The Board met at the Hilton Hotel, Moody Ballroom, 8181 Airport Boulevard, Houston, Texas, at 9:00 a.m., Carolyn Merritt, Chair, presiding.

BOARD MEMBERS:

CAROLYN MERRITT       Chair
JOHN BRESLAND
DR. GERALD POJE
DR. IRV ROSENTHAL
DR. ANDREA K. TAYLOR

CHARLES JEFFRESS, Chief Operating Officer
CHRISTOPHER WARNER, General Counsel

STAFF PRESENT:

JOHN MURPHY
LISA LONG
GIBY JOSEPH
DONALD HOLMSTROM
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CHAIR MERRITT: The meeting will come to order. This is a regular board meeting for the U.S. Chemical Safety Board, which is being held in public. I welcome you to our meeting, and good morning.

This is the U.S. Chemical Safety and Hazard Investigation Board. The board is an independent and nonregulatory federal agency that investigates the causes of chemical accidents and recommends safety improvements to prevent future accidents.

I'm Carolyn Merritt; I'm the chairman of the board. And with me today are my fellow board members Dr. Gerry Poje, Dr. Andrea Taylor, Dr. Irv Rosenthal, and Mr. John Bresland. Also with us is Mr. Charles Jeffress, who is our chief operating officer; and Mr. Christopher Warner, who is our general counsel; and also members of our staff, and I greet you all this morning.

This public meeting is also being webcast live, and I extend a welcome to our viewers over the worldwide web. This marks the board's first public meeting in the state of Texas, and it's a privilege to be back into my hometown here -- or former home -- of
Houston, of which I was here for about four years, and it's always a pleasure to be back.

This May the board began its public accident investigation in Texas of the plant fire in Pearland at Third Coast Industries' facility. We anticipate completing our Third Coast investigation this winter, so we'll probably be back shortly.

Today we address a most important challenge facing the industry here in Texas, but also throughout the country: the problem of managing hazards associated with chemical reactivity.

Our investigation of reactive hazards marks an important milestone for the board. It represents our first effort, since we opened our doors in 1998, at not just examining the cause of a single accident that's already occurred, but rather looking prospectively at the whole class of hazards and recommending steps to prevent future accidents across a broad range of industries.

With this study we begin to realize the vision of Congress when it first authorized creation of the board in 1990. Reactive hazards have been responsible for many accidents, deaths, and injuries over the last years.

Plants have been damaged or destroyed by
explosions, fires; jobs have been lost, productivity, capacity has been lost.

When we talk about reactive accidents, we're generally referring to two kinds of incidents: one, planned chemical reactions that go awry because of unusual or uncontrolled conditions and, two, reactions caused by inadvertent mixing of materials.

Three of the five costliest reactive accidents nationally in the past 20 years happened here in Texas or in Louisiana. Property losses from these three events totaled more than $200 million, a steep price to pay for accidents that could have been prevented inexpensively with better-managed safety systems.

These eye-opening figures are just the direct costs of the accidents and don't include sudden and prolonged capital drain, business interruption, loss of market share, or legal costs.

The pictures outside of the room show the level of destruction that reactive accidents have caused in Texas and around the country. Companies that are predictive, proactive, and preventive have long recognized the return on investment in avoiding accidents and have voluntarily instituted broad and effective safety programs that exceed government
requirements.

Companies directly benefit from such programs at the bottom line. They also avoid the loss of life, the human suffering, and the public mistrust and financial toll that accidents can cause.

Houston residents have frequent reminders of frightening effects of chemical accidents: toxic clouds, evacuations, road closures, shelters in place.

The explosion at Freeport's BASF plant on Friday is but another of the latest examples of chemical accidents with ominous potential.

Today we're meeting a short drive from the site of one of the worst US chemical accidents in decades: the ARCO Channelview disaster. On the evening of July 5, 1990, maintenance workers were completing repairs near a large liquid waste tank at the Channelview complex.

Unknown to plant personnel, the chemical reaction within the tank had produced a highly explosive fuel oxygen atmosphere. At 11:21 p.m. explosive fumes from the tank reached outside ignition source. Moments later the entire 900,000-gallon tank exploded, hurling its massive 24-ton roof into the parking lot 600 feet away.

All 17 workers in the area were killed, and the area
the size of a city block was devastated.

Two more accidents caused by chemical reactions at Phillips Chemical Company in Pasadena resulted in three deaths and more than 70 injuries in 1999 and 2000.

Several men who survived one of these accidents but were injured are here with us in the audience today: Alan Goss, Roby Plemons, and Jeff Kuper are all here.

(Applause.)

CHAIR MERRITT: And we thank you for being here this morning.

The Clean Air Act amendments of 1990 require OSHA and EPA to develop new regulatory standards for the chemical industry. The OSHA process safety management standards took effect in 1992, and the EPA risk management program rule took effect in 1996.

These rules require companies to use a variety of good safety practice for covered chemical processes. The regulations require companies to identify process hazards, assess their significance, and implement control programs designed to prevent accidents.

These rules have a central limitation:
They only apply to processes using certain listed individual chemicals and classes of chemicals. They do not comprehensively cover reactive hazards associated with process-specific conditions and combinations of chemicals.

It is precisely these hazards which are often subtle and random dangers that, nonetheless, lead to catastrophic reactive accidents.

The Chemical Safety Board staff has now completed a two-year special investigation on the management of reactive hazards. As part of their study, the staff has collected information on 167 serious reactive accidents that occurred in 38 US states between 1980 and 2001.

Twenty-three serious reactive accidents occurred in the state of Texas. That's more than double any other state in the union. More than half of the accidents in the CSB study happened after the OSHA process safety rules were put in place in 1992.

The board released preliminary staff findings from the study this spring. On May 30 we took a full day of public comment and testimony in Patterson, New Jersey, which has been the scene of two major reactive accidents in recent years.

You may view a video of that proceeding by
going to our CSB website at www.chemsafety.gov. The
Chemical Safety Board has continued to collect written
comment from the public, and the comments and
testimony have been used in developing proposed final
conclusions and safety recommendations.

This morning the CSB staff will present
these conclusions and recommendations to the full
board, and board members will have a chance to ask
questions of the staff.

The public will have an opportunity to
offer comments but not questions to the staff or the
board before the board moves on to deliberate and then
vote on the report with any approved amendments.

Members of the public who wish to comment
should register at the sign-in desk out front, and
please limit your remarks to three minutes.

After voting on the reactive report and
its recommendations, the board will then move on to
consider some routine business which you're welcome to
stay and view as well, including our new performance
plan for the next year. We plan to adjourn around
lunchtime.

There has been considerable work done on
this reactive hazards prior to the confirmation of
John Bresland and myself in August.
This work, done by Dr. Poje, Dr. Rosenthal, and Dr. Taylor, may not be fully appreciated in these proceedings, but I would like to offer my gratitude for your perseverance and for your dedication to this issue to bring us to this point today. And we thank you.

With that, the chair will recognize any other members of the board who would like to offer opening statements.

Anyone? Dr. Poje?

DR. POJE: Thank you, Madam Chair, for those thoughtful and kind opening remarks. Thanks also to the staff and my fellow board colleagues for your efforts.

I'm grateful to the many wise and generous people who shared so much expertise with us during the course of this investigation.

This past week has been a sober and somber one for so many Americans. As a native New Yorker now living and working in Washington, DC, the 9/11 anniversary has revived many painful memories of Ground Zero in Manhattan and the Pentagon in northern Virginia.

However, knowing that the board would soon bring our reactives hazard investigation to Houston
also evoked memories of an earlier tragedy that lies at the heart of chemical process safety and our study.

I'd ask everyone to recall, in the early morning hours of December 3, 1984, pressurized methyl isocyanate burst through safety valves of a large storage tank at the Union Carbide plant in Bhopal, India, releasing more than 30 metric tons of a highly toxic gas into the air.

The dense cloud quietly spread like a white pall over the nearby sleeping community. Many men, women, and children died in their beds. Others awoke to the sounds of their own choking as they struggled to escape into the streets.

Those able to flee could only run so far before collapsing in the streets and writhing on the ground, engulfed in the vapor. Within days, when the air finally cleared, more than 3000 people lay dead, and scores of thousands were permanently disabled.

Exothermic polymerization of methyl isocyanate in the tank had been inhibited by the addition of phosgene; however, about 500 kilograms of water entered the MIC tank in Bhopal and reacted with and deactivated the phosgene, producing carbon dioxide, and raising the temperature of the MIC.

The tank was also equipped with a cooling
system, but the refrigeration system was not working. Furthermore, the tank high temperature alarm was disconnected at the time of the accident.

By consuming the phosgene and heating the MIC in the unrefrigerated tank, this precursor reaction led to a runaway MIC polymerization and venting of this deadly gas into the heavily populated area surrounding the pesticide-manufacturing plant.

Inadequate safety systems at the plant failed to prevent a runaway reaction and to contain the deadly cloud.

Bhopal's ripple effect was enormous and felt around the world. In America many chemical manufacturers redesigned processes in inherently safer ways to avoid storage of such highly hazardous intermediate chemicals.

Professional engineers established the Center for Chemical Process Safety that prepared best-practice guidances for the industry.

