. And we would want to make sure that in any revisions to PSM, and to RMP, where I don't think that there are specific access to information requirements, rights for unions, that that is explicitly added.

The question of worker participation is vital in any recommendations, because as I think much

of the testimony here has pointed out, and the Board's own report, there are so many operations, there are so many different types of chemicals, that unless a core of the rule relies on the skill and expertise, and knowledge of individual workers familiar with those particular operations, that it is going to be impossible for regulatory agencies, even with their staff doubled, tripled, quadrupled, to have an effective regulatory presence.

So the question of specific mechanisms for worker participation is absolutely vital.

BOARD MEMBER TAYLOR: Okay, thank you.

BOARD MEMBER POJE: Thank you, Andrea. Dr. Rosenthal?

BOARD MEMBER ROSENTHAL: Yes. When you open your public hearing process, or participation, or whatever we want to call it, will you table an initial set of recommendations from the staff as a basis for discussion, or will you just go in completely unstructured?

MR. WOLFE: It won't be completely unstructured. We will have some general outlines

about where we would like to take the debate. I think that will lead to a much more productive discussion with everyone.

BOARD MEMBER ROSENTHAL: When do you think you will initiate these discussions, and so therefore force Reggie to come up with a set of tabled recommendations, by what date approximately?

MR. WOLFE: It is going to be this summer, I would say within the next month to two months.

BOARD MEMBER ROSENTHAL: Okay, you are on the hot seat now, right?

One last question. Under New Jersey regulations do you have to consider cost effectiveness, something that OSHA and EPA have to do under federal law?

MR. WOLFE: It is something that we do consider, and where we have regulations that go beyond corresponding federal requirements we have to go through a cost benefit analysis to justify what the more stringent requirements are justified by that analysis.

BOARD MEMBER ROSENTHAL: Okay.

MR. WOLFE: That is not so much an obstacle to getting more stringent regulations done, it is just additional work that we need to do.

BOARD MEMBER ROSENTHAL: Okay, thank you.

BOARD MEMBER POJE: Thank you. My questions are for the DEP folks, Mr. Wolfe and Mr. Baldini.

Can you give me a little bit more insight into the staffing and the experience, and training basis of your inspectors in the TCPA program? I've heard not only from Mr. Engler representing labor and environmental community, but also from the New Jersey Chemical Industry Council, some very favorable statements about the administration and the content of the TCPA program.

MR. BALDINI: Well, the fundamental, a chemical safety engineer in the state of New Jersey must have a bachelor in chemical engineering, or a bachelor in mechanical engineering. And he should have five years experience in either process design, or process management, or some activity related to maintenance at a site.

And also the key, which turns out to be a key requirement, is to be able to read a piping and instrument diagram, because the information in a piping and instrument diagram is so coded that a person that doesn't have a background in that wouldn't be able to comprehend what someone is explaining to him.

BOARD MEMBER POJE: And again, you reiterate the length of the audit period that you usually would engage in, and the number of audits that your staff would conduct over a year?

MR. BALDINI: Yes. We visit, we have some 115 sites that we, sources in EPA terminology, that we regulate. And a large source would be something like Chamberworks in Southern Delaware, and it might take us two weeks, and it might take five people to go down there for that entire period.

And then there would be a water treatment plant, or an ammonia refrigeration unit, which would take two men two days. And we review the kinds of documents that their risk management program requires them to maintain, that it reflects training, that it

reflects preventive maintenance, it reflects complete operating instructions, and all of that.

And we do the same level for the large or the small.

BOARD MEMBER POJE: And just to follow-up on that. We heard earlier today from our staff, in particular, about the need for better sharing of information about reactive chemistry and to lessons learned.

Is there elements within the TCPA that would promote common knowledge about reactive chemistry, and about lessons learned about reactive incidents?

MR. BALDINI: It is an area that we haven't really looked at, Dr. Poje.

BOARD MEMBER POJE: Thank you very much. Do any of the Board members have any other questions?

(No response.)

BOARD MEMBER POJE: Well, thank you very much for your input, and we hope our staff will stay in touch with yours as we bring this to completion.

Now it is my honor to introduce Senator

Corzine. We are pleased to have you here with us this afternoon. We know you have a very busy schedule.

Senator Corzine was elected to the United States Senate in 2000, after a distinguished and highly successful career in investment banking. Prior to his election to the Senate he was the chief executive of the prominent Goldman Sachs firm.

Senator Corzine has already made a mark in the Senate on environmental and safety related issues, and security issues. He serves on the Environment and Public Works Committee.

Senator Corzine, we welcome you, and look forward to your remarks.

SENATOR CORZINE: Good afternoon, Dr. Poje. I am very pleased you are holding this hearing, particularly pleased that you are doing it in New Jersey.

As you well know our history is one that has had tragedies strike in human terms, in human life. And we consider this a very, very important issue to be debated, and progress brought to bear. And I very much appreciate the opportunity to testify,

and am pleased that you are here in New Jersey.

I heard requests to come back and see how things might be developing a year from now. I think this is one of those things without constant attention it is very easy for progress to fall behind.

You know the question in light of Napp Technologies, or Morton International, and other things, is really the question, what could we have done to prevent these kind of accidents from happening?

And I think you all have done a terrific service by putting together your draft Reactive Hazard Investigation Report, one that both myself and the staff, and I hope the people in the EPA committee, in Congress, and others, will take very seriously, and I commend you for your efforts and your work in this area.

But I think it speaks to the facts as we see them, 167 incidents involving reactive chemicals since 1980. The Board, I think, has looked at the causes, and looked at the adequacies of the regulations, at least I read those, that there are

some recommendations that I would like to join, and underscore as we go forward.

I find the facts situation extremely troubling, and I hope that the action reflects those concerns. Not just for myself, but for what I have heard from others who have already been here, and my staff tells me comments that we've had.

You know, with 50 percent of those 167 accidents not really covered by current OSHA or EPA regulations, I think that tells you by common sense, by general principle, that there needs to be more done, that the regulations are inadequate, in my view.

And, frankly, given the density, we are the most densely populated state in the nation. We have a high number of chemical plants. I think we heard the previous witness talk about 115 reviewed regularly.

I just don't think the existing regulations meet the mark. Looking at other findings in the study, the list of reactive chemicals covered by current regulations, I think is borrowed from a list of 325 chemicals developed by the National Fire

Protection Association, actually a fairly dated list as well.

And whatever the merits of that with respect to fire fighting, it has some drawbacks in the current context of the things that I think we are trying to discuss here, and certainly in the context of the problems we've had in our state.

Primary flaw is that it only considers the inherent instability of a chemical and how it reacts with water, if I have this right. I'm not an engineer. But I think that from what I understand, this is a major flaw, and how we look at the, how chemicals will react in process conditions.

And we need to be concerned about those process conditions, and the interactions of various chemicals themselves. And I think you point that out very appropriately in your report.

Also I would say that 60 percent of the 167 accidents studied involved chemicals that are either not on the NFPA list, or are rated as no special hazard, they are in that lower context of these.

I think we need some work on this. It just doesn't strike me that we are looking at this properly. And, you know, I hear about cost benefit, but 48 of those 167 incidents led to loss of life. That is a huge cost.

I'm not sure it is measurable in economic terms. 108 people, if I've read the report properly. And it strikes me that we need to have real action. And I certainly intend on being an advocate for this in my oversight functions in the EPA hearings.

I plan on trying to be a voice for recognition of the problem, and changes that need to be done. Frankly some of this could be done if the administration chose to act. And so we will be letter writing, and doing the normal political hooting and hollering to try to get OSHA to promulgate revised process safety management regulations to address the deficiencies identified by your study.

President Clinton had these revisions on a priority list,a nd I think anyone who studies both your report and is concerned about the risk to the general population, has to be concerned that President

Bush has removed them from the list earlier this year.

Even more concerned about the lack of visibility of that action within the public domain. And I think can also be a concern. So hopefully this hearing and other opportunities will make that more noticeable in the public eye.

