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

Page

OPENING STATEMENTS:
Board Member Poje 5
Other Board Members
Former Senator Lautenberg 14

NARRATIVE OF INCIDENTS BY EYEWITNESSES
Jim Gannon - 1995 Napp Technologies 20
Robert Oliver - 1998 Morton International ...28
Allan Goss - 2000 Phillips Chemical 31

PRESENTATION OF FINDINGS AND PRELIMINARY CONCLUSIONS
John Murphy 39
Kevin Mitchell 47
Lisa Long 55
Giby Joseph 60
Board questions 67

INDUSTRY PANEL
Donald J. Connolley 84
Chris Bagley 90
Bill Almond 96
Scott Berger 99
Board questions 104

LABOR PANEL
Glenn Erwin 112
Eric Frumin 118
Mark Dudzic 124
Mike Wright 129
Michael Sprinker 136

SENATOR JON CORZINE STATEMENT 172

NEW JERSEY PANEL
Samuel Wolfe 146
Rick Engler 155
Board questions 163

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

TECHNICAL PANEL
Amy Spencer 180
Dr. Dan Crowl 190
Dr. David Leggett 195
Walt Frank 204
Board Questions 213

OPEN PUBLIC COMMENTS 232

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

2 (1:10 a.m.)

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

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

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

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

22 Two years ago we convened in this very

1 same chamber in Paterson, New Jersey. We were here to
2 review the CSB's investigation into the 1998 chemical
3 incident at Morton International's Paterson
4 Manufacturing Plant.
5 The Board found that this tragic accident
6 was triggered by a series of uncontrolled chemical
7 reactions. On the evening of April 8th, 1998, two
8 relatively inert materials were combined in a reactor
9 to produce a fuel die called automate yellow.
10 Unknown to the workers at the plant, if
11 these materials were heated just a little beyond the
12 intended temperature, highly energetic and dangerous
13 chemical reactions would ensue.
14 That night the worse did occur. Less than
15 40 minutes after the process was initiated, and after
16 desperate attempts to cool the reactor had failed, a
17 violent explosion erupted from the reactor. Nine
18 workers were injured, including two who were badly
19 burned.
20 One of the injured workers, Robert Oliver,
21 is here with us today. A massive fireball rose over
22 the plant and hazardous material rained down on the

1 surrounding neighborhood.

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

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

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

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

20 Reactive chemicals are certainly one such
21 hazard. It is worth remembering that the 1984 Bopal
22 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

1 information on over 160 domestic incidents involving
2 reactive chemicals since 1980. Together these
3 incidents have cost over 100 workers' lives, and have
4 caused much damage and adversity.
5 We will also learn that the current
6 federal regulatory system is less than ideal in its
7 coverage of reactive hazards. The current system
8 developed by OSHA and EPA seeks to control the hazards
9 of specific listed chemicals, except by happenstance,
10 however, the combination of chemicals that can lead to
11 reactive incidents are largely exempt from these list-
12 based process safety rules.
13 Fewer than half the incidents we surveyed
14 would likely be covered by these regulations. The
15 process at Napp and Morton, for example, were not
16 regulated under these standards.
17 Meanwhile the toll of reactive incidents
18 continues. I was on scene at the recent building
19 explosion in the Chelsea neighborhood in Manhattan.
20 This incident was initially, and incorrectly, reported
21 as a boiler explosion. The prime suspect now is an
22 uncontrolled chemical reaction.

1 Dr. Rosenthal has just returned from
2 Augusta, Georgia, where last week the Board released
3 its report on a March 2001 polymer explosion at BP
4 Amoco. After careful analysis this incident proved
5 attributable to an uncontrolled reactive hazard.
6 In this case a slow chemical breakdown
7 that produced gas and pressure inside a closed vessel.
8 Three workers died when they went, unsuspectingly, to
9 open the cover. This process, likewise, was not
10 regulated under OSHA's process safety standard.
11 Today we will hear from a number of
12 distinguished panelists from industry, labor,
13 government, and academia. They will all address one
14 basic question. Should the rules to control reactive
15 hazards be changed, and if so, how?
16 Each witness will be allotted five or ten
17 minutes for testimony, and each of the witnesses has
18 agreed to take questions from the board.
19 After lunch Senator John Corzine will
20 grace us with his presence, and give us his statement
21 on this issue. And then we will have the completion,
22 after completion of four witness panels, there will be

1 a period for public comment.

2 Each commenter will be allotted five

3 minutes. If you wish to provide an oral comment, and

4 you have not already registered, you may do so at the

5 media table outside the hearing room. If you do not

6 wish to offer a comment this afternoon, you may still

7 comment in writing until June 30th. Instructions may

8 be found on our website, chemsafety.gov.

9 At the conclusion of the hearing we will

10 be collating and analyzing all of the information we

11 have received. During this summer we will issue our

12 final report on reactive hazards, including

13 recommendations for any needed changes to regulations,

14 codes, or practices.

15 With that I will yield to Dr. Taylor for

16 any opening remarks she may have.

17 BOARD MEMBER TAYLOR: Thanks, Dr. Poje. I

18 would like to welcome all of you here today,

19 particularly our victims who come from various plants

20 around the country, as well as our stakeholders.

21 First I would like to say that I'm anxious

22 to hear from the Staff, to give their presentation on

1 their findings. And I would like to thank the Staff
2 for all of the hard work that has been put into
3 getting to this point, and hopefully from this we will
4 hear from you, which is also very important.
5 I'm anxious to hear from our stakeholders
6 so that you can give us feedback on what you feel
7 should be the step forwards that we should take, the
8 recommendations that should be made on such an
9 important issue as are reactive chemicals.
10 And with that I would like to yield to Dr.
11 Rosenthal.
12 BOARD MEMBER ROSENTHAL: Presumably this
13 is on. I want to thank all of you for coming here. I
14 appreciate your taking time from your busy schedules.
15
16 The thing that we are interested in
17 arriving at is the best possible approach to this
18 problem, and your inputs are vital for this purpose.
19 Please, if you do not have the opportunity to submit
20 your comments during the open session, we would
21 welcome, and need, your inputs after the session is
22 completed. Thy.

1 BOARD MEMBER POJE: Thank you, Dr.
2 Rosenthal, and Dr. Taylor.
3 Today we are especially pleased to have
4 former Senator Frank Lautenberg with us. Senator
5 Lautenberg is truly the father of the Chemical Safety
6 Board. After the Board was authorized in the Clean
7 Air Act of 1990, both the Bush and Clinton
8 administrations opposed actual establishment of the
9 agency.
10 But in 1997 Senator Lautenberg prevailed
11 on the Appropriations Committee to provide four
12 million dollars to get the Board started in 1998. We
13 deeply appreciate his efforts on our behalf, and his
14 continuing support of our work.
15 Senator Lautenberg served three
16 distinguished terms in the U.S. Senate. He was a
17 member of the Appropriations, Budget, Intelligence,
18 and Environment Committees.
19 Throughout his career he has been a strong
20 advocate for a better environment for the people of
21 New Jersey, and the entire country.
22 Senator Lautenberg, we welcome you, and

1 look forward to your remarks.

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

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

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

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

1 built this great nation.

2 And we sent people to work in those mills

3 and they were so happy to have the jobs. My father

4 was a health faddist in the '30s, it was very unusual.

5 You couldn't smoke around my father, it was way

6 before I wrote legislation against smoking.

7 But my father had no tolerance for those

8 who would abuse their health. He worked in the silk

9 mill. He was a handsome, wonderful, intelligent man.

10 He died when he was 43, of colon cancer.

11 My father's brother was 52, he worked in

12 the mills. He died from cancer, colon cancer. My

13 grandfather worked in the mills, and he died when he

14 was 56 years old.

15 I just celebrated an uncle's birthday, my

16 father's brother, a hundred and a half this very day.

17 Now, I don't want to give you the other side of this,

18 but he had a saloon here in town, so --

19 But the shock, the shock to a family

20 sending a member to work each and every day, and

21 finding out that they weren't being protected.

22 Learning only too late that the consequences of

1 exposure to chemicals, reactive, foul air in those
2 mills, can be such a negative thing.
3 And so when I walked to the City Hall in
4 Paterson and a young assistant of mine said, do you
5 know where we are going? I said yes, we are going
6 back to roots, as far as I'm concerned.
7 I love this city. It has changed a lot,
8 but what hasn't changed is that people still work in
9 industrial facilities. And they are still concerned
10 about their health. Thank goodness we have
11 organizations that are out there to protect the health
12 and well being of these workers.
13 We have, I understand, a couple of
14 survivors here today. I was at the Napp site in Lodi,
15 very shortly, very soon after the explosion occurred,
16 the fire engines were still there. The fire continued
17 for a couple of days.
18 And then right down here, not far from
19 where I used to play baseball in East Side Park, the
20 Morton Company, it used to be called Morton Salt, but
21 it is the Morton Company, another explosion. That
22 though it didn't kill, it injured, substantially, many

1 people, nine I think.

2 And I have a prepared speech, and if the

3 press is interested I will give it to them free of

4 charge. But I was so moved by what I heard Dr. Poje

5 say. The incidents that helped create this Board.

6 The Board, by the way, was created in

7 1990. And we couldn't get money for it. That is not

8 untypical of actions in the Congress. Throw up a

9 name, and throw up an idea, but don't give it any

10 money. And then you can walk home, you get a lot of

11 votes sometimes.

12 But we got the funding. We got the

13 funding because the unions were there trying to

14 protect their members. And health organizations were

15 there trying to protect their colleagues.

16 So it took us almost eight years to get

17 the funding, and it was the Napp incident, the

18 explosion in that factory, that helped finally

19 convince other members of the Senate and the Congress,

20 that it was worth doing.

21 You said, Mr. Chairman, that John Corzine,

22 I can't say my successor, the next occupant of the

1 seat, I'm very proud of him, he has done a very good
2 job since he has been in the Senate. Envious at
3 times, but other than that it is --
4 And he is going to be here confirming our
5 interest in seeing that the Chemical Safety Board does
6 its job, that you don't let things go by. It is
7 something akin to the National Transportation Safety
8 Board.
9 Yes, the accidents happen, and they will
10 continue to happen unless the Chemical Safety Board
11 does its work, or the National Transportation Safety
12 Board does its work. Those studies, those
13 investigations, can make a world of difference in what
14 happens to people who are either traveling or working
15 in unsafe sites.
16 And so, members of the Chemical Hazard
17 Board, I commend you for your work, plead with you to
18 be energetic, and diligent, and not be dissuaded, or
19 not be convinced that what you are doing is one of
20 those things that may be cut out.
21 I plead with President Bush, from this
22 podium, to make sure that we continue to fund the

1 Chemical Safety Board, to make sure that we focus on
2 those things that can help save lives and permit
3 people to develop their lives in normal health, and
4 enjoy things.
5 We have a celebration coming in this city,
6 on Saturday. A high school classmate of mine name
7 Larry Dobi will be honored with the establishment of
8 two beautiful baseball fields in Eastside Park, which
9 was the only place that we could afford to have some
10 recreation in the days that I grew up.
11 And this city is a proud city. But what
12 it needs to know, like the other industrial cities in
13 this country, that when they go to work, that the only
14 thing that they have to be concerned about is making
15 the product, and getting out at the end of the day,
16 and enjoying themselves, and enjoying their families.
17 And so the work you are doing is, frankly,
18 essential. We have OSHA regulations, and I don't
19 criticize the OSHA, at all, but those regulations
20 don't protect everybody sufficiently. We are going to
21 depend on you to sound the alarm, and not let things
22 go unreviewed, or don't be deterred from finding out

1 what caused it; don't let the corporate world
2 interfere.
3 In most cases the corporate world will
4 not, but should anybody want to, and we saw it in a
5 couple of these accidents, it was just neglect that
6 killed or injured these people.
7 And so you move there with advanced
8 knowledge and experience, and the imprimatur of the
9 United States government. We thank you very much for
10 this opportunity to be with you.
11 BOARD MEMBER POJE: Thank you very much,
12 Senator.
13 (Applause.)
14 BOARD MEMBER POJE: With that we would
15 like to ask if the next panel would appear before the
16 Board, Mr. Jim Gannon, Mr. Robert Oliver, and Mr.
17 Allan Goss. We would like you to come to the witness
18 stand and give us your input.
19 The first witness is Jim Gannon.
20 MR. GANNON: Hi, I'm Jim Gannon, a victim
21 of Napp Chemical. I would just like to echo Senator
22 Lautenberg's comments that I have a lot of distress

1 and frustration because it just keeps going on and on.
2 But having you people sit in front of me
3 is just a ray of hope that maybe Napp would have never
4 existed. I just wanted to say that.
5 On April 21st, 1995, the day of the
6 explosion, I woke up at 5 a.m., I got ready for work.
7 And like any other day I said goodbye to my wife,
8 went in the room where my kids were sleeping, and
9 kissed them goodbye.
10 I arrived at work at 5:45 and went to the
11 deli across the street for coffee, buttered roll, and
12 newspaper. I came back, went upstairs to the locker
13 room to change, have breakfast, and read the paper.
14 At 7 a.m. I went downstairs to the
15 equipment locker in processing and blending, P&B, to
16 get gloves and paper uniform cover. There I also
17 found out where I was working.
18 Andy Mazzola, plant unit leader on the day
19 shift, assigned me to the 20 inch number 2 room. This
20 was directly across from the 125 PK blender that
21 exploded. I started a routine safety and systems
22 check.

1 Up to this point I had no idea that
2 anything was wrong. After about ten minutes into the
3 safety check, and systems check, Joe Carson came,
4 opened the door, and told me they were evacuating the
5 building, as somebody noticed fumes coming from the
6 125PK.
7 I left the 20 inch number 2 room and
8 headed for the back parking lot. I now noticed the
9 smell of rotten eggs, which I knew to be sodium
10 hydrosulfide. When we were in the back parking lot
11 they asked me if anybody had a full face mask. I told
12 them I did.
13 Me and Buster McKenzie went up to my
14 locker to get the full face mask. Buster was asked to
15 unload the 125PK to undo the situation that had gone
16 wrong. As Buster was a leadsman, who usually did not
17 work, and just drove the forklift, I told Buster I
18 would go into the 125PK room and unload the blender,
19 but he insisted he would go in.
20 I told Buster that when the coffee truck
21 had come at 8 a.m., we would switch places.
22 Unfortunately we never made it to 8 a.m., because the

1 plant exploded at 7:43. If I had won that argument it
2 might be Buster standing here instead of me.
3 We went back to the back parking lot, and
4 I was approached by Jim Gordine, who is maintenance
5 foreman. He asked me if I was on the fire brigade, I
6 told him I was. He then told me to come with him, and
7 we went back inside the building to the firehouse just
8 outside the P&B department.
9 He gave me instructions, two or three
10 times, to charge the fire hose only if I heard him
11 holler. I didn't know then, I know now, had I charged
12 that fire hose it would have set off an alarm at the
13 fire department.
14 I don't know why, if that was in Jim's
15 mind when he kept telling me not to charge it unless
16 he told me. But if the fire department had come,
17 maybe that situation would have ended up a little bit
18 different.
19 As I could not see Jim from where he
20 wanted me to stay, I went around the corner into the
21 P&B department, where I could see him standing in
22 front of the 125PK room.

1 Just outside the 125PK room, Cisco Rivera
2 was putting the tops on drums from the 125PK room. As
3 far as I could see, from where I was standing, they
4 had gotten four drums out of the blender. We had
5 charged 6,000 pounds of sodium hydrosulfide, and 2000
6 pounds of aluminum powder.
7 The metal drums were, I don't know, maybe
8 about 300 pounds a piece. So it was maybe 1,200
9 pounds out at the time I seen him standing there.
10 At this point the smell of rotten eggs was
11 so strong that I had to wear my respirator. I had a
12 bad feeling about the whole situation. I looked at
13 the clock, it was now 7:40. I told myself I was being
14 ridiculous, and soon the coffee truck would be here,
15 and the situation would be over.
16 At this point I saw Jim Gordine, who was
17 leaning on the wall of the 20 inch number 2 room. He
18 walked towards the 125PK room pointing at something
19 and hollering. I now heard a noise like air escaping
20 from a tire.
21 Everything got quiet, and I saw Jim get
22 stiff as a board. Then it was like the sun came into

1 the room, and I was flying backwards towards the back
2 parking lot, but my arms and legs were being sucked in
3 the opposite direction.
4 I could feel my hair burning off, and the
5 skin burning off my hands. But as hard as I could
6 try, I couldn't pull them in. I felt like I was going
7 to die, so I relaxed because I figured it would just
8 be easier if I just let it happen, rather than trying
9 to fight it.
10 I then bounced off the back cinder block
11 wall, and bounced onto the floor. I felt my uniform
12 on fire, and the ceiling caving in on me. I thought
13 if I rolled to the wall it may put out the flames
14 while I was rolling, and stop me from getting killed
15 from the debris falling from the ceiling.
16 Then everything just stopped. When I
17 realized I wasn't going to die, I stood up and tried
18 to make it back towards the 25PK room to see if I
19 could help anybody who had been there.
20 But I could see nothing, because there was
21 a black smoke so thick that I could feel it touching
22 my face. After about ten minutes I had only gone

1 about ten feet.

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

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

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

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

1 I should have been there, possibly, for
2 weeks. But I have a good wife who took me home,
3 washed me, fed me, and changed the bandages. After
4 the explosion my family paid the price, as I could not
5 sleep with my wife due to horrendous nightmares.
6 On a few occasions I struck my wife and
7 kicked her while I was flailing in my sleep. I had a
8 tremendous problem with short term memory, and startle
9 response, where at the sound of loud noises I was
10 diving for the ground.
11 Today the nightmares are not as terrible.
12 I have fought against startle response by bowling
13 once a week, which is conditioning me to loud noises.
14 But my short term memory will probably never get any
15 better than it is right now.
16 If my coming here today should save one
17 life, or stop somebody else from going through the
18 nightmare I have been living, then it is worth coming
19 here and going through the pain of living it again.
20 Thank you.
21 BOARD MEMBER POJE: Thank you very much,
22 Jim. Let's hope this will be a healing process for

1 you, and help us all do our job of improving chemical
2 process safety.
3 Next we would like Mr. Robert Oliver to
4 come to the podium.
5 MR. OLIVER: My name is Robert Oliver, and
6 thanks for having me here, first of all. And it
7 sounds just like what happened to me, exactly. And
8 I'm glad to be here, that is number two, I'm glad to
9 be here, because with the explosion I was in, I never
10 thought anybody could survive that.
11 It is about 8 o'clock, we all go back to
12 work, and I always look out for my fellow workers,
13 make sure that everybody is safe, because we had some
14 new guys, new people, and I'm looking out for myself,
15 because when you are working with chemicals, nothing
16 is safe.
17 So I was sitting in the chair reading a
18 paper, newspaper, and it just didn't seem right. So
19 I looked around at the rest of the guys standing
20 around the kettle, I said, something is wrong there.
21 So I goes over.
22 If it wasn't for my warning, I don't think

1 nobody would have made it out of that place. And I
2 did something else earlier. I went down and closed
3 all the doors, because it was a cool evening, and I
4 can't stand coldness, very cold hearted.
5 And I closed all the doors. And the three
6 guys that got burnt pretty bad, they wouldn't have
7 been here today if them doors was opened, because the
8 explosion was so intense it blew the door open, but it
9 saved the fire from going out, while they was going
10 out the back door.
11 They was burnt, but they would have never
12 made it, they would have been fried. And with me I
13 warned them, and I started to leave, but they didn't
14 take the warning like I did.
15 When I got to the top of the stairs, going
16 downstairs, I heard like a -- I know what he is
17 talking about, when you hear a blast, the air is just
18 like something -- it scares you, and it scares me
19 right now. I heard a blast, like an air blast, and I
20 started running.
21 I ran to the first floor and warned the
22 guys in the first floor that there was going to be an

1 explosion. And by that time it was three loud bang,
2 and it blew me out of the door, about 40 feet in the
3 air. I didn't know where I was going to fall. I was
4 lucky I land on my hand and feet.
5 And when I got up I said, I looked back at
6 the building and I said, there is no way that them
7 other eight guys made it out of there. So when I was
8 able to get up, because the pressure was so much on
9 me, I couldn't move, it had me pinned against the wall
10 for about, it seemed like forever, but it was only
11 like a couple minute, or a couple of seconds.
12 And when I got up I was able to run toward
13 the barrack to send somebody to see if they could put
14 water on the building to save these guys, so they
15 won't be so hot. I don't know what was going through
16 my mind.
17 But, anyway, when I got up to the barracks
18 they were all sitting in there, I was the only one
19 back. I said, man, what a blessing. You don't know
20 how it is. If you was never in an explosion, it is a
21 horrible feeling. You will never forget it.
22 I'm still healing, just like Mr. Gannon

1 said, you never get over it. Any loud noise makes you
2 nervous. So I hope this would help not the United
3 States, but the whole world, to be more careful or get
4 more insight on the chemical that they are working
5 with. Thank you.
6 BOARD MEMBER POJE: Thank you very much,
7 Mr. Oliver. Now if we could have Allan Goss come to
8 the podium?
9 MR. GOSS: Thank you. My name is Allan
10 Goss, I was involved on March the 27th, 2000, in a
11 fire and explosion at the K Resin plant at the Houston
12 Chemical Complex, for Phillips Chemical Company.
13 I had, at that time I had worked for about
14 eight years as a health and safety representative for
15 the electricians. We were doing a pre-startup safety
16 review on some equipment that had been damaged nine
17 months earlier in a fire and explosion at the K Resin
18 plant, that had killed two contractors.
19 We were about 20 minutes into the review
20 when a Butadiene tank exploded on us. We were about
21 70 feet up in the air, we were standing on grading.
22 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.

1 So I had to use the rungs of the ladder
2 and wrap my wrist around the rungs and climb down.
3 Eventually made it to the nurse's station, where they
4 took one look at me and said, put this man on life
5 flight.
6 So they life flighted me and one other
7 individual to Herman Hospital, where I found out that
8 Herman hospital, the burn unit, was going to be my
9 home for the next 101 days.
10 At that time I found out that I had second
11 and third degree burns to 50 percent of my body. At
12 first they were looking at 75 percent, and then they
13 brought it on down to about 55 percent, and kind of
14 settled in at 50 percent of my body was burnt.
15 I passed out whenever I got on the
16 helicopter to go to the hospital. I woke up in the
17 emergency room. I passed out, again, in the emergency
18 room, and I didn't wake up for three and a half weeks.
19 Whenever I finally did wake up I asked my
20 wife if anybody was killed. And that is when she told
21 me that probably the finest individual I've ever known
22 was killed in that fire.