Other safety leaders initiated development of an OSHA process safety policy. Congress expanded right-to-know policies from workplaces to communities and instituted new emergency planning and preparedness requirements through EPA.

Multiple domestic chemical accidents in
the late 1980s, including many reactive incidents, prompted the Clean Air Act amendments of 1990 that ultimately established OSHA PSM regulations by 1992, led to EPA's risk management program by 1996, and prompted creation of the Chemical Safety Board by 1998.

Today, after recent tragic events, we find ourselves in new age of chemical safety and security. Once again we will need to strengthen safety on a number of fronts, reforming regulatory policy, improving information gathering and access, developing professional guidance, improving private practice, and increasing awareness.

I'm honored to be here today as part of this board as we take the next steps to prevent reactive chemical accidents. Thank you.

CHAIR MERRITT: Is there anyone else?

MR. BRESLAND: Yes, Madam Chairman.

It's my pleasure to be back in Texas, which I believe is the home of the largest concentration of chemical and oil refining processes in the world.

Our topic today is of great interest to everybody in the chemical processing industry, and as a recently confirmed CSB board member, I'm looking
forward to a very interesting and stimulating
discussion today.

    Thank you.

    CHAIR MERRITT: Thank you.

    Anyone else?

    (No response.)

    CHAIR MERRITT: Thank you. With that, at
this point in our board meeting I would like to call
Charles Jeffress and ask him to proceed, then, with
the staff presentation to the board.

    MR. JEFFRESS: Thank you, Madam Chair. As
you indicated, a team of members from the Chemical
Safety Board has been working on this study of
reactive chemical incidents for the past two years,
and that team is here to make a presentation of their
recommendations to you today.

    They will present their conclusions, their
findings, and their recommendations. The leader of
that team is John Murphy, who will start the
presentation this morning; also on the team, Lisa
Long, Giby Joseph, and Don Holmstrom, a member of the
team and the recommendations specialist for the
agency, participated in developing the
recommendations.

    To begin the presentation this morning,
John?

MR. MURPHY: Thank you, Mr. Jeffress.

Good morning, Madam Chair, board members,
Mr. Jeffress, Mr. Warner.

My name is John Murphy. I am the lead investigator on the reactive chemical hazard investigation. With me this morning are Giby Joseph and Lisa Long, fellow investigators; and Don Holmstrom from our recommendations group.

This is a presentation to the board of the findings, conclusions, and recommendations of the reactive chemical hazard investigation.

Board members, reactive chemical incidents are a significant safety problem. Reactive chemical incidents have resulted in fires, explosions, in toxic releases. Such events have injured people, damaged property, and caused adverse environmental impact.

As Madam Chair has already told you, there have been severe reactive chemical incidents right here on the Gulf Coast. On March 27, 2000, Phillips Chemical Company in Pasadena, Texas, a shock-sensitive material exploded and resulted in one fatality and many serious injuries. Local residents had to shelter in place for more than two hours, and there was major property damage.
Another incident occurred here in Texas on June 23, 1999, Phillips Chemical in Pasadena, Texas. Operators were mixing a mini-batch of production chemicals to ensure that the reaction was running correctly. Evidence shows that valves were operated out of sequence, allowing 40 times the amount specified of a highly volatile chemical known as butadiene to pour into the reactor.

Operators then introduced a catalyst, a procedure that had not been done for about six years, to try to get rid of the odor. Soon after the catalyst addition, a vapor cloud escaped and exploded, resulting in two fatalities.

Reactive chemical incidents can be catastrophic. On April 21, 1995, in Lodi, New Jersey, there was an incident at Napp Technologies. An explosion and fire occurred when Napp was conducting a blending operation to produce a commercial precipitation agent.

The chemicals in the process were water reactive. During the process water was inadvertently introduced into the blender. Operators noticed an unexpected reaction taking place in the blender, producing heat and the release of foul-smelling gas.

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

The chemicals involved in this incident were not covered by the OSHA process safety management standard.

The importance of this incident is that six labor unions, after the incident, petitioned OSHA for an emergency revision of the process safety management standard, stating that it failed to cover reactive chemicals adequately.

OSHA and EPA, who also investigated the incident, also stated that reactive coverage needed to be relooked at.

To date there have been no regulatory changes to address the process safety management issue. In fact, OSHA has recently removed reactive chemicals from its regulatory agenda.

Another important incident took place on April 8, 1998, in Patterson, New Jersey, at Morton International. The Chemical Safety Board investigated this incident and determined that a runaway reaction resulted in a fire and explosion that injured nine employees.
During the Chemical Safety Board investigation of the Morton incident, many stakeholders raised concerns that reactive chemical problems merited a more systematic analysis by the board.

In light of the number of incidents similar to Morton that have occurred since 1995, the board decided to conduct a hazard investigation of reactive chemicals. The board had the following objectives for the hazard investigation. I will let you read them.

The objectives were met by analyzing past incidents, discussions with stakeholders and regulators, site visits and surveys of chemical companies, and examining existing standards and guidance.

The investigative process resulted in recommendations to improve reactive hazard management. You will be hearing these recommendations at the end of the presentation.

Many interested groups inputted into the hazard investigation. We had representation from academia, industry trade associations, labor unions, and public interest groups, and good participation by regulatory agencies.
I would like to thank each of them for the contribution to the hazard investigation. Diversity of input was very important to doing a thorough investigation.

As Madam Chair has already stated, a public hearing on reactive chemical hazards was held May 30, 2002, in Patterson, New Jersey. There were presenters from government, industry, labor, public interest groups, and technical experts.

For 30 days after the meeting public comments were accepted. Public comments were received from individuals, companies, industry trade associations, unions, and consultants.

There were many topics covered in the public comments. One important topic was, was there a need for regulation? If so, what would the regulation look like? Should it be prescriptive or performance-based?

Also, specific changes were recommended to the process safety management standard. There was discussion on the value of industry initiatives and guidance and whether changes had to be made.

All comments were reviewed and seriously considered before recommendations were formulated. The comments confirmed and elaborated on ideas that...
the staff had already concluded.

This was primarily due to the fact that many of these groups were interactive during the hazard investigation. I would like to thank all of those who submitted public comments.

One of the first tasks of the staff was to define a reactive chemical incident. We did this after thorough discussion with many of the stakeholders mentioned previously. The following definition was agreed to: A reactive chemical incident is a sudden event involving an uncontrolled chemical reaction with significant increases in temperature, pressure, or gas evolution that has the potential to or has caused serious harm to people, property, or the environment.

This concludes the introduction. I am now going to go on and start the discussion of the conclusions. I will discuss conclusion number 1. Lisa Long and Giby Joseph will follow with the rest of the conclusions.

The investigative process led to the following conclusions:

Conclusion number 1: Reactive incidents are a significant safety problem. Limited data available to the Chemical Safety Board includes 167 industrial incidents in the United States involving
uncontrolled chemistry since 1980.

Forty-eight of these incidents involved a total of 108 fatalities to workers and the public. The data include an average of six injury-related incidents per year, resulting in five fatalities per year.

About 50 incidents of the 167 incidents had public impact. By public impact we meant there was death, injury, public evacuation or shelter in place.

This is not a comprehensive examination of reactive incidents. As you will learn later, we had problems finding sufficient and adequate public information sources. This will be discussed further later on. For example, oftentimes it was difficult from the information to determine whether an incident was caused by uncontrolled reactivity.

Reactive incidents have resulted in severe consequences. The following two slides list incidents that resulted in three or more fatalities. Several of these will be discussed in some detail during the rest of the presentation. Several serious incidents have occurred in Texas, as has been already stated.

This slide illustrates that reactive incidents have occurred recently and continue to
occur. In fact, the Chemical Safety Board is currently investigating the Pennington, Alabama, incident and another reactive chemical incident that took place in New York City.

I will now pause briefly for a few questions from the board on subject matters that I've covered today.

CHAIR MERRITT: Dr. Taylor?

DR. TAYLOR: John, I have two questions, and one of them is related to the public comments. Can you expound on how public comments were used, again, in formulating the recommendations a little bit more, please.

MR. MURPHY: The staff reviewed all public comments in detail. They were summarized, and during the process of formulating recommendations, they were very useful in making sure that all alternatives were evaluated.

Most of the comments were not new to us, but some of them had enough detail that they were very useful in finalizing recommendations. So like I said before, I thank all those that inputted during the public comment period.

DR. TAYLOR: Thank you. Now, my second question goes back to the conclusion that you reached
from the incidents that were recorded since 1980 that you were able to find.

It says that reactive incidents are a significant chemical safety problem, and there were 108 fatalities -- 48 of the incidents resulted in 108 fatalities to workers and the public, and 50 incidents with public impact, and an average of five fatalities per year.

Now, my question to you -- in the investigation that you conducted, how significant are the reactive incidents that have occurred in the chemical industry as compared to other incidents that may have occurred in the same sector?

MR. MURPHY: We didn't examine other type of chemical accidents in detail. The staff concluded, though, that five fatalities per year is significant, and 50 incidents affecting the public are significant. We think probably our data sources are not adequate, and perhaps these numbers could be understated.

I think the important thing to realize, as I pointed out during my presentation, that these incidents can be catastrophic; when they do occur, they can be multiple fatalities, serious economic impact, and environmental impact.