Frankly there is no cause, no reason, no common sense in my view for further delay. And I think your report makes that clear.

I also want to call on the administration to work with me and other members to address another pressing safety issue, it is one that is dear to my heart. I'm sure Senator Lautenberg talked about it this morning, and that is the threat of terrorist attacks on chemical facilities.

This is a real deal here in New Jersey. And I don't think it is something that should be swept under the rug. And I would like to see us do a little connecting of the dots before there is a problem, as opposed to afterwards.

The Justice Department looked at this issue a couple of years ago, in April of 2000 they

issued a report stating the risk of terrorists attempting, in the foreseeable future, to cause an industrial chemical release is both real and credible, quote, unquote.

That was more than a year before September 11th. Not much has been done, although there are certainly positive actions by some in the industry, but there is no verifiable and visible action.

And I think this is a reason for real concern. And as I suggested, Senator Lautenberg introduced chemical security legislation in his last year in Congress. He had been working on chemical safety issues throughout his career, and I'm very pleased to have an opportunity to walk where he is walking with regard to these issues.

And I think it is absolutely essential that we make progress in this area. My legislation would require EPA and the Department of Justice to divine and identify high priority chemical facilities, look at the implications of problems that could occur there, and then require those facilities to take steps to reduce hazards and improve security.

By the way, a lot of those things relate to the same kinds of issues that you are talking about with regard to reactive chemicals. And I'm going to be pushing very hard, this month, to try to get this bill through EPA, and out onto the floor, before this session of Congress ends.

But, again, I want to thank the Board for taking on this serious issue of reactive hazards investigation. I think it is vital, I know it is important to the people of New Jersey. It is not one of those things that you read on the front pages of the newspapers, but when it strikes and causes a problem, and the 108 people end up using their lives, then it has real meaning.

And that is before you talk about all of the property loss and damage to the security of our community. So for me I think your efforts are both commendable, and I think they make very clear it is time for new regulations to move forward.

I think that ought to be done by experts like yourselves, in conjunction with others, but I think that we ought to move. And I appreciate this

opportunity to talk with you, and express our views, and look forward to working with you, and maybe even coming back and joining you in another hearing in a year.

So thank you very much.

BOARD MEMBER POJE: Thank you very much, Senator. We are honored to have you before us today and offering those words of encouragement for a very important area of chemical safety. Thank you.

(Applause.)

BOARD MEMBER POJE: With that we would like to now introduce the technical panel, the last panel of our very busy day, but a most important panel as well.

Amy Spencer from the National Fire Protection Association; Dr. Dan Crowl, professor of chemical engineering at Michigan Technical University; Dr. David Leggett, principal scientist at Baker Engineering and Risk Consultants; and Mr. Walt Frank, Senior Consultant with ABS Consulting.

We will begin the afternoon's discussion from this technical panel with Ms. Amy Spencer from

NFPA.

MS. SPENCER: Thank you, Dr. Poje for the opportunity to testify this afternoon. I'm Amy Spencer, and I'm a senior chemical engineer with the National Fire Protection Association, NFPA, and I'm accompanied, in the audience, by assistant vice president Guy Colona PE, he is responsible for the NFPA fire protection applications and chemical engineering department.

I will begin this afternoon giving you a brief history of NFPA, followed by a description of the NFPA 704, as it applies to this hearing, and how I agree that the NFPA 704 instability rating is an inappropriate tool, when used alone, to identify reactive chemicals for the application of the OSHA SPM standard.

NFPA is a non-profit international organization who develops voluntary consensus codes and standards adopted by state and local jurisdictions across the U.S., and the rest of the world.

Including, as a mandatory reference cited by OSHA. All NFPA codes and standards are accredited

by ANSE, and meet the criteria mandated by Congress in the National Technology Transfer and Advancement Act.

For those of you who might not realize you are familiar with NFPA, we've got some aspects of NFPA which you might be very familiar with. Our public education department educates your children, and grandchildren, about fire safety, using Sparky, the fire dog. That is a registered trademark of NFPA.

Many people are unaware that every October NFPA is the official sponsor of fire prevention week, a tradition that has continued over 80 years.

NFPA panels the National Electrical Code, and also NFPA 101. Those are two of our biggest standards, the life safety code. And about 300 other codes and standards adopted throughout the nation.

We have nearly 75,000 members across 107 different countries, and more than 250 committees made up of 6,700 experts, to write our nearly 300 codes and standards. One of those standards in NFPA 704, standard system for the identification of hazards of materials for emergency response.

Many people simply refer to the standard

as the hazard diamond rating standard. And you may be familiar with our placards. They are widely seen any place that there are chemicals.

The first edition of NFPA 704 was published in 1960, and we have revisions every three to five years. The NFPA 704 system provides a simple system for ranking a hazard of a chemical, based on a relative scale of zero to four, with four indicating the most severe hazard.

The ratings are provided for health, flammability, instability, and special hazards. If present the two possible special hazards recognized on the signs by NFPA 704, are unusual reactivity with water, indicated with a W with a slash through it, and OX, indicating an oxidizer.

To indicate these special hazards it is important from an emergency response perspective, because it lets the responders know that an oxidizer could supply oxygen if there is a fire, and if they are water reactive chemicals, extinguishment with water could be a problem.

This highlights the intent of the standard

for emergency response purposes. I will elaborate on the intent of the standard a little bit later. The committee has rated over 1,600 chemicals, and the NFPA 704 system can be used, by knowledgeable individuals, in the private sector to rate their own chemicals.

It was because of NFPA 704 that I was asked to speak this afternoon. The question was raised, by the CSB, if it is an appropriate use of NFPA 704 instability ratings to generate a list of chemicals to which the OSHA PSM standards would apply, by identifying the chemicals with an instability rating of 3 or 4.

In February 2001 some key members of the NFPA 704 technical committee, and I, participated in a conference call with some CSB staff on this very issue. The NFPA 704 committee members participating in the call were Dr. Larry Britton of Union Carbide, Richard Gowlen of Dow, at the time the companies had not been combined; Dr. Arthur Crowits of Phoenix Chemical Laboratories, and William Satterfield of Rodi and Associates.

In summary the technical committee members

present during the call did not believe it appropriate to apply the NFPA 704 instability ratings for this purpose. And I will highlight those reasons in just a moment.

They did believe, however, that the instability rating could perhaps be explored as one of the many components to be considered regarding hazardous reactive chemicals. The instability ratings can usefully be employed as elements of the hazard risk assessment of a process, provided that other factors of the process are also considered.

I will address the scope and purpose of NFPA 704 as it applies to this hearing. The purpose of the 704 rating, as I mentioned before, is to provide information to emergency responders, and to assist facility personnel in evaluating hazards with respect to an emergency.

This is noted in the scope and purpose statements of NFPA 704 that read as follows: The standard shall provide a simple, readily recognized, and easily understood system of markings that provides a general idea of the hazards of a material, and the

severity of these hazards as they relate to emergency response.

The health, flammability, and instability ratings for a given chemical are provided based on the anticipated conditions during storage, or during an emergency. It is foreseeable that numerous processes in which the chemicals are involved, could render the original rating of the pure chemical to be inaccurate, and irrelevant, in the context of a chemical process.

In my opinion it would be a misuse of the NFPA 704 system to have a group of chemicals identified for PSM regulations based solely on the instability rating, without considering actual process conditions.

As Lisa Long, of your staff, put it today, the reactivity problem is too multifaceted to be captured by a list of chemicals.

The instability rating of a pure compound is not properly used when it is employed as the sole index of the safety of a process that involves a reaction of that substance with one or more other substances.

In short, as one technical committee member put it, the sum of the hazards of the parts does not necessarily equal the hazard of the whole. It should be noted, for purposes of this discussion, that the instability rating was formerly called reactivity.

The name was changed in the '96 edition of 704 for clarity. The instability rating is designed to indicate the inherent instability, and sometimes the indication of water reactivity, rather than the reactivity between chemicals as was commonly mistaken.

The name change helped clarify this distinction. As further noted in NFPA 704 section 713, the instability rating is not meant to establish separation or segregation between chemicals, but rather it provides guidance to emergency personnel.