1 At that time I became very upset, became
2 very angry. I guess most of my anger was aimed
3 towards God, because how could something like this
4 happen to me, and how could that happen to Rodney
5 Gott, who was killed.
6 When you first get brought into the
7 hospital with burns, the first thing that they do is
8 they clean you up. To do that they have to scrub your
9 skin. The -- it is not a pleasant experience to go
10 through. They give you morphine, and vicodin. That
11 was my cocktail drink for most of the time that I was
12 in the hospital.
13 So I don't have a lot of memory of that
14 pain because I was out of it most of the time, during
15 the time that they were cleaning my skin. They also
16 come in with therapy and begin bending the fingers,
17 bending the arms, the legs, trying to get you
18 movement.
19 Because if you don't move those joints
20 they will freeze up on you. And they did that for the
21 entire 101 days I was in the hospital. Finally on
22 July the 5th, 2000, I came home.

1 I was scared, I was nervous, I was also
2 glad. I knew what kind of care I had been getting at
3 the hospital, I wasn't sure if my wife could handle
4 that all by herself. I could not stand, I could not
5 walk, I could not feed myself.
6 We had a little instrument in the therapy
7 that they called, I can't remember the technical name
8 of it, I called it a gripper meter. You squeeze it
9 and it tells you how many pounds of pressure you can
10 squeeze.
11 My right hand could squeeze five pounds.
12 The normal for a male is about anywhere from 90 to 110
13 pounds of pressure. My left hand I couldn't even hold
14 the meter in my hand, it was so weak.
15 Today I have about 75 percent of that
16 strength back. I got home from the hospital on July
17 the 5th. July the 6th I'm thinking this is going to
18 be great. We leave the house about 8 o'clock in the
19 morning, arrive at therapy.
20 For the next six months I go through three
21 hours of therapy five days a week. At the end of
22 therapy the other three guys that were injured with

1 me, they had afternoon therapy, I had morning therapy,
2 we would meet for lunch at the hospital cafeteria.
3 And we developed our own little support
4 group. So it was a time that we could share our
5 experiences together.
6 During that six month period of time some
7 of those guys started getting better. And as they got
8 better their therapy decreased, and I saw them leaving
9 me, and I was left there eating lunch by myself.
10 I would get home about 1:30 in the
11 afternoon, take me about a 15, 20 minute nap, and then
12 my home health care nurse would show up at two o'clock
13 in the afternoon. And for the next four hours I was
14 in the shower getting my bandages soaked, to pull
15 those off.
16 Because if you don't soak those bandages
17 the blood has dried. And if you peel them off blood
18 will just start flowing, so you have to soak them down
19 real well, so that they will just gently pull off.
20 After the shower we would remedicated the
21 wounds, put bandages back on. And then eventually I
22 got into some garments that they call compression

1 garments, and I brought those with me today.
2 Because I was burned on the face I had to
3 go around for a year wearing this mask. And you can
4 imagine the stares that people will give you when you
5 walk around in public with something like this on.
6 Because I was burned on the hands I had to
7 wear gloves. I was also burned on the back of the
8 arms, so they gave me a shirt with sleeves that I got
9 to wear. And because I was burnt on the legs,
10 gentlemen, let me tell you something, you don't want
11 to wear these things, leave them to the women, I got
12 to wear some pantyhose. Those are real great. Thanks
13 a lot, Joe Namath, New York Jets, Joe Namath.
14 I got to wear those garments for a year.
15 And then after a year's period of time finally got to
16 where I was able to come out of those garments and not
17 have to wear them again.
18 During the time that I was in the hospital
19 I had 11 surgeries. Since I've gotten out of the
20 hospital, which has been about 22 months ago, I've had
21 seven more surgeries. A week and a half ago I had
22 surgeries on my hand.

1 I'm not sure how many surgeries I have
2 left to go. But there are at least a few more. I
3 told you a while ago that during the time I was in the
4 hospital I got very angry with God.
5 I've been reading my bible almost daily
6 for 30 years. And while I was laying there in that
7 bed in the hospital a verse of scripture came to my
8 mind, and it is Roman's 8:28. And it says: All
9 things work together for good to those that love the
10 Lord, to those that are called according to His
11 purpose.
12 Some of the things that can work together
13 for good, I believe, is the Chemical Safety Board
14 doing something to help the workers that are still out
15 there in these places. Thank you.
16 BOARD MEMBER POJE: Thank you very much,
17 Allan, for that moving testimony. We also hope that
18 today's entire hearing is a demonstration of us
19 collectively working together with all the expertise
20 in this room to address the problems of reactive
21 chemistry that the management needs for it.
22 At this point in time I would like to ask

1 that our Staff come before the Board and give us their
2 presentation on the results of their two years worth
3 of work.
4 John Murphy is the lead investigator for
5 the Reactive Hazards Investigation. And, John, I
6 trust you will introduce the team.
7 MR. MURPHY: Thank you, Dr. Poje, and good
8 morning to everybody.
9 My name is John Murphy, and maybe I should
10 say a little bit about myself. I've been with the
11 Chemical Safety Board going on for two years.
12 Previous to that I was with the Dow Chemical Company
13 for 28 years, was senior technical management
14 positions in process safety.
15 I was on Dow's reactive chemical
16 committees for 13 years. I was chairman of the
17 committee at one of the major Dow sites for five
18 years. So I have been involved in the reactive
19 chemical issues for a long time.
20 I have a BS in chemical engineering from
21 Tufts University, and a Masters degree in business
22 administration from Central Michigan University. But

1 that is enough about me.

2 This morning, this is a presentation to

3 the Board of the findings and preliminary conclusions

4 of the reactive chemical hazard investigation.

5 Board members, the Staff has concluded

6 that reactive chemical incidents are a significant

7 safety problem. As you have heard from others already

8 reactive chemical incidents have resulted in fires,

9 explosions, and toxic release.

10 Such events have injured people, have

11 damaged property, and caused adverse environmental

12 impacts.

13 With that I would like to briefly

14 introduce my team. If they could stand up as I

15 introduce them, for just a moment.

16 First I would like to introduce Kevin

17 Mitchell. Kevin has been with the Chemical Safety

18 Board going on for two years. He was involved in the

19 BP Amoco investigation that has been discussed

20 already, a reactive chemical incident.

21 He has been recently involved in the

22 Caltech investigation that just started in New York

1 City. Also likely to be a reactive chemical incident.
2 Kevin has a BS in chemical engineering
3 from the University of Minnesota. He has over ten
4 years of consulting experience in process safety,
5 management, and risk management. Thank you, Kevin.
6 I would like to introduce Lisa Long. Lisa
7 Long also has been working on her second year with the
8 Chemical Safety Board. She has been, also, involved
9 in the BP Amoco investigation, and is currently the
10 lead investigator on the Georgia Pacific incident
11 investigation, another reactive chemical incident.
12 Lisa has a BS in chemical engineering from
13 Virginia Tech. She has over 12 years of experience
14 with chemical manufacturing companies in various
15 positions, most recently a production manager with
16 Rodia. Thank you, Lisa.
17 Giby Joseph is also working on his second
18 year at the Chemical Safety Board. He has been very
19 active in the reactive chemical hazard investigation,
20 but he has also participated in other investigations,
21 Bethlehem Steel, and most recently involved in the
22 packaging incident, which has recently been started.

1 Giby has a BS in chemical engineering from
2 the University of Houston. He went on to Texas A&M
3 where he got a masters degree in safety engineering.
4 He also has several years experience in process safety
5 management, and risk management consulting. Thank
6 you, Giby.
7 You've already heard about the Napp
8 Technology incidents. Reactive chemical incidents can
9 be catastrophic. The incident that took place in
10 Lodi, New Jersey on April 21st, 1995, at Napp
11 Technologies is an example of a catastrophic reactive
12 chemical incident.
13 You've already heard a very good
14 description of the incident from a worker. From a
15 technical standpoint an explosion and fire occurred
16 when Napp was conducting a blending operation to
17 produce a commercial chemical used in gold
18 manufacturing.
19 The chemical involved in this process were
20 water reactive. During the process water was
21 inadvertently introduced into the blender. Operators
22 noticed an unexpected reaction taking place in the

1 blender, producing heat and gas.

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

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

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

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

1 Again, you also heard several speakers
2 talk about the Morton incident that took place right
3 here in Paterson, New Jersey, on April 8th, 1998. The
4 Chemical Safety Board investigated this incident. It
5 determined that a runaway reaction caused a fire and
6 explosion and severely injured nine employees.
7 This is a significant incident because it
8 was the beginning of the reactive chemical hazard
9 investigation. During the Chemical Safety Board's
10 investigation of the Morton incident, many groups
11 raised concerns that reactive chemical problems
12 merited a more systematic analysis by the Board.
13 In light of the number of incidents
14 similar to Morton that have occurred since 1995, the
15 Board decided to conduct a hazard investigation of
16 reactive chemicals.
17 The board had the following objectives for
18 the hazard investigation: Evaluate the impact of
19 reactive chemical incidents. By impacts we meant the
20 number and severity of reactive chemicals along with
21 the nature of these kind of incidents.
22 Examine how OSHA and EPA address reactive

1 hazards. Analyze the National Fire Protection
2 Association's reactivity ratings. These are important
3 because they are used by the OSHA PSM standard to
4 determine coverage as far as reactivity is concerned.
5 Examine non-regulatory standards and
6 guidance, examine company policies, practices, and
7 testing. We did this two ways. First we actually
8 went to five chemical manufacturing facilities and
9 discussed these issues with their process safety
10 technology people.
11 In addition to that we surveyed another
12 nine companies to determine their practices regarding
13 reactive chemicals. Finally to develop
14 recommendations to improve reactive chemical process
15 safety.
16 This is why we are here today, to gather
17 further input from groups that have an interest in
18 this subject, especially the public, so the Board can
19 develop recommendations to improve reactive chemical
20 process safety.
21 There are many groups involved in this
22 hazard investigation. They are listed in your

1 handouts, I think in the last page we have a detailed
2 list. They represent academia, industry trade
3 associations, labor unions, public interest groups,
4 regulatory agencies. Many of these groups are
5 represented here today. I would like to thank them
6 for their help.
7 In addition to that we had several
8 consultants and reviewers that have inputted into the
9 hazard investigation and reviewed some of the
10 preliminary findings and conclusions.
11 Again many of these people are represented
12 here today. I won't name them specifically, but take
13 a moment to look at this slide and see the diversity
14 of input into the hazard investigation.
15 One of the first issues the team had to
16 deal with is what is a reactive chemical incident.
17 There are various opinions on this, and we talked to
18 these various groups that are shown on the slide, to
19 get their input.
20 The staff finally came up with this
21 definition. A reactive chemical incident is a sudden
22 event involving an uncontrolled chemical reaction with

1 significant increases in temperature, pressure and/or
2 gas evolution, that has the potential to, or has
3 caused serious harm to people, property, or the
4 environment.
5 With that I would like to turn the podium
6 over to Kevin Mitchell to start a review of the
7 conclusions, preliminary conclusions of the staff.
8 Kevin will be talking about the impact of reactive
9 chemical incidents and gaps in existing regulatory
10 coverage. Kevin?
11 MR. MITCHELL: Thank you, John, good
12 morning.
13 The staff's first conclusion is that
14 incidents involving uncontrolled chemical reactivity
15 are a significant safety problem. This is evidenced
16 by the following.
17 Limited data available to the Chemical
18 Safety Board includes 167 incidents involving
19 uncontrolled chemical reactivity in the United States
20 since 1980; 48 of these incidents resulting in a total
21 of 108 fatalities.
22 The data include an average of six injury

1 related incidents each year, resulting in five
2 fatalities per year, on average. And finally about 50
3 of the 167 incidents impacted members of the public
4 located near industrial facilities, causing death,
5 injury, public evacuation, or shelter in place.
6 Board Members, be advised this is not a
7 comprehensive examination of reactive incidents. There
8 are numerous serious incidents that are not part of
9 our analysis, including many that involved serious
10 injury.
11 This is due to the limitations of the data
12 sources, as you will hear shortly, which in many cases
13 precluded us from determining whether an incident
14 involved uncontrolled chemical reactivity.
15 Therefore this is but a sampling of recent
16 reactive incidents, and the limitations preclude the
17 Chemical Safety Board from drawing statistical
18 conclusions concerning the number and severity of
19 reactive incidents since 1980.
20 The staff identified 12 incidents, each
21 involving the death of three or more persons. These
22 are shown here. And as you can see, in many cases,

1 the death toll was much higher.

2 Today we will tell you about several of

3 these incidents. Although several of these

4 catastrophic incidents date back the better part of 20

5 years, reactive incidents continue to occur.

6 These more recent incidents are a

7 continuing reminder that the hazards of uncontrolled

8 chemical reactivity continue to be a significant

9 safety problem.

10 Even after we finalize the analysis of the

11 167 incidents, reactive incidents continue to occur,

12 such as the Pennington, Alabama incident shown here.

13 And, indeed, the incident that Mr. Goss spoke so

14 passionately about this morning is listed here, the

15 Pasadena, Texas incident in the year 2000.

16 Our second conclusion, there are

17 significant gaps in safety regulations designed to

18 protect workers from the hazards of reactive

19 chemicals. In fact over 50 percent of the 167

20 incidents involved chemicals that are not covered by

21 OSHA process safety regulations.

22 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

1 chemicals that are normally stable even under fire
2 conditions.
3 As I mentioned, OSHA selected NFPA
4 published chemicals with reactivity ratings of 3 or 4
5 for their process safety management standard.
6 However, only about 10 percent of the 167 incidents we
7 analyzed included, involved chemicals that were rated
8 at FPA 3 or 4.
9 Moreover, approximately 60 percent of the
10 167 incidents involved chemicals that are either not
11 rated by NFPA, or rated zero for chemical reactivity,
12 meaning "no special hazard".
13 Now, the significant gaps in coverage of
14 reactive chemical hazards in the process safety
15 management standard by OSHA are due to, in part, the
16 fundamental limitations of the NFPA reactivity ratings
17 themselves.
18 While the ratings are useful for initial
19 emergency response and fire fighting purposes, they
20 were not specifically designed for process safety
21 purposes.
22 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

1 processed at Concept Sciences at the time, known as
2 hydroxylamine.
3 As I said, the explosion resulted in five
4 deaths, included four persons from Concept Sciences,
5 and one member of the public who was working at a
6 business located adjacent to Concept Sciences.
7 In addition there were numerous off-site
8 injuries and extensive off-site property damage.
9 Although the chemical involved, hydroxylamine, is
10 listed under OSHA's process safety management
11 standard, it is not listed as a covered chemical by
12 EPA's risk management program rule.
13 Board Members, as I mentioned earlier,
14 existing process safety regulations for reactive
15 hazards are primarily based on chemical lists.
16 And now I would like to turn the floor
17 over to Ms. Lisa Long, who will illustrate the
18 difficulty in defining such a diverse problem as
19 reactive hazards using chemical lists alone.
20 MS. LONG: Thank you, Kevin. Good
21 morning.
22 The reactive problem is not adequately

1 defined by simply placing chemicals on a list. The
2 problem is too multifaceted. All chemicals can be
3 reactive.
4 Reactivity is not necessarily an intrinsic
5 chemical property. In fact we looked at the 167
6 different incidents that we gathered, to try and find
7 if there were certain chemicals, or classes of
8 chemicals, that were involved more often in the
9 chemical reactive incidents.
10 What we found was that the incidents
11 involved over 40 different chemicals and classes of
12 chemicals. These were such things as acid spaces,
13 even water, and many other chemicals.
14 As was the case at both Napp and Morton,
15 hazards arise from interactions in specific conditions
16 of the chemical process. Some do not react until they
17 are heated, some do not react until they are
18 pressurized. Some react only when they are mixed.
19 For example, you may have some cleaning
20 chemicals around your house, such as bleach and
21 ammonia, which on their own are relatively stable.
22 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,

1 but they were using the chemicals as a raw material in
2 their leather tanning process.
3 Another example, an incident occurred on
4 May 8th, 1997, at Bartlow Packaging, Incorporated, or
5 BPS, in West Helena, Arkansas. BPS was repacking a
6 pesticide called AZM50W.
7 The AZM was offloaded into a warehouse,
8 when employees noticed smoke coming from the building
9 they called the fire department. A team of four West
10 Helena firefighters were conducting a recognizance
11 mission to locate the source of the smoke.
12 They had been told that there was no
13 explosive hazard. An explosion occurred and three of
14 the four firefighters were struck by a collapsing
15 cinder block wall. Three of the firefighters were
16 killed, and another was seriously injured.
17 The most likely cause of this incident was
18 decomposition of the pesticide which had been placed
19 against the hot compressor discharge pipe. The
20 decomposition resulted in the evolution of flammable
21 gassage, which were ignited and resulted in the
22 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.

1 This conclusion is based on the following
2 facts. First, there is no one comprehensive data
3 source that you can go to, to retrieve this
4 information. We had to search over 40 data sources to
5 compile information on our 167 incidents.
6 A key learning that we made during our
7 search was that OSHA and EPA data is not designed to
8 identify or track reactive incidents. Also, the data
9 that is available is very limited in terms of lessons
10 learned, and root cause information.
11 This lack of crucial incident information
12 is a major obstacle in preventing reactive incidents.
13 Less than 40 of our 167 incidents contained causal or
14 lessons learned information.
15 We felt analysis of this data subset would
16 still give us meaningful results. This analysis led
17 to our next conclusion, which is incidents are often
18 caused by inadequate recognition and evaluation of
19 reactive hazards.
20 We found that 60 percent of the incidents
21 in the data subset occurred because reactive hazards
22 were not adequately identified, or evaluated. If you

1 keep in mind that incidents often occur due to more
2 than one cause, then almost 50 percent of the data
3 subset also involved inadequate work procedures.
4 The key message here in this slide is that
5 we need to improve our recognition of these hazards.
6 The incident at BP Amoco is a good example where
7 reactive hazards were not adequately recognized.
8 The incident caused three fatalities, and
9 significant damage to the unit that produced amodel, a
10 plastic used in products such as lawn and garden
11 tools, and automotive parts.
12 The CSB investigated this incident, and we
13 found that amodel was susceptible to thermal
14 decomposition at processing temperatures. However,
15 operators and technical staff at the Augusta facility
16 were unaware that amodel could decompose and generate
17 pressure in this vessel. Thus amodel's decomposition
18 hazard was not adequately addressed in the process
19 design.
20 Next conclusion. Existing knowledge of
21 reactive hazards is not being effectively applied. We
22 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

1 and their combinations must be considered under
2 process-specific conditions.
3 Many reactive incidents could be prevented
4 by applying knowledge that already exists about the
5 hazards. Industry voluntary good practice guidelines
6 need to be improved.
7 So what is the path forward from here?
8 The Board needs additional information from the groups
9 involved in the panels here today, and the public, so
10 recommendations can be developed to improve reactive
11 chemical hazard safety.
12 These are some of the questions that the
13 Board has. Is the OSHA PSM standard adequate, does it
14 need to improve coverage? If so, what could be used
15 for criteria for classifying reactive mixtures?
16 Someone suggested energy release, temperature at which
17 the reaction begins, pressurize, these are all
18 possibilities, alone or in combinations.
19 Is there a need for a minimum regulatory
20 requirement for hazard evaluation? Are there
21 alternative regulatory approaches? Process already
22 under OSHA process safety management, should the

1 requirements be changed or added?

2 For example, under process safety hazard

3 analysis, does there need to more specifically address

4 reactive chemical hazards? Process safety

5 information, is there a need for more explicit

6 requirements for reactivity data?

7 EPA's RMP regulation, is it sufficient or

8 not? What should be changed or added? Should OSHA

9 and EPA take non-regulatory actions to reduce the

10 number and severity of reactive chemical accidents?

11 There are other considerations, too, that

12 I would like to briefly mention. Is there a need for

13 additional industry initiatives regarding reactive

14 chemicals? Is there a need for additional guidance in

15 reactive chemical hazard management? Is there a need

16 for sharing reactive chemical test data throughout the

17 industry, and how could this be done?

18 These are other major issues that the

19 Board would like to have input on.

20 That concludes our presentation, Board

21 members, and the staff is now open to questions.

22 Thank you for your attentiveness.

1 BOARD MEMBER POJE: Thank you John, and
2 thank you to your team, yourself and your team, and
3 the rest of our staff, for the conduct of this study,
4 up to this point in time, and for your preparations
5 for today's meeting.
6 With that I would like to open the
7 questioning period by the Board, and I would like to
8 offer to Dr. Taylor to offer the first questions.
9 BOARD MEMBER TAYLOR: Thank you, Dr. Poje.
10 I would like to start by talking about a lot of work
11 that has gone into this report, again.
12 But my question, there is a couple of
13 questions that I have, and I will start with the first
14 one regarding my background, industrial hygiene.
15 The material safety data sheets, what do
16 they tell employers or employees, what did you find
17 when you researched that area?
18 MR. MURPHY: We didn't look at the
19 material safety data sheets in detail. But in general
20 I think the team would conclude that they just have
21 minimum reactivity data.
22 I would say that they are, in general,

1 inadequate to describe all the reactivity data
2 necessary to run a chemical operation safely.
3 Any other input from Kevin?
4 MR. MITCHELL: Yes. Board Member Taylor,
5 in addition to what John said, it should be noted that
6 the conclusion we have that process specific
7 conditions are important in identifying and evaluating
8 reactive hazards, and that type of information is not
9 something that is typically found on material safety
10 data sheets, as they are intended for a wide range of
11 users that may have a variety of different storage or
12 processing uses of those chemicals.
13 BOARD MEMBER TAYLOR: My next question is
14 regarding, Lisa, you mentioned that chemical listing
15 didn't, would not be adequate to assist with listing
16 reactive chemicals.
17 And can you describe that again, of why
18 that is, or why there is such a problem?
19 MS. LONG: Yes. As I mentioned, it is
20 difficult to describe them by a list because all
21 chemicals are reactive. And it is particularly
22 important to highlight the chemicals and their

1 combinations that process specific conditions, and it
2 would really be impossible to develop a list that
3 considered all those factors.
4 BOARD MEMBER TAYLOR: And my last question
5 regards training issues for the employers who
6 initially are using, are getting the chemicals that
7 they are using to process, as well as from the
8 employers to the senior staff, and down to the
9 employees.
10 How is that done, is there a way, or what
11 did you find in your research regarding that issue?
12 MR. MURPHY: Again, this was not a subject
13 that we researched in depth, but we did visit five
14 chemical manufacturing sites and discussed with them
15 the various training programs.
16 We saw some very good ones from major
17 chemical companies that made reactive chemical
18 training a specific part of their process safety
19 management training.
20 The companies we visited had reactive
21 chemical training integrated in their process safety
22 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,

1 what happens to ensure how much research is done
2 prior?
3 Because, you know, there is so many
4 chemicals that it seems to me that it would be very
5 hard to say or identify which ones will be reactive
6 before you actually use it in the process.
7 So I'm just trying to figure out how that
8 happens beforehand, or what did you find in your
9 research?
10 MR. MURPHY: Again, in our site visits we
11 visited chemical manufacturing operations with premier
12 programs, and we found out that many of the premier
13 companies evaluate all chemicals as they come into the
14 plants, looking for incompatibility issues, how they
15 are used in the process.
16 I think it is important that, if you are
17 handling chemicals, some type of reactive chemical
18 hazard evaluation needs to be done. And then, like I
19 said, we would like to have done a more in-depth
20 survey, but we didn't do that.
21 BOARD MEMBER TAYLOR: Are they looking at
22 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

1 involved hazards that are documented in the literature
2 that is available to industry.
3 We used several sources to conclude that,
4 one of which is well know, Brethericks Reactive
5 Chemical Handbook has a wealth of information on
6 reactive hazards.
7 We used, in addition to that, computerized
8 tools from the National Oceanic and Atmospheric
9 Administration, and tools from the Environmental
10 Protection Agency, which provide information on the
11 hazards of mixing incompatible substances.
12 The number, I don't have a number off the
13 top of my head, but it is several.
14 BOARD MEMBER ROSENTHAL: It is several.
15 But what I gather is that it is less than 10?
16 MR. MITCHELL: That would be --
17 BOARD MEMBER ROSENTHAL: Yes. And so it
18 is a feasible number of publicly available sources
19 that had they been consulted, might have supplied some
20 inputs?
21 MR. MURPHY: I think this ties into Dr.
22 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

1 companies from making such data available? Not
2 barriers, considerations, is this because the data is
3 proprietary, is this because there is a fear of
4 liability, is this because there is no mechanism for
5 sharing it? What are your findings?
6 MR. MURPHY: I think all the ones you
7 mentioned. One premier company has over 60,000 pieces
8 of data that they are willing to share. There have
9 been some efforts in the past, among some of the
10 premier companies, to share reactive chemical test
11 data more thoroughly.
12 And I think that this is something that
13 needs to be explored. I think there are the liability
14 concerns. This is a personal view. And some of the
15 other concerns that you talked about.
16 But the staff feels like this would be a
17 great improvement in reactive chemical hazard safety,
18 to make this kind of information available to small
19 and medium sized companies that don't have the
20 resources to generate this kind of information.
21 BOARD MEMBER ROSENTHAL: Let me proceed,
22 since you did your job well and left too much time,

1 that is what you get into trouble for.