The other thing I might mention is my
discussion with the chemical industry process safety leaders. Reactive chemical incidents are a significant safety problem in the eyes of the chemical industry, and so I think there's no doubt that everybody considers reactive chemical incidents a serious safety problem.

DR. TAYLOR: Thank you.

CHAIR MERRITT: Dr. Rosenthal?

DR. ROSENTHAL: John, in both the Napp and the Pasadena Phillips accident, you noted that inadvertent mixing was a critical factor in causing these accidents.

Am I correct in presuming that the inadvertent mixing served to catalyze what was already a source of high energy in the reaction?

MR. MURPHY: Yes. There's always a heater reaction potential that can be manifested by catalysts or inadvertent mixing of other chemicals, so I would agree with that.

DR. TAYLOR: Thank you.

CHAIR MERRITT: Dr. Poje?

DR. POJE: John, I noticed the focus of our study has been on domestic incidents, but as I stated earlier, the Bhopal tragedy has had a fairly enormous impact on our thinking about reactive
hazards.

Can you give us any perspective as to whether this issue is of current concern outside of the United States?

MR. MURPHY: Well, certainly it's a concern in Europe. The Toulouse incident with multiple fatalities involving ammonium nitrate is an example; of course, the Seveso incident that occurred a number of years ago resulted in the Seveso directive, which member companies are required to do safety case analysis. So this is a major concern in Europe.

There's been some recent guidance produced by the health and safety executive on runaway reactions in batch reactors. There's also a project, HarsNet, that is attempting to provide reactive chemical hazard evaluation tools to companies in Europe that don't have major resources.

So this has been identified for some time as a serious problem in Europe.

CHAIR MERRITT: Any other questions?

Mr. Bresland.

MR. BRESLAND: John, without downplaying the impact of the deaths and injuries that occurred as a result of these incidents, did you also examine the
financial impact of the incidents?

MR. MURPHY: Marsh & McLennan report always lists 100 major incidents in the last 30 years, and these are incidents generally $10 million or greater in property damage, and about 10 percent of the incidents that occurred with 100 lives as losses involved reactive chemical incidents. So I think that supports what I said before, that when reactive chemical incidents do occur, they not only injure people, but they cause major economic loss.

MR. BRESLAND: Thank you.

MR. MURPHY: I think the exact numbers are in the report, so I'm just giving an overview on that.

CHAIR MERRITT: Any other questions?

(No response.)

CHAIR MERRITT: Thank you, John.

MR. MURPHY: Okay. Thank you. And with that, we'll continue discussing the conclusions. I'd like to turn the podium over to fellow investigator Ms. Lisa Long.

MS. LONG: Thank you, John. Good morning, board members.

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

The Occupational Safety & Health Administration, or OSHA, develops and promulgates regulations designed primarily to protect workers. The primary OSHA regulation covering reactive chemical hazards in industry is OSHA's process safety management or PSM standard.

In the Clean Air Act amendments of 1990, Congress specified that OSHA should cover highly reactive chemicals in its standard. The standard has been in effect since 1992; it covers a range of chemical manufacturing processes containing 137 individually listed chemicals that present hazards, including reactivity, as well as a class of flammable substances and explosives.

OSHA selected the 137 chemicals listed in PSM from a variety of lists, including a list developed by the National Fire Protection Association, or NFPA.

NFPA has developed a chemical hazard rating system that addresses health, flammability, and chemical reactivity. OSHA selected reactive chemicals covered in its PSM standard because of their NFPA
reactivity rating of 3 or 4 on a scale of 0 to 4, with 4 being the most reactive and 0 being the most stable.

Those chemicals were selected from the 1975 version of NFPA's Number 49 standard. You can see from the pie chart that only 10 percent of the 167 incidents that we analyzed involved chemicals that were rated NFPA 3s or 4s by NFPA.

Approximately 60 percent of the 167 incidents involved chemicals that were either not listed by NFPA or rated a 0 for reactivity.

Our third conclusion is that NFPA instability ratings are insufficient as the sole basis for determining the coverage of reactive hazards in the OSHA PSM standard.

The gaps in coverage of reactive hazards in OSHA's PSM standard are due in part to some fundamental limitations in the NFPA reactivity ratings. First, the ratings were designed for initial emergency response and firefighting purposes; they were not designed for process safety purposes, and as such they represent only one aspect of reactive hazards.

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

The ratings do not address processing conditions such as elevated temperatures or pressures, which can be common in chemical manufacturing environments.

And finally, NFPA Standard Number 49, from which OSHA selected the PSM-covered reactive chemicals, lists only 325 substances, a relatively small percent of chemicals used in industry. As a result, only 40 of the 137 chemicals listed in PSM are listed due to their reactivity.

The staff's next conclusion is that safety regulations designed to protect the public have significant gaps in the coverage of reactive hazards.

Over 60 percent of the 167 incidents that we looked at are not covered by existing process safety regulations from the Environmental Protection Association [sic], or EPA.

The EPA develops and promulgates regulations primarily designed to protect the public and the environment. The primary safety regulation intended to protect the public from chemical incidents is the EPA's risk management or RMP rule.
This regulation has been in effect since 1990, and it covers processes containing individually listed chemicals. Again, in the Clean Air Act amendments of 1990, Congress specified that EPA should cover highly reactive materials in its RMP standard.

When determining which substances should be covered by this regulation, EPA listed chemicals based on their toxicity and flammability. EPA stated that it could not identify criteria for listing chemicals due to insufficient technical information.

An incident that occurred on February 19, 1999, at Concept Sciences in Allentown, Pennsylvania, a tragic illustration of how reactive chemical incidents can affect the public.

Concept Sciences was attempting to distill an aqueous solution of hydroxylamine and potassium sulfate, in an attempt to produce 50-percent hydroxylamine. On the day of the incident, hydroxylamine was concentrated to at least 88.4 percent. Literature and testing show that hydroxylamine at this concentration is detonable.

After the process was shut down for the evening, the material they had accumulated detonated, resulting in an explosion which is shown here. The explosion killed four Concept Sciences employees and
the owner of an adjacent business.

Many people were injured. The Concept Sciences facility was destroyed, and ten local buildings and several residences were also damaged.

Our fifth conclusion is that the reactive problem is not adequately defined by simply placing chemicals on a list.

All chemicals can be reactive. Reactivity is not necessarily an intrinsic property. In fact, we looked at the 167 difference incidents to see if we could try and find common chemicals or classes of chemicals that were more often involved in the incidents, and what we found is that the incidents involved over 40 different chemicals or classes of chemicals, such as acids, bases, and even water.

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

For example, you may have some cleaning chemicals in your home such as ammonia and bleach. On their own, they're relatively stable, but when mixed, they can produce toxic chlorine gas.

Reactivity can result in an energy release such as a fire or an explosion, but it can also result
in the release of toxic materials, and we found this
to be the case in 37 percent of the 167 incidents.

An incident that occurred on June 4, 1999
at Whitehall Leather Company in Whitehall, Michigan,
illustrates that reactive chemicals can result in
toxic releases of gases.

On the day of the incident, a truck driver
arrived at the Whitehall Leather facility to deliver a
load of sodium hydrosulfide solution. The delivery
took place on the night shift, and the shift
supervisor working that shift that only received what
was commonly known as pickle acid previously on night
shift, and so he assumed that the sodium hydrosulfide
was pickle acid and directed the truck driver to the
pickle acid tank to unload the material.

The material commonly known as pickle acid
on site was actually ferrous sulfate, and when the
sodium hydrosulfide solution was unloaded into the
ferrous sulfate tank, toxic hydrogen sulfide gas was
produced.

As a result of the exposure to the
hydrogen sulfide gas, the truck driver died, and a
Whitehall Leather employee was seriously injured.

Many people believe that most reactive
incidents occur as thermal runaway reactions in
chemical reactors. We looked at the 167 different incidents and tried to determine if they commonly occurred in similar types of equipment, and what we found was that only 25 percent occur in reactors. The remaining occur in various other types of equipment that can be found in chemical manufacturing and chemical processing facilities, including 22 percent in storage equipment.

Reactive incidents are not unique to the chemical manufacturing industry. While 70 percent of the 167 incidents occurred in chemical manufacturing, the remaining 30 percent occurred in storage, handling, and consumer sites.

The Whitehall Leather example I just gave is an example of one incident that occurred at a consumer site. Another example of an incident that occurred at a repackaging facility or a storage facility occurred at BPS, or Bartlo Packaging, Incorporated, in West Helena, Arkansas.

BPS was repackaging a pesticide called AZM 50W. The AZM was offloaded into a warehouse when employees noticed smoke coming from the building, and they called the fire department.

A team of four West Helena firefighters were in the process of doing reconnaissance to locate
the source of the smoke. The firefighters had been
told by BPS that there was no explosive hazard.

When an explosion occurred, the
firefighters were struck by a collapsing cinderblock
wall. Three of the firefighters were killed, and one
was seriously injured.

The most likely cause of this incident was
the decomposition of a bulk sack of pesticide which
had been placed close to a hot compressor discharge
pipe.

The examples I have given illustrate that
it is difficult to develop a list of reactive
chemicals or categorize places or equipment where
reactive chemicals more often occur.