That section reads as follows: The degree of instability hazard shall indicate to fire fighting, and emergency personnel, whether the area shall be evacuated, whether a fire shall be fought from a protected location, whether caution shall be used in approaching a spill, or fire, to apply extinguishing

agents, or whether a fire can be fought using normal procedures.

Another reason the NFPA 704 instability rating would be an inappropriate as a sole trigger, is that there are many chemicals that have not been rated by the NFPA technical committee. Although 1,600 chemicals have been rated, and they appear in our fire protection guide to hazardous materials, there are many that have to be rated by the individual companies themselves, because we have not rated them.

The wide group of users rating their own chemicals likely leads to some inconsistencies, especially since the conditions of storage can alter the ratings. In addition, instability is largely based on qualitative criteria, and can sometimes vary by plus or minus one for instability ratings other than zero.

There are quantitative criteria for calculation of instability involving instantaneous power density, or IPD data. However, there are very limited IPD data available, and it is expensive, and it requires a great deal of technical expertise.

When asked about other potential standards that could be used for the PSM regulations, the committee noted that NFPA 491 hazardous chemical reactions found in the guide that I mentioned before, NFPA Fire Protection Guide to Hazardous Materials, much like Brethericks Handbook of Reactive Chemicals, lists the chemicals that are incompatible with each other.

And Dr. Rosenthal alluded this morning that a good recommendation might be to require a literature search with a prescribed list of references when creating an MSDS. And I submit that the NFPA Fire Protection Guide might be a good addition to that list.

A committee member who was unable to attend the conference call on February of 2001 on this very topic, Curtis Paine, of the U.S. Coast Guard, offered a suggestion that the CSB may wish to review the U.S. Coast Guard's compatibility of cargos, 46 CFR part 150.

Committee member Richard Gauland mentioned that his company has the DOW fire and explosion index

that could perhaps be of use to the CSB as well as several other company's proprietary data that they might be willing to share with the CSB.

In summary, the NFPA 704 system is in wide use, and successfully assists emergency responders, and facility personnel, to properly plan and avoid potential disasters.

However, the NFPA 704 instability rating alone is not an appropriate trigger, a sole trigger, with which to enact the OSHA PSM requirements for a group of chemicals. Thank you.

BOARD MEMBER POJE: Thank you very much for that thorough evaluation of the NFPA standard.

Now I would like to ask that Dr. Dan Crowl give us his remarks. Dan?

DR. CROWL: Thank you, Dr. Poje. I'm Dan Crowl, professor of chemical engineering at Michigan Technological University. I've been involved in process safety since the early 1980s, and have written several books, and many research papers on process safety, including chemical reactivity issues.

I have a research lab at Michigan Tech

that focuses on flammability and reactivity areas, and in the reactivity areas our work is directed towards improving our fundamental understanding of reactivity, and improving the characterization methods to characterize reactive chemicals.

Now, I'm only here to address one issue, and that is what can we do about identifying criteria to classify chemical mixtures as highly hazardous due to chemical reactivity? And what I did is I took 13 sets of calorimeter data that I had available.

These data sets were chosen, primarily, because of data availability, because this data is not typically found on the open literature. And the data are not deemed representative, necessarily, of all chemicals.

However, these 13 systems do represent a wide range of chemistries. The purpose of this evaluation was to brainstorm whether a set of criteria could be used to trigger PSM or RMP requirements for reactive chemicals.

Now, this work does not propose any set of criteria to completely characterize reactive

chemicals, nor does it consider any hazards due to design or operation of processing equipment, which may impose many additional and significant reactive hazards.

I looked at a total of nine criteria for this work, and this criteria are typically used by industry, or found in the open literature. The criteria includes the NFPA reactivity or instability rating, heat of reaction, total heat released, instantaneous power density, reaction onset temperature, total change in temperature, total change in pressure, maximum temperature rate, and maximum pressure rate.

I also selected screening values and assigned them to this various criteria, and these screening values were selected either from common literature values, or they were done by myself in an arbitrary fashion.

Now, based on these 13 sets of calorimetry data, the following conclusions can be made, and I understand that the Board does have a complete copy of -- I have a more detailed discussion of my work that

has been provided to the Board.

Of the nine criteria considered here, any single criterion may, by itself, be an indicator reactive chemistry. Thus any method which uses a subset of these criteria may be incomplete.

Furthermore, there is no guarantee that the criteria evaluated here are complete for characterizing these materials in the first place. No single criteria alone seems adequate as a screening tool to trigger PSM and RMP.

The heat of reaction, based on the limiting reactant, perform the best, and I put quotes around the best, as a single criterion, here best is defined as the criterion that selects the most chemicals out of the list of 13.

The success of this criterion might be due more to its conservative nature. Also this criterion alone is not indicative of mildly exothermic gassy systems with large pressure increases which are fairly common, by the way.

The NFPA rating, heat of reaction, total heat released, and total pressure change combined

appear to do the best job screening the reactive chemicals. And most of the criteria that we use require some sort of experimental data, and many of these criteria require data from an adiabatic close cell calorimeter, and that data is kind of hard, and a little bit expensive to obtain, and it requires some technical capability.

The results of this study are mixed. It might be possible to establish a screening method based on several of the criteria discussed in this work. However, this would require much more analysis with a much larger set of chemicals prior to establishing the final screening method.

And it is hard to believe that only 13 sets of calorimeter data is readily available on the open literature, out of the tens of thousands of chemicals that are used routinely in the United States.

And I think our recommendation to have some sort of a data base of reactive chemical information would help quite a bit. It would help me in my study, alone. So that is all I have to say, and

I thank you for having this opportunity to talk.

BOARD MEMBER POJE: Good, thank you very much, Dan.

Now we can turn to Dr. David Leggett. David, as I said earlier, is the principal scientist with Baker Engineering and Risk Consultants. David?

DR. LEGGETT: Thank you. I appreciate the opportunity afforded by the Board to allow us to offer our opinions on the matter of reactive chemistry in chemical manufacturing. The word chemical just keeps coming up. They are chemicals, it is chemistry.

A little bit about what we do. We have a lab, just as Dan does, it is full of calorimeters, and its purpose is to actually try and determine the reactivity of chemicals within a manufacturing environment. And it is that phrase that is going to be, really, the key of my brief presentation.

I fully support the position of the complete assessment of the safety of the chemical manufacturing process must be founded on process specific hazards test data for the desired chemistry, and unit operations, in other words, the

manufacturing.

I was speaking with somebody at lunch today, and was trying to explain to them, as a non-chemist, what we were thinking about, and what came to mind was, since we were eating pizza, we had the pizza in front of us, but unless you know how to take the ingredients and put them together, you can end up with a nasty, smelly mess, or something that is called a pizza.

So really just having the flour and everything else that goes into a pizza, does not make a pizza. The sum of the hazards is not, whatever that clever phrase was.

The word intrinsic has come up this morning, and I very much like that. And I went around looking for some definitions for intrinsic. And its mate, extrinsic. The intrinsic properties of something depend only on that thing, whereas the extrinsic properties of something may depend wholly, or partly, on something else.

In other words, turning it to this situation, a chemical may be characterized by a number

of physical parameters, or properties, such as melting point, boiling point, toxicity towards humans, solubility in water, and so on. They are all intrinsic properties specific to that particular molecule.

The reactivity of a molecule, on the other hand, is governed by its unique thermodynamic and kinetic properties, and how those interact with the external factors. Chemical thermodynamics, for instance, looks at the energy transformations that occur as a result of chemical reaction.

Many chemicals, when mixed together, cause the mixture to become hot, it is because of the chemical reaction heat. Kinetics is the study of chemical reaction rate, and the sequence of steps that the reaction goes through in proceeding from reactors to products. In other words, how you get from A to B, and how quickly you can do it.

So many factors affect both the performance of the chemical and its kinetics. Collectively these factors relate to the conditions of the reaction, and therefore are what makes reactivity

an extensive property of the molecule.