2 MR. MURPHY: I knew there was danger in

3 that.

4 BOARD MEMBER ROSENTHAL: Right, the

5 danger. You noted, very specifically, during the

6 course of the presentation, that NFPA criteria, in

7 and of themselves, are not as sufficient basis for

8 generating coverage under either the OSHA standard, or

9 the EPA standard.

10 It is a two part question, I will tell you

11 both parts so you won't be trapped, and then we will

12 go back to the first part.

13 So the first part is, then, what

14 possibilities, I know you have not arrived at any

15 conclusions or recommendations, but what possibilities

16 have you considered as alternative criteria?

17 And then the second part of the question,

18 which I will ask separately, you have noted, and

19 others have noted, that the expression of the hazard,

20 the hazard reactivity giving the potential to cause

21 injury, but the expression of that hazard is very

22 dependent on process specific conditions.

1 What possibilities exist for action in
2 that area? I know you have no conclusions, but what
3 are some of the thoughts that have crossed the team's
4 mind in that regard?
5 So first part, what are the criteria that
6 might be used in terms of potential coverage under
7 regulations or other things?
8 MR. MURPHY: Well, part one I will put to
9 Kevin Mitchell, and I will try to answer part two.
10 BOARD MEMBER ROSENTHAL: Okay.
11 MR. MITCHELL: Dr. Rosenthal, as we
12 mentioned in our presentation, there are significant
13 gaps in process safety regulations and at least with
14 respect to the OSHA PSM standard, those gaps are due,
15 at least in part, due to the fundamental limitations
16 of the ratings themselves.
17 Considerable thought has gone into what
18 would be a suitable alternative criteria for
19 identifying hazards that rise to the level that should
20 be regulated under workplace safety standards.
21 Although we haven't identified any
22 specific criteria we can say, generally, the concept

1 of the quantity of energy released, the ease and the
2 rate at which the energy could be released, would be
3 one area for exploration in how reactive hazards
4 should be identified.
5 Also the issue of toxic chemicals should
6 be considered. We know that in many cases in our data
7 toxic byproducts were produced in chemical reactions.
8 And as Lisa showed in the Whitehall Leather example,
9 they can indeed result in injuries and fatalities.
10 That may be considered in terms of how to
11 list hazardous chemical reactions for process safety
12 standards. And, in summary, some of the issues that
13 might need to be addressed are including the energy of
14 reaction, the temperature at which the energy is
15 liberated, the maximum pressure rise of a reaction, as
16 measured in laboratory settings, or the rate of
17 reaction, or some combination of all of those.
18 MR. MURPHY: I believe several of our
19 panelists are going to speak to the same issue that
20 Kevin just expounded on.
21 The second part of your question involves
22 one of the themes of the investigation, which is, you

1 can't look at chemicals alone, and their intrinsic
2 properties alone. You need to look at them in process
3 specific conditions.
4 So the next step in the evaluation process
5 would be to look at process specific conditions, are
6 they likely to see if there could be potential
7 catastrophic consequences.
8 You could look at things like loss of
9 agitation, cooling pool, cooling off, heat on, and you
10 can look at some likely scenarios to evaluate whether
11 there is any catastrophic effects.
12 So like Kevin said, the intrinsic
13 properties of chemicals lead you to the potential.
14 But the manifestation of hazard has to also take into
15 account the process specific conditions.
16 BOARD MEMBER ROSENTHAL: Thank you. I'm
17 going to turn this over to Dr. Poje, who --
18 BOARD MEMBER POJE: Thank you, Irv. Just
19 a couple of questions. I know we want to proceed to
20 hear with everybody else.
21 But one of the things that we uncovered in
22 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.

1 Like I mentioned in my part of the
2 presentation, there was no one comprehensive data
3 source that tracked reactive incidents. I believe we
4 ended up searching over 40 data sources. We got real
5 good at searching the internet, surfing it.
6 And I feel fairly confident that we have a
7 fairly complete incident data for fatal incidents.
8 But for less severe and near-miss incidents, the data
9 is fairly conservative.
10 Now, recommendations for improving this
11 process could be, you know, if someone could generate
12 a data base that would specifically track reactive
13 incidents, that would be a great help for industry,
14 and also for government agencies, so they can track
15 the progress of these incidents.
16 BOARD MEMBER POJE: Thank you very much.
17 With that I think I will close the questioning for
18 this period of time. Obviously the Board members will
19 have access to the staff for further questions, in
20 private.
21 But let's take our break now. And I would
22 like to warn everybody that I will begin precisely at

1 11:05 a.m. So please, anybody who will be on the
2 industry panel please be here at that point in time.
3 Thank you.
4 (Whereupon, the above-entitled matter went
5 off the record at 10:45 a.m. and went
6 back on the record at 11:05 a.m.)
7 BOARD MEMBER POJE: Before we get started
8 I just want to reiterate, once again, that we are
9 engaged, right now, as a Board in a public comment
10 period. And while we are most appreciative of people
11 who are physically present today, and have offered
12 their skills and talents, and observations to us in
13 their formal comments, we would still welcome
14 everybody's written comments.
15 And even those who have provided written
16 comments today may want to reflect upon the hearing of
17 today, and add additional comments to our record. We
18 want to be as thorough and as comprehensive as we can
19 be, and that requires input from more than just the
20 Board and its staff.
21 With that I would like to bring us back
22 into session, and ask that Don Connolley offer us his

1 comments on the reactive chemicals issues.

2 MR. CONNOLLEY: Thank you, Sir. Good

3 morning. First I would like to introduce myself a

4 little bit. My name is Don Connolley, I'm a manager

5 of safety and health in the Americas for Akzo Nobel

6 Chemicals.

7 I'm an active member of both American

8 Chemistry Council Process Safety Subgroup, and it is

9 the American Chemistry Council I'm here to represent

10 today, as well as the Center for Chemical Process

11 Safety.

12 I have a bachelor of science degree in

13 chemistry, and a masters of science in chemical

14 engineering, and I'm a certified safety professional.

15 I have spent about 20, out of 23 years of my

16 professional life, working on better and safer ways to

17 use and manufacture chemicals.

18 I'm proud of the contribution the business

19 of chemistry makes to the well being of our nation.

20 As part of the country's critical infrastructure we

21 make significant and sustained contributions to

22 America's economic and national security.

1 We make thousands of products that make
2 people's lives better, healthier, and safer. From
3 medicines to medical equipment, from the space age
4 materials used by the military in aircraft, to
5 aviation fuel, and night vision equipment; from
6 satellite communication systems to ensuring that the
7 water we drink is safe and clean.
8 What is more, every other manufacturing
9 industry in the United States depends, in some way, in
10 the products of chemistry for their survival and
11 growth.
12 I'm also proud of the industry's culture
13 of safety, which goes back many years. The nature of
14 our operations certainly requires it. This culture of
15 safety has created what the Labor Department data
16 reveals as one of the safest industries in the United
17 States, and the world.
18 In fact, ACC was originally organized
19 roughly 130 years ago, explicitly to improve safety of
20 chemical distribution and production. We take safety
21 and security of our facilities and employees very
22 seriously, and as such are committed to working with

1 the Chemical Safety Board, and others, to minimize
2 reactive chemical incidents within our facilities, and
3 through the use of our products.
4 ACC agrees with many of the Board's
5 conclusions from the recent reactive chemical hazard
6 investigation. We would especially like to highlight
7 the following points.
8 Guidance and training on management of
9 chemicals, and potentially reactive chemistry is the
10 best way to minimize chemical reactivity incidents. A
11 number of documents are available that provide
12 guidance on assessing and managing chemical reactive
13 hazards.
14 A brief summary of this issue was recently
15 published by CCPS on October 1, 2001, in a document
16 entitled: "Reactive Material Hazards, What You Need
17 to Know." In a dozen pages this document provides an
18 overview of methods that can be used to identify the
19 level of reactive hazard a facility might have.
20 CCPS is currently developing additional
21 materials on this topic, including a tool to screen
22 the processes and systems that use, manufacture,

1 handle, and store chemicals for potential chemical
2 reactive hazards, and I'm proud to be a part of that
3 effort.
4 These materials are expected to be
5 available by the end of 2002. In addition other
6 documents are available, most for the more advanced
7 user, from CCPS, ASTM, NFPA, and others, and your
8 group that was here a moment ago mentioned many of
9 these, as a matter of fact.
10 Addressing reactive chemical hazards
11 through a chemical list, as in OSHA PSM, or EPA R&P
12 programs, is not appropriate. The reactivity of
13 materials with one another is very, the very
14 foundation of the science of chemistry.
15 Reactive chemical hazards do not lend
16 themselves to chemical list-based rules. There are
17 simply too many site specific and user specific issues
18 that have significant impact on the level of reactive
19 hazard present.
20 Moreover, the reactivity of a chemical is
21 more frequently a function of the way the chemical is
22 used, or what it is in contact with, rather than

1 innate properties of the chemical itself, as pointed
2 out by your team.
3 The problem is actually not reactive
4 chemicals, but reactive chemistry. As pointed out in
5 a CSB document, a number of serious incidents have
6 occurred which involve chemicals considered to be
7 relatively low reactivity hazards.
8 When combined with other materials,
9 however, these chemicals can produce very serious
10 reaction. Thus we believe a chemical list based rule
11 would be encyclopedic, but provide very little value
12 in managing chemicals or reducing chemical reactivity
13 incidents.
14 Another, though a less practical,
15 alternative means to addressing reactive chemical
16 hazards could be a performance based program. ACC
17 believes it would be very difficult to develop a
18 program that attempts to deal with the issue of
19 reactive chemical hazards in a detailed prescriptive
20 manner.
21 While these issues can quickly become
22 complex, the solution may be as simple as don't mix

1 these chemicals together. We are not recommending the
2 development of such a program at this time. However,
3 if such a program is needed in the future, should one
4 be founded on performance based systems, which are
5 needed to address risks of reactive chemistry; two,
6 address site specific extrinsic factors, such as
7 sitting and proximity.
8 Three, address the situations that can
9 create potentially reactive situations, rather than a
10 list of reactive chemicals. And, four, consider the
11 use of chemical testing only as an adjunct to the
12 performance based program , not as a starting point.
13 The ACC appreciates the invitation to
14 speak with you today, we look forward to working
15 closely with the CSB, and others, to improve chemical
16 safety. Thank you.
17 BOARD MEMBER POJE: Thank you very much,
18 Don, and thank you for making your statement
19 appropriate to the available time we have today. You
20 and your members have been very helpful to our staff
21 in the conduct of our work, so far, and we look
22 forward to receipt of these comments, and future

1 comments, within the commentary period.

2 Now I would like to turn it to Chris

3 Bagley, representing the synthetic Organic Chemical

4 Manufacturers Association, and the Dan Chem

5 Technologies, Incorporated Company. And thank you,

6 also, for your assistance with some of the substantive

7 field visit work for this particular study.

8 MR. BAGLEY: Thank you. Good morning,

9 members of the Board. My name is Chris Bagley, and

10 I'm the health safety and environmental manager at Dan

11 Chem Technologies, Inc., at Danville, Virginia.

12 I'm appearing on behalf of the Synthetic

13 Organic Chemical Manufacturers Association, or SOCMA,

14 of which Dan Chem Technologies is a member.

15 Dan Chem is a small custom chemical

16 company, with a single manufacturing site, employing

17 about 110 people. SOCMA is the trade association that

18 represents batch and specialty chemical manufacturing

19 manufacturers, with a particular focus on the interest

20 of small businesses.

21 SOCMA has 273 members, and over 75 percent

22 of these are small businesses. I would like to turn

1 now, to how SOCMA and its members are addressing
2 reactive chemicals.
3 SOCMA and its members have actively
4 participated in the Chemical Safety Board's
5 investigation. We, at Dan Chem Technologies, hosted a
6 visit to our manufacturing site, to share our
7 knowledge of batch manufacturing operations.
8 SOCMA has long recognized the importance
9 of process safety. SOCMA's employee and process
10 safety committee meets regularly to address important
11 issues, and help members further improve process
12 safety practices.
13 SOCMA has developed guidance to help
14 members use the chemical industry's responsible care
15 program to make a difference at their facilities. For
16 example, the responsible care process safety code
17 requires SOCMA members to identify potential process
18 hazards, including those associated with reactive
19 chemicals, and to assign appropriate action items to
20 reduce risk.
21 This process, called a process hazard
22 analysis, or PHA, is required for all processes, not

1 just those covered by EPA and OSHA regulations. Thus
2 the process safety code reaches beyond regulations to
3 establish practices for all manufacturing processes.
4 The responsible care product stewardship
5 code recognizes that management of reactive chemicals
6 is an issue that extends beyond the chemical industry.
7 The product stewardship code thus requires companies
8 to reach out and provide health safety and
9 environmental information on all products to
10 suppliers, distributors, and customers.
11 SOCMA routinely provides regulatory
12 support, training, and workshops to its members on
13 keep process safety issues. SOCMA also provides
14 opportunities for members to benchmark their practices
15 with others in industry.
16 For example, SOCMA and a number of other
17 associations are currently planning a third annual PSM
18 conference. I assure you that management of reactive
19 chemicals will be part of this program.
20 SOCMA has been considering various issues
21 identified by the Board during this hearing. SOCMA
22 was particularly struck by a preliminary board finding

1 that over 90 percent of all reactive chemistry
2 incidents involved chemicals with known chemistry.
3 Therefore a significant number of
4 incidents should be prevented based on current
5 knowledge. The key question is, how can this
6 knowledge be used most effectively to prevent these
7 incidents?
8 The CSB has asked whether expanding the
9 existing OSHA PSM and EPA risk management plan
10 programs would provide better protection against these
11 types of incidents. Having considered this issue with
12 its members, SOCMA does not believe that expanding
13 these programs would significantly reduce the
14 potential for future incidents.
15 In fact, in the Federal Register notice
16 the CSB identified a concern, shared by SOCMA, that
17 the list-based approach to reactive chemicals fails to
18 address the hazards from combinations of chemicals,
19 and process-specific conditions.
20 From SOCMA's perspective the goal is
21 supporting safe use of reactive chemistry, and not
22 further identification and listing of individual

1 reactive chemicals.

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

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

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

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

1 A central website can be used to post
2 information and best practices. Companies could then
3 find and use information pertinent to their own
4 operations. Facilities could apply basic process
5 management tools to analyze risks associated with the
6 use of reactive chemistry at their sites.
7 Ultimately each situation needs individual
8 analysis. SOCMA is committed to working together to
9 help develop management systems, and tools, to assure
10 that such analysis becomes an integral part of
11 individual company operations.
12 I would like to conclude by assuring you
13 that the chemical industry is dedicated to ensuring
14 the safety of all of our processes. A failure to
15 address health, safety, and environmental issues, can
16 have a devastating impact on our own lives, on the
17 lives of our neighbors, and on our business.
18 In a very real sense we view ourselves as
19 being on the front lines in assuring the safety and
20 well being of our community.
21 That concludes my statement, and I would
22 like to thank the Board for this opportunity to speak

1 here today.

2 BOARD MEMBER POJE: Thank you very much,

3 Chris.

4 I would also now like to introduce Bill

5 Almond, and hear from his remarks. The National

6 Association of Chemical Distributors has also been

7 very generous with their time and perspective, to our

8 staff, during the conduct of this study, and

9 particularly welcome Bill to the podium today.

10 MR. ALMOND: Thank you, Jerry. Good

11 morning, Board Members. My name, once again, is Bill

12 Almond, with the National Association of Chemical

13 Distributors.

14 We represent approximately 270 member

15 companies across the U.S., representing about 1,000

16 facilities. We buy chemicals in bulk from chemical

17 suppliers. We warehouse them. In some cases we

18 repackage, and sell, and transport those chemicals to

19 a customer base of approximately 750,000 customers.

20 A small percentage of our members do do

21 mixtures and blendings. They are usually simple in

22 nature. But, nonetheless, we do, we will take one or

1 two chemicals together, and blend them to create
2 another product.
3 Most of our members do have warehouses, or
4 bulk storage locations. As an industry we are
5 required to report to EPA's annual toxic release
6 inventory. The last three years that we've been
7 required to report our totals have been 0.03 percent
8 of the totals, or less.
9 We do have an industry environmental
10 health safety and security program, known as the
11 responsible distribution process, with a mandatory
12 independent third party verification aspect.
13 Regrettably, in the last three years,
14 we've had to terminate 20 companies due to non-
15 compliance. We are beginning to start the third, or
16 the second three year cycle of on-site verification,
17 in July of this year.
18 It is a continuous improvement process.
19 So whatever findings the Board concludes, we certainly
20 would be very interested in knowing how it impacts our
21 program, so we can update it accordingly.
22 We are in the midst of gathering data,

1 industry data, on our members, specifically with
2 accidents, injuries and fatalities, to judge how well
3 our program is having an impact in our companies.
4 We do support the Chemical Safety Board
5 quite anxiously in its mission. Our president is Jim
6 Colstat, he is the former chairman of the National
7 Transportation Safety Board, under the Reagan
8 administration. So safety is of the utmost concern to
9 him.
10 Our members have lobbied Congress for
11 additional funding of the Board so that it can fulfill
12 its mission, its very critical mission. Most of our
13 members do not fall under OSHA's process safety
14 management regulation, less than 50 percent fall under
15 EPA's risk management program.
16 We believe that through better
17 collaboration with the Board we can develop safety
18 practices above and beyond any existing or new
19 regulations, and we certainly appreciate the time to
20 join you today, and look forward to future work
21 together.
22 BOARD MEMBER POJE: Thank you very much,

1 Bill. And now I would like to turn to Scott Berger,
2 who is the senior manager for the American Institute
3 of Chemical Engineers Center for Chemical Process
4 Safety.
5 I just would like to note that in many of
6 the Board's investigative works we use the CCPS
7 reference material as a good practice guidance that
8 should undergird the systems of safety and welcome you
9 here today, Scott.
10 MR. BERGER: Thank you, Jerry. First a
11 little bit about my own background. I have a BS and
12 MS from MIT. I have been working for 25 years in
13 industry in a variety of engineering and environment
14 health and safety projects aimed at reducing safety
15 accidents, and also environmental impacts.
16 I feel strongly about this subject,
17 especially because I have personally witnessed,
18 fortunately from a distance though, but witnessed two
19 reactive chemical incidents.
20 The Center for Chemical Process Safety, or
21 CCPS, which is a directorate of the American Institute
22 of Chemical Engineers, or AICHE, is a not-for-profit

1 technical organization founded in 1985, in response to
2 the incident in Bopal, India.
3 CCPS and its 80-plus industrial sponsors,
4 are dedicated to improving chemical process safety
5 across all industries. Over the past 17 years we
6 published more than 70 books on the subject of process
7 safety, and have also started several, and actually
8 maintained several data bases in various aspects of
9 process safety.
10 Since 1992 CCPS has undertaken several
11 projects, which have been mentioned already, directly
12 addressing the prevention of reactive chemical
13 accidents, including the one project that is currently
14 in progress, that Don Connolley has already mentioned.
15 This project will result in a book, before
16 the end of the year, titled "Essential Practices for
17 Managing Reactive Chemical Hazards".
18 This project, as all of our projects, are
19 staffed and guided by people with expertise in
20 reactive chemicals, and not only expertise, but also
21 passion. They come from manufacturing and consulting
22 companies across industry.

1 And the result is that we put together the
2 best of the best practices available in reactive
3 chemical hazard management. Last year we published a
4 pamphlet which was titled "Reactive Chemicals: What
5 you Need to Know". Copies of this pamphlet are
6 available in the back of the room, and also on our
7 website. I can also email copies to people who are
8 interested.
9 Now, since CCPS is a technical
10 organization, we do not normally advocate for or
11 against regulations. But we do offer the following
12 observations related to the questions that the CSB put
13 in the Federal Register.
14 With regard to the use, or to coverage
15 under PSM, or RMP, we also agree that the use of a
16 list-based approach is not really appropriate for this
17 type of a situation. We are concerned that such a
18 list cannot be sufficiently complete or accurate.
19 It would be difficult to create and
20 maintain a comprehensive list of unstable or self-
21 reactive materials, whether it is for regulatory
22 purposes, or otherwise.

1 A more effective way to identify such
2 substances may be to define better criteria for
3 reactivity. As difficult as it would be to create and
4 maintain a comprehensive list of single reactive
5 materials, it would be a virtual impossibility to
6 maintain a list or table showing reactivity hazard
7 with pairs, or even three way reactive hazards.
8 We do believe that for materials currently
9 under the OSHA PSM standard, and also under the EPA
10 RMP regulation, that the process hazard analysis
11 provisions would be adequate to identify reactive
12 chemical hazards.
13 Obviously materials that are not under
14 those provisions are not required to undergo those
15 type of techniques, but we believe they would still be
16 useful.
17 In terms of additional activities that
18 could be taken, we would recommend that OSHA and EPA,
19 and others, conduct research on methods for
20 anticipating unexpected reactions during process
21 development and plant design, as well as during hazard
22 reviews for existing facilities.