This requires regulators in industry to
address the hazards of chemicals and their
combinations under specific process conditions. In
other words, it's not reactive chemicals; it's
reactive chemistry and the management of its hazards.

At this point I'll take a few questions
from the board.

CHAIR MERRITT: Any board questions?

DR. TAYLOR: I have one, Lisa. How often
is the OSHA's general duty clause used in a reactive
incident?
MS. LONG: Well, we didn't -- we weren't able to determine what regulatory standards were used in all of the 167 different incidents. We did look at a subset, and we found that the general duty clause was used, but it's always used after the fact, and it has to be used when there's concrete evidence that industry or the facility knew that a hazard existed.

So it is used, but I don't have exact numbers on how many cases, and it's always used after the fact.

DR. TAYLOR: Afterwards.

CHAIR MERRITT: Dr. Rosenthal?

DR. TAYLOR: As OSHA presently defines process which is involving any hazardous chemical storage, manufacturing, handling, would it have encompassed the operations at, for example, repackaging, if they had had a covered substance?

MS. LONG: If they had had a sufficient quantity of a covered substance.

DR. TAYLOR: It would have been covered. Okay. So it does not just deal with reactors. Am I correct?

MS. LONG: It does -- right. It does not just deal with reactors.

DR. TAYLOR: Thank you.
DR. POJE: I'd just make a comment. I just was struck by your analysis and the conclusions, looking at the inadequacies of the NFPA system. From what I gather from the report, only 13 NFPA 4 chemicals have been listed, and 25 NFPA 3 that operate out of NFPA 49 to provide coverage for OSHA's PSM of reactive chemicals.

Give me some examples of what you would see as the glaring omissions in such an approach from some of the investigative work that the board has had to tackle. What other kinds of chemicals have we run into that have not been 3s or 4s or have not actually even been listed?

MS. LONG: Well, certainly in the Morton and Napp cases, these contained chemicals that were not 3s and 4s. In general the NFPA rated their chemicals based on their 704 standard. They only rated probably a small number of more common chemicals, and that's what listed in some of their standards, such as the 49 standard.

So although many more chemicals can be rated, NFPA itself only rated probably a small percentage of chemicals.

DR. POJE: And I was also struck by the fact that OSHA has approached another difficult topic
of flammables by establishing a class of flammables. What kinds of criteria would go into defining that? Obviously not a named list of any of thousands and thousands of chemicals that could be flammable?

MS. LONG: OSHA defines a flammable as a substance that is flammable under -- that has a flash point of under 100 degrees Fahrenheit, so there's a very objective criteria for determining what a flammable is.

DR. POJE: Thank you.

MR. BRESLAND: Getting back to your conclusion number 4, which has to do with RMP coverage, do you have any examples of reactive chemicals that are not covered by the RMP regulation?

MS. LONG: A good example would be in the Concept Sciences incident. Hydroxylamine is an NFPA 3, and it is covered in PSM but not in RMP.

MR. BRESLAND: Okay. Thank you.

CHAIR MERRITT: What we're doing or what we're saying, I think, or what you're asking us or telling us is that industry, being able to look at the vast combination of chemicals that exist on their properties which may be unique to everyone else, is the first step to prevention of these chemicals reacting and creating a reactive hazard. Is that
correct?

    MS. LONG: Yes. It's a difficult issue, and it's very process- and condition-specific.

    DR. ROSENTHAL: Let me follow on that question, based on what you stated.

    If you were to look, in terms of the incidents that you looked at -- Napp, Morton, Concept Sciences -- is there a way of looking at what the potential existed for these accidents? Is there something equivalent to an objective property, such as flammability, and in particular I'm thinking of something like $\delta h$ or $\delta p$?

    MS. LONG: There are many different things that --

    CHAIR MERRITT: Would you define $\delta h$, $\delta p$, please, for us.

    MS. LONG: $\delta p$ would be a pressure increase, and $\delta h$ is heat of a reaction you're referring to. There are many different parameters that can define reactivity; that's what makes it so difficult. But we have looked at a few such as $\delta h$ and find that, more often than not, they're exothermic reactions, so they have a positive heat of reaction.

    There are some endothermic reactions which would consume energy, but most give off energy.
DR. ROSENTHAL: Just make the comment that a positive heat of reaction is expressed as a negative term.

MS. LONG: Right.

(General laughter.)

CHAIR MERRITT: Thank you very much.

MS. LONG: Okay. Giby Joseph will now finish the conclusion.

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, or to analyze incident frequency trends.

This conclusion is based on the following findings: No single data source provides a comprehensive collection of chemical incidents from which reactive incident data could be retrieved or tracked. In particular, OSHA and EPA incident data sources are not designed to identify or track reactive incidents.

We had to search over 40 different data sources to compile information on our 167 incidents. A few of these are listed here. The last two, The Accident Database and MHIDAS, are European sources that contain some US incident data.
Again, the key message is that there is no one data source that anyone can go to to find a comprehensive collection of reactive incident data.

Another key finding was that the data that is available is very limited in terms of root cause or lessons-learned information. This leads us to conclusion number 8: There is no publicly available database for sharing lessons learned from reactive incidents.

Fewer than 40 of our 167 incidents contained causal or lessons-learned information. This information was obtained from incident reports generated by government agencies, industry associations, and companies, rather than any one particular database.

Although there are fundamental limitations in available incident data, we feel that our analysis still gave us some meaningful results regarding causes of reactive incidents.

Our data analysis indicated that reactive incidents are often caused by inadequate recognition and evaluation of reactive hazards. We found that over 60 percent of the incidents in our data for which we had causal information occurred because reactive hazards were not adequately identified or evaluated.
The incident at BP Amoco is a good example where reactive hazards were not adequately recognized. The incident caused three fatalities and significant damage to the unit that produced Amodel, a plastic used in products such as lawn and garden tools and automobile parts.

The CSB investigated this incident, and what we found was that Amodel was susceptible to thermal decomposition at processing temperatures. However, BP Amoco wasn't unaware -- was unaware that Amodel could decompose. Thus, Amodel's decomposition hazard was not adequately addressed in the process design.

A critical lesson learned from this and other incidents in our data was that industry needs to improve its recognition of these hazards. This will be a key message in our report.

Now that we've established that recognition of reactive hazards is a problem, the next five conclusions will address some specific issues regarding hazard identification and hazard evaluation.

Conclusion number 9: Neither OSHA PSM nor EPA RMP standards explicitly require specific hazards to be examined when performing a process hazard analysis or PHA. Although PSM and RMP standards
require that all hazards be addressed during a PHA, improving reactive hazard management requires that both inherent self-reactive hazards, such as thermal and mechanical shock, and hazards resulting from combinations of chemicals under process-specific conditions, such as inadvertent mixing of incompatible materials and runaway reactions, be identified and evaluated.

Rate and quantity of gas or heat generated by possible reactions, thermal stability of reaction mixtures, byproducts, waste streams, and products and effects of variables such as charging rates, catalyst additions, and possible contaminants are all relevant factors that need to be considered to adequately recognize reactive hazards.

Our next conclusion is that OSHA PSM and EPA RMP standards do not explicitly require that multiple sources be consulted when compiling necessary process-safety information.

We found that over 90 percent of the data involved chemistry readily available in literature. This is important, because where causal information was available, 25 percent of our data occurred due to inadequate hazard identification.

A variety of resources can be consulted to
better understand reactive hazards. We'll talk about some of them in the next slide.

Conclusion number 11: Publicly available resources are not always used by industry to assist in identifying reactive hazards. During our analysis we gathered most of our hazard information from searches in literature such as Bretherick's Handbook of Reactive Chemical Hazards and Sax's Dangerous Properties of Industrial Materials, and also computerized tools such as NOAA's The Chemical Reactivity Worksheet.

However, we found during our site visits and through our industry survey that such resources are not always used.

The key method in this slide is that companies need to perform more thorough searches of literature and other sources to obtain existing knowledge about reactive hazards. To ensure this happens, PSM and RMP process-safety information requirements might need to be modified.

Next conclusion: There is no publicly available database to share reactive chemical test data. Chemical information found in databases such as CHETAH, DIPPR, and National Institute of Standards and Technology's Chemistry Web Book are not sufficient to
fully understand reactive hazards.

Now, this doesn't mean that these sources don't provide useful information; we just mean that reactive hazard identification and evaluation usually need more detailed information than these sources can provide at this time.

Chemical testing which determines effects of various processing temperatures and pressures and effects of other variables, such as contaminants, need to be conducted.

Several companies visited by CSB generate and collect this type of reactive chemical test data; however, we found that these companies very rarely share this data with others in industry.

To improve management of reactive hazards, industry needs to better share and communicate reactive hazard information gathered from test data. Establishing a centralized repository of such data may help.

Conclusion number 13: 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 such as ACC, SOCMA, and NACD are working at providing more guidance to industry through
programs such as Responsible Care and Responsible Distribution.

Now, 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; hazard identification, hazard evaluation, management of change, and inherently safer design are all critical elements necessary for managing reactive hazards within a process.

Our last conclusion is that, given the impact and diversity of reactive hazards, progress in the prevention of reactive incidents requires both enhanced regulatory and nonregulatory programs.