How does that apply to where we are today? Well, it is clear that environmental regulations and permits are based, in part on the concentration, for example, of a molecule, which characterizes the composition of a plant's effluent stream, for example.

So it is very easy for a plant that is concerned about staying within compliance for environmental issues to simply measure something and compare the number that they have, the concentration of the chemical in a waste stream, the concentration of chemical in the air, with the mandated requirements in the regulations.

It is a very straightforward measurement, usually, and it is a very straightforward comparison, and it is a very straightforward conclusion. You are either in compliance, or you are not.

And if we had that ability to do that same thing with reactivity, we probably wouldn't be having these hearings today. And we don't, there is no such simple relationship.

So chemical reactivity is an extrinsic

property. Chemical reactivity is the foundation of the chemical manufacturing industry. We can manipulate the chemistry of what is going on in the pot to make whatever we want.

Simply take a look at what you can do with ethylene. You make polyethylene, but that is not where it stops. Depending upon how we run the polyethylene reactor depends upon what type of polyethylene we obtain, and there are thousands of types of polyethylene.

Therefore a different approach is needed in order to provide a standard gauge with which to determine if a manufacturer's activities are within the arena of chemical reactivity are safe, as defined by some standard measure.

It is not straightforward, and it may be impossible to arrive at a satisfactory single number that portrays a chemical's safety by simply considering a couple of chemical properties, without regard to the operation and the environment of the chemical.

The PSM regulation framework is a logical

place to locate, however, the regulatory issues of reactive chemicals. The development of a single criteria or definition of a highly hazardous reactive mixture rests on the issue of intrinsic versus extrinsic.

For example, the hazards and risks of a chemical reaction mixture, or a single component, is at least a function of the temperature of the reaction, the addition rates of the reactants, the nature of the process, is it batched, everything tossed in at once, it is semi batched as it continues?

The pressure of the reaction, the type of the reaction, is it a nitration, is it an acidification? The presence of potentially unstable reactive groups within the molecule, the thermodynamics of the desired process, the thermodynamics of the undesired reactions.

If the process, if we lose control of the process, how bad is it going to get? An issue that was apparently not very well known, or arguably not known in the Morton accident. We did not know what was going to happen when we lost control.

The kinetics of the desired reaction. The kinetics of the undesired reaction. We did not know in Morton, again, that it was going to go so fast leading to catastrophic results. And the likelihood of failure of unit operations and equipment.

These factors contribute to the extrinsic nature of reactivity, making it difficult to use only a couple of intrinsic properties. So, for example, in a simple engineering example, a lot of information must be assembled to put together what is called the heat balance.

How much heat do you need to remove from a chemical reactor in order to keep the reaction and the process safe? The heat is generated by the chemistry, the chemical equipment is used to remove the heat.

It is only when you bring both together that you get the desired result, which is a reaction running under control. We have heard a lot about what is good and bad about the systems that we have in place.

I think, and I think I'm going to make the same points, using data from specified sources, listed

data really doesn't work, and we've had eloquent explanations as to why.

Dr. Crowl just talked about how the heat of reaction might not be the best thing to do. I would say I agree with him, and especially we might need to add a heat of reaction for the undesired reactions.

We've heard some talk about is there a maximum pressure above which we should not go? The instantaneous power density has been raised. All of these taken, in and of themselves, will not satisfy the question that we seek to answer.

However, bringing them together as a single entity may do it. The trick is how do you actually do that? Well, we have some examples before us. DOW takes a number of individual data points, and using a technique called the fire and explosion index, rolls all of that information into a single number.

That single number is then used as a judge of the potential hazard for process. It has nothing to do with reactivity, however it acts as a very good model for what we are thinking about here.

There is the figures of merit approach produced by the ASTM. Again, taking single pieces of information and putting them together to come up with a composite answer.

I think that we should bear in mind a couple of quotations when it comes to the bottom line here. One comes from Lord Calvin. His name is particularly appropriate to heat, chemistry, calorimetry, temperature.

When you can measure what you are speaking about, and express it in numbers you know something about it. But when you cannot express it in numbers, your knowledge is of a meager and unsatisfactory kind. It may be the beginning of knowledge, but you have scarcely in your thoughts advance the state of science in this case, process safety, whatever it might be. Lord Calvin, 1824-1907.

But there is an additional quotation I would like to throw in as well. From a gentleman called Artemius Ward. It ain't so much the things we don't know that gets us into trouble, it is the things that we know that ain't so.

We are in danger by not following the advice of Lord Calvin to be lured into the trap identified by Artemius Ward. Thank you.

BOARD MEMBER POJE: Thank you, David. And now we will turn to Walt Frank. Walt is the senior consultant with ABS consulting. Walt?

MR. FRANK: I have a BS degree in chemical engineering, I'm a registered professional engineer in the state of Delaware.

The first 24 of my 29 years in industry I spent with the Dupont company, and I spent over half of my career working in the area of process safety consulting. I am an active participant in both CCPS and NFPA programs, and I'm a chairman of the AICAG safety and health division.

I want to thank the Chemical Safety Board for asking me to speak on this important topic. As a process safety professional I've had to deal with the difficult problems associated with controlling chemical reactivity hazards.

I have also contributed technical support to the attempts to regulate reactive chemicals, both

at the state and federal levels. This background provides me a variety of perspectives on the challenges posed by this multifaceted problem.

The Board has asked, is there a need to improve the regulatory coverage of reactive chemicals, either under OSHA's PSM standard, or EPA's RNP rule? I would begin my answer by asserting that industry has, in the main, a good record of safely handling billions of pounds of highly reactive chemicals each year.

Yet, as we've seen, reactive chemical incidents do occur, and the results can be tragic. As a young newly hired engineer with Dupont, I was taught, and I came to accept as a value, that all accidents can be prevented.

Clearly when lives are at stake we should strive for continuous improvement in safety performance. The issue here, though, is whether a regulatory impetus is either necessary or sufficient to promote such improvements.

The data gathered during the CSB investigation, while not definitive, indicate that

reactive chemical events account for about 8 percent of the known fatalities resulting from fires, explosions, and toxic exposures in the chemical industry.

Even if we assume that perhaps an equal number of fatalities are associated with events that have not been identified, and included in the data base, the total number of fatalities resulting from reactive chemical events is still a minor fraction.

As we consider new regulations let's keep in mind the hazards that come from the other, or rather that cause the other 80 to 90 percent of the fatalities. And remember that many of these hazards are already regulated under the PSM and NRP regulations.

My point is that I just suggest that we do not focus on new regulations as some sort of panacea to address the control of reactive chemical hazards.

There has been a lot of mention of the NFPA rating system. When we developed the technical basis for the Delaware process safety regulation, we chose admittedly a relatively simple approach to

identifying those chemicals that would be regulated.

We did select the chemicals that had NFPA reactivity hazard ratings of 3 or 4. What hasn't been pointed out is that we really regarded this as a first step, intended to identify higher hazard chemicals.

It was anticipated that a more general technical basis would be later developed to allow for identifying other reactive chemicals more broadly identifying other chemicals that would warrant regulation.

OSHA, of course, later used the same approach to identify the reactives that it would regulate under PSM. Several years later I had the opportunity to chair a joint API CMA task group, which sought to identify options for broader regulation of reactives.

As has been pointed out, all chemicals are reactive under certain sets of circumstances, either by themselves, mixed with other chemicals, or under certain conditions of temperature or pressure.

The challenge for our task group was to identify whether a protocol could be developed to

screen all chemicals, in all mixtures, under all conditions.

Assuming such a general protocol could be devised, could it be described and implemented within a regulatory framework? Ultimately we concluded that there were very profound technical obstacles to crafting a common sense approach to identifying those chemicals having reactivity hazard sufficient to warrant regulation.

And it is gratifying to hear, today, that there seems to be very little enthusiasm for more list-based approaches.

As one task group member suggested, if your goal is to prevent all reactive chemical events, then you would have to regulate all reactivity chemicals. Clearly it would be impractical to do so.