1 We also invite others to join us in
2 advocating a multistep hazard identification process.
3 Such as what will be published in our upcoming book.
4 This management system has ten steps, it is well
5 thought out, and will again be the best of the best
6 practices available in industry.
7 We will describe the management process in
8 our written comments. In terms of the second thing
9 that we would advocate is additional education and
10 training.
11 The American Institute of Chemical
12 Engineers already has reactive chemical training
13 courses available. And we believe that there is
14 significant room for more training in this area.
15 So, in conclusion, I would say that there
16 are no simple solutions to the issue of safely
17 managing reactive chemical hazards. Companies must
18 understand the chemistry in their processes, and that
19 companies must have management systems to develop all
20 the information they need to build and operate a safe
21 process.
22 Most importantly there must be management

1 commitment to allocate the resources and expertise to
2 build and operate a safe process. And large
3 companies, such as our sponsors, in general have the
4 resources to develop such management systems.
5 And we would ask, and perhaps offer some
6 help, in how to ensure that smaller companies become
7 educated on this issue.
8 Thank you for the opportunity to comment.
9 BOARD MEMBER POJE: Thank you very much
10 Scott, and thank you to all of the panelists. I would
11 now like to open the discussion period. And Dr.
12 Taylor, if you would want to offer your first
13 questions?
14 BOARD MEMBER TAYLOR: Sure, thanks, Dr.
15 Poje.
16 I think ACC and SOCMA, Mr. Bagley and Mr.
17 Connolley mentioned that a performance based approach
18 would be one that you would recommend. And I was just
19 wondering if you could expound a little bit on that.
20 MR. CONNOLLEY: Some of the things that we
21 do at Akzo Nobel, and I know that many other companies
22 do, we rely fairly heavily on process hazard analysis,

1 and like techniques.

2 Certainly when we go into these type of

3 analysis if we -- questions are asked about

4 compatibility, about the nature of the reactions, if

5 we don't have that type of information, then we go get

6 it.

7 We've got a variety of different types of

8 processes in our company, anywhere from what I call

9 our fancy dirt makers, they make the catalysts that go

10 into cracking oil. And they don't have very much in

11 the way of hazards associated with that process, to

12 making organic peroxides, which as you are well aware

13 of, I'm sure, are very hazardous.

14 And that latter program, or the business

15 with the organic peroxides, has a heavy testing

16 program, because we know the nature of the reactions

17 there. I think that a system for looking at the

18 management system for looking at reactive hazards

19 should include screening techniques, where you do

20 literature searches.

21 You look for known groups that are

22 reactive, reactive groups with chemicals. If those

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

1 material.

2 Or in what we would call a non-process

3 environment, the purest stage being your storage tank

4 intermediate between chemical producer and some of

5 Bill Almond's customers.

6 Would you think that there ought to be one

7 standard in terms of reactive hazards, if OSHA or

8 someone were to choose to do so? Or would you need

9 two different types of approaches, the one dealing

10 with unintentional admixture, and the other one

11 dealing with intentional actions? Brief comment on

12 that?

13 MR. ALMOND: That is a good question, Dr.

14 Rosenthal. And I notice that, again, 30 percent of

15 the incidents happened with storage handling in our

16 consumer sites. I would be interested to see a

17 further breakout of that, to determine how much of

18 that 30 percent is storage, how much of it is

19 handling, how much of it is at the consumer site.

20 I don't know the correct answer to your

21 question. I think that any additional guidance that

22 we can have on mixing chemicals together,

1 particularly before our smaller companies, who may
2 have five employees, would be very beneficial to
3 making those safer.
4 BOARD MEMBER ROSENTHAL: Thank you. And,
5 one more question, I've been told. So, Scott, I don't
6 want you to feel bad. Mr. Berger.
7 CCPS, I think you mentioned that you were
8 doing additional work. One of the conclusions drawn
9 by the Board's investigation team, or two of the
10 conclusions, had to do with the need for better data
11 sources, and the need for better guidance.
12 Could you comment whether CCPS is doing
13 anything in these regards, and briefly what the nature
14 of those things are?
15 MR. BERGER: Well, as I mentioned in my
16 remarks, we are developing a book, another book I
17 should say, in managing reactive chemical hazards.
18 That book will put out a ten step process for managing
19 reactive chemical hazards, and is being contributed to
20 by experts across industry.
21 When that book is complete, as we do with
22 all of our books, we put them out for a peer review,

1 and perhaps the Chemical Safety Board would offer some
2 guidance as to other sources of peer review that might
3 want to have a look at that book.
4 I think the other thing that we could talk
5 about is data bases. Now, currently CCPS has a
6 process safety incident data base. It is not specific
7 to reactive chemicals, and in fact, in order to
8 protect the anonymity of the companies that
9 participate in this project, or in this data base, we
10 talk about classes of chemicals, rather than the
11 specific chemical names.
12 However, I think that type of approach
13 might be effective for collecting the information, and
14 making it more available in terms of reactive chemical
15 interactions.
16 BOARD MEMBER ROSENTHAL: Thank you.
17 MR. CONNOLLEY: May I add to that point,
18 briefly?
19 One of the aspects of the book that Scott
20 mentioned, we recognize that many of the incidents
21 that have happened, people didn't realize that they
22 had a potential problem. And I think that several

1 other members of that committee think that one of the
2 things that is necessary is to help people recognize a
3 potential problem.
4 So one of the things that are in that
5 book, that we are working on, is a preliminary
6 screening tool that can help answer that question, do
7 I have in my situation a problem, here?
8 BOARD MEMBER POJE: If I can just ask a
9 question, quickly.
10 One of the observations from our staff's
11 presentation was that there is a significant amount of
12 information, test data that seems to be available,
13 maybe even membership of ACC who would be willing to,
14 perhaps, make that more shared.
15 As well as the understanding that the
16 lessons learned from past incidents are
17 extraordinarily important to share beyond the place
18 that had the incident, so that others might benefit
19 from learning from that.
20 Any suggestions, from any of the
21 panelists, on how we can more effectively ensure that
22 such information is made more readily available, and

1 shared within the industry?

2 MR. CONNOLLEY: I think some of that was

3 touched on, earlier, with the question that Dr.

4 Rosenthal had.

5 Recognizing there are some potential

6 barriers of proprietary information, concerns about

7 liability, personally I'm all in favor of that sort of

8 thing. I think that sharing is an excellent way.

9 Some of our businesses participate in industry

10 organizations where there is sharing, and some of the

11 organizations that I participate in there is sharing.

12 You've just somehow got to get around the

13 lawyers, unfortunately, especially where there is

14 potential litigation, or is litigation, that barrier

15 of the worry about liability is a big one.

16 BOARD MEMBER POJE: Okay, thank you very

17 much, I thank you all for your comments today. And I

18 would, again, encourage you to share them with your

19 fellow members and your associations, and seek to have

20 them also provide us input for their perspective on

21 the important questions that we framed in the Federal

22 Register notice.

1 BOARD MEMBER TAYLOR: Do we have written
2 comments, have you all submitted written comments?
3 All of you have, okay.
4 BOARD MEMBER POJE: Thank you all. If I
5 could now ask for the next panel to come before the
6 Board?
7 (Pause.)
8 BOARD MEMBER POJE: Thank you very much.
9 I would like to now introduce Glenn Erwin, who is the
10 health and safety coordinator with the paper, Allied-
11 Industrial Chemical and Energy Workers International
12 Union, better known as the PACE union.
13 And, Glenn, it is nice to have you here,
14 once again, in Paterson. I believe you were with us
15 two years ago, when we introduced the Morton
16 investigation.
17 MR. ERWIN: Yes, I was. Thanks for the
18 invitation.
19 I will limit my comments to the record for
20 the problems due to the lack of information sharing
21 within the petrochemical industry.
22 As the Board and the Staff found out

1 during the recent reactive hazards study, even the
2 Board could not get adequate information about
3 reactive incidents from industry, or from the industry
4 trade groups.
5 And I will submit to you that without the
6 open dissemination of information, and stricter
7 regulations, nothing will change in our industry.
8 You know, it is a wise person who learns
9 from their mistakes, but it is an even wiser person
10 who learns from the mistakes of others. And I'm
11 ashamed to admit to you that for the most part the
12 petrochemical industry does not fit into either one of
13 those categories.
14 Every reactive incident where people have
15 been seriously injured, or killed, that I have
16 investigated or reviewed, could have been prevented
17 if, number one, the equipment had been designed to
18 handle the worst case reaction possible.
19 Number two, if the information about the
20 reactivity properties of the chemicals being used had
21 been fully communicated, and understood by both
22 management and the workers at the site.

1 And, number three, if previous incidents
2 and near misses were investigated, and the
3 recommendations from those investigations were
4 followed through to completion.
5 First I would like to discuss the issue of
6 equipment. All -- there are two approaches to the
7 design of equipment associated with reactive material.
8 The first way is to design it to contain the worst
9 possible reaction.
10 The equipment must be able to withstand
11 the greatest pressure, or temperature possible by the
12 reaction. This is expensive, and is rarely done, but
13 it gives the greatest measure of safety.
14 The second option is to design it to where
15 it can mitigate the worst reaction if that so takes
16 place. This would require ways to automatically vent
17 the pressure, reduce the temperature, or to kill the
18 reaction from taking place.
19 If you look at any reactive incident you
20 will find the equipment was not designed to contain
21 the reaction, or the mitigation systems either were
22 not in place, or failed.

1 The second item is information about the
2 reactivity properties of the chemicals. I have
3 investigated an incident not long ago, and was
4 informed by the chief chemist of the corporation, that
5 he had concluded that the reactive material that was
6 in this vessel could not have possibly have caused the
7 explosion.
8 And every person at the site, without
9 exception, was unaware of how violent reaction was
10 possible due to that chemical that they worked with
11 every day.
12 But after completing an independent
13 investigation it was, that was conducted, it was
14 determined that the explosion was, in fact, due to the
15 reactive material.
16 You see, there is a major gap in how we
17 analyze and understand reactive chemicals versus
18 flammable materials. We put a lot more emphasis on
19 the flammability of a chemical, even if it may be
20 reactive.
21 And the third item is that all incidents
22 and near misses must be investigated and the

1 recommendations from those investigations must be
2 followed through to completion.
3 Then the lessons learned have to be
4 shared. First we have to learn the lessons, then we
5 have to be able to share them. But we do have some
6 problems with this concept.
7 Recently I sat in a meeting room with a
8 management team from a major petrochemical company.
9 And I mean a major petrochemical company, discussing
10 the concepts of investigations and information
11 sharing.
12 To my amazement their position was,
13 concerning the investigations, was to conduct as few
14 of them as possible, because they felt that conducting
15 an investigation on a minor or less serious incident,
16 would only create a paper trail that when they had a
17 more serious one, they would have -- it would increase
18 their liability.
19 On the issue of information sharing, they
20 were totally against that concept, too. Because they
21 explained to me that there was such competition
22 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

1 understood by all that worked from the design to the
2 disposal face of that material.
3 And, number three, we suggest a depository
4 of lessons learned from reactive incidents must be
5 established. To learn these lessons it becomes
6 necessary to require that all incidents and near
7 misses associated with reactive excursions be
8 investigated and reported to the depository. Thank
9 you.
10 BOARD MEMBER POJE: Thank you very much,
11 Glenn.
12 And now I would like to introduce Eric
13 Frumin. Eric is the director of Occupational Safety
14 and Health for the Union of Needletrades, Industrial
15 and Textile Employees, better known as Unite. Eric?
16 MR. FRUMIN: Thank you very much. Unite
17 represents about 250,000 workers in the U.S. and
18 Canada, including about 20,000 who handle chemicals of
19 one sort or another. And we represented the workers
20 at the Lodi plant.
21 In October 23rd, 1995, along with the
22 other unions here, and the AFL-CIO, we petitioned OSHA

1 to close the loopholes in the PSM standard, and the
2 HAZWAP standard on emergency response, as well.
3 I won't take the time to recount the facts
4 of that incident. Most of them have already been
5 introduced into the record. This investigative series
6 by the Bergen record in '95 clearly identified many of
7 the key factors, including the uncontroverted evidence
8 that the vice president for regulatory affairs at Napp
9 Chemical, Fred Schafer, had a criminal history.
10 He was an accomplice to a guy who did time
11 for a felony conviction for mishandling chemicals in a
12 private business he was running on the side, and he
13 personally stole electricity from the local utility.
14 He had misrepresented his credentials, and
15 the Napp managers above him, the people who hired him,
16 misrepresented his credentials, he lied about ever
17 having gone to graduate school, lied about his D
18 average and his lousy BS degree at the University of
19 Rochester, in chemistry.
20 That is the kind of chemical industry
21 management we are dealing with here today, folks, it
22 is not just the people who appear before you.

1 The other obvious facts are the OSHA
2 citations at Napp, the OSHA/EPA report, the peer
3 review on the OSHA/EPA report. They are in the
4 record.
5 Management incompetence, and
6 unfortunately, as we've seen at Napp, even corruption
7 are at the heart of the problem. In light of the easy
8 availability of the information about severe reactive
9 hazards from the chemicals used at Napp, the
10 underlying cause of the death and destruction was the
11 demonstrable incompetence of the managers at all
12 levels of that company.
13 The management of the Napp company was
14 small. Total employment was only about 140 people.
15 Indeed, these associations whom you've heard from
16 said, repeatedly in the past, they don't belong to us,
17 they are not part of SOCMA, not part of the Chemical
18 Manufacturers Association.
19 The owners of Napp were not small. The
20 Sackler brothers, physicians both of them, own the
21 Perdue company, at the time about a 700 million dollar
22 corporation, today about a billion dollar corporation.

1 One of them was knighted by the Queen of England
2 about a year later, for their philanthropy.
3 It is not enough for the Board to merely
4 recognize the incompetence and blatant corruption in
5 the management structure at Napp. Notwithstanding the
6 well known best practices on reactive chemical
7 hazards, followed by some chemical companies, and we
8 salute those who do, we are anxiously awaiting to hear
9 from the individual companies who carry out those best
10 practices.
11 The fact is the repeated failure of
12 corporate management throughout the nation to
13 recognize, evaluate, and control reactive hazards,
14 identified so vividly in the Staff's analysis, this
15 demands that the Board adopt the most forceful
16 position possible on this question.
17 The shameful record by chemical companies,
18 large and small, requires you to act forcefully and
19 soon. If executives as sophisticated as the Sackler
20 brothers could construct such a horrifyingly
21 incompetent and corruptive management structure, then
22 we must greatly improve our vigilance against the

1 merely incompetent.

2 If these same corporate executives

3 believe, for one minute, that airplane pilots, air

4 traffic controllers, or mechanics, suffer the same

5 outrageous weaknesses as plant managers in the

6 chemical industry, the cry for new regulations would

7 be deafening.

8 Second, OSHA's failure to close the

9 loopholes for reactive chemicals in the PSM standard

10 is completely inexcusable, and requires a forceful

11 response from the Board.

12 In the interest of time I will skip the

13 horrendous chronology that OSHA has compiled. Suffice

14 it to say that the very associations who just left

15 this table, both in October of '96, and in February of

16 '97, presented these documents to OSHA, opposing any

17 change in OSHA standards on reactive chemical hazards,

18 until the CCPS release of their new guidance document

19 in October, they made no useful contribution to the

20 agency's search for ways to control this.

21 And now OSHA has dropped the PSM standard

22 from their list of regulations. We know that the

1 chemical industry has made major political
2 contributions to the administration. To us it is a
3 simple question that the industry speaks out of one
4 mouth here, and speaks out of a completely different
5 mouth in Washington.
6 There is no question that the PSM standard
7 was on the hit list of corporate management who wanted
8 to oppose OSHA regulation. And you, the Board, have
9 the obligation to help remedy that problem.
10 It is simply beyond us to believe OSHA's
11 claim that they dropped the PSM standard because of
12 "resource constraints, and other priorities". So the
13 de facto repeal of the OSHA Act must stop.
14 OSHA has simply forgotten its mission.
15 You have the authority to create the compelling
16 arguments to identify and control these reactive
17 hazards. The American people deserve to know those
18 arguments, to hear them from you, and we implore you
19 to advance these ideas with all the resources at your
20 command.
21 And I would like to present to the Board a
22 copy of the original Bergen record series, which I

1 will put into the record as well. Thank you.

2 BOARD MEMBER POJE: Thank you very much,

3 Eric. Now I would like to introduce Mark Dudzic.

4 Mark is the president of PACE local 1-149. That was

5 the local that represented the work force of the now

6 defunct and deceased facility here in Paterson. Mark?

7 MR. DUDZIC: Good morning. I want to

8 thank the Board for again coming to Paterson. I think

9 it is a very significant move that you chose to go out

10 in the field to hold these hearings, and to talk first

11 to the victims of reactive chemistry, as it is

12 currently practiced.

13 I am president of local 149, we

14 represented the Morton Plant here in Paterson, and we

15 also represent a number of other small chemical and

16 pharmaceutical production plants in the New Jersey

17 area.

18 And I'm going to try to focus my comments

19 on the inadequacy of the current OSHA process safety

20 management standard. And I'm going to try to do that

21 in the real world, not the world of what should be,

22 and what might be.

1 In the real world the first thing that
2 happens, whenever there is a reactive chemical
3 incident in the real world, is that the companies hire
4 lawyers. I know that one of the industry people spoke
5 about the lawyers being a problem, but they are the
6 ones who usually hire them.
7 They hire lawyers who try to convince OSHA
8 that the process involved is not covered under process
9 safety management. That is the first thing that most
10 companies do. In both Morton and Napp they were
11 successful in convincing OSHA that they had no
12 regulatory authority under process safety management.
13 At Morton the two chemicals that were
14 involved in the runaway exothermic reaction had NFP
15 reactivity ratings of either zero, or were not covered
16 under the NFP reactivity standards.
17 Although a later step of the same
18 manufacturing process, a step that involved the use of
19 xylene was covered under process safety management,
20 the company was able to demonstrate to OSHA that the
21 step that caused the explosion was not technically
22 covered.

1 So what happened? OSHA ended up issuing a
2 citation under the general duty clause, and levying a
3 small fine of 7,000 dollars to this company, which had
4 no effect, I would submit, on the entire industry in
5 terms of the need to regulate reactive chemistry.
6 Now, to OSHA's credit, they did understand
7 that the real need in the Morton case was to utilize
8 PSM methodologies in all phases of the manufacture of
9 this product. And they did insert an unenforceable
10 abatement note in the OSHA citation.
11 And I want to read this to you, because it
12 is really illustrative of what OSHA, on the ground,
13 understands is the limitations of the current
14 standards.
15 They wrote in an abatement note: A
16 comprehensive process hazard analysis designed to
17 identify, evaluate, and control the hazards involved
18 in the process, is recommended. This analysis should
19 include an emphasis on the potential for
20 uncontrollable exothermic reactions.
21 The results of the process hazard analysis
22 should be reflected in the standard operating

1 procedures used by operators to manufacture the
2 product.
3 Members of the Board, I submit to you that
4 when the agency that is in charge of enforcing
5 regulations to protect American working people, in
6 their work lives, is reduced to using the words like
7 recommend and should, in their citations, there is
8 something horribly wrong with the regulatory process.
9 Now, this is not the first time in my own
10 local that a company has attempted to wiggle out of
11 the process safety management standard. In 1996 an
12 uncontrolled exothermic reaction involving calcium
13 carbide and water at a BOC acetylene plant in
14 Middlesex, New Jersey, created a fireball that sent
15 two workers, members of my local, to the hospital.
16 In that case the company claimed that on
17 the actual day of the explosion, that they had less
18 than the threshold amount of the covered chemical on
19 site.
20 Any approach to reactive chemistry that
21 relies on lists of chemicals, NFPA ratings, and
22 threshold amounts is flawed. Under current conditions

1 many chemical reactions can produce catastrophic
2 consequences.
3 OSHA regulations must be broadened so that
4 all reactive chemistry is covered. The second point I
5 would like to make, quickly, is that even if a
6 reactive process is covered under PSM, the standard
7 itself is inadequate to protect the workers from the
8 consequences of uncontrolled reactions.
9 Again, in the Morton incident, despite the
10 fact that the company claimed it wasn't covered under
11 OSHA, the company did attempt to do a process hazard
12 analysis. That analysis did not require a literature
13 search, didn't require pilot testing under actual
14 conditions, or more effective understandings of
15 reactivity.
16 It didn't even require them to go back to
17 earlier studies that the company themselves had
18 undertaken in this area. And without this crucial
19 information, the committee that did the process hazard
20 analysis, which included members of my union, who
21 received some significant training in this, that
22 committee had no way of knowing that the process was

1 always, from the very beginning, in eminent danger of
2 becoming a runaway reaction.
3 And the operators who followed the
4 instructions on the batch sheet, had no way of knowing
5 that they were following a recipe for disaster.
6 We heard about best practices today, best
7 practices are great. But I would submit to you that
8 they are not a substitute for effective regulation.
9 And in light of the conclusions on reactive chemical
10 safety that were reported today by the Safety Board,
11 here, OSHA's recent decisions to remove reactive
12 chemical safety from its regulatory agenda, is
13 unconscionable.
14 My union today calls on OSHA to expand and
15 develop standards that will protect workers from all
16 reactive chemical incidents. Thank you.
17 BOARD MEMBER POJE: Thank you very much,
18 Mark. Now we would like to hear from Mike Wright, who
19 is the health and safety director for the United Steel
20 Workers of America. Mike?
21 MR. WRIGHT: Thank you, Dr. Poje. Let me
22 say a couple of things about the union. We represent

1 600,000 workers in the United States and Canada,
2 mostly not working in the steel industry.
3 As many as 50,000 work in plants where a
4 catastrophic chemical accident could threaten their
5 lives, or the lives of their neighbors. And, in fact,
6 that has happened on several occasions.
7 We are the union that represented workers
8 who were involved in the Charleston, South Carolina
9 incident in 1991. We had another incident involving a
10 runaway fire, and a strong oxidizer, which we had not
11 thought of as a reactive chemical incident, but it
12 certainly meets the definition that was put forward on
13 the board today.
14 That killed two workers. We've had a number of
15 other near misses. So it is not just a potential
16 risk, it is a risk that has actually caused death and
17 disability.
18 Happily the risks, over the years, have
19 been reduced by OSHA's chemical process safety
20 standard, and by work by unions, and by the industry
21 itself. Yet as the Board's own report, other
22 testimony today, and most recently the Chelsea

1 accident, have shown much remains to be done on the
2 issue of reactive chemicals.
3 We are very grateful to the Board for
4 addressing this issue, and I think your work on this
5 really shows the fact that the Board has great
6 promise, and can do great things.
7 My own involvement with process safety
8 began in 1980, when our union negotiated comprehensive
9 contract language aimed at preventing the release of
10 lethal levels of carbon monoxide in the steel
11 industry.
12 Based on past rates that language has
13 probably saved about 50 lives. We didn't call it
14 process safety management, but all of the elements
15 were there.
16 USWA was also active in the attempt to, in
17 the successful attempt to establish the OSHA chemical
18 process safety standard, even before that standard was
19 proposed we did extensive training on the issue for
20 workers and managers, in our work places.
21 We've also been involved with work with
22 the ILO, and the OACD on what those organizations

1 call, in european lingo, major hazards.