Both regulators and industry understand that reactive hazards present a problem, so to improve management of these hazards and ensure the safety of workers and the public, we need them to do more, like enhancing PSM and RMP requirements, making more guidance available, improving industry initiatives, such as Responsible Care and Responsible Distribution.

Board members, those are the staff's conclusions. I'll let John come up and direct the questions to the staff.
CHAIR MERRITT: Thank you.

Do you have questions, board? Please raise your hand.

MR. MURPHY: We're open to all questions for Giby, Lisa, or I.

CHAIR MERRITT: Thank you.

Dr. Taylor.

DR. TAYLOR: I guess I'll guess start with one, and then I'll come back.

Giby, you mentioned that there were areas needing more guidance, and specifically management of reactive hazards that -- for example, hazard identification, management of change, hazard evaluation, and inherently safer design.

Now, the question I have is regarding your investigation. Among the companies you interviewed and the onsite visits that you conducted, did you investigate or pose any questions about the design of equipment, at any of sites, on preventing catastrophic releases?

MR. JOSEPH: We did ask questions regarding how they evaluate hazards, how they recognize reactive hazards, and our conclusions were based primarily on our site visits and our industry survey, so we did ask those kind of questions.
MR. MURPHY: I would have to say that we only casually investigated inherently safer principles. That came up in a discussion, but it wasn't a major focus of the investigation. But it was certainly a point of discussion.

DR. TAYLOR: Was this at all of the facilities or just in general?

MR. MURPHY: I would say it came up at some of the facilities.

MR. JOSEPH: But primarily our focus was on how they identified and evaluated reactive hazards.

DR. TAYLOR: How they --

MR. JOSEPH: Yes.

DR. TAYLOR: Okay. Thank you.

CHAIR MERRITT: Anyone else?

Dr. Rosenthal?

DR. ROSENTHAL: Yes. The BP Amoco accident you described as an endothermic reaction. For the most part would you say that most reactive accidents are associated with endothermic or exothermic events?

MR. JOSEPH: I'll let John discuss more, but I would say that primarily exothermic reactions.

DR. TAYLOR: That is -- in the percentage of investigations that you conducted, what was the
percentage of those incidents that were exothermic?

MR. JOSEPH: Well, the only one that we know of is BP Amoco --

DR. TAYLOR: Endo--; that was endo-.

MR. JOSEPH: Endothermic.

DR. TAYLOR: Okay. But exothermic --

MR. JOSEPH: But we really didn't focus specifically on how many were exothermic and how many were endothermic.

DR. TAYLOR: Okay.

MR. JOSEPH: But we do know BP Amoco was an endothermic reaction.

MR. MURPHY: I might add that we did look at several of the most notorious incidents, and the heater reaction involved most often was exothermic. But we didn't do a comprehensive study of this; this was just a sampling of some of the well known incidents.

CHAIR MERRITT: Dr. Poje?

DR. POJE: I'd like to observe that I'm impressed by the breadth of the analysis that you've gone through here. I'd like to think that there's a great interdigitation between regulations, between best practices, between guidance, that they all speak to each other, and they all become an important part
of the context of chemical process safety.

Let me get to the issue of the data, though. I'm kind of puzzled and would want to seek some more information from you about the capture of incident data by the regulatory agencies.

Under what circumstances does OSHA conduct an investigation of an incident, and what's the nature of their investigation, reports? Are they part of those that give you good information on causation? And how does the OSHA PSM standard require facilities to investigate?

MR. JOSEPH: Sure. Let me break that question down; I'll answer your first part first.

In general, OSHA investigates incidents that have caused three or more hospitalizations or have had a fatality. But they can also be referred through complaints or media reports.

I think, to answer the second part, the incident reports that OSHA does collect or perform -- they're -- the information from that is stored in the IMIS database, and it is publicly available.

DR. POJE: But a fundamental aspect, both of good practice as defined by the CCPS, but also now as a part of the regulatory standard under PSM for OSHA, is to investigate incidents.
MR. JOSEPH: Sure. And that's the third part of your question. Let me get to that.

And the third part of your question is PSM does require that facilities or companies investigate an incident, and -- but the only thing about that is PSM does not require, once a company has performed an investigation, to share that incident back with OSHA so they can understand what type of incidents or what type of things that they need to focus on.

DR. TAYLOR: But can OSHA request -- if they go on site to conduct an investigation, then can they request the information from the company?

MR. JOSEPH: Yes. Once they do an audit, they can request companies' investigations on prior incidents.

DR. POJE: I'm struck by our past experience as a board, where our depth of investigation on any single incident is quite deep or embracing of the importance of pursuing root causation is very deep, and the value of that work for providing lessons on how to be truly preventative are quite important, so pursuing lessons-learned causation is a most important aspect.

MR. JOSEPH: Sure. One thing that I wanted to add was that PSM doesn't require that root
cause be investigated or any management system failures.

DR. ROSENTHAL: To follow up on Dr. Poje's question, I guess EPA does require that all incidents be investigated and that they be reported, and these are available on the database.

MR. JOSEPH: The five-year accident history?

DR. ROSENTHAL: Yes. And that has details -- but what you're saying is that they don't have a separate class of reactors so that you can identify -- they have a thorough report, but they don't have it on reactives per se.

MR. JOSEPH: That's right.

DR. ROSENTHAL: Is that correct?

MR. JOSEPH: That's right.

CHAIR MERRITT: Mr. Bresland.

MR. BRESLAND: I guess following up on Dr. Poje and Dr. Rosenthal, is -- in answer to their questions you've described the way that OSHA collects incident data on reactive chemicals, and the way that EPA collects information on reactive chemicals.

If you put those two databases together, or if you were able to put those two databases together, how comprehensive a list would that be of
reactive chemical incidents that would be available to the public or to trade organizations or to outside interested parties?

   MR. JOSEPH: To be honest, we really didn't consider that or look at that issue. Maybe John can talk about that a little bit more.

   MR. MURPHY: I'll let Lisa speak to that.

   MS. LONG: I was just going to say that's in essence part of what we did. We took their data -- EPA's data and OSHA's data, along with data from several other sources, and came up with our 167 different incidents, so that's as comprehensive as could get, I think.

   CHAIR MERRITT: But it doesn't exist that way in normal --

   MS. LONG: It doesn't exist that way. There's a lot of work --

   CHAIR MERRITT: -- course of events. You have to pull it together yourself.

   MR. JOSEPH: That's right. One of the things I did talk about was there's no one comprehensive collection of reactive incident data, and that is one of the major problems.

   MR. BRESLAND: Yes. I think that was the point I was trying to make in my question, in that if
you're a facility that's covered by PSM, there is a requirement that you keep records of your incidents, but there's no requirement that this --

MR. JOSEPH: Yes. To share that data.

CHAIR MERRITT: Right. And you're also saying that there's no standard format for the detail that might go in there. So everyone could have different information, and none of it really is useful.

MR. JOSEPH: That's absolutely correct.

CHAIR MERRITT: And they're not actually always identifying a reactive incident.

MS. LONG: Right.

DR. ROSENTHAL: The reactive -- am I correct that the reactive incidents are identified in OSHA.

CHAIR MERRITT: On OSHA, but not with --

DR. ROSENTHAL: But you have this anomaly that you have a good system, good data and everything in the EPA system, but they don't collect data on reactives, whereas you have the situation in OSHA where they do have the data in the plant on reactives, but they --

MR. JOSEPH: But you don't share --

DR. ROSENTHAL: -- don't structure it and
they don't report it.

MR. JOSEPH: To share.

CHAIR MERRITT: And one of the points is it's not just data collection for data collection; it's being able to use this as an industry to be able to prevent these incidents from occurring within our own facilities or within other facilities that have like processes.

MS. LONG: If I could just add to Irv's question, OSHA does regulate reactives, and you have to do reports under PSM, but you would have to look at the incident and decide if it occurred due to reactivity; it doesn't have a checkbox that says, This is a reactive incident. So the data's there, but you have to analyze it and see whether or not it's a reactive incident.

DR. ROSENTHAL: Thank you.

CHAIR MERRITT: Very good. Thank you.

Oh, Dr. Poje, one more?

DR. POJE: Yes. Just one more. I think we've dealt with some very important issues about coverage of how complex the problem is and how insufficient a single listing of chemicals could be, but you also elevated at least two important aspects of process-safety management regulations that also
bear some additional reflection.

One is on the recognition of the hazards, how to address the multitude of potential sources of information that are available, and the second is on the process of hazard assessment elements. Can you give us a little bit more meat on those two important points?

MR. JOSEPH: That's absolutely correct. Again, I just want to clarify -- I mean, I just want to emphasize that one of the biggest -- or key findings and one of our major conclusions is that we need to better identify and evaluate reactive hazards. I think and we think it's a major problem in industry, so if we could do a better job in terms of actually identifying reactive hazards and --

CHAIR MERRITT: Before they happen.

MR. JOSEPH: Before they happen -- and evaluating some of these hazards, then we can get a better handle on these incidents.

DR. POJE: And the hydroxylamine question, seeing a paper published on the reactivity chemistry, after a terrible tragedy at Concept Sciences and a horrific tragedy at the Nissan chemical facility in Japan, is the wrong way of putting that cart more appropriately after the horse; the horse should be out
of the barn.

Knowing the information about the reactivity hazards and the cart of process-hazard assessment should be driven by that knowledge beforehand.