It is also worth noting, as has been pointed out earlier, that EPA has, so far, deferred the regulation of reactives, similarly for a lack of sound technical basis for doing so.

Am I suggesting that it is not possible to identify, evaluate, and control the hazards of

reactives, either individually or in mixtures under a variety of process and conditions? Of course not.

Industry does this generally successfully on a day to day basis. What I am suggesting, however, is that the description of a universally applicable reactive chemical safety protocol, within a regulatory context, is a task made exceedingly difficult by the limitless diversity of chemistry.

What I also suggest is that other non-regulatory alternatives would provide greater flexibility to deal with the sorts of problems revealed by chemical incident data.

The Board has asked, what alternatives are there to regulatory approaches? The CSB investigation has identified a number of best practices that companies are using to manage chemical reactivity hazards. These are but a sampling of the tools that exist today.

Further, new tools, both technical approaches and management practices continue to be developed. What I suggest is that there is no shortage of tools. What may exist, however, is a

shortage of awareness, and understanding of the hazards and the potential consequences of reactive chemical events.

As a result opportunities to apply these tools to the control of reactive chemicals can be lost. One alternative to regulatory approaches, which the Board has identified, and which I support, would be the implementation of programs to stimulate a broader awareness, and understanding, of hazards consequences and tools.

This should occur across the breadth of those industries involved in the manufacture, storage, transport, and consumption of reactive chemicals. Organizations such as CCPS, ACC, SOCMA, all have within their memberships, the industry leaders in chemical reactivity safety technology, and management practices.

These organizations should assume a greater outreach responsibility to share their knowledge with customers, suppliers, toll manufacturers, etcetera.

In doing so they would be serving to

protect the interest of the public, of employees, and of their industry.

It is axiomatic that a hazard that is not identified is a hazard that cannot be controlled. With awareness, understanding, and tools, new -- I'm sorry, without awareness, understanding and tools, new regulations would likely be ineffective. With the awareness, understanding and tools, new regulations may be unnecessary.

The Board has also asked if a process is already covered under OSHA PSM standard, do the safety management requirements of the standard adequately address reactive hazards?

I would assert that the standard provides a good framework. However, by intent, the PSM standard provides little explicit guidance on the control of any regulated hazard. There are changes that could be made to the content of certain of the PSM elements in order to more explicitly address chemical reactivity hazards.

However, I suggest that sort of detail could be more easily promulgated, perhaps more

appropriately communicated, in the form of voluntary compliance guidance issued by OSHA, rather than by a rulemaking.

Finally, the Board has asked, what non-regulatory actions could be taken by OSHA, and EPA, to reduce the number and severity of reactive chemical incidents?

Hopefully we all learn by our mistakes, as was suggested earlier. Ideally we also learn from the mistakes of others. It is my belief that many organizations producing and handling reactive chemicals are learning by repeating the mistakes of their peers.

They do so for lack of a mechanism for sharing lessons learned from chemical reactivity incidents. The Board has suggested the need for OSHA and EPA to provide means for better tracking of reactive incident statistics.

I suggest that any such effort should also provide for capturing lessons learned from incidents, at least near misses, so that those responsible for reactive chemical safety would have a broader

experience base from which to draw learnings.

And as it has been pointed out earlier, CCPS has successfully implemented such an incident data base for subscribing members. Thank you.

BOARD MEMBER POJE: Thank you, Walt. Now we will open it up to questions from the other board members.

Dr. Taylor, would you like to go first?

BOARD MEMBER TAYLOR: Sure, why not. I have a question for Ms. Spencer regarding the NFPA rating. How often does the NFPA review the chemicals that have already been previously rated, and update that list?

And by updating I mean something has been rated a zero or one, do you ever go back and review it after an incident occurs, or if something else triggers another review to update the list?

MS. SPENCER: Dr. Taylor, we had a whole lot of chemicals rated before. It started back previous to 1960, and the data, it was well substantiated, the sources of the ratings, where we got the data.

When the standard 704 became more quantitative in 1990, gave more quantitative cut points for the particular ratings, then the chemicals were re-rated. In 1996 we just completed a full re-rating of all the chemicals, because as time goes on, NFPA 704 is reviewed, as I mentioned, more quantitative cut points are put in.

And so a complete review was just completed, and that is reflected in this new Fire Protection Guide to Hazardous Materials, which just came out about two weeks ago.

We hope to create an internet based data base that is accessible to the public, with pretty much real time changes as more data is found, or people provide us with that, or if there are any kind of corrections to be made, we hope to do that in real time in the future, and that is a project that we are currently working on.

BOARD MEMBER TAYLOR: Thank you. The second question that I wanted to raise, I guess, I could raise to the panelists, and it is regarding a recommendation that Mr. Frank made, but similar

recommendations on, that it is better to do a non-regulatory approach versus a regulatory approach.

And the question that I wanted to ask around that was regarding this whole implementation of programs that broaden awareness. How would that impact -- I mean, some of the large industries probably could do some kind -- they have more of an impact on the workers.

But what about the smaller facilities where if there is no regulation, or if there is no additional guidance, where they usually do review, and it is hard even then for them to follow those regulations, what happens for non-regulatory, where we just implement a program that broadens awareness, and what does that mean?

MR. FRANK: Perhaps it sounds simplistic, but I think part of the issue here is really convincing people what many large companies believe, that process safety is good business. Getting an awareness out to smaller, and I display a bias here, there is a lot of very good smaller companies, so don't let me confuse people.

But to get the message across to people who have not heard the message previously, that their business is in jeopardy unless they address these issues. In jeopardy from the standpoint of even the existence of the business.

Our first tier companies know an awful lot about how to safely handle reactive chemicals. And a lot of them do share that information with others in the industry. What I'm saying is, I'm suggesting the need for a more aggressive program to do that.

BOARD MEMBER TAYLOR: And is there a company, or an association, I understand that perhaps could, like CCPS, or is there a recommendation that you are making that would be something that we could recommend happen to get that message to the smaller industries, and what is it that we can make as a recommendation, in that direction, if that was --

MR. FRANK: Well, certainly some organizations such as CCBS is already attempting to do that. Really all I'm talking about is an amplification of the existing programs. Responsible care is a model for the sort of outreach that we are

talking about.

More emphasis on reactive chemical issues under responsible care would be an example. But to get back to the earlier part of your question about why an emphasis away from regulatory programs, I guess I respond in terms of any attempt at some sort of prescriptive regulatory program, something that says, okay, if you are addressing reactive chemicals you will do this test, you will have that data, you will perform that analysis.

My concern, personally, is that any prescriptive program is going to leave out something that someone needs. Any prescriptive program is going to require more than someone else needs. That is why my -- I personally believe we need a system that promotes people doing what they need to do.

And I don't see that coming as effectively out of a prescriptive regulatory program.

BOARD MEMBER TAYLOR: Would any of the other panelists care to address that as well?

DR. LEGGETT: I think that this does come, again, I think I and Walter in agreement, but possibly

on detail, but certainly the base of it, absolutely. This cannot be prescriptive, it is not an environmental pollution limit, it is not an exposure limit, it isn't even a matter of is this process got a hazard number of X.

It is, what is it going to take to have your process in your chemical company, using your chemicals, be run in such a way that it is not a hazard to all who are concerned with it.

And that is not something you can get from a number, that is not something that can be done easily, and it is not something that can be just tossed off to a couple of operators, go figure it out.

I think it requires a profound change in the way we think about chemical process safety.

BOARD MEMBER POJE: I can turn it over to Dr. Rosenthal.

BOARD MEMBER ROSENTHAL: Thanks for some excellent presentations.

I would like to ask one question, first of Amy. Leaving aside the fact that the NFPA lists is made up of substances from the point of view of fire

protection, you classified these categories on the basis of energy releases.

At least in what used to be called the water reactivity grouping. How did you arrive at the thresholds, what made you decide that up to 70 calories was category one, or was it a hundred? That is immaterial.

And from a hundred to something else was category two. What were the criteria you used to arrive at those energy release values?