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

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

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

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

1 likely cause. However, Union Carbide did succeed in
2 showing that sabotage would have been relatively easy
3 for a determined terrorist.
4 So addressing this issue of chemical
5 reactivity is also important in the effort to protect
6 Americans from a terrorist attack.
7 Since time is short I would like to talk
8 just about two points, about the kind of action the
9 Board should take. Others, of course, argued
10 eloquently for the need to take action.
11 First, it will not be enough to simply
12 transmit a general recommendation to OSHA. History
13 has shown that OSHA needs a great deal, let me say
14 this politely, encouragement, instead of pressure, to
15 act.
16 OSHA's two most important chemical safety
17 standards are hazard communication and chemical
18 process safety. In neither case did the agency set
19 those standards voluntarily. In 1981 OSHA withdrew a
20 draft HAZCOM standard, and removed the issue from its
21 regulatory agenda. Sound familiar?
22 They reversed their position only after a

1 dozen states had passed chemical information laws, and
2 only after those conflicting laws showed the need for
3 a uniform federal standard.
4 The Bopal accident, and several chemical
5 accidents in the United States, clearly showed the
6 need for an OSHA chemical process safety standard as
7 early as 1984. But OSHA began serious work on that
8 standard only after Congress ordered them to, six and
9 a half years later, in the 1990 amendments to the
10 Clean Air Act.
11 Today, of course, the agency is justly
12 proud of both those standards, and they've done a
13 generally good job of enforcing both. Some day OSHA
14 will, no doubt, be proud of their new provisions on
15 chemical reactives.
16 But for that to happen the Board and
17 others will have to keep up the pressure, forgive me,
18 encouragement. And it may be necessary for the Board
19 to work with Congress, as well as the Labor Department
20 and EPA.
21 Second, the Board should be prepared to
22 craft a specific detailed recommendation on how

1 reactives might be covered in regulation. I have
2 great respect for the staff of the OSHA standards
3 office.
4 But the expertise on chemical reactives
5 lies with the Board, and with your staff. Of course
6 it would be very useful for the board to promptly
7 transmit a recommendation to OSHA and EPA, that they
8 add chemical reactives to their regulatory agendas and
9 begin work.
10 But the Board must stay involved in this
11 process, working directly with the agencies, labor and
12 industry, if possible. But if OSHA and the EPA do not
13 wish to work with the Board, then the Board should
14 write and recommend a standard, on its own, including
15 the Congress, if necessary.
16 That concludes my remarks. Thank you,
17 again, for your attention to this issue.
18 BOARD MEMBER POJE: Thank you very much,
19 Mike. And now I will turn to the last mike on the
20 panel. Michael Sprinker is the health and safety
21 director for the International Chemical Workers Union
22 Counsel, part of the United Food and Commercial

1 Workers International Union.

2 The Board has had some exposure to the

3 work force represented by the Chemical Workers Union

4 Council, in our investigation into the Candia Vista

5 incident. Mike, it is nice to have you here.

6 MR. SPRINKER: Yes, thank you for the

7 opportunity to appear before you today.

8 One of the things, in addition to being

9 the health and safety director for the Chemical

10 Workers, is I did spend 8 years at Oregon OSHA on the

11 enforcement side, and went through all of OSHA's

12 process safety management training, including team

13 leader training back in '93, being the first class to

14 have done that.

15 Which gives me, certainly, some

16 appreciation for the quality of folks who are out

17 there enforcing those rules. And also the massive job

18 it is to do that. Plus, of course, some of the

19 pitfalls in the rules, too.

20 I had planned to address the issues of

21 EPA's regulation of reactive chemicals, but I think

22 the report of the staff pretty much says it all.

1 Preliminary conclusions number 4, EPA states that it
2 could not identify or develop criteria for listing
3 reactive chemicals.
4 And in the second part of that, over 60
5 percent of the incidents were not covered by these EPA
6 process safety regulations. As I was digging through
7 things, I noticed the '96 letter, which the Chemical
8 Workers had sent to EPA asking about how reactives
9 were covered.
10 And as I recall the answer is fairly
11 minimal. But that lays out most of the problems of
12 the EPA risk management planning rule. And I won't
13 get into the apparent lack of enforcement, or advisory
14 activities on the part of the EPA.
15 You just basically have to go to the EPA
16 office of solid waste emergency response website to
17 see that. And I also won't dwell on the lack of
18 worker protection against discrimination for any
19 workers, or union folks, who participate in EPA R&P
20 inspections, whenever those things actually happen.
21 And the fact that there are no walk-around
22 rights for workers, either. And to be involved in

1 those inspections. Certainly two glaring problems
2 with EPA risk management planning rules.
3 And while EPA, while R&P was meant to
4 protect the public, you also have to look at the fact
5 that -- in fact, you take a look around Paterson, or
6 any industrialized area, and you will see that the
7 nearest public to a lot of the plants are workers in
8 another plant.
9 And their rights for information about
10 hazards in those plants is pretty minimal. R&P is
11 also meant to protect emergency responders who in a
12 large number of states have no protection under OSHA
13 standards, because in most states emergency responders
14 are second class citizens when it comes to worker
15 protection.
16 But we strongly believe that in addition
17 to changes under, that OSHA needs, you know, EPA had
18 the same legal charge under the Clean Air Act
19 amendments, to address catastrophic chemical
20 incidents.
21 And it certainly didn't meet that charge
22 when it came to reactive chemicals. So strongly

1 recommend the Board make a very strong recommendation.
2 And as brother Wright has said, and other folks here
3 too, it needs to be in some detail, that R&P be
4 adjusted to deal with the hazards of reactive company.
5 In fact, you only need to take a look, as
6 one example with what the health and safety executive
7 has done in the United Kingdom, with their document in
8 designing and operating safe chemical reaction
9 processes. It is a very good guideline. It shows
10 that things can be done.
11 We've suffered, our members have suffered
12 injuries, loss of life, and loss of employment due to
13 reactive incidents. And I will just briefly mention a
14 few of those.
15 As you mentioned Condia Vista, just a few
16 hours down the road, down I-95 here, in Baltimore we
17 had aluminum chloride, water, and steam reaction,
18 releasing hydrogen gas, and hydrochloric acid in a
19 reactor during cleaning, and trying to free up a bunch
20 of gunk in that, causing an explosion.
21 And one of my members said that if he had
22 been a little bit faster getting some work reports

1 out, there would have been two or three people right
2 out in the blast zone. So he said he was very happy
3 he was a little bit slow that day.
4 And that was a reaction which was really
5 caused, in fact the company did a pretty decent
6 investigation, along with the union. One thing it did
7 point out, though, was a lack of staffing, a lack of
8 not enough engineers, technical support, or workers.
9 Which is a big problem in industry these
10 days, with downsizing. In fact, that is one reason
11 why we couldn't have one of our folks here today, was
12 because of that.
13 Let me jump over to another case, one of
14 the major corporations in this country, used to be an
15 operator at a Department of Energy weapons facility in
16 Oakridge, had a release of sodium potassium alloy.
17 Followed what their procedure was, put
18 some kerosene on it, let it sit around for a while.
19 Unfortunately it formed a superoxide, which was a
20 hazard the company knew about in other parts of the
21 facility.
22 And resulted in one horribly serious burn,

1 and eventually one suicide. Again, a lack of data
2 sharing, even within the same company.
3 I'm going to bring this to a quick close,
4 but just one other major point is that, you know, we
5 agree that a list of chemicals aren't really the
6 answer. We are looking at, it is really understanding
7 the reactions of multi-component systems.
8 Unfortunately employers, both small and
9 large, won't do anything unless they are regulated. I
10 have personally seen some very great improvements in
11 management cooperation with hourly workers on process
12 safety.
13 But that came after the PSM standard
14 mandated worker involvement. You see that in the
15 paper industry in the northwest, where I spent a lot
16 of time, chemical plants throughout this company.
17 And plant managers themselves have told me
18 that basically they started doing that because of the
19 standard, and it really worked out. There is also a
20 need for something like a reactive data sheet. I was
21 happy to hear industry talk about this.
22 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

1 been made by our staff regarding the NFPA ratings, the
2 lists, limited lists, inadequacy and all, what would
3 you recommend to the Board that we recommend to OSHA?
4 And that would be the same for EPA. And I
5 know that is sort of like a broad -- but that is what
6 I'm looking for. And it may take a long time, but
7 maybe -- I know these people can be long.
8 MR. FRUMIN: We are prepared to provide to
9 the record, following all the testimony today, a more
10 detailed set of recommendations. We've already done
11 quite a bit of work looking at how, for instance, the
12 health and safety executive document fits, how it
13 interlaces with the existing PSM standard, to close
14 some of those loopholes.
15 So you can expect to see a recommendation
16 for us that takes some of the good work that the
17 health and safety executive has done, and fit it into
18 the PSM standard.
19 I think Mike Wright's point is essential,
20 that you have to give OSHA a very simple draft
21 regulation. Short of that, even when they develop the
22 political will, whether it is because of congressional

1 action, or other reasons, they need your guidance.
2 And we will be providing additional
3 detail.
4 BOARD MEMBER POJE: Thank you all, thank
5 you very much for you -- one more response.
6 MR. SPRINKER: I think one critical thing
7 in this, too, will be the need to ensure that the
8 scope is not so narrow as the PSM standard scope is.
9 Because we can clearly see that we've got incidents in
10 warehousing, and so on, things that would never have
11 been covered under the scope of the PSM standard.
12 So I think that needs to be a clear charge
13 to OSHA that the reality of the scope needs to be
14 broader on the reactive chemicals.
15 BOARD MEMBER POJE: Thank you all for your
16 time and your presentation. Again, we welcome the
17 written comments, as well, more detailed comments than
18 you presented here.
19 We will convene, once again, promptly at
20 1:10 this afternoon. Senator Corzine will start off
21 the afternoon sessions. Thank you.
22 (Whereupon, at 12:13 p.m. the above-

1 entitled matter was recessed for lunch.)

2

3

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

5 1:10 p.m.

6 BOARD MEMBER POJE: If I could call

7 everybody to attention, please? We are going to begin

8 this afternoon's session with a slight change in the

9 agenda.

10 Something very unusual has happened here

11 in northern New Jersey, that Senator Corzine is

12 encountering some traffic difficulty getting here, and

13 we are, therefore, going to switch the New Jersey

14 panel to come on first, and then we will hear from the

15 Senator when he arrives.

16 I would like to, before they come to the

17 table, also announce that the Chemical Safety Board is

18 webcasting this hearing, it is being webcast live.

19 But the archive of the webcast will also be prepared,

20 and up on our website, we believe, within two days

21 from today.

22 So those of you who wanted to share it

1 with other people, or give people access to the
2 information, let them know. We hope to have a
3 webcasting availability of this hearing for other
4 people to see after the hearing.
5 I would also like to remind people that we
6 are taking public comment after the panels today. And
7 if you want to, please sign up outside of the room.
8 With that I would like to ask Samuel
9 Wolfe, the Assistant Commissioner for Environmental
10 Regulations for the State of New Jersey, and Mr. Rick
11 Engler, to come to the table.
12 We are very thankful to be granted the
13 hearing room from the city of Paterson. But we are
14 also quite thankful for the leadership in the State of
15 New Jersey, for working diligently on issues of
16 chemical safety and for trying to build a strong
17 community across the management, labor, and
18 governmental sides, to improve the way we ensure our
19 public health and safety, and occupational health and
20 safety, from chemical management.
21 If we could have Mr. Wolfe offer us his
22 comments now?

1 MR. WOLFE: Good afternoon. My name is
2 Sam Wolfe, and I'm the Assistant COmmisioner for
3 Environmental Regulation at the New Jersey Department
4 of Environmental Protection.
5 I would like to thank the Board for
6 holding this hearing, and for giving me the
7 opportunity to present the DEP's views on regulatory
8 options for the safe handling or reactive chemicals.
9 New Jersey is the nation's most densely
10 populated state. We also have a large number of
11 facilities that produce or use highly hazardous
12 chemicals. As a result we have to be especially
13 diligent in protecting the public against the threats
14 that are posed by these substances.
15 We've heard the Board's key findings this
16 morning about the shortcomings in current efforts to
17 regulate hazards from reactive chemicals. We agree
18 that we need to do better.
19 We need to start filling the regulatory
20 gaps, the gaps in the EPA's rules for preventing
21 accidental releases, and in OSHA's rules for assessing
22 the risks of using reactive chemicals in manufacturing

1 processes, and in evaluating alternatives for reducing
2 those risks.
3 We need additional safeguards to protect
4 workers, and the public, from accidents caused by
5 uncontrolled chemical reactivity.
6 In New Jersey we also have an opportunity
7 to do more to protect workers and the public under our
8 own program, the Toxic Catastrophe Prevention Act, or
9 TCPA. TCPA was enacted in 1986, shortly after the
10 tragic accident in Bopal, India.
11 More than 15 years later TCPA is the basis
12 for the nation's most comprehensive program to prevent
13 accidental releases. Our TCPA rules are due to be
14 reviewed in a little bit over a year, in June of next
15 year.
16 We now have to review those rules,
17 determine whether they are still necessary and
18 appropriate, and figure out exactly what changes we
19 need to make.
20 So the ability to regulate reactive
21 chemicals is at the top of our agenda, as we look at
22 the changes that we need to make.

1 Starting this summer we are going to be
2 asking the regulative community, labor
3 representatives, and environmental organizations, to
4 join a workgroup to explore the most viable options to
5 minimize the risks that are associated with reactive
6 chemicals.
7 This type of workgroup process has brought
8 us excellent results in the past, and I think you are
9 seeing something similar in the panels that you've
10 convened today. When we first established the TCPA
11 program, and whenever we've made major changes to the
12 program, we've reached out to the regulative
13 community, and to labor and environmental groups, so
14 that we can tap into the expertise that is there, the
15 technically expertise, the operational expertise, and
16 the practical on the ground day to day expertise.
17 This kind of cooperative approach I think
18 has brought us much better rules than we could have
19 gotten if we didn't do this kind of outreach. So
20 extending that approach to the implementation of our
21 program, has also brought us better results.
22 We found it very effective to use our

1 inspections to emphasize compliance assistance. A
2 typical TCPA inspection will be performed over the
3 course of an entire week, where we work with a
4 facility to examine alternatives, in many cases
5 involving the use of innovative technology to bring
6 the facility into compliance, and reduce risks.
7 What often happens is a side benefit, is
8 that implementing the changes that are needed shows
9 the possibility of yielding some efficiencies that can
10 pay off with increased profits for the facility.
11 In other words, doing what makes sense
12 from the standpoint of protecting public health and
13 safety, also shows the opportunity to do things that
14 make economic sense.
15 Now, given our cooperative approach, both
16 to getting our rules right, and to implementing our
17 program, I'm not going to try to prejudge where we are
18 going to end up with our workgroup efforts. But at
19 this point I do know some of the questions that we are
20 going to need to be asking ourselves.
21 As I think you've heard from everybody who
22 has sat at this table, today, the key issue is going

1 to be determining what must be regulated. The success
2 of any process, safety or accidental release
3 prevention program, depends on what criteria, or what
4 methods are used to identify the substances that are
5 to be regulated.
6 Now, OSHA is already regulating some
7 reactives under its process safety management program.
8 The EPA's risk management plan program currently
9 doesn't address reactives.
10 But what the history is showing us is that
11 neither set of rules is yet doing enough to protect
12 the public, and workers, from explosions caused by
13 reactive substances.
14 Now, in deciding how to regulate reactive
15 chemicals we have a number of choices that we have to
16 make. We've talked about the limited universe covered
17 by OSHA's PSM program. We've also heard some
18 discussion about the limitations of the NFPA category
19 3 and 4 lists, which the State of Delaware is already
20 using in its accidental release prevention program.
21 We have other lists that we can refer to.
22 We can also look to the U.S. Department of

1 Transportation list, or tables of hazardous materials.
2 But everybody has said, again earlier today, all
3 these lists have their shortcomings.
4 Most importantly, they are based on the
5 reactive properties of the individual listed
6 substance. They don't include the reactive hazards of
7 chemical mixtures, which brought us both the Napp and
8 the Morton incidents.
9 In addition to Napp and the Morton
10 incidents involved reactive chemicals that were not
11 listed as an NFPA 3 or 4. So that is just, again, the
12 need to go beyond those lists.
13 Now, where this is leading is just a
14 recognition that anything that we are going to do to
15 try an expand our TCPA program to cover reactive
16 chemistry is going to be an incredible challenge.
17 And I have to ask what should be the goal
18 that we set. What we've heard today is showing us
19 that getting a comprehensive program that is going to
20 address every kind of risk that is out there, is
21 probably going to be beyond our reach.
22 But what I'm not ready to say is the fact

1 that it is impossible to do everything should stop us
2 from doing anything. We have to get started
3 somewhere. And so that is why I'm hoping that this
4 process that we are kicking off soon is going to bring
5 us some, at least, some steps towards regulating
6 reactive chemicals.
7 Now, aside from the open questions about
8 what substances should be regulated, I would also like
9 to talk about some practices that we have under our
10 TCPA program, that should be considered for
11 implementation at the federal level.
12 One practice is conducting periodic
13 audits. In New Jersey we have internal and external
14 audits to determine if a facility is in compliance
15 with its risk management plan, and the compliance of
16 the RMP with the applicable regulatory requirements.
17 Risk reduction efforts resulting from
18 these periodic audits have been an important
19 contribution in New Jersey to the prevention of
20 catastrophic incidents.
21 Another important feature is risk
22 assessment. TCPA requires risk assessments, where

1 facilities perform consequence and likelihood analyses
2 to evaluate the need for additional risk reduction
3 measures.
4 The risk assessment is an important
5 extension of the process hazard analysis that is
6 already provided for in the federal rules. One area
7 where we would also like to see some improvement on
8 the federal level, and this is something that could be
9 promoted by the Board, is the sharing of test data and
10 lessons learned from incidents that were created from
11 reactive hazards.
12 And at the same time if the Board has the
13 ability to critique the codes and standards that
14 already apply to chemical hazards, toxic, flammable
15 and reactive, that is something that is also going to
16 be an enormous help in moving both state and federal
17 programs forward.
18 So aside from these recommendations, I'm
19 really looking forward to the Board's own findings and
20 recommendations that are coming out of its
21 investigation, and out of this hearing today. We are
22 hoping that we will see those recommendations in time

1 so that we can consider them for use in our TCPA
2 rulemaking, which is going to be coming up shortly.
3 In closing I would like to thank you,
4 again, for the opportunity to come before you and
5 discuss this topic. As there is an opportunity for
6 questions a little later on, I've got Reggie Baldini,
7 of the TCPA program, and both of us would be pleased
8 to answer any questions that you have for us. Thank
9 you.
10 BOARD MEMBER POJE: Thank you Commissioner
11 Wolfe, and thank you for also bringing Mr. Baldini to
12 the table with you.
13 We now would like to hear from Mr. Rick
14 Engler. He is the Director of the New Jersey Work
15 Environment Council.
16 MR. ENGLER: Thank you very much, and
17 thank you to the Board for coming to Paterson. We
18 very much appreciate your return to this community, a
19 community where within miles there are chemical
20 facilities that process and store hazardous
21 substances, including those located in extremely
22 densely populated urban neighborhoods.

1 Facilities that you can literally walk
2 down the street, reach particularly through a chain
3 link fence, and be in contact with chemical drums of
4 hazardous material.
5 It is an appropriate place to meet, not
6 just because of the proximity to the -- to the
7 incidents where Morton and Napp occurred, but because
8 of the continuing set of facilities in an older
9 setting, in the context of where new investment is not
10 being put in.
11 Not because of regulation, but because
12 essentially in the smaller industrial capacity, the
13 industry has decided to divest investment from New
14 Jersey, which is a contributing factor to some of
15 these incidents.
16 Industry has never seen a regulation that
17 it liked. And that is clear, again, from the industry
18 testimony of this morning. We support, as did the
19 labor panel, the strengthening of both the process
20 safety management standard, and the risk management
21 reporting and procedures issued by EPA.
22 And we would urge the Board to approach

1 this issue with the greatest possible specificity, so
2 that the work of the Board is actually used by the
3 regulatory agencies, without having to go through
4 multiple steps to develop the appropriate regulatory
5 approach. And I will come back to that.
6 The organization I represent, the Work
7 Environment Council is an alliance of 55 labor,
8 community, and environmental organizations
9 representing a wide range of groups from labor unions,
10 and many industrial facilities, to down the street, to
11 Paterson Task Force for Community Action, to one of
12 the state's largest environmental groups, the New
13 Jersey Environmental Federation.
14 And it is because of this collaboration of
15 organizations in New Jersey, not particularly us, but
16 the whole effort over the last more than a decade, we
17 have been able to pass path breaking laws that have
18 been a model for the nation.
19 Not only the Toxic Catastrophe Prevention
20 Act in 1986, but also the Worker and Community Right
21 to Know Law of 1983, and the Pollution Prevention Act
22 in 1991. And these preceded federal action.

1 And we would argue that part of the value
2 of this hearing today is a spur to the state to move
3 forward on the regulation of reactive processes, as
4 well.
5 The Toxic Capacity Prevention Act, in
6 particular, has been an enormous success. For
7 example, particularly in the public sector, not so
8 much in the private sector, facilities that have used
9 chlorine, because of the requirements of TCPA, have
10 stopped using chlorine, have gone to safer
11 substitutes, such as sodium hypochlorite.
12 So you see a direct impact on prevention,
13 on reducing inventories of highly dangerous materials,
14 and we think that New Jersey is a place that we can
15 also potentially pioneer some of the use of the Board
16 recommendations.
17 And, in fact, on December 14th, before our
18 new Governor, Jim McGrieve even took office, 75
19 organizations asked him to do just what we are talking
20 about today, to regulate reactive chemistry. And
21 formal recommendations made by a wide range of labor,
22 environmental, community organizations, too.