Now, what are the missing elements in PHA or the elements that you think need to be strengthened?

CHAIR MERRITT: Is that covered in your recommendations?

MR. JOSEPH: Yes, it is.

CHAIR MERRITT: Why don't we leave that for the recommendations.

DR. ROSENTHAL: One last quick thing so that my friends in industry don't kill me: Is it true that there are a number of people in industry have expressed a willingness to share data, but they're afraid that if the data is misused they'll get sued?

CHAIR MERRITT: Always a fear.

MR. MURPHY: There has been a group of major chemical companies that have proposed sharing reactive chemical test data. There are certain barriers that probably have to be overcome. There is liability concerns, and there's also the concern that data can be misinterpreted. So there is a move afoot
to do something just like that; we're going to talk about it during our recommendations, but there are some barriers to overcome.

CHAIR MERRITT: Thank you very much.

Very, very good.

And with that, we'd like to have Don Holmstrom.

MR. MURPHY: Yes. I'm going to turn it over to Don Holmstrom, who will review our recommendations.

Don.

MR. HOLMSTROM: Thank you, John.

Good morning, Madam Chair, board members, Mr. Jeffress, Mr. Warner. Today I will present the staff recommendations from the reactive hazard investigation to the board.

The recommendations program of the Chemical Safety Board not only participates in the development of recommendations but, just as importantly, advocates for, tracks, and ensures the successful adoption of board recommendations.

Safety recommendations are the primary tool used by the board to motivate implementation of safety improvements and prevent future incidents.

We use our unique independent accident
investigation perspective to identify trends or issues that might otherwise be overlooked.

The Chemical Safety Board recommendations may be issued to corporations, trade associations, government entities, safety organizations, labor unions, and others. Board recommendations begin the process that eventually saves lives and protects the environment.

Recommendations are issued and closed only by a vote of the board. The staff proposes making significant recommendations to the following organizations: the Occupational Safety & Health Administration, the Environmental Protection Agency, the National Institute of Standards and Technology, AIChE's Center for Chemical Process Safety, American Chemistry Council, Synthetic Organic Chemical Manufacturers Association, National Association of Chemical Distributors.

Board members, the first recommendation that will be presented today is to the Occupational Safety & Health Administration. The recommendation reads:

Amend the process-safety management standard 29 CFR 1910.119 to achieve more comprehensive control of reactive hazards that could have
catastrophic consequences.

The purpose of the process-safety management standard is to protect workers, preventing or minimizing the consequences of catastrophic releases of highly hazardous chemicals, including listed reactive chemicals.

The OSHA PSM standard lists 137 highly hazardous chemicals, only 38 of which are considered highly reactive based on an NFPA rating of 3 or 4. Using the list is an inadequate approach for regulatory coverage.

Additionally, in recommendation number 1 to OSHA: broaden the application to cover reactive hazards resulting from process-specific conditions and combinations of chemicals. Additionally, broaden coverage of hazards from self-reactive chemicals.

Board members, it is evident that the process-safety management standard has significant gaps in the coverage of reactive hazards, because it is based on a limited list of individual chemicals with inherently reactive properties.

Using lists of chemicals is an inadequate approach for regulatory coverage of reactive hazards. Not only is the listing of self-reactive chemicals incomplete due to the insufficiency of relying on NFPA
instability ratings, but also reactive hazards resulting from process-specific conditions and combinations of chemicals are not addressed at all. Fifty percent of the 167 incidents examined by the Chemical Safety Board, the chemicals involved were not covered by the process-safety management standard.

Also, in recommendation number 1 to OSHA, in expanding PSM coverage, use objective criteria. Consider criteria such as the North American Industry classification system, a reactive hazard classification system; for example, based on heat of reaction or toxic gas evolution; incident history or catastrophic potential.

While reactive hazards are currently addressed by a limited list of individual chemicals, there are other objective criteria that can be used to achieve more comprehensive coverage.

Also in recommendation number 1, in the compilation of process-safety information, require that multiple sources of information be sufficiently consulted to understand and control potential reactive hazards.

Ninety percent of the incidents in the CSB's data involve known chemistry. The OSHA PSM standard does not explicitly require the use of
multiple sources of information concerning reactive hazards when compiling process-safety information, nor does the standard define what specifically is to be included in compiling reactivity data, the level of detail required, or the method of compilation.

Additionally, in recommendation number 1, concerning process-safety information, useful sources include literature surveys -- for example, Bretherick's Handbook of Reactive Chemical Hazards, Sax's Dangerous Properties of Industrial Materials -- information developed from computerized tools, chemical reactivity test data produced by employers or obtained from other sources -- for example, differential-scanning calorimetry, thermographic metric analysis, accelerating-rate calorimetry -- relevant incident reports from the plant, the corporation, the industry, and government; and chemical abstract service.

Additionally, in recommendation number 1 to OSHA, augment the process-hazard analysis element to explicitly require an evaluation of reactive hazards.

The PSM standard does not explicitly define requirements to address reactive hazards during a process hazard analysis.
Additionally, in recommendation number 1, in revising this element -- process-hazard analysis -- evaluate the need to consider relevant factors such as rate and quantity of heat or gas generated; maximum operating temperature to avoid decomposition; thermal stability of reactants, reaction mixtures, byproducts, waste streams, and products; effect of variable, such as charging rates, catalyst addition, and possible contaminants; understanding the consequences of runaway reactions or toxic-gas evolution.

The second recommendation to the Occupational Safety & Health Administration: Implement a program to define and record reactive incidents that OSHA investigates. Structure the collected information so that it can be used to measure trends in the number of catastrophic reactive incidents. At a minimum, identify industry sectors that experience the incidents, chemicals and processes involved, and consequences.

There is no comprehensive repository of chemical incident data. The CSB examined more than 40 data sources. OSHA databases don't identify and therefore can't track reactive incidents.

At this time I would ask the board members if they have any questions on the recommendations to
CHAIR MERRITT: Dr. Taylor?

DR. TAYLOR: Don, I have a few questions. One is what other alternatives did the staff consider for recommendations to OSHA?

MR. HOLMSTROM: There was discussion of other alternatives in terms of how specific the recommendation should be based on the findings of the reactive hazard investigation.

The staff decided that the recommendation should be outcome based and should address the deficiencies found in the staff's analysis of the 167 incidents.

DR. TAYLOR: Okay. So in doing that, did you consider like defining a particular class of reactive chemicals, and if you did, what did you find would be a problem associated with that?

MR. HOLMSTROM: There were insufficient findings that would lend support to any specific regulatory approach. The staff considered several possible approaches, and they are discussed in the language of the recommendation that suggests considering various types of objective criteria. Those are listed for exemplary purposes.

There is no one parameter that
comprehensively defines reactivity. An example would be the Whitehall Leather Company incident that was discussed in the presentation involving the inadvertent mixture of two incompatible chemicals that gave rise to a toxic gas release, is an example of one type of outcome from a reactive incident that is different from, let's say, a runaway reaction.

DR. TAYLOR: Okay. I'll stop for now; then I'll hold the other questions.

CHAIR MERRITT: Mr. Bresland?

MR. BRESLAND: Can you give us an example -- this is getting back to recommendation number 1, where you state broadened coverage of hazards from self-reactive chemicals. Can you give us an example of a self-reactive chemical that would be included in this coverage?

MR. HOLMSTROM: Well, I can give you an example of a chemical in the course of the investigation that was involved in a reactive incident but was not covered by the PSM standard but nonetheless was highly hazardous and self-reactive.

In the Napp incident the product of the mixture taking place in the blender in the Napp incident, a gold precipitation agent, was not rated by NFPA. However, the MSDS for the chemical gave it a
rating of 3, which, if it had been rated by NFPA, it would have been considered a highly reactive chemical and included -- as a self-reactive chemical in the NFPA list, but this incident shows the limitations of relying on the NFPA system as a sole basis for regulating reactive hazards.

CHAIR MERRITT: But that information is available, so if we're doing -- our group was doing a PHA or process-hazard analysis to begin with and they looked at the reactive product of these two materials and came up with this gold precipitating agent, they would have data available in other sources to be able to identify it as a highly reactive material.

MR. HOLMSTROM: That certainly is the ideal situation. In the Napp incident there was inadequate process-hazard analysis that led to identification of the hazards involved.

CHAIR MERRITT: Okay.

MR. BRESLAND: One other question.

CHAIR MERRITT: Mr. Bresland.

MR. BRESLAND: One of the criteria that you suggested using for increasing the coverage under the OSHA PSM regulation was the NAICS or the old SIC code characterization. If you did that, would -- and I assume that you would pick certain SIC codes that
were generally related to the chemical-processing industry. But reactive chemicals are used across a broad range of industries. How would you deal with that dichotomy?

MR. HOLMSTROM: Again, the staff is not recommending any particular regulatory approach, but we're suggesting, for exemplary purposes, that the NAICS system, which is the new system that is generally replacing the SIC codes, could be used to identify industry sectors where a significant number of incidents were occurring or most incidents were occurring, and that could be used as one of the objective criteria in terms of identifying coverage for regulatory purposes.

DR. POJE: If I could just follow up on that, I had some experience in the early 1990s trying to watch the implementation of the toxics-release inventory provisions of the amendments to the -- Superfund amendments of 1986.