MS. SPENCER: Dr. Rosenthal, are you referring to the IPD data, specifically, the IPD data, the instantaneous power density?

BOARD MEMBER ROSENTHAL: Yes.

MS. SPENCER: We were approached by Dow with a proposal. They had provided the cut points, and that was based on some research that they did, where they did a correlation of the instantaneous power density with the --

BOARD MEMBER ROSENTHAL: No, I'm not talking -- for example, on water reactivity you do not have instantaneous power density, you have a delta H

value. How did you arrive at those, what made you decide that there was a difference between category one, the consequences, and category two, three, and four?

Was that based on experience, or --

MS. SPENCER: No, you mentioned with respect to water reactivity?

BOARD MEMBER ROSENTHAL: Yes, let's -- yes. Why did you decide that the four was, you know, absolutely terrible, and one was a threat, but of a lower threat. What were the basis on which you divided?

I don't need to know the answer now, but perhaps you could get --

MS. SPENCER: Well, I guess I'm not getting at your question. The water reactivity is largely a qualitative --

BOARD MEMBER ROSENTHAL: Yes, but you list them, if you look through, you have a description of the consequences next to it, delta, you know, category one has --

MS. SPENCER: With instabilities.

BOARD MEMBER ROSENTHAL: Yes, called instability, but they used to be called reactivity.

MS. SPENCER: Reactivity, right.

BOARD MEMBER ROSENTHAL: Okay. You have different descriptions of consequences, or potential consequences.

MS. SPENCER: Right.

BOARD MEMBER ROSENTHAL: How did you arrive at that scale?

MS. SPENCER: Well, the instantaneous power density is part of it, and then you are talking about --

BOARD MEMBER ROSENTHAL: No, I'm talking about --

MS. SPENCER: You are talking about the qualitative?

BOARD MEMBER ROSENTHAL: I'm talking water reactivity. You have delta H's as a sole criteria for putting them in one, two, three, four.

In other words, forget about instantaneous power density. The water reactivity is certain levels of values, you categorize them by consequences. How

did you arrive at those consequences?

MS. SPENCER: Could I defer to --

BOARD MEMBER ROSENTHAL: Okay, you can get me the answer --

MS. SPENCER: I don't understand your question, I'm sorry.

BOARD MEMBER ROSENTHAL: Okay, I will try to clarify it, but let me go on.

MS. SPENCER: Dr. Crowl works with the reactivity as well. Are you able to answer the question, Dr. Crowl?

DR. CROWL: I can't answer the water reactivity. I do know a lot more about the instantaneous power density stuff. But they already had, on the instantaneous power densities, as I recall, they took about 35 compounds that they had data on, and then they made the cut points that made the data fit the best.

BOARD MEMBER ROSENTHAL: Okay. I will go on, we can clarify that later.

If you were faced with the necessity of doing something that would catch, that would cause

further examination of 80 percent, not 100 percent, which you've all addressed.

If you had to deal with what essentially is a cost effectiveness thing, and you had to select the top 80 percent of potential combinations of reactants that might warrant further examination of process conditions, which is the point that you and Dave have made.

What one or two criteria might you use and which ones might be most cost effective?

DR. LEGGETT: Let me be bold and say I challenge the question. I don't believe that there are one or two criteria, quite honestly. I would say cost effective means, let me as a consultant give you a day of my time, that is going to cost you, the chemical manufacturer, a certain amount of money.

And in that period of time we together will sit down and try to figure out an answer that will catch 80 percent of potential hazardous situations. And I would probably end up looking at about 10 to 12 items on my list of things that worry me.

And I would come up, watching the clock very carefully, I'm not going to spend seven hours on one item, but I'm going to whip through that list, I'm going to come up with, I hope, answers of that list of 12, maybe 8 numbers.

In other words, stand back and take a look at that set of 8, and does it tell me high, high, low, high, high, high, in which case I'm going to be very concerned. Or do I just get a list of low hazards, in which case I'm not concerned.

It is crude, it is simple, but it is not one or two, it is ten or twelve.

BOARD MEMBER ROSENTHAL: Okay. Dan?

DR. CROWL: Well, in my opinion this is an information flow problem. I mean, you need enough information to have confidence that you know what you are doing.

And in my opinion on the reactivity systems that I've studied you could never have enough information on reactivity. More is always better.

BOARD MEMBER ROSENTHAL: Well, let me comment, I've never met a technical expert who would

give a different answer.

Your data suggests that of your 13 one criteria would catch 12 out of 13, and that criteria is by what I believe is a relatively cheap test?

DR. CROWL: Let me explain that. That information is derived from the total heat released. I take the total heat release and divide by the concentration of the limiting reactant, and that gives me the heat reaction.

There is no more additional information provided in that piece of information. Those two are related. Now, why that one works better than the other? It seems like an accounting trick to me.

I'm dividing by a number less than one, which gives me a bigger number, and that covers more chemicals. But the information content is the same as the one that covers only 50 percent of the chemicals.

BOARD MEMBER ROSENTHAL: Yes.

DR. LEGGETT: Let me chip in to augment Dan's comment. And I think it appears in the draft report, the Board commented, or one of the staff commented that a reactor with contents at 300 degrees

centigrade is most of the time simply a heat hazard.

But a reactor at 200 degrees centigrade that is in the process of running away, with the pressure building inside it, is a detonation hazard. So just to simply think about heat does not include pressure.

BOARD MEMBER ROSENTHAL: My question, again, was which of the ones that should be a candidate for further examination. I didn't ask for the question of which of the ones you could completely decide.

One question, one last question Jerry tells me. We can continue this over a beer later. You say the problem with regulations is they always leave out something, which reminded me of the old cliche that the perfect is the enemy of the good.

What would you do, again I will put the same question, if you were willing to leave out something and go for effectiveness, would you come up, in the regulation, would you come up with something different than your conclusion than regulation could not contribute anything?

MR. FRANK: Well, first of all, let me jus say, again, my big bogaboo is prescriptive regulation. And if you are asking is there a conceivable regulatory approach? You know, it has been suggested before that, you know, if we were going to solve something, this problem by a regulatory approach, something along the lines of the Savazo requirements might be something you would consider.

Impose upon all industry a requirement that they develop a safety case, you know, a detailed explanation for why is my process safe to operate. I view that as sort of the general duty clause, with a documentation requirement.

The problem that I see with that, you know, and I'm going to balance the presentation here, the problem with that is where do you find enough people qualified to review the safety cases to gain confidence that you are getting the results that you are intending?

You know, as a parallel I would point to the R&P rule, and the fact that EPA is already having to look at the third party auditor program, as a means

of finding enough people to audit R&P programs, where they are looking at what is, admittedly, a far less technically sophisticated issue.

BOARD MEMBER ROSENTHAL: Thank you.

BOARD MEMBER POJE: Well, certainly that plays off of some of the questions I had earlier for the New Jersey panel, and the TCPA program, and how they defined their auditing functions.

And this is a very complex issue trying to balance the appropriate strengthening of the system of safety, where does it best lie? And it is a challenging one. I don't think Dr. Rosenthal was off the mark starting off his remarks today saying this is a very difficult area to tackle. But, nonetheless, it is a quite important one.

The event in Tolouse, France in September 21st of this past year, is also one that has to give us great cause for concern, simply counting those who are dead over a period of time is an example of where the problem lies, knows that we have huge problems in catastrophic risk, in trying to get summary statistics in such a way.

It just doesn't seem to work. Monumental events will change policy. And unless there is a degree of thoughtfulness and preparedness from the community, for what is the best policy, we seem to go all over the place.

I guess the last question I would like to give is to Walt. You mentioned the need, as you would see it, for better capturing lessons learned by EPA and OSHA.

And let me just ask you, what do you see as the important data elements that would be appropriate for lessons learned gathering by the regulatory agencies, and by what mechanism would you anticipate these being gathered?

MR. FRANK: The phrase I had in my presentation before I had to cut it for length is sometimes we don't know what we don't know. What I would love to see would be a data base that gives the basic factual events associated with incidents, with causes identified, root causes identified.