1 And then on May 14th, again, we asked the
2 DEP to take such action. We look forward to working
3 with the DEP. I'm not sure I look forward to a
4 workgroup based on past experience, but we do look
5 forward to working with the DEP to try to move forward
6 on this issue.
7 Now, it was also suggested this morning
8 that voluntary efforts by industry would be enough,
9 and that better information sharing would be a nice
10 thing to do. Well, last night at 11 o'clock I got an
11 email from a local union that we work very closely
12 with, representing hundreds of workers at one of the
13 state's largest chemical facilities, attaching a copy
14 of a letter from this company, denying the union
15 information under the Toxic Capacity Prevention Act.
16 Now, that information by the TCPA statute,
17 is accessible to workers. That information, by
18 National Labor Relations Act precedent, is accessible
19 to the union. And instead we get a letter from a
20 major company saying to the union, you can't have this
21 information.
22 And this is in the context of a joint

1 effort by this local union, which is not all that far
2 away, and our organization, and community based
3 organizations, to take steps to prevent a major
4 catastrophe.
5 This is a major facility, uses millions of
6 pounds of various toxic substances, in a highly
7 congested area, and it is only -- I would be happy to
8 name the company, except that I only received this
9 last night at 11 o'clock, and I would like to discuss
10 with the local union leadership the appropriate
11 protocol of how we are going to proceed, whether there
12 is going to be a formal complaint to DEP, Labor Board
13 charges, whatever.
14 But the notion that this is going to all
15 be done voluntarily, perhaps, there is some reason to
16 think because of the success in Right to Know, that
17 that is all, you know, going to proceed.
18 But the reality is that we are still
19 engaged in those kind of struggles to get that kind of
20 basic information, even the information clearly
21 guaranteed by at least two statutes. So we cannot
22 depend on voluntary efforts.

1 And then I would also like to point out
2 that I think the hope that the federal EPA is going to
3 take strong action on this one is an illusion. If all
4 you need to really do is look at the role of the
5 current EPA administrator on this issue.
6 When the Napp explosion happened, and five
7 people were killed, and the community was evacuated,
8 and small businesses were shut, and I'm not going to
9 say what Jim Gannon can say, far, far better, the
10 Governor came to the bedside of those workers, and
11 consoled them, and got a nice photo op.
12 Then she went out on the street and blamed
13 the workers for causing the accident. Within a week
14 40 of those workers, in coordination with their union,
15 Unite, wrote a letter, along with the Industrial Union
16 Council, to the Governor.
17 And Christine Todd Whitman said she was
18 too busy to meet with these workers. And I would
19 suggest to you that the likelihood of the current EPA
20 administrator actually taking up this issue is remote,
21 at best. I would be happy to be proven wrong.
22 And it seems to me that that increases the

1 moral weight, the urgency for action by this Board.
2 And, again, we urge you to not only make
3 recommendations, but to put those recommendations in a
4 form that can be immediately go through a process by
5 OSHA, and by EPA, that could be adopted in the
6 future.
7 Not that we are saying that OSHA and EPA
8 shouldn't act promptly after receiving your
9 recommendations, but we would like to hasten the
10 process and we think you could help do that by putting
11 the recommendations in a specific form that would
12 accelerate the regulatory procedure.
13 And, finally, we would like to invite you
14 back. Because you can contribute a great amount, both
15 on the federal scene, to putting together a formal
16 regulatory protocol, and to also spurring action in
17 New Jersey.
18 So on behalf of the Work Environment
19 Council we would like to invite you to come back here
20 within a year, especially if there has been no action
21 by EPA, or by OSHA in particular, and to hold a public
22 hearing on a specific rule proposal.

1 If you want to call it not a rule
2 proposal, because you don't have legislative authority
3 to call it a rule proposal, you can call it a
4 watermelon, you can call it whatever you want. But we
5 think it would move the process forward, and continue
6 to open the process to public debate and discussion,
7 as you've done so well today, to come back in a year,
8 and to share the recommendations in that particular
9 form.
10 And we hope that you will do so, and urge
11 you to do so, and be interested in any responses to
12 that request.
13 Thank you very much for the opportunity to
14 testify today.
15 BOARD MEMBER POJE: Thank you very much,
16 Rick. Now we will open it up to questions. Andrea?
17 BOARD MEMBER TAYLOR: Thank you, Dr. Poje.
18 I have a question, one for Mr. Wolfe, and
19 also for you, Mr. Engler. The first question
20 regarding some of the practices on the TCPA program
21 that are going to be changed, or improved.
22 Do you already conduct periodic audits at

1 facilities who are required to be, under this rule?
2 MR. WOLFE: Yes, we do.
3 BOARD MEMBER TAYLOR: And you were saying
4 that you will be making a recommendation that there be
5 additional audits conducted? Or how does that work,
6 exactly?
7 MR. WOLFE: I was making a recommendation
8 that some practices that were already in the TCPA
9 program be reflected in the programs at the federal
10 level.
11 BOARD MEMBER TAYLOR: I see. So this is
12 something that you are recommending to us, that could
13 be a recommendation?
14 MR. WOLFE: That is right.
15 BOARD MEMBER TAYLOR: Great. And then the
16 second was give me a little bit more about the
17 critiquing of the hazard, what do you mean by that,
18 exactly? And that would be an addition that they
19 could be doing, OSHA and EPA.
20 MR. WOLFE: I would like to defer to Mr.
21 Baldini for a more helpful response on that.
22 BOARD MEMBER TAYLOR: Great.

1 MR. BALDINI: There are many codes and
2 standards employed throughout the nation. And I will
3 give you an example.
4 In the handling of chlorine in the West
5 Coast, there was a requirement that firemen when they
6 arrive at a scene, at a fire, be able to shut off the
7 source of chlorine before they send their staff in.
8 And so in the West Coast they have an
9 automatic shutoff, a remotely operated shutoff valve,
10 and a man presses a button, and the valve is closed,
11 and the firemen can go in.
12 Well, on the East Coast states there was
13 no requirement like that. But we became aware of the
14 West Coast standard, and we recommended that it be
15 applied in New Jersey, in a case by case basis.
16 So there are many codes and standards that
17 are used throughout the nation, and they don't all
18 reflect the most up to date practices, the most risk
19 reduction practices. And the Board is in a position
20 to review those codes and standards, and critique
21 them.
22 BOARD MEMBER TAYLOR: One last question to

1 Rick. One of the things that I asked the panel
2 previously was regarding strengthening the PSM
3 standard or the RMP standard.
4 What, specifically, should we be telling
5 the OSHA or EPA that they should do in strengthening
6 the standard?
7 MR. ENGLER: Well, I think that there are
8 many things already in the recommendations, and that
9 is why we are urging you to put them in particular
10 form that would expedite that process.
11 I would say that there are things that are
12 instructive from TCPA, in that regard, as well. And
13 that, and some of those things focus on worker
14 participation.
15 For example, the TCPA provides for really
16 complete access to every document. And we would want
17 to make sure that in any revisions to PSM, and to RMP,
18 where I don't think that there are specific access to
19 information requirements, rights for unions, that that
20 is explicitly added.
21 The question of worker participation is
22 vital in any recommendations, because as I think much

1 of the testimony here has pointed out, and the Board's
2 own report, there are so many operations, there are so
3 many different types of chemicals, that unless a core
4 of the rule relies on the skill and expertise, and
5 knowledge of individual workers familiar with those
6 particular operations, that it is going to be
7 impossible for regulatory agencies, even with their
8 staff doubled, tripled, quadrupled, to have an
9 effective regulatory presence.
10 So the question of specific mechanisms for
11 worker participation is absolutely vital.
12 BOARD MEMBER TAYLOR: Okay, thank you.
13 BOARD MEMBER POJE: Thank you, Andrea.
14 Dr. Rosenthal?
15 BOARD MEMBER ROSENTHAL: Yes. When you
16 open your public hearing process, or participation, or
17 whatever we want to call it, will you table an initial
18 set of recommendations from the staff as a basis for
19 discussion, or will you just go in completely
20 unstructured?
21 MR. WOLFE: It won't be completely
22 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.

1 MR. WOLFE: That is not so much an
2 obstacle to getting more stringent regulations done,
3 it is just additional work that we need to do.
4 BOARD MEMBER ROSENTHAL: Okay, thank you.
5 BOARD MEMBER POJE: Thank you. My
6 questions are for the DEP folks, Mr. Wolfe and Mr.
7 Baldini.
8 Can you give me a little bit more insight
9 into the staffing and the experience, and training
10 basis of your inspectors in the TCPA program? I've
11 heard not only from Mr. Engler representing labor and
12 environmental community, but also from the New Jersey
13 Chemical Industry Council, some very favorable
14 statements about the administration and the content of
15 the TCPA program.
16 MR. BALDINI: Well, the fundamental, a
17 chemical safety engineer in the state of New Jersey
18 must have a bachelor in chemical engineering, or a
19 bachelor in mechanical engineering. And he should
20 have five years experience in either process design,
21 or process management, or some activity related to
22 maintenance at a site.

1 And also the key, which turns out to be a
2 key requirement, is to be able to read a piping and
3 instrument diagram, because the information in a
4 piping and instrument diagram is so coded that a
5 person that doesn't have a background in that wouldn't
6 be able to comprehend what someone is explaining to
7 him.
8 BOARD MEMBER POJE: And again, you
9 reiterate the length of the audit period that you
10 usually would engage in, and the number of audits that
11 your staff would conduct over a year?
12 MR. BALDINI: Yes. We visit, we have some
13 115 sites that we, sources in EPA terminology, that we
14 regulate. And a large source would be something like
15 Chamberworks in Southern Delaware, and it might take
16 us two weeks, and it might take five people to go down
17 there for that entire period.
18 And then there would be a water treatment
19 plant, or an ammonia refrigeration unit, which would
20 take two men two days. And we review the kinds of
21 documents that their risk management program requires
22 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

1 Corzine. We are pleased to have you here with us this
2 afternoon. We know you have a very busy schedule.
3 Senator Corzine was elected to the United
4 States Senate in 2000, after a distinguished and
5 highly successful career in investment banking. Prior
6 to his election to the Senate he was the chief
7 executive of the prominent Goldman Sachs firm.
8 Senator Corzine has already made a mark in
9 the Senate on environmental and safety related issues,
10 and security issues. He serves on the Environment and
11 Public Works Committee.
12 Senator Corzine, we welcome you, and look
13 forward to your remarks.
14 SENATOR CORZINE: Good afternoon, Dr.
15 Poje. I am very pleased you are holding this hearing,
16 particularly pleased that you are doing it in New
17 Jersey.
18 As you well know our history is one that
19 has had tragedies strike in human terms, in human
20 life. And we consider this a very, very important
21 issue to be debated, and progress brought to bear.
22 And I very much appreciate the opportunity to testify,

1 and am pleased that you are here in New Jersey.

2 I heard requests to come back and see how

3 things might be developing a year from now. I think

4 this is one of those things without constant attention

5 it is very easy for progress to fall behind.

6 You know the question in light of Napp

7 Technologies, or Morton International, and other

8 things, is really the question, what could we have

9 done to prevent these kind of accidents from

10 happening?

11 And I think you all have done a terrific

12 service by putting together your draft Reactive Hazard

13 Investigation Report, one that both myself and the

14 staff, and I hope the people in the EPA committee, in

15 Congress, and others, will take very seriously, and I

16 commend you for your efforts and your work in this

17 area.

18 But I think it speaks to the facts as we

19 see them, 167 incidents involving reactive chemicals

20 since 1980. The Board, I think, has looked at the

21 causes, and looked at the adequacies of the

22 regulations, at least I read those, that there are

1 some recommendations that I would like to join, and
2 underscore as we go forward.
3 I find the facts situation extremely
4 troubling, and I hope that the action reflects those
5 concerns. Not just for myself, but for what I have
6 heard from others who have already been here, and my
7 staff tells me comments that we've had.
8 You know, with 50 percent of those 167
9 accidents not really covered by current OSHA or EPA
10 regulations, I think that tells you by common sense,
11 by general principle, that there needs to be more
12 done, that the regulations are inadequate, in my view.
13 And, frankly, given the density, we are
14 the most densely populated state in the nation. We
15 have a high number of chemical plants. I think we
16 heard the previous witness talk about 115 reviewed
17 regularly.
18 I just don't think the existing
19 regulations meet the mark. Looking at other findings
20 in the study, the list of reactive chemicals covered
21 by current regulations, I think is borrowed from a
22 list of 325 chemicals developed by the National Fire

1 Protection Association, actually a fairly dated list
2 as well.
3 And whatever the merits of that with
4 respect to fire fighting, it has some drawbacks in the
5 current context of the things that I think we are
6 trying to discuss here, and certainly in the context
7 of the problems we've had in our state.
8 Primary flaw is that it only considers the
9 inherent instability of a chemical and how it reacts
10 with water, if I have this right. I'm not an
11 engineer. But I think that from what I understand,
12 this is a major flaw, and how we look at the, how
13 chemicals will react in process conditions.
14 And we need to be concerned about those
15 process conditions, and the interactions of various
16 chemicals themselves. And I think you point that out
17 very appropriately in your report.
18 Also I would say that 60 percent of the
19 167 accidents studied involved chemicals that are
20 either not on the NFPA list, or are rated as no
21 special hazard, they are in that lower context of
22 these.

1 I think we need some work on this. It
2 just doesn't strike me that we are looking at this
3 properly. And, you know, I hear about cost benefit,
4 but 48 of those 167 incidents led to loss of life.
5 That is a huge cost.
6 I'm not sure it is measurable in economic
7 terms. 108 people, if I've read the report properly.
8 And it strikes me that we need to have real action.
9 And I certainly intend on being an advocate for this
10 in my oversight functions in the EPA hearings.
11 I plan on trying to be a voice for
12 recognition of the problem, and changes that need to
13 be done. Frankly some of this could be done if the
14 administration chose to act. And so we will be letter
15 writing, and doing the normal political hooting and
16 hollering to try to get OSHA to promulgate revised
17 process safety management regulations to address the
18 deficiencies identified by your study.
19 President Clinton had these revisions on a
20 priority list,a nd I think anyone who studies both
21 your report and is concerned about the risk to the
22 general population, has to be concerned that President

1 Bush has removed them from the list earlier this year.
2 Even more concerned about the lack of
3 visibility of that action within the public domain.
4 And I think can also be a concern. So hopefully this
5 hearing and other opportunities will make that more
6 noticeable in the public eye.
7 Frankly there is no cause, no reason, no
8 common sense in my view for further delay. And I
9 think your report makes that clear.
10 I also want to call on the administration
11 to work with me and other members to address another
12 pressing safety issue, it is one that is dear to my
13 heart. I'm sure Senator Lautenberg talked about it
14 this morning, and that is the threat of terrorist
15 attacks on chemical facilities.
16 This is a real deal here in New Jersey.
17 And I don't think it is something that should be swept
18 under the rug. And I would like to see us do a little
19 connecting of the dots before there is a problem, as
20 opposed to afterwards.
21 The Justice Department looked at this
22 issue a couple of years ago, in April of 2000 they

1 issued a report stating the risk of terrorists
2 attempting, in the foreseeable future, to cause an
3 industrial chemical release is both real and credible,
4 quote, unquote.
5 That was more than a year before September
6 11th. Not much has been done, although there are
7 certainly positive actions by some in the industry,
8 but there is no verifiable and visible action.
9 And I think this is a reason for real
10 concern. And as I suggested, Senator Lautenberg
11 introduced chemical security legislation in his last
12 year in Congress. He had been working on chemical
13 safety issues throughout his career, and I'm very
14 pleased to have an opportunity to walk where he is
15 walking with regard to these issues.
16 And I think it is absolutely essential
17 that we make progress in this area. My legislation
18 would require EPA and the Department of Justice to
19 divine and identify high priority chemical facilities,
20 look at the implications of problems that could occur
21 there, and then require those facilities to take steps
22 to reduce hazards and improve security.

1 By the way, a lot of those things relate
2 to the same kinds of issues that you are talking about
3 with regard to reactive chemicals. And I'm going to
4 be pushing very hard, this month, to try to get this
5 bill through EPA, and out onto the floor, before this
6 session of Congress ends.
7 But, again, I want to thank the Board for
8 taking on this serious issue of reactive hazards
9 investigation. I think it is vital, I know it is
10 important to the people of New Jersey. It is not one
11 of those things that you read on the front pages of
12 the newspapers, but when it strikes and causes a
13 problem, and the 108 people end up using their lives,
14 then it has real meaning.
15 And that is before you talk about all of
16 the property loss and damage to the security of our
17 community. So for me I think your efforts are both
18 commendable, and I think they make very clear it is
19 time for new regulations to move forward.
20 I think that ought to be done by experts
21 like yourselves, in conjunction with others, but I
22 think that we ought to move. And I appreciate this

1 opportunity to talk with you, and express our views,
2 and look forward to working with you, and maybe even
3 coming back and joining you in another hearing in a
4 year.
5 So thank you very much.
6 BOARD MEMBER POJE: Thank you very much,
7 Senator. We are honored to have you before us today
8 and offering those words of encouragement for a very
9 important area of chemical safety. Thank you.
10 (Applause.)
11 BOARD MEMBER POJE: With that we would
12 like to now introduce the technical panel, the last
13 panel of our very busy day, but a most important panel
14 as well.
15 Amy Spencer from the National Fire
16 Protection Association; Dr. Dan Crowl, professor of
17 chemical engineering at Michigan Technical University;
18 Dr. David Leggett, principal scientist at Baker
19 Engineering and Risk Consultants; and Mr. Walt Frank,
20 Senior Consultant with ABS Consulting.
21 We will begin the afternoon's discussion
22 from this technical panel with Ms. Amy Spencer from

1 NFPA.

2 MS. SPENCER: Thank you, Dr. Poje for the
3 opportunity to testify this afternoon. I'm Amy
4 Spencer, and I'm a senior chemical engineer with the
5 National Fire Protection Association, NFPA, and I'm
6 accompanied, in the audience, by assistant vice
7 president Guy Colona PE, he is responsible for the
8 NFPA fire protection applications and chemical
9 engineering department.

10 I will begin this afternoon giving you a
11 brief history of NFPA, followed by a description of
12 the NFPA 704, as it applies to this hearing, and how I
13 agree that the NFPA 704 instability rating is an
14 inappropriate tool, when used alone, to identify
15 reactive chemicals for the application of the OSHA SPM
16 standard.

17 NFPA is a non-profit international
18 organization who develops voluntary consensus codes
19 and standards adopted by state and local jurisdictions
20 across the U.S., and the rest of the world.

21 Including, as a mandatory reference cited
22 by OSHA. All NFPA codes and standards are accredited

1 by ANSE, and meet the criteria mandated by Congress in
2 the National Technology Transfer and Advancement Act.
3 For those of you who might not realize you
4 are familiar with NFPA, we've got some aspects of NFPA
5 which you might be very familiar with. Our public
6 education department educates your children, and
7 grandchildren, about fire safety, using Sparky, the
8 fire dog. That is a registered trademark of NFPA.
9 Many people are unaware that every October
10 NFPA is the official sponsor of fire prevention week,
11 a tradition that has continued over 80 years.
12 NFPA panels the National Electrical Code,
13 and also NFPA 101. Those are two of our biggest
14 standards, the life safety code. And about 300 other
15 codes and standards adopted throughout the nation.
16 We have nearly 75,000 members across 107
17 different countries, and more than 250 committees made
18 up of 6,700 experts, to write our nearly 300 codes and
19 standards. One of those standards in NFPA 704,
20 standard system for the identification of hazards of
21 materials for emergency response.
22 Many people simply refer to the standard

1 as the hazard diamond rating standard. And you may be
2 familiar with our placards. They are widely seen any
3 place that there are chemicals.
4 The first edition of NFPA 704 was
5 published in 1960, and we have revisions every three
6 to five years. The NFPA 704 system provides a simple
7 system for ranking a hazard of a chemical, based on a
8 relative scale of zero to four, with four indicating
9 the most severe hazard.
10 The ratings are provided for health,
11 flammability, instability, and special hazards. If
12 present the two possible special hazards recognized on
13 the signs by NFPA 704, are unusual reactivity with
14 water, indicated with a W with a slash through it, and
15 OX, indicating an oxidizer.
16 To indicate these special hazards it is
17 important from an emergency response perspective,
18 because it lets the responders know that an oxidizer
19 could supply oxygen if there is a fire, and if they
20 are water reactive chemicals, extinguishment with
21 water could be a problem.
22 This highlights the intent of the standard

1 for emergency response purposes. I will elaborate on
2 the intent of the standard a little bit later. The
3 committee has rated over 1,600 chemicals, and the NFPA
4 704 system can be used, by knowledgeable individuals,
5 in the private sector to rate their own chemicals.
6 It was because of NFPA 704 that I was
7 asked to speak this afternoon. The question was
8 raised, by the CSB, if it is an appropriate use of
9 NFPA 704 instability ratings to generate a list of
10 chemicals to which the OSHA PSM standards would apply,
11 by identifying the chemicals with an instability
12 rating of 3 or 4.
13 In February 2001 some key members of the
14 NFPA 704 technical committee, and I, participated in a
15 conference call with some CSB staff on this very
16 issue. The NFPA 704 committee members participating
17 in the call were Dr. Larry Britton of Union Carbide,
18 Richard Gowlen of Dow, at the time the companies had
19 not been combined; Dr. Arthur Crowits of Phoenix
20 Chemical Laboratories, and William Satterfield of Rodi
21 and Associates.
22 In summary the technical committee members

1 present during the call did not believe it appropriate
2 to apply the NFPA 704 instability ratings for this
3 purpose. And I will highlight those reasons in just a
4 moment.
5 They did believe, however, that the
6 instability rating could perhaps be explored as one of
7 the many components to be considered regarding
8 hazardous reactive chemicals. The instability ratings
9 can usefully be employed as elements of the hazard
10 risk assessment of a process, provided that other
11 factors of the process are also considered.
12 I will address the scope and purpose of
13 NFPA 704 as it applies to this hearing. The purpose
14 of the 704 rating, as I mentioned before, is to
15 provide information to emergency responders, and to
16 assist facility personnel in evaluating hazards with
17 respect to an emergency.
18 This is noted in the scope and purpose
19 statements of NFPA 704 that read as follows: The
20 standard shall provide a simple, readily recognized,
21 and easily understood system of markings that provides
22 a general idea of the hazards of a material, and the

1 severity of these hazards as they relate to emergency
2 response.
3 The health, flammability, and instability
4 ratings for a given chemical are provided based on the
5 anticipated conditions during storage, or during an
6 emergency. It is foreseeable that numerous processes
7 in which the chemicals are involved, could render the
8 original rating of the pure chemical to be inaccurate,
9 and irrelevant, in the context of a chemical process.
10 In my opinion it would be a misuse of the
11 NFPA 704 system to have a group of chemicals
12 identified for PSM regulations based solely on the
13 instability rating, without considering actual process
14 conditions.
15 As Lisa Long, of your staff, put it today,
16 the reactivity problem is too multifaceted to be
17 captured by a list of chemicals.
18 The instability rating of a pure compound
19 is not properly used when it is employed as the sole
20 index of the safety of a process that involves a
21 reaction of that substance with one or more other
22 substances.