And there one of the elements of coverage was connected to SIC code numbers, and it was a horrific difficulty in finding out how people would characterize themselves, one year based upon a primary business interest that characterized one number, a subsequent year changing that number because they may
have had an elevation in product output that allowed them to redefine themselves, not that they were trying to avoid characterizing themselves, but that also has difficulties.

And do you see -- did the staff look at the relative strengths and weaknesses of these objective criteria and try to do a rating amongst them?

MR. HOLMSTROM: No, we did not. We listed those for exemplary purposes, for example. We listed them because they perhaps were being utilized in other regulatory schemes -- for example, SIC codes or NAICS codes -- or utilized to some degree in the program level determinations of EPA's risk management rule.

CHAIR MERRITT: And in your recommendation, then, you would expect that in the rulemaking process, identifying the right way of identifying these sectors would then be hashed out and determined.

MR. HOLMSTROM: Right. And that's just one example. There are other examples that we gave. One is a reactive hazard classification such as heat of reaction could be used; another is incident history, which is also used in the EPA's RMP rule, and there are other objective criteria, such as
catastrophic potential could be used as an objective criteria.

CHAIR MERRITT: So your recommendation has been written in a way that suggests many different possibilities but doesn't really focus in on any one.

MR. HOLMSTROM: That's correct.

CHAIR MERRITT: Dr. Taylor?

DR. TAYLOR: I do have one more question. Did you give any consideration, Don, to whether OSHA should give exemptions to regulation?

MR. HOLMSTROM: We discussed it. The staff felt that there were not sufficient findings that would support the issuance of a recommendation for a specific regulatory approach such as opt-out clauses, exemptions, that sort of thing.

CHAIR MERRITT: Dr. Rosenthal?

DR. ROSENTHAL: First of all, I want to congratulate you and the staff for an excellent presentation and bringing together of information, and it's been extremely valuable. I know it's been very difficult work, and so I wanted to go with that first.

MR. HOLMSTROM: Thank you.

DR. ROSENTHAL: In terms of the NAIC codes, as we were talking about, the NAIC codes and the coverage -- all of these are things which
presumably OSHA is equipped to deal with on the basis of getting something that is not cost-benefit but cost-effective, and they have to balance costs and, I hate to mention the word, but political and other considerations in going through fashioning a regulation that can go in.

So from the point of view of NAIC codes and from the point of view of criteria, you essentially -- the staff felt that this should be left to OSHA to decide. Is that the way I --

MR. HOLMSTROM: That's correct, Dr. Rosenthal. We're just providing suggestions and exemplary alternatives with the idea in mind that we think there are ways that reactive hazards can be regulated, and we give some examples, but we don't believe there's sufficient findings for us to recommend a specific approach.

DR. ROSENTHAL: Just a point of information: I'm aware of the answer, but how long -- has OSHA been considering regulatory reform for some period of time on hazardous chemicals? And since when?

MR. HOLMSTROM: Well, if you're -- I think -- and correct me if I'm wrong, but I think you're referring to the petition that I believe --
DR. ROSENTHAL: Yes.

MR. HOLMSTROM: -- was issued in 1995, and so that issue has been before OSHA for some time and only recently was dropped from the list of potential regulatory actions by OSHA.

DR. ROSENTHAL: By the pressure of other things. Thank you.

MR. HOLMSTROM: Yes. Thank you.

CHAIR MERRITT: Dr. Taylor, do you have another question?

DR. TAYLOR: Just one specific question. I don't know if Don can answer it, but does OSHA exempt -- they're a regulator agency, so they don't exempt companies when they regulate on a standard -- right? -- from any of those, to your knowledge.

MR. HOLMSTROM: OSHA hasn't used the regulatory feature of an exemption, to my knowledge; however, EPA in the risk-management plan rule has a tiered approach for regulatory coverage that does offer different types of requirements based on certain criteria, which could be deemed to be an opt-out, so to speak, in that context.

However, the staff did not study the specifics of the efficacy or the performance of those particular regulatory features sufficiently in order
to make a recommendation as to their desirability.

DR. TAYLOR: Okay. Thank you.

CHAIR MERRITT: All right. Thank you.

So we should proceed. Then at this point we are almost on time. We would like to take a --

DR. TAYLOR: Are we going through the rest of the recommendations, or are we going to stop?

MR. HOLMSTROM: Yes, we just did the OSHA recommendation.

DR. TAYLOR: Yes. That's what I was thinking.

CHAIR MERRITT: Right. Go ahead, Don. I'm sorry.

MR. HOLMSTROM: Okay. Thank you.

CHAIR MERRITT: We're ready for a break, though.

(General laughter.)

CHAIR MERRITT: Not that I'm hurrying them along.

MR. HOLMSTROM: I would never stand in the way of a break, Madam Chair.

The next recommendation is to the US Environmental Protection Agency, EPA. The recommendation reads: Revise the chemical accident prevention program, 40 CFR 68, better known as the RMP
rule, to include catastrophic reactive hazards, including those resulting from process-specific conditions and combinations of chemicals. Seek congressional authority, if necessary, to amend the regulation.

Despite the fact that the Clean Air Act amendment specified that EPA should cover highly reactive chemicals, the list of 130 chemicals covered by RMP does not contain any substances listed to reactive hazards.

In 60 percent of the 167 incidents examined by the Chemical Safety Board, the chemicals involved were not RMP listed. Nearly 50 of 167 incidents affected the public.

The second recommendation to the Environmental Protection Agency reads as follows: Implement a program to define and record reactive incidents. Structure the collected information so that it can be used to measure trends in the number of catastrophic reactive incidents.

EPA databases don't identify and therefore can't track reactive incidents.

At a minimum, in terms of developing a program to track and record reactive incidents, identify industry sectors that experience the
incidents; chemicals and processes involved; and
impact on the workforce, the public, and the
environment. Require reporting of reactive incidents
and processes covered by 40 CFR 68 that involve both
regulated and nonregulated reactive hazards. Seek
congressional authority, if necessary, to amend the
regulation.

Do the members of the board have any
questions on the recommendations to the Environmental
Protection Agency?

CHAIR MERRITT: Dr. Rosenthal?

DR. ROSENTHAL: Yes. Right now the
Environmental Protection Agency contains and defines
its incidents in how many classes? I believe there's
four?

MR. HOLMSTROM: Are you referring to the
types of hazards covered, Dr. Rosenthal?

DR. ROSENTHAL: Yes.

MR. HOLMSTROM: Yes. Well, flammables,
toxics -- but it doesn't cover reactives.

DR. ROSENTHAL: Yes. Toxics, flammables,
leaks -- so that in essence are you thinking that they
ought to put another class like reactives or something
in there?

MR. HOLMSTROM: Again, in this particular
recommendation we propose an outcome, but we do not propose specific --

DR. ROSENTHAL: Okay.

MR. HOLMSTROM: -- way to get at -- one possibility is forming a classification -- that is certainly one possibility -- based on objective criteria.

DR. ROSENTHAL: Okay.

MR. BRESLAND: Question.

CHAIR MERRITT: Mr. Bresland.

MR. BRESLAND: This goes back to recommendation number 1 to EPA, where you're asking that they include reactive hazards in their list of chemicals covered by the RMP regulation.

EPA now has a list of chemicals, about 130, 140 chemicals; some of them are -- approximately half of them are toxics, toxic gases, and the other half are highly flammable chemicals.

Can you give me an example of a chemical that would be covered by your recommendation that isn't currently covered by the RMP regulation?

MR. HOLMSTROM: Well, I think one example was given before, and that was hydroxylamine. It's covered by the process-safety management standard as a highly hazardous chemical due to its inherent
reactivity, but it's not currently covered by the RMP rule.

CHAIR MERRITT: Dr. Poje.

DR. POJE: And would I be correct in perceiving also that the situation that unfurled at the Morton facility, in which 2-ethylhexylamine and ortho-nitrochlorobenzene, NFPA 0 and 1, put into a reactor, reacting without knowledge of the decomposition reaction, causes a runaway, blows open the tank, releasing chemicals into the air and a broad distance away from the facility, raining down onto that community.

But those kinds of process-specific circumstances would be encompassed in your recommendation for reform in the RMP process.

MR. HOLMSTROM: That's correct, Dr. Poje.

The first example of hydroxylamine was a self-reacting chemical. The Morton example is chemicals in their combination under process-specific conditions.

CHAIR MERRITT: Dr. Rosenthal.

DR. ROSENTHAL: In the EPA recommendation you say, Require reporting of reactive incidents and processed covered by 40 CFR and both regulated and nonregulated reactive hazards. I'm interested in the nonregulated reactive hazards, two points:
What did you have in mind about nonregulated reactive hazards, and why is that text included in reference to EPA and not in reference to OSHA?

MR. HOLMSTROM: Okay. That's a very good question. First I'll answer and say nonregulated -- there are certain incidents that OSHA investigates -- I mean -- excuse me -- EPA investigates that may involve nonregulated chemicals.

For example, EPA was involved in investigating the incident at Concept Science, but that was not an RMP-covered chemical, but they should track, record that as a reactive incident. It's also part of the Clean Air Act amendments that every five years or, as necessary, EPA should evaluate their list of substances.