Explain in some way that people could go in and learn from the mistakes that their peers are

making. Perhaps a model of this. Again, I did cite CCPS, they do have an incident data base that they have been collecting.

But another model may actually be the FAA near miss data base. The FAA was having, I guess, considerable amount of difficulty getting information from the airline industry on near miss events, until they created a program where those reports can now be made to NASA.

NASA looks at them, and after a period removes any identifying information, and passes that information on to the FAA. And apparently it has been quite successful, the program has, in generating viable information that have prevented other airline disasters.

Perhaps the Board, in you role, or with the constraints that you work under, or the proviso that your findings cannot be used in lawsuits, perhaps the Board could serve as a forum for collecting, sanitizing, and making that information available.

Because the real impediment that I see for that information being available in industry, is the

fear of legal liability. We don't share that sort of information because we don't want the lawyers to get it.

BOARD MEMBER POJE: Amy, you had one more comment to make?

MS. SPENCER: I do have one more comment. This is regarding Dr. Rosenthal's very good question about the cut points. And I'm going to apply this to all the cut points, including water reactivity, with the heat of reactions.

The way that the cut points were formed in the NFPA system was based on the qualitative description, how that fit with the heat of reaction data. And then the cut points were then found. Same with the IPD.

So that is the method by which all the cut points were created in the NFPA system.

BOARD MEMBER ROSENTHAL: That response, then, regardless of what caused that energy release, you would have the same consequences?

MS. SPENCER: Absolutely.

BOARD MEMBER ROSENTHAL: Okay, thank you.

MS. SPENCER: Thank you.

BOARD MEMBER POJE: Thank you to all of the panelists in this session. I do want to thank you for your service to the Board, with giving your comments and your analysis.

Also, at this point in time we would like to apologize for the other panelists, even on these panelists, the Board has attempted to tackle, in one single day, a rather large and complex topic. I think we have been urged to come back to New Jersey by the people in the State of New Jersey.

We clearly want to get additional input from all of the parties who were here today, and we didn't allow those at the table to give a full discourse on all of their expertise. But please bear with us.

We now go into an open public comment period, and we have several people who have signed up to give comments today. I would like to call Mr. John Clark to the podium if he is here, to give his comments.

And we will have a five minute limit for

all of the public comments.

(Pause.)

BOARD MEMBER POJE: Okay. Mr. Peter Howell.

MR. POWELL: Good afternoon. I really appreciate that you have taken the time to prepare this hearing, and accept the comments from all these people that have made presentations.

Like the others I would like to tell you a little bit about myself. I'm currently a process safety management consultant, I'm a chemical engineer, I'm a member of the American Institute of Chemical Engineers. I'm a former member of the CCPS, I'm a current member of the safety and health division of AICHE.

I have 36 years of chemical industry experience, and about 27 years of experience with PSM. Within industry I have held a wide range of jobs in all areas, from operations through design, through production, through management.

I have a pretty good feel as to what it takes to operate a chemical plant, what it takes to

design a chemical plant.

Recently I have investigated a lot of chemical incidents. The two main areas that I do in my PSM consulting are auditing for PSM compliance, and accident investigation.

I have investigated about 20 serious incidents over the last several years, concerning fires and explosions. I have investigated five of the incidents that showed on the board earlier today.

The common cause of these incidents, in every case, has been failure of management systems. The question is, why? The PSM regulation is good in many ways, but it also has some shortcomings.

There are two of them I would like to discuss today. One is that it does not cover all hazardous chemicals. It utilizes a listing method. And even their definitions of flammable does not include all the hazardous chemicals that it should.

The other problem that I see is with interpretation and understanding of a portion of the PSM regulation. And that deals with process safety information identified in D3I, or D1, D2, D3, and D3-I

and III.

These deal with hazards associated with the chemicals of the process, hazards associated with the technology of the process, and information concerning the equipment used in the process.

We want to look, specifically, at D3I, and II, which require conformance with recognized and generally accepted good engineering practices. And this is where we are seeing a lot of failures.

CCPS developed the requirements for PSM and published them in 1989. It is no coincidence that the OSHA PSM regulation mirrors what CCPS had proposed a good number of years ago. But there are some major differences.

The CCPS guidelines cover all hazardous materials. There is no list, it covers all hazardous materials. And management is required to determine if a process contains hazardous materials.

And within their guidelines books they provide methods for determining when a chemical is hazardous, starting with various screening methods, and identification of various characteristics of those

chemicals, going on to doing experimental testing if necessary.

D3II and III you must follow RAEGAEP which is recognized and generally accepted good engineering practice. Management is not following that requirement. And OSHA doesn't enforce it.

In the incidents that I have investigated, in every single case, if management had followed and complied with the CCPS guidelines the incident never would have occurred.

I want to make it clear that even though there are many obstacles that must be overcome, the bulk of the technology that is necessary to operate a plant safely is available. The bulk of the information necessary to identify hazardous chemicals is available.

I would also like to address, for a moment, one of the problems and perceptions with PSM. PSM needs to be looked at as an investment. It reaps many rewards, it provides a higher on-stream factor and with that increased reliability, fewer incidents, and lower manufacturing costs.

Thank you.

BOARD MEMBER POJE: Thank you very much, Peter. We can now have Steve Arendt.

MR. ARENDT: Thank you Board, and good afternoon. I'm Steve Arendt with ABS Consulting, but I'm here to speak on a personal basis. I have a background in process safety.

I wanted to make a few points, picking up off many of the things that have been talked about today. First of all I agree with a lot of what has been said, but some that I disagree with.

I'm a little frustrated that we tend to present things in the extremes, where we must collaborate on the common ground that appears to be in the middle, and we definitely need to do this if we are going to move forward in reactive chemical safety.

A few points that I want to make. First of all, we do not know how big, nor how small this problem. We really don't. And I'm not going to improperly characterize the significant of the tragedies that the individuals that testified this morning portrayed, by trying to discuss statistical

numbers, and to compare it with everything else that is happening.

But I do know that the Board has the statutory ability to do more in this area. And I know that you all are going to make recommendations to a wide variety of groups. And I suspect that you are probably going to make some to yourself, as well.

And one would be in the area of improving chemical incident reporting systems. And I would encourage you not to simply look at improving reactive chemical incident reporting, since you would be discussing and working over many of the same problems that you would have to work if you were dealing with the large variety of chemical incident root causes.

So I would encourage you to look at that for yourself. You could, obviously, talk to industry organizations, and groups that have reporting systems in place to help improve that from a reactive chemical standpoint.

Or perhaps that could be a short term solution. But I think that you are the ones that are going to need to take this bull by the horns.

Item two, any regulatory effort, I think we are going to need to, in keeping the end in mind, have some features that we are going to look to. It is going to need to be a blend of goal oriented, or performance based approaches, and prescriptive approaches.

But it is going to have to be scaled to need. Otherwise you are always going to run into cost benefit arguments, either at the end, or somewhere down the road.

And I listened to the New Jersey Commisioner who, I'm not sure if he is still here, but just to give you the example about how people, myself included, can hear things differently.

I can't remember who asked the question, but I think what I heard him say was that they didn't let cost benefits get in the way of writing regulations in New Jersey.

Now, I don't think that is what he said, but that is what I heard. And I don't believe that is what he meant. But I think that what we are going to need to do is to keep feasibility and cost benefit

issues at the forefront of all efforts to come up with better solutions, and better approaches, rather than just waiting for it to be a gate that we sort of check out at the end.

And one way to do that, to keep that in mind, is to make sure that everything that we do is based on need. And the need areas that exist, I think, you can put in four categories.

The people that warehouse or store materials; the people that blend materials; the people that process but don't intend on reacting them; and then the people that intentionally react them.

So we keep that in mind, I think we can be much more fruitful in our efforts.

Some specifics about how you might move forward if regulatory initiatives are one area. And, by the way, I guess I would recommend that on the short term that you threaten, excuse me encourage, that was the code word we were using this morning, everyone to continue to improve and line up industry guidance and awareness training programs.