1 In short, as one technical committee
2 member put it, the sum of the hazards of the parts
3 does not necessarily equal the hazard of the whole.
4 It should be noted, for purposes of this discussion,
5 that the instability rating was formerly called
6 reactivity.
7 The name was changed in the '96 edition of
8 704 for clarity. The instability rating is designed
9 to indicate the inherent instability, and sometimes
10 the indication of water reactivity, rather than the
11 reactivity between chemicals as was commonly mistaken.
12 The name change helped clarify this
13 distinction. As further noted in NFPA 704 section
14 713, the instability rating is not meant to establish
15 separation or segregation between chemicals, but
16 rather it provides guidance to emergency personnel.
17 That section reads as follows: The degree
18 of instability hazard shall indicate to fire fighting,
19 and emergency personnel, whether the area shall be
20 evacuated, whether a fire shall be fought from a
21 protected location, whether caution shall be used in
22 approaching a spill, or fire, to apply extinguishing

1 agents, or whether a fire can be fought using normal
2 procedures.
3 Another reason the NFPA 704 instability
4 rating would be an inappropriate as a sole trigger, is
5 that there are many chemicals that have not been rated
6 by the NFPA technical committee. Although 1,600
7 chemicals have been rated, and they appear in our fire
8 protection guide to hazardous materials, there are
9 many that have to be rated by the individual companies
10 themselves, because we have not rated them.
11 The wide group of users rating their own
12 chemicals likely leads to some inconsistencies,
13 especially since the conditions of storage can alter
14 the ratings. In addition, instability is largely
15 based on qualitative criteria, and can sometimes vary
16 by plus or minus one for instability ratings other
17 than zero.
18 There are quantitative criteria for
19 calculation of instability involving instantaneous
20 power density, or IPD data. However, there are very
21 limited IPD data available, and it is expensive, and
22 it requires a great deal of technical expertise.

1 When asked about other potential standards
2 that could be used for the PSM regulations, the
3 committee noted that NFPA 491 hazardous chemical
4 reactions found in the guide that I mentioned before,
5 NFPA Fire Protection Guide to Hazardous Materials,
6 much like Brethericks Handbook of Reactive Chemicals,
7 lists the chemicals that are incompatible with each
8 other.
9 And Dr. Rosenthal alluded this morning
10 that a good recommendation might be to require a
11 literature search with a prescribed list of references
12 when creating an MSDS. And I submit that the NFPA
13 Fire Protection Guide might be a good addition to that
14 list.
15 A committee member who was unable to
16 attend the conference call on February of 2001 on this
17 very topic, Curtis Paine, of the U.S. Coast Guard,
18 offered a suggestion that the CSB may wish to review
19 the U.S. Coast Guard's compatibility of cargos, 46 CFR
20 part 150.
21 Committee member Richard Gauland mentioned
22 that his company has the DOW fire and explosion index

1 that could perhaps be of use to the CSB as well as
2 several other company's proprietary data that they
3 might be willing to share with the CSB.
4 In summary, the NFPA 704 system is in wide
5 use, and successfully assists emergency responders,
6 and facility personnel, to properly plan and avoid
7 potential disasters.
8 However, the NFPA 704 instability rating
9 alone is not an appropriate trigger, a sole trigger,
10 with which to enact the OSHA PSM requirements for a
11 group of chemicals. Thank you.
12 BOARD MEMBER POJE: Thank you very much
13 for that thorough evaluation of the NFPA standard.
14 Now I would like to ask that Dr. Dan Crowl
15 give us his remarks. Dan?
16 DR. CROWL: Thank you, Dr. Poje. I'm Dan
17 Crowl, professor of chemical engineering at Michigan
18 Technological University. I've been involved in
19 process safety since the early 1980s, and have written
20 several books, and many research papers on process
21 safety, including chemical reactivity issues.
22 I have a research lab at Michigan Tech

1 that focuses on flammability and reactivity areas, and
2 in the reactivity areas our work is directed towards
3 improving our fundamental understanding of reactivity,
4 and improving the characterization methods to
5 characterize reactive chemicals.
6 Now, I'm only here to address one issue,
7 and that is what can we do about identifying criteria
8 to classify chemical mixtures as highly hazardous due
9 to chemical reactivity? And what I did is I took 13
10 sets of calorimeter data that I had available.
11 These data sets were chosen, primarily,
12 because of data availability, because this data is not
13 typically found on the open literature. And the data
14 are not deemed representative, necessarily, of all
15 chemicals.
16 However, these 13 systems do represent a
17 wide range of chemistries. The purpose of this
18 evaluation was to brainstorm whether a set of criteria
19 could be used to trigger PSM or RMP requirements for
20 reactive chemicals.
21 Now, this work does not propose any set of
22 criteria to completely characterize reactive

1 chemicals, nor does it consider any hazards due to
2 design or operation of processing equipment, which may
3 impose many additional and significant reactive
4 hazards.
5 I looked at a total of nine criteria for
6 this work, and this criteria are typically used by
7 industry, or found in the open literature. The
8 criteria includes the NFPA reactivity or instability
9 rating, heat of reaction, total heat released,
10 instantaneous power density, reaction onset
11 temperature, total change in temperature, total change
12 in pressure, maximum temperature rate, and maximum
13 pressure rate.
14 I also selected screening values and
15 assigned them to this various criteria, and these
16 screening values were selected either from common
17 literature values, or they were done by myself in an
18 arbitrary fashion.
19 Now, based on these 13 sets of calorimetry
20 data, the following conclusions can be made, and I
21 understand that the Board does have a complete copy of
22 -- I have a more detailed discussion of my work that

1 has been provided to the Board.

2 Of the nine criteria considered here, any

3 single criterion may, by itself, be an indicator

4 reactive chemistry. Thus any method which uses a

5 subset of these criteria may be incomplete.

6 Furthermore, there is no guarantee that

7 the criteria evaluated here are complete for

8 characterizing these materials in the first place. No

9 single criteria alone seems adequate as a screening

10 tool to trigger PSM and RMP.

11 The heat of reaction, based on the

12 limiting reactant, perform the best, and I put quotes

13 around the best, as a single criterion, here best is

14 defined as the criterion that selects the most

15 chemicals out of the list of 13.

16 The success of this criterion might be due

17 more to its conservative nature. Also this criterion

18 alone is not indicative of mildly exothermic gassy

19 systems with large pressure increases which are

20 fairly common, by the way.

21 The NFPA rating, heat of reaction, total

22 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

1 I thank you for having this opportunity to talk.

2 BOARD MEMBER POJE: Good, thank you very

3 much, Dan.

4 Now we can turn to Dr. David Leggett.

5 David, as I said earlier, is the principal scientist

6 with Baker Engineering and Risk Consultants. David?

7 DR. LEGGETT: Thank you. I appreciate the

8 opportunity afforded by the Board to allow us to offer

9 our opinions on the matter of reactive chemistry in

10 chemical manufacturing. The word chemical just keeps

11 coming up. They are chemicals, it is chemistry.

12 A little bit about what we do. We have a

13 lab, just as Dan does, it is full of calorimeters, and

14 its purpose is to actually try and determine the

15 reactivity of chemicals within a manufacturing

16 environment. And it is that phrase that is going to

17 be, really, the key of my brief presentation.

18 I fully support the position of the

19 complete assessment of the safety of the chemical

20 manufacturing process must be founded on process

21 specific hazards test data for the desired chemistry,

22 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

1 an extensive property of the molecule.

2 How does that apply to where we are today?

3 Well, it is clear that environmental regulations and

4 permits are based, in part on the concentration, for

5 example, of a molecule, which characterizes the

6 composition of a plant's effluent stream, for example.

7 So it is very easy for a plant that is

8 concerned about staying within compliance for

9 environmental issues to simply measure something and

10 compare the number that they have, the concentration

11 of the chemical in a waste stream, the concentration

12 of chemical in the air, with the mandated requirements

13 in the regulations.

14 It is a very straightforward measurement,

15 usually, and it is a very straightforward comparison,

16 and it is a very straightforward conclusion. You are

17 either in compliance, or you are not.

18 And if we had that ability to do that same

19 thing with reactivity, we probably wouldn't be having

20 these hearings today. And we don't, there is no such

21 simple relationship.

22 So chemical reactivity is an extrinsic

1 property. Chemical reactivity is the foundation of
2 the chemical manufacturing industry. We can
3 manipulate the chemistry of what is going on in the
4 pot to make whatever we want.
5 Simply take a look at what you can do with
6 ethylene. You make polyethylene, but that is not
7 where it stops. Depending upon how we run the
8 polyethylene reactor depends upon what type of
9 polyethylene we obtain, and there are thousands of
10 types of polyethylene.
11 Therefore a different approach is needed
12 in order to provide a standard gauge with which to
13 determine if a manufacturer's activities are within
14 the arena of chemical reactivity are safe, as defined
15 by some standard measure.
16 It is not straightforward, and it may be
17 impossible to arrive at a satisfactory single number
18 that portrays a chemical's safety by simply
19 considering a couple of chemical properties, without
20 regard to the operation and the environment of the
21 chemical.
22 The PSM regulation framework is a logical

1 place to locate, however, the regulatory issues of
2 reactive chemicals. The development of a single
3 criteria or definition of a highly hazardous reactive
4 mixture rests on the issue of intrinsic versus
5 extrinsic.
6 For example, the hazards and risks of a
7 chemical reaction mixture, or a single component, is
8 at least a function of the temperature of the
9 reaction, the addition rates of the reactants, the
10 nature of the process, is it batched, everything
11 tossed in at once, it is semi batched as it continues?
12 The pressure of the reaction, the type of
13 the reaction, is it a nitration, is it an
14 acidification? The presence of potentially unstable
15 reactive groups within the molecule, the
16 thermodynamics of the desired process, the
17 thermodynamics of the undesired reactions.
18 If the process, if we lose control of the
19 process, how bad is it going to get? An issue that
20 was apparently not very well known, or arguably not
21 known in the Morton accident. We did not know what
22 was going to happen when we lost control.

1 The kinetics of the desired reaction. The
2 kinetics of the undesired reaction. We did not know
3 in Morton, again, that it was going to go so fast
4 leading to catastrophic results. And the likelihood
5 of failure of unit operations and equipment.
6 These factors contribute to the extrinsic
7 nature of reactivity, making it difficult to use only
8 a couple of intrinsic properties. So, for example, in
9 a simple engineering example, a lot of information
10 must be assembled to put together what is called the
11 heat balance.
12 How much heat do you need to remove from a
13 chemical reactor in order to keep the reaction and the
14 process safe? The heat is generated by the chemistry,
15 the chemical equipment is used to remove the heat.
16 It is only when you bring both together
17 that you get the desired result, which is a reaction
18 running under control. We have heard a lot about what
19 is good and bad about the systems that we have in
20 place.
21 I think, and I think I'm going to make the
22 same points, using data from specified sources, listed

1 data really doesn't work, and we've had eloquent
2 explanations as to why.
3 Dr. Crowl just talked about how the heat
4 of reaction might not be the best thing to do. I
5 would say I agree with him, and especially we might
6 need to add a heat of reaction for the undesired
7 reactions.
8 We've heard some talk about is there a
9 maximum pressure above which we should not go? The
10 instantaneous power density has been raised. All of
11 these taken, in and of themselves, will not satisfy
12 the question that we seek to answer.
13 However, bringing them together as a
14 single entity may do it. The trick is how do you
15 actually do that? Well, we have some examples before
16 us. DOW takes a number of individual data points, and
17 using a technique called the fire and explosion index,
18 rolls all of that information into a single number.
19 That single number is then used as a judge
20 of the potential hazard for process. It has nothing
21 to do with reactivity, however it acts as a very good
22 model for what we are thinking about here.

1 There is the figures of merit approach
2 produced by the ASTM. Again, taking single pieces of
3 information and putting them together to come up with
4 a composite answer.
5 I think that we should bear in mind a
6 couple of quotations when it comes to the bottom line
7 here. One comes from Lord Calvin. His name is
8 particularly appropriate to heat, chemistry,
9 calorimetry, temperature.
10 When you can measure what you are speaking
11 about, and express it in numbers you know something
12 about it. But when you cannot express it in numbers,
13 your knowledge is of a meager and unsatisfactory kind.
14 It may be the beginning of knowledge, but you have
15 scarcely in your thoughts advance the state of science
16 in this case, process safety, whatever it might be.
17 Lord Calvin, 1824-1907.
18 But there is an additional quotation I
19 would like to throw in as well. From a gentleman
20 called Artemius Ward. It ain't so much the things we
21 don't know that gets us into trouble, it is the things
22 that we know that ain't so.

1 We are in danger by not following the
2 advice of Lord Calvin to be lured into the trap
3 identified by Artemius Ward. Thank you.
4 BOARD MEMBER POJE: Thank you, David. And
5 now we will turn to Walt Frank. Walt is the senior
6 consultant with ABS consulting. Walt?
7 MR. FRANK: I have a BS degree in chemical
8 engineering, I'm a registered professional engineer in
9 the state of Delaware.
10 The first 24 of my 29 years in industry I
11 spent with the Dupont company, and I spent over half
12 of my career working in the area of process safety
13 consulting. I am an active participant in both CCPS
14 and NFPA programs, and I'm a chairman of the AICAG
15 safety and health division.
16 I want to thank the Chemical Safety Board
17 for asking me to speak on this important topic. As a
18 process safety professional I've had to deal with the
19 difficult problems associated with controlling
20 chemical reactivity hazards.
21 I have also contributed technical support
22 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

1 reactive chemical events account for about 8 percent
2 of the known fatalities resulting from fires,
3 explosions, and toxic exposures in the chemical
4 industry.
5 Even if we assume that perhaps an equal
6 number of fatalities are associated with events that
7 have not been identified, and included in the data
8 base, the total number of fatalities resulting from
9 reactive chemical events is still a minor fraction.
10 As we consider new regulations let's keep
11 in mind the hazards that come from the other, or
12 rather that cause the other 80 to 90 percent of the
13 fatalities. And remember that many of these hazards
14 are already regulated under the PSM and NRP
15 regulations.
16 My point is that I just suggest that we do
17 not focus on new regulations as some sort of panacea
18 to address the control of reactive chemical hazards.
19 There has been a lot of mention of the
20 NFPA rating system. When we developed the technical
21 basis for the Delaware process safety regulation, we
22 chose admittedly a relatively simple approach to

1 identifying those chemicals that would be regulated.
2 We did select the chemicals that had NFPA
3 reactivity hazard ratings of 3 or 4. What hasn't been
4 pointed out is that we really regarded this as a first
5 step, intended to identify higher hazard chemicals.
6 It was anticipated that a more general
7 technical basis would be later developed to allow for
8 identifying other reactive chemicals more broadly
9 identifying other chemicals that would warrant
10 regulation.
11 OSHA, of course, later used the same
12 approach to identify the reactives that it would
13 regulate under PSM. Several years later I had the
14 opportunity to chair a joint API CMA task group, which
15 sought to identify options for broader regulation of
16 reactives.
17 As has been pointed out, all chemicals are
18 reactive under certain sets of circumstances, either
19 by themselves, mixed with other chemicals, or under
20 certain conditions of temperature or pressure.
21 The challenge for our task group was to
22 identify whether a protocol could be developed to

1 screen all chemicals, in all mixtures, under all
2 conditions.
3 Assuming such a general protocol could be
4 devised, could it be described and implemented within
5 a regulatory framework? Ultimately we concluded that
6 there were very profound technical obstacles to
7 crafting a common sense approach to identifying those
8 chemicals having reactivity hazard sufficient to
9 warrant regulation.
10 And it is gratifying to hear, today, that
11 there seems to be very little enthusiasm for more
12 list-based approaches.
13 As one task group member suggested, if
14 your goal is to prevent all reactive chemical events,
15 then you would have to regulate all reactivity
16 chemicals. Clearly it would be impractical to do so.
17 It is also worth noting, as has been
18 pointed out earlier, that EPA has, so far, deferred
19 the regulation of reactives, similarly for a lack of
20 sound technical basis for doing so.
21 Am I suggesting that it is not possible to
22 identify, evaluate, and control the hazards of

1 reactives, either individually or in mixtures under a
2 variety of process and conditions? Of course not.
3 Industry does this generally successfully
4 on a day to day basis. What I am suggesting, however,
5 is that the description of a universally applicable
6 reactive chemical safety protocol, within a regulatory
7 context, is a task made exceedingly difficult by the
8 limitless diversity of chemistry.
9 What I also suggest is that other non-
10 regulatory alternatives would provide greater
11 flexibility to deal with the sorts of problems
12 revealed by chemical incident data.
13 The Board has asked, what alternatives are
14 there to regulatory approaches? The CSB investigation
15 has identified a number of best practices that
16 companies are using to manage chemical reactivity
17 hazards. These are but a sampling of the tools that
18 exist today.
19 Further, new tools, both technical
20 approaches and management practices continue to be
21 developed. What I suggest is that there is no
22 shortage of tools. What may exist, however, is a

1 shortage of awareness, and understanding of the
2 hazards and the potential consequences of reactive
3 chemical events.
4 As a result opportunities to apply these
5 tools to the control of reactive chemicals can be
6 lost. One alternative to regulatory approaches, which
7 the Board has identified, and which I support, would
8 be the implementation of programs to stimulate a
9 broader awareness, and understanding, of hazards
10 consequences and tools.
11 This should occur across the breadth of
12 those industries involved in the manufacture, storage,
13 transport, and consumption of reactive chemicals.
14 Organizations such as CCPS, ACC, SOCMA, all have
15 within their memberships, the industry leaders in
16 chemical reactivity safety technology, and management
17 practices.
18 These organizations should assume a
19 greater outreach responsibility to share their
20 knowledge with customers, suppliers, toll
21 manufacturers, etcetera.
22 In doing so they would be serving to

1 protect the interest of the public, of employees, and
2 of their industry.
3 It is axiomatic that a hazard that is not
4 identified is a hazard that cannot be controlled.
5 With awareness, understanding, and tools, new -- I'm
6 sorry, without awareness, understanding and tools, new
7 regulations would likely be ineffective. With the
8 awareness, understanding and tools, new regulations
9 may be unnecessary.
10 The Board has also asked if a process is
11 already covered under OSHA PSM standard, do the safety
12 management requirements of the standard adequately
13 address reactive hazards?
14 I would assert that the standard provides
15 a good framework. However, by intent, the PSM standard
16 provides little explicit guidance on the control of
17 any regulated hazard. There are changes that could be
18 made to the content of certain of the PSM elements in
19 order to more explicitly address chemical reactivity
20 hazards.
21 However, I suggest that sort of detail
22 could be more easily promulgated, perhaps more

1 appropriately communicated, in the form of voluntary
2 compliance guidance issued by OSHA, rather than by a
3 rulemaking.
4 Finally, the Board has asked, what non-
5 regulatory actions could be taken by OSHA, and EPA, to
6 reduce the number and severity of reactive chemical
7 incidents?
8 Hopefully we all learn by our mistakes, as
9 was suggested earlier. Ideally we also learn from the
10 mistakes of others. It is my belief that many
11 organizations producing and handling reactive
12 chemicals are learning by repeating the mistakes of
13 their peers.
14 They do so for lack of a mechanism for
15 sharing lessons learned from chemical reactivity
16 incidents. The Board has suggested the need for OSHA
17 and EPA to provide means for better tracking of
18 reactive incident statistics.
19 I suggest that any such effort should also
20 provide for capturing lessons learned from incidents,
21 at least near misses, so that those responsible for
22 reactive chemical safety would have a broader

1 experience base from which to draw learnings.
2 And as it has been pointed out earlier,
3 CCPS has successfully implemented such an incident
4 data base for subscribing members. Thank you.
5 BOARD MEMBER POJE: Thank you, Walt. Now
6 we will open it up to questions from the other board
7 members.
8 Dr. Taylor, would you like to go first?
9 BOARD MEMBER TAYLOR: Sure, why not. I
10 have a question for Ms. Spencer regarding the NFPA
11 rating. How often does the NFPA review the chemicals
12 that have already been previously rated, and update
13 that list?
14 And by updating I mean something has been
15 rated a zero or one, do you ever go back and review it
16 after an incident occurs, or if something else
17 triggers another review to update the list?
18 MS. SPENCER: Dr. Taylor, we had a whole
19 lot of chemicals rated before. It started back
20 previous to 1960, and the data, it was well
21 substantiated, the sources of the ratings, where we
22 got the data.

1 When the standard 704 became more
2 quantitative in 1990, gave more quantitative cut
3 points for the particular ratings, then the chemicals
4 were re-rated. In 1996 we just completed a full re-
5 rating of all the chemicals, because as time goes on,
6 NFPA 704 is reviewed, as I mentioned, more
7 quantitative cut points are put in.
8 And so a complete review was just
9 completed, and that is reflected in this new Fire
10 Protection Guide to Hazardous Materials, which just
11 came out about two weeks ago.
12 We hope to create an internet based data
13 base that is accessible to the public, with pretty
14 much real time changes as more data is found, or
15 people provide us with that, or if there are any kind
16 of corrections to be made, we hope to do that in real
17 time in the future, and that is a project that we are
18 currently working on.
19 BOARD MEMBER TAYLOR: Thank you. The
20 second question that I wanted to raise, I guess, I
21 could raise to the panelists, and it is regarding a
22 recommendation that Mr. Frank made, but similar

1 recommendations on, that it is better to do a non-
2 regulatory approach versus a regulatory approach.
3 And the question that I wanted to ask
4 around that was regarding this whole implementation of
5 programs that broaden awareness. How would that
6 impact -- I mean, some of the large industries
7 probably could do some kind -- they have more of an
8 impact on the workers.
9 But what about the smaller facilities
10 where if there is no regulation, or if there is no
11 additional guidance, where they usually do review, and
12 it is hard even then for them to follow those
13 regulations, what happens for non-regulatory, where we
14 just implement a program that broadens awareness, and
15 what does that mean?
16 MR. FRANK: Perhaps it sounds simplistic,
17 but I think part of the issue here is really
18 convincing people what many large companies believe,
19 that process safety is good business. Getting an
20 awareness out to smaller, and I display a bias here,
21 there is a lot of very good smaller companies, so
22 don't let me confuse people.

1 But to get the message across to people
2 who have not heard the message previously, that their
3 business is in jeopardy unless they address these
4 issues. In jeopardy from the standpoint of even the
5 existence of the business.
6 Our first tier companies know an awful lot
7 about how to safely handle reactive chemicals. And a
8 lot of them do share that information with others in
9 the industry. What I'm saying is, I'm suggesting the
10 need for a more aggressive program to do that.
11 BOARD MEMBER TAYLOR: And is there a
12 company, or an association, I understand that perhaps
13 could, like CCPS, or is there a recommendation that
14 you are making that would be something that we could
15 recommend happen to get that message to the smaller
16 industries, and what is it that we can make as a
17 recommendation, in that direction, if that was --
18 MR. FRANK: Well, certainly some
19 organizations such as CCBS is already attempting to do
20 that. Really all I'm talking about is an
21 amplification of the existing programs. Responsible
22 care is a model for the sort of outreach that we are

1 talking about.

2 More emphasis on reactive chemical issues

3 under responsible care would be an example. But to

4 get back to the earlier part of your question about

5 why an emphasis away from regulatory programs, I guess

6 I respond in terms of any attempt at some sort of

7 prescriptive regulatory program, something that says,

8 okay, if you are addressing reactive chemicals you

9 will do this test, you will have that data, you will

10 perform that analysis.