And in order to adequately make that evaluation, they need to be looking beyond the list of regulated substances. And so our concern there is that, in talking to EPA, and why we included it with EPA, they indicated to us -- they expressed a concern to us that they may not be able to, for example, request five-year accident history data on nonregulated substances because they were not within the RMP rule, and we felt it was important to include
that specific language in order to capture that sort of data that could occur even within a covered process -- that's covered for some other reason but could involve a nonregulated substance in a reactive incident.

DR. ROSENTHAL: So, in other words, if EPA broadened their coverage of reactives, that's in essence what we're saying, to broaden their coverage of reactives.

MR. HOLMSTROM: We have two recommendations. If they did 1, that would certainly help with 2, but we cannot speculate in time as to which recommendation may or may not be adopted first, but we're confident that we'll get both successfully implemented.

CHAIR MERRITT: Thank you.

Any other questions?

(No response.)

CHAIR MERRITT: Then proceed with the rest of the recommendations.

MR. HOLMSTROM: The next recommendation is to the National Institute of Standards and Technology, NIST. NIST is a nonregulatory federal agency within the US Commerce Department's Technology Administration.
NIST's mission is to develop and promote measurements, standards, and technology to enhance productivity and facilitate trade.

The recommendation reads: Develop and implement a publicly available database for reactive hazard test information. Structure the system to encourage submission of data by individual companies and academic and government institutions that perform chemical testing.

There is no publicly available comprehensive database to share reactive chemical test data.

The next recommendation is to the Center for Chemical Process Safety, CCPS. The American Institute of Chemical Engineers Center for Chemical Process safety is an organization of chemical manufacturers, insurers, consultants, and others established to prevent catastrophic releases of hazardous chemicals.

The CCPS has published over 70 books and CD-ROM tools covering a number of process-safety topics.

The recommendation reads: Publish comprehensive guidance on model reactive hazard management systems.
The industry's voluntary good-practice guidelines for managing reactive hazards are limited and not complete.

Additionally, in recommendation 1 to CCPS:

At a minimum, ensure these guidelines cover, for companies engaged in chemical manufacturing, reactive hazard management, including hazard identification, hazard evaluation, management of change, inherently safer design, and adequate procedures in training; for companies engaged primarily in the bulk storage, handling, and use of chemicals: identification and prevention of reactive hazards, including the inadvertent mixing of incompatible substances.

The findings of the hazard investigation indicate that more than 60 percent of the incidents for which some causal information was available involved inadequate practices for identifying hazards or conducting process-hazard evaluations.

Nearly 50 percent involved inadequate procedures for storage, handling, or processing of chemicals.

The second recommendation to CCPS is to communicate the findings and recommendations of this report to your membership.

The next recommendation is to the American
Chemistry Council, ACC. The first recommendation is to expand the Responsible Care process-safety code to emphasize the need for managing reactive hazards.

The American Chemistry Council is a trade association of chemical manufacturers, with 190 member and partner companies that sponsor the Responsible Care program designed to improve the health, safety, and environment performance of member companies, largely through codes of management practices such as the process-safety code. The process-safety code does not explicitly include requirements for reactive hazard management.

Also related to the first recommendation:

- Ensure that member companies are required to have programs to manage reactive hazards that address, at a minimum, hazard identification, hazard evaluation, management of change, inherently safer design, and adequate procedures and training.

- Also ensure that there is a program to communicate to your membership the availability of existing tools, guidance, and initiatives to aid in identifying and evaluating reactive hazards.

The second recommendation to the American Chemistry Council reads: Develop and implement a program for reporting reactive incidents that includes
the sharing of the relevant safety knowledge and lessons learned with your membership, the public, and the government, to improve safety system performance and prevent future incidents.

Member companies submit to ACC annual reports on process-safety incidents that meet specific criteria, but this data does not include causes of incidents or lessons learned.

We are seeking in this recommendation to ensure that this data is received by ACC as an organization and then shared with others.

The third recommendation to the American Chemistry Council: Work with NIST, the National Institute for Standards and Technology, in developing and implementing a publicly available database for reactive hazard test information, promote submissions of data by your membership.

The fourth recommendation to ACC is: Communicate the findings and recommendations of this report to your membership.

The next recommendation goes to the Synthetic Organic Chemical Manufacturers Association, SOCMA. The first recommendation is: Expand the Responsible Care process safety code to emphasize the need for managing reactive hazards.
The Synthetic Organic Chemical Manufacturers Association, SOCMA, is a trade association serving the specialty batch and custom chemical industry, representing more than 320 member companies.

Also in recommendation number 1 to SOCMA:

Ensure that member companies are required to have programs to manage reactive hazards that address, at a minimum, hazard identification, hazard evaluation, management of change, inherently safer design, and adequate procedures in training.

Also ensure that there's a program to communicate to your membership the availability of existing tools, guidance, and initiatives to aid in identifying and evaluating reactive hazards.

The second recommendation to SOCMA reads:

Develop and implement a program for reporting reactive incidents that includes the sharing of relevant safety knowledge and lessons learned with your membership, the public, and the government to include safety system performance and prevent future incidents.

The third recommendation to SOCMA reads:

Work with NIST in developing and implementing a publicly available database for reactive hazard test
information, promote submissions of data by your membership.

For SOCMA the fourth recommendation reads:
Communicate the findings and recommendations of this report to your membership.

The next recommendation is to the National Association of Chemical Distributors, NACD. The National Association of Chemical Distributors is an international association of chemical distributor companies. Member companies process, formulate, repack, warehouse, transport, and market chemical products exclusively for an industry customer base of about 750,000 customers.

The recommendation reads: Expand the existing Responsible Distribution process to include reactive hazard management as an area of emphasis. At a minimum ensure that the revisions address storage and handling, including the hazards of inadvertent mixing of incompatible chemicals.

Thirty percent of the incidents examined by the CSB involved a variety of other industrial sectors that store, handle, or use chemicals in bulk quantities. There's a lack of concise guidance targeted at companies engaged primarily in the bulk storage, handling, or use of chemicals to prevent
inadvertent mixing of incompatible substances.

The second recommendation to NACD: Communicate the findings and recommendations of this report to your membership.

The final recommendations are to labor unions and ASSE: Communicate the findings and recommendations of this report to your membership.

This recommendation is addressed to the International Association of Firefighters; the Paper, Allied-Industrial, Chemical, and Energy Workers International Union, PACE; the United Steelworkers of America; the Union of Needle Trades, Industrial and Textile Employees, UNITE; United Food and Commercial Workers International Union; and the American Society of Safety Engineers, ASSE.

Board members, that concludes the staff recommendations presentation of the reactive hazard investigation.

Do the members of the board have any additional question for myself or other members of the staff?

CHAIR MERRITT: Dr. Taylor, did you have one?

DR. TAYLOR: I just wanted to say -- I wanted to thank the staff. This is a very
comprehensive report. I know it's been a long time coming.

One of the things that I find with the recommendations that you just made -- one of the things that stick out at me are the sharing of information among companies, and I'm hoping with the recommendations that we're making to specific associations that that would be done -- that will be done, so that information regarding reactive chemical accidents can be recorded, talked about, and somehow, without trade secret information being released, maybe can figure another way of doing that.

CHAIR MERRITT: Dr. Rosenthal.

DR. ROSENTHAL: Just in passing -- I hadn't noticed it till now: There are other organizations besides ASSE who have a strong role in safety. Any reason why, for example, AIHA, which now promotes itself as both a safety and industrial-hygiene group is not included?

DR. TAYLOR: Just didn't think about it, huh?

MR. HOLMSTROM: We primarily picked the organizations that were listed in relationship to the interest they showed in the process of compiling the information and sharing it with stakeholder groups
that occurred during the reactive hazard investigation
two-year process.

CHAIR MERRITT: And we certainly don't
limit the distribution of this information to those
organizations and certainly it's available on our
website and will be also.

DR. TAYLOR: And since it is one of the
organizations that I belong to, I think it will be
responsive.

CHAIR MERRITT: We heard you, Dr. Taylor.

(General laughter.)

CHAIR MERRITT: Dr. Poje?

DR. POJE: Don, if you could just give me
a little bit of perspective, as I said earlier, I
believe that there is an importance to the
comprehensiveness of all of the regulations, that they
work together to strengthen the system of safety.

Just for perspective's sake, give me an
understanding of the trade associations that you've
issued recommendations to. You've characterized them.
Do they themselves comprehensively encompass all
those who are likely to have such reactive hazard
management responsibilities?

MR. HOLMSTROM: Well, let me first say
that I think the good-practice guidelines and industry
initiatives such as Responsible Care and CCPS guidelines are an important part of impacting process safety in the industry.

But it is true that that is not the complete universe or the complete arena of chemical safety, and, for example, not all the industries that might encounter reactive hazards are necessarily represented by ACC. I can give the pulp and paper industry as an example, and there are others.

DR. TAYLOR: Pharmaceuticals.

MR. HOLMSTROM: Pharmaceuticals.

DR. POJE: We have an ongoing investigation into a reactive hazard incident at one of the pulp and paper industries.

And then also you said 320-some-odd members of SOCMA -- clearly there can be many more smaller and mid-size enterprises that have not found SOCMA to