And that could be done in the short term

as efforts in a collegial way are done to conceive solutions both to identify these problems, and then to regulate them if necessary, on down the road.

This is not going to happen in six months or a year, it is probably going to be about a three year effort. But in the short term these motivations, through industry and professional groups, can certainly bear short term fruit.

You could, certainly with OSHA, improve the PSM elements, not the coverage, in my opinion, in certain elements to explicitly deal with the reactive chemical situations. And we've highlighted them numerous times, and I would be glad to provide them, and comments, afterward, for the record.

I think you would want to improve how the HAZCOM and the HAZWAP regulations deal with this as a floor for what I would call the lower need situations. The problem with that is, as it was explained to me by an OSHA administrator a few years ago, that is a career event, to reopen those two rules.

It would take ten years, probably, to make something happen. And so to do that, to have a better

floor for lower need situations to deal with reactive chemicals, then I suggest doing that through the use of interpretive guidance, through those organizations.

You could begin a negotiated rulemaking with complete stakeholder involvement. Twelve years ago, thirteen years ago, the ORC served that need in bringing together stakeholders to conceive suggestions for OSHA to consider in the PSM rulemaking.

The CSB may very well be ORC of the year 2002. Where you all can, in fact, be the nexus, or the focal point for bringing together this information. Again, it is not going to happen immediately. It is going to happen over a period of time, but it can certainly begin.

And lastly I guess I would want people to look around. We had a full house this morning. Most of the morning dealt with motivational activities, I think. I think this afternoon, particularly in the end, we are dealing with some solutions.

And the fact is we are all going to have to work together to make sure that this comes out to the benefit of workers, the public, and the industries

that have to choose to use these chemicals for everyone's benefit.

Thank you.

BOARD MEMBER POJE: Thank you, Steve. We now ask Mr. Mike Kinsword. Pardon me if I've mispronounced your name.

(No response.)

BOARD MEMBER POJE: Okay, then the next is Eric Frumin.

MR. FRUMIN: I wanted to take the floor again, members of the board, to address the question of how the stakeholders here could effectively contribute to the process that lies ahead.

And I think actually the previous speaker raised some of these questions in a pretty vivid way. We've heard pleadings for collaboration. I think those were the words that came from Mr. Connolley, and from the SOCMA representative.

And the difficulty I have with the concept of collaboration is that in most such discussions between the stakeholders in a regulatory context, the industry representatives will withhold the facts about

the economics of the matter.

Whether it is because of concerns about proprietary matters, what your costs are, what your sales are, or what your business plan is, or whatever it is.

And everyone knows perfectly well that in the absence of such information OSHA or EPA is hamstrung. Because they have to demonstrate the economic feasibility of any proposal, never mind a final rule.

We've had, February 5th, 1996, CMA to Tom Seymour, expanding the scope of the coverage of the PSM standard would make it unwieldy and overall less effective. It is likely that additional burden will fall heavily on small establishments.

Extension of the PSM standard would divert significant resources away from the more important need to address process safety, and those processes with the greatest potential for catastrophic releases.

CMA and API believe the PSM standard is an effective standard, and OSHA should not take any action to expand its coverage. Signed Sandy Terriel,

Assistant Vice President, Regulatory Affairs.

And then in October '97, similar comments. And I didn't hear anything today from ACC or SOCMA, or the chemical distributors, which basically contradicted that.

Which basically said, we as industry representatives, are in favor of stronger regulation. It was all volunteerism, and all collaboration. And I'm all in favor of collaboration in order to solve a problem.

But the basic message has been don't touch the standard, don't touch the regulation. Hey, unions are regulated, we don't like to have to file more reports about our finances. It is a pain in the ass.

But what is disheartening, and which undermines the ability of the stakeholders here to collaborate, is the reluctance of the industry representatives in the face of the stunning facts which have been presented here today, to alter their position.

So I think the burden is on the industry representatives here, and I wanted to take the floor

to say this. There is ample interest in collaboration from myself and my colleagues. We will go anywhere, any time.

Glenn Erwin spends his whole life on the road for PACE, Mark Dudzic is not a shy guy, neither is Mike Wright, or Mike Sprinker. We will go, we will meet you anywhere.

But it is not going to be collaboration about withholding the facts from the Board, from labor, from communities, and least of all from OSHA and EPA. We are going to have to put some facts on the table, and talk about the real problems of dealing with the employers who are not doing what needs to be done.

It is not enough for you to simply say, CCPS guidance says: Look at all chemicals, and then turn around and say what you've said for the last six years, don't touch the standard. That leaves us in a total bind, and it offers the Board no middle ground that all parties could be comfortable with.

We may never get there, but we are not even going to try unless we do something different.

So I would encourage industry representatives to look at their intent, and look at their -- what they actually say, and see whether we can change the terms of the debate.

And I hope, if the Board sees that problem, in the same light that I've described it, your recommendations could help promote that kind of discussion. You have the ability to go beyond that, and we intend to provide our detailed recommendations, and we hope you adopt them.

But at the same time I think the Board has the opportunity to seek the guidance of the industry representatives who are willing to change what has been, up until this moment at least, a hard and fast position that contradicts what the Board is about, and certainly what labor and community representatives are about.

And we would encourage the Board to look at its role in those lights. I am disturbed at some of the comments from the Board about volunteerism. I think it encourages a sense of denial by industry representatives who think that the Board's interest in

volunteerism will get them somewhere.

And I think it is important that the Board not give those signals to industry representatives, that volunteerism is going to do anything to solve this problem. It hasn't done anything yet. No matter how many bulletins CCPS puts out.

Thank you.

BOARD MEMBER POJE: Thank you, Eric. With that, that is the last person signed up to give public commentary. Is there anybody else in the room who would like to avail themselves of the microphone at this moment?

(No response.)

BOARD MEMBER POJE: Thank you, and that concludes the public comment period. I would like to thank the CSB investigation team for their outstanding work to bring this study forward.

Thanks also to my fellow Board Members for their diligence in examining this threat to chemical safety. I extend my personal gratitude to our three eyewitnesses, Mr. Oliver, Mr. Gannon, and Mr. Goss. They made a great effort to be here, and they were

willing to relive, for our benefit, some of the terribly traumatic experiences that they have had.

My thanks go to each of them, and to their families. I would also like to commend each of our panelists today. They have shed a great deal of light on a complex and difficult problem. The panelists have offered a wealth of ideas on how to reduce the hazards from reactive chemicals, a goal which we all share.

I would also like to thank everyone who provided public comments. You waited through a lengthy day of testimony to offer your thoughts, and we appreciate your commitment to democratic principles, and public service.

We will be digesting all of this information over the coming weeks, and then issuing our final report and recommendations during the summer. Our docket will remain open until June 30th, and we would welcome any written comments on the issues today's hearing.

Instructions for submitting comments can be found on our website, www.chemsafety.gov.

Lastly, on behalf of the entire Board, let me thank Senator Lautenberg and Senator Corzine for taking time from their busy schedules to join us today. Their participation attests to the seriousness of the issue of reactive hazards, and is a hallmark of the state of New Jersey's leadership on chemical safety.

As we heard from the eyewitnesses, reactive accidents, explosions, fires, and chemical releases, destroy lives and tremendously alter the quality of life for those that survive.

Those of us in positions of public responsibility have a duty to see that these accidents are prevented by every available means. Federal government rules, such as the OSHA process safety management standard, do prevent accidents and save lives.

The standard encompasses a number of good safety practices. As we have seen today, however, the approach of applying the standard to a fixed set of listed chemicals has grave limitations. Some unregulated chemical combinations or process

conditions result in hazards that are as dangerous, sometimes even greater, than those that are currently regulated under the standard.

It is disturbing to reflect that workers can and do lose their lives in chemical process accidents, and more will in the future. Yet in many cases the federal government has not been requiring those same plants to follow established good practices for process safety.

With that sobering thought, if there are no further Board statements, this meeting is adjourned.

(Whereupon, at 3:12 p.m. the above-entitled matter was concluded.)

1

2

3

4