11 My concern, personally, is that any

12 prescriptive program is going to leave out something

13 that someone needs. Any prescriptive program is going

14 to require more than someone else needs. That is why

15 my -- I personally believe we need a system that

16 promotes people doing what they need to do.

17 And I don't see that coming as effectively

18 out of a prescriptive regulatory program.

19 BOARD MEMBER TAYLOR: Would any of the

20 other panelists care to address that as well?

21 DR. LEGGETT: I think that this does come,

22 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

1 protection, you classified these categories on the
2 basis of energy releases.
3 At least in what used to be called the
4 water reactivity grouping. How did you arrive at the
5 thresholds, what made you decide that up to 70
6 calories was category one, or was it a hundred? That
7 is immaterial.
8 And from a hundred to something else was
9 category two. What were the criteria you used to
10 arrive at those energy release values?
11 MS. SPENCER: Dr. Rosenthal, are you
12 referring to the IPD data, specifically, the IPD data,
13 the instantaneous power density?
14 BOARD MEMBER ROSENTHAL: Yes.
15 MS. SPENCER: We were approached by Dow
16 with a proposal. They had provided the cut points,
17 and that was based on some research that they did,
18 where they did a correlation of the instantaneous
19 power density with the --
20 BOARD MEMBER ROSENTHAL: No, I'm not
21 talking -- for example, on water reactivity you do not
22 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

1 did you arrive at those consequences?

2 MS. SPENCER: Could I defer to --

3 BOARD MEMBER ROSENTHAL: Okay, you can get

4 me the answer --

5 MS. SPENCER: I don't understand your

6 question, I'm sorry.

7 BOARD MEMBER ROSENTHAL: Okay, I will try

8 to clarify it, but let me go on.

9 MS. SPENCER: Dr. Crowl works with the

10 reactivity as well. Are you able to answer the

11 question, Dr. Crowl?

12 DR. CROWL: I can't answer the water

13 reactivity. I do know a lot more about the

14 instantaneous power density stuff. But they already

15 had, on the instantaneous power densities, as I

16 recall, they took about 35 compounds that they had

17 data on, and then they made the cut points that made

18 the data fit the best.

19 BOARD MEMBER ROSENTHAL: Okay. I will go

20 on, we can clarify that later.

21 If you were faced with the necessity of

22 doing something that would catch, that would cause

1 further examination of 80 percent, not 100 percent,
2 which you've all addressed.
3 If you had to deal with what essentially
4 is a cost effectiveness thing, and you had to select
5 the top 80 percent of potential combinations of
6 reactants that might warrant further examination of
7 process conditions, which is the point that you and
8 Dave have made.
9 What one or two criteria might you use and
10 which ones might be most cost effective?
11 DR. LEGGETT: Let me be bold and say I
12 challenge the question. I don't believe that there
13 are one or two criteria, quite honestly. I would say
14 cost effective means, let me as a consultant give you
15 a day of my time, that is going to cost you, the
16 chemical manufacturer, a certain amount of money.
17 And in that period of time we together
18 will sit down and try to figure out an answer that
19 will catch 80 percent of potential hazardous
20 situations. And I would probably end up looking at
21 about 10 to 12 items on my list of things that worry
22 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

1 give a different answer.

2 Your data suggests that of your 13 one

3 criteria would catch 12 out of 13, and that criteria

4 is by what I believe is a relatively cheap test?

5 DR. CROWL: Let me explain that. That

6 information is derived from the total heat released. I

7 take the total heat release and divide by the

8 concentration of the limiting reactant, and that gives

9 me the heat reaction.

10 There is no more additional information

11 provided in that piece of information. Those two are

12 related. Now, why that one works better than the

13 other? It seems like an accounting trick to me.

14 I'm dividing by a number less than one,

15 which gives me a bigger number, and that covers more

16 chemicals. But the information content is the same as

17 the one that covers only 50 percent of the chemicals.

18 BOARD MEMBER ROSENTHAL: Yes.

19 DR. LEGGETT: Let me chip in to augment

20 Dan's comment. And I think it appears in the draft

21 report, the Board commented, or one of the staff

22 commented that a reactor with contents at 300 degrees

1 centigrade is most of the time simply a heat hazard.
2 But a reactor at 200 degrees centigrade
3 that is in the process of running away, with the
4 pressure building inside it, is a detonation hazard.
5 So just to simply think about heat does not include
6 pressure.
7 BOARD MEMBER ROSENTHAL: My question,
8 again, was which of the ones that should be a
9 candidate for further examination. I didn't ask for
10 the question of which of the ones you could completely
11 decide.
12 One question, one last question Jerry
13 tells me. We can continue this over a beer later.
14 You say the problem with regulations is they always
15 leave out something, which reminded me of the old
16 cliche that the perfect is the enemy of the good.
17 What would you do, again I will put the
18 same question, if you were willing to leave out
19 something and go for effectiveness, would you come up,
20 in the regulation, would you come up with something
21 different than your conclusion than regulation could
22 not contribute anything?

1 MR. FRANK: Well, first of all, let me jus
2 say, again, my big bogaboo is prescriptive regulation.
3 And if you are asking is there a conceivable
4 regulatory approach? You know, it has been suggested
5 before that, you know, if we were going to solve
6 something, this problem by a regulatory approach,
7 something along the lines of the Savazo requirements
8 might be something you would consider.
9 Impose upon all industry a requirement
10 that they develop a safety case, you know, a detailed
11 explanation for why is my process safe to operate. I
12 view that as sort of the general duty clause, with a
13 documentation requirement.
14 The problem that I see with that, you
15 know, and I'm going to balance the presentation here,
16 the problem with that is where do you find enough
17 people qualified to review the safety cases to gain
18 confidence that you are getting the results that you
19 are intending?
20 You know, as a parallel I would point to
21 the R&P rule, and the fact that EPA is already having
22 to look at the third party auditor program, as a means

1 of finding enough people to audit R&P programs, where
2 they are looking at what is, admittedly, a far less
3 technically sophisticated issue.
4 BOARD MEMBER ROSENTHAL: Thank you.
5 BOARD MEMBER POJE: Well, certainly that
6 plays off of some of the questions I had earlier for
7 the New Jersey panel, and the TCPA program, and how
8 they defined their auditing functions.
9 And this is a very complex issue trying to
10 balance the appropriate strengthening of the system of
11 safety, where does it best lie? And it is a
12 challenging one. I don't think Dr. Rosenthal was off
13 the mark starting off his remarks today saying this is
14 a very difficult area to tackle. But, nonetheless, it
15 is a quite important one.
16 The event in Tolouse, France in September
17 21st of this past year, is also one that has to give
18 us great cause for concern, simply counting those who
19 are dead over a period of time is an example of where
20 the problem lies, knows that we have huge problems in
21 catastrophic risk, in trying to get summary statistics
22 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

1 making. Perhaps a model of this. Again, I did cite
2 CCPS, they do have an incident data base that they
3 have been collecting.
4 But another model may actually be the FAA
5 near miss data base. The FAA was having, I guess,
6 considerable amount of difficulty getting information
7 from the airline industry on near miss events, until
8 they created a program where those reports can now be
9 made to NASA.
10 NASA looks at them, and after a period
11 removes any identifying information, and passes that
12 information on to the FAA. And apparently it has been
13 quite successful, the program has, in generating
14 viable information that have prevented other airline
15 disasters.
16 Perhaps the Board, in you role, or with
17 the constraints that you work under, or the proviso
18 that your findings cannot be used in lawsuits, perhaps
19 the Board could serve as a forum for collecting,
20 sanitizing, and making that information available.
21 Because the real impediment that I see for
22 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.

1 MS. SPENCER: Thank you.

2 BOARD MEMBER POJE: Thank you to all of
3 the panelists in this session. I do want to thank you
4 for your service to the Board, with giving your
5 comments and your analysis.

6 Also, at this point in time we would like
7 to apologize for the other panelists, even on these
8 panelists, the Board has attempted to tackle, in one
9 single day, a rather large and complex topic. I think
10 we have been urged to come back to New Jersey by the
11 people in the State of New Jersey.

12 We clearly want to get additional input
13 from all of the parties who were here today, and we
14 didn't allow those at the table to give a full
15 discourse on all of their expertise. But please bear
16 with us.

17 We now go into an open public comment
18 period, and we have several people who have signed up
19 to give comments today. I would like to call Mr. John
20 Clark to the podium if he is here, to give his
21 comments.

22 And we will have a five minute limit for

1 all of the public comments.
2 (Pause.)
3 BOARD MEMBER POJE: Okay. Mr. Peter
4 Howell.
5 MR. POWELL: Good afternoon. I really
6 appreciate that you have taken the time to prepare
7 this hearing, and accept the comments from all these
8 people that have made presentations.
9 Like the others I would like to tell you a
10 little bit about myself. I'm currently a process
11 safety management consultant, I'm a chemical engineer,
12 I'm a member of the American Institute of Chemical
13 Engineers. I'm a former member of the CCPS, I'm a
14 current member of the safety and health division of
15 AICHE.
16 I have 36 years of chemical industry
17 experience, and about 27 years of experience with PSM.
18 Within industry I have held a wide range of jobs in
19 all areas, from operations through design, through
20 production, through management.
21 I have a pretty good feel as to what it
22 takes to operate a chemical plant, what it takes to

1 design a chemical plant.

2 Recently I have investigated a lot of

3 chemical incidents. The two main areas that I do in

4 my PSM consulting are auditing for PSM compliance, and

5 accident investigation.

6 I have investigated about 20 serious

7 incidents over the last several years, concerning

8 fires and explosions. I have investigated five of the

9 incidents that showed on the board earlier today.

10 The common cause of these incidents, in

11 every case, has been failure of management systems.

12 The question is, why? The PSM regulation is good in

13 many ways, but it also has some shortcomings.

14 There are two of them I would like to

15 discuss today. One is that it does not cover all

16 hazardous chemicals. It utilizes a listing method.

17 And even their definitions of flammable does not

18 include all the hazardous chemicals that it should.

19 The other problem that I see is with

20 interpretation and understanding of a portion of the

21 PSM regulation. And that deals with process safety

22 information identified in D3I, or D1, D2, D3, and D3-I

1 and III.

2 These deal with hazards associated with
3 the chemicals of the process, hazards associated with
4 the technology of the process, and information
5 concerning the equipment used in the process.

6 We want to look, specifically, at D3I, and
7 II, which require conformance with recognized and
8 generally accepted good engineering practices. And
9 this is where we are seeing a lot of failures.

10 CCPS developed the requirements for PSM
11 and published them in 1989. It is no coincidence that
12 the OSHA PSM regulation mirrors what CCPS had proposed
13 a good number of years ago. But there are some major
14 differences.

15 The CCPS guidelines cover all hazardous
16 materials. There is no list, it covers all hazardous
17 materials. And management is required to determine if
18 a process contains hazardous materials.

19 And within their guidelines books they
20 provide methods for determining when a chemical is
21 hazardous, starting with various screening methods,
22 and identification of various characteristics of those

1 chemicals, going on to doing experimental testing if
2 necessary.
3 D3II and III you must follow RAEGAEP which
4 is recognized and generally accepted good engineering
5 practice. Management is not following that
6 requirement. And OSHA doesn't enforce it.
7 In the incidents that I have investigated,
8 in every single case, if management had followed and
9 complied with the CCPS guidelines the incident never
10 would have occurred.
11 I want to make it clear that even though
12 there are many obstacles that must be overcome, the
13 bulk of the technology that is necessary to operate a
14 plant safely is available. The bulk of the
15 information necessary to identify hazardous chemicals
16 is available.
17 I would also like to address, for a
18 moment, one of the problems and perceptions with PSM.
19 PSM needs to be looked at as an investment. It reaps
20 many rewards, it provides a higher on-stream factor
21 and with that increased reliability, fewer incidents,
22 and lower manufacturing costs.

1 Thank you.

2 BOARD MEMBER POJE: Thank you very much,
3 Peter. We can now have Steve Arendt.

4 MR. ARENDT: Thank you Board, and good
5 afternoon. I'm Steve Arendt with ABS Consulting, but
6 I'm here to speak on a personal basis. I have a
7 background in process safety.

8 I wanted to make a few points, picking up
9 off many of the things that have been talked about
10 today. First of all I agree with a lot of what has
11 been said, but some that I disagree with.

12 I'm a little frustrated that we tend to
13 present things in the extremes, where we must
14 collaborate on the common ground that appears to be in
15 the middle, and we definitely need to do this if we
16 are going to move forward in reactive chemical safety.

17 A few points that I want to make. First
18 of all, we do not know how big, nor how small this
19 problem. We really don't. And I'm not going to
20 improperly characterize the significant of the
21 tragedies that the individuals that testified this
22 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

1 issues at the forefront of all efforts to come up with
2 better solutions, and better approaches, rather than
3 just waiting for it to be a gate that we sort of check
4 out at the end.
5 And one way to do that, to keep that in
6 mind, is to make sure that everything that we do is
7 based on need. And the need areas that exist, I
8 think, you can put in four categories.
9 The people that warehouse or store
10 materials; the people that blend materials; the people
11 that process but don't intend on reacting them; and
12 then the people that intentionally react them.
13 So we keep that in mind, I think we can be
14 much more fruitful in our efforts.
15 Some specifics about how you might move
16 forward if regulatory initiatives are one area. And,
17 by the way, I guess I would recommend that on the
18 short term that you threaten, excuse me encourage,
19 that was the code word we were using this morning,
20 everyone to continue to improve and line up industry
21 guidance and awareness training programs.
22 And that could be done in the short term

1 as efforts in a collegial way are done to conceive
2 solutions both to identify these problems, and then to
3 regulate them if necessary, on down the road.
4 This is not going to happen in six months
5 or a year, it is probably going to be about a three
6 year effort. But in the short term these motivations,
7 through industry and professional groups, can
8 certainly bear short term fruit.
9 You could, certainly with OSHA, improve
10 the PSM elements, not the coverage, in my opinion, in
11 certain elements to explicitly deal with the reactive
12 chemical situations. And we've highlighted them
13 numerous times, and I would be glad to provide them,
14 and comments, afterward, for the record.
15 I think you would want to improve how the
16 HAZCOM and the HAZWAP regulations deal with this as a
17 floor for what I would call the lower need situations.
18 The problem with that is, as it was explained to me
19 by an OSHA administrator a few years ago, that is a
20 career event, to reopen those two rules.
21 It would take ten years, probably, to make
22 something happen. And so to do that, to have a better

1 floor for lower need situations to deal with reactive
2 chemicals, then I suggest doing that through the use
3 of interpretive guidance, through those organizations.
4 You could begin a negotiated rulemaking
5 with complete stakeholder involvement. Twelve years
6 ago, thirteen years ago, the ORC served that need in
7 bringing together stakeholders to conceive suggestions
8 for OSHA to consider in the PSM rulemaking.
9 The CSB may very well be ORC of the year
10 2002. Where you all can, in fact, be the nexus, or
11 the focal point for bringing together this
12 information. Again, it is not going to happen
13 immediately. It is going to happen over a period of
14 time, but it can certainly begin.
15 And lastly I guess I would want people to
16 look around. We had a full house this morning. Most
17 of the morning dealt with motivational activities, I
18 think. I think this afternoon, particularly in the
19 end, we are dealing with some solutions.
20 And the fact is we are all going to have
21 to work together to make sure that this comes out to
22 the benefit of workers, the public, and the industries

1 that have to choose to use these chemicals for
2 everyone's benefit.
3 Thank you.
4 BOARD MEMBER POJE: Thank you, Steve. We
5 now ask Mr. Mike Kinsword. Pardon me if I've
6 mispronounced your name.
7 (No response.)
8 BOARD MEMBER POJE: Okay, then the next is
9 Eric Frumin.
10 MR. FRUMIN: I wanted to take the floor
11 again, members of the board, to address the question
12 of how the stakeholders here could effectively
13 contribute to the process that lies ahead.
14 And I think actually the previous speaker
15 raised some of these questions in a pretty vivid way.
16 We've heard pleadings for collaboration. I think
17 those were the words that came from Mr. Connolley, and
18 from the SOCMA representative.
19 And the difficulty I have with the concept
20 of collaboration is that in most such discussions
21 between the stakeholders in a regulatory context, the
22 industry representatives will withhold the facts about

1 the economics of the matter.

2 Whether it is because of concerns about

3 proprietary matters, what your costs are, what your

4 sales are, or what your business plan is, or whatever

5 it is.

6 And everyone knows perfectly well that in

7 the absence of such information OSHA or EPA is

8 hamstrung. Because they have to demonstrate the

9 economic feasibility of any proposal, never mind a

10 final rule.

11 We've had, February 5th, 1996, CMA to Tom

12 Seymour, expanding the scope of the coverage of the

13 PSM standard would make it unwieldy and overall less

14 effective. It is likely that additional burden will

15 fall heavily on small establishments.

16 Extension of the PSM standard would divert

17 significant resources away from the more important

18 need to address process safety, and those processes

19 with the greatest potential for catastrophic releases.

20 CMA and API believe the PSM standard is an

21 effective standard, and OSHA should not take any

22 action to expand its coverage. Signed Sandy Terriel,

1 Assistant Vice President, Regulatory Affairs.
2 And then in October '97, similar comments.
3 And I didn't hear anything today from ACC or SOCMA,
4 or the chemical distributors, which basically
5 contradicted that.
6 Which basically said, we as industry
7 representatives, are in favor of stronger regulation.
8 It was all volunteerism, and all collaboration. And
9 I'm all in favor of collaboration in order to solve a
10 problem.
11 But the basic message has been don't touch
12 the standard, don't touch the regulation. Hey, unions
13 are regulated, we don't like to have to file more
14 reports about our finances. It is a pain in the ass.
15 But what is disheartening, and which
16 undermines the ability of the stakeholders here to
17 collaborate, is the reluctance of the industry
18 representatives in the face of the stunning facts
19 which have been presented here today, to alter their
20 position.
21 So I think the burden is on the industry
22 representatives here, and I wanted to take the floor

1 to say this. There is ample interest in collaboration
2 from myself and my colleagues. We will go anywhere,
3 any time.
4 Glenn Erwin spends his whole life on the
5 road for PACE, Mark Dudzic is not a shy guy, neither
6 is Mike Wright, or Mike Sprinker. We will go, we will
7 meet you anywhere.
8 But it is not going to be collaboration
9 about withholding the facts from the Board, from
10 labor, from communities, and least of all from OSHA
11 and EPA. We are going to have to put some facts on
12 the table, and talk about the real problems of dealing
13 with the employers who are not doing what needs to be
14 done.
15 It is not enough for you to simply say,
16 CCPS guidance says: Look at all chemicals, and then
17 turn around and say what you've said for the last six
18 years, don't touch the standard. That leaves us in a
19 total bind, and it offers the Board no middle ground
20 that all parties could be comfortable with.
21 We may never get there, but we are not
22 even going to try unless we do something different.

1 So I would encourage industry representatives to look
2 at their intent, and look at their -- what they
3 actually say, and see whether we can change the terms
4 of the debate.
5 And I hope, if the Board sees that
6 problem, in the same light that I've described it,
7 your recommendations could help promote that kind of
8 discussion. You have the ability to go beyond that,
9 and we intend to provide our detailed recommendations,
10 and we hope you adopt them.
11 But at the same time I think the Board has
12 the opportunity to seek the guidance of the industry
13 representatives who are willing to change what has
14 been, up until this moment at least, a hard and fast
15 position that contradicts what the Board is about, and
16 certainly what labor and community representatives are
17 about.
18 And we would encourage the Board to look
19 at its role in those lights. I am disturbed at some
20 of the comments from the Board about volunteerism. I
21 think it encourages a sense of denial by industry
22 representatives who think that the Board's interest in

1 volunteerism will get them somewhere.

2 And I think it is important that the Board

3 not give those signals to industry representatives,

4 that volunteerism is going to do anything to solve

5 this problem. It hasn't done anything yet. No matter

6 how many bulletins CCPS puts out.

7 Thank you.

8 BOARD MEMBER POJE: Thank you, Eric. With

9 that, that is the last person signed up to give public

10 commentary. Is there anybody else in the room who

11 would like to avail themselves of the microphone at

12 this moment?

13 (No response.)

14 BOARD MEMBER POJE: Thank you, and that

15 concludes the public comment period. I would like to

16 thank the CSB investigation team for their outstanding

17 work to bring this study forward.

18 Thanks also to my fellow Board Members for

19 their diligence in examining this threat to chemical

20 safety. I extend my personal gratitude to our three

21 eyewitnesses, Mr. Oliver, Mr. Gannon, and Mr. Goss.

22 They made a great effort to be here, and they were

1 willing to relive, for our benefit, some of the
2 terribly traumatic experiences that they have had.
3 My thanks go to each of them, and to their
4 families. I would also like to commend each of our
5 panelists today. They have shed a great deal of light
6 on a complex and difficult problem. The panelists
7 have offered a wealth of ideas on how to reduce the
8 hazards from reactive chemicals, a goal which we all
9 share.
10 I would also like to thank everyone who
11 provided public comments. You waited through a
12 lengthy day of testimony to offer your thoughts, and
13 we appreciate your commitment to democratic
14 principles, and public service.
15 We will be digesting all of this
16 information over the coming weeks, and then issuing
17 our final report and recommendations during the
18 summer. Our docket will remain open until June 30th,
19 and we would welcome any written comments on the
20 issues today's hearing.
21 Instructions for submitting comments can
22 be found on our website, www.chemsafety.gov.

1 Lastly, on behalf of the entire Board, let
2 me thank Senator Lautenberg and Senator Corzine for
3 taking time from their busy schedules to join us
4 today. Their participation attests to the seriousness
5 of the issue of reactive hazards, and is a hallmark of
6 the state of New Jersey's leadership on chemical
7 safety.
8 As we heard from the eyewitnesses,
9 reactive accidents, explosions, fires, and chemical
10 releases, destroy lives and tremendously alter the
11 quality of life for those that survive.
12 Those of us in positions of public
13 responsibility have a duty to see that these accidents
14 are prevented by every available means. Federal
15 government rules, such as the OSHA process safety
16 management standard, do prevent accidents and save
17 lives.
18 The standard encompasses a number of good
19 safety practices. As we have seen today, however, the
20 approach of applying the standard to a fixed set of
21 listed chemicals has grave limitations. Some
22 unregulated chemical combinations or process

1 conditions result in hazards that are as dangerous,
2 sometimes even greater, than those that are currently
3 regulated under the standard.
4 It is disturbing to reflect that workers
5 can and do lose their lives in chemical process
6 accidents, and more will in the future. Yet in many
7 cases the federal government has not been requiring
8 those same plants to follow established good practices
9 for process safety.
10 With that sobering thought, if there are
11 no further Board statements, this meeting is
12 adjourned.
13 (Whereupon, at 3:12 p.m. the above-
14 entitled matter was concluded.)
15
16
17
18
19
20
21
22

1

2

3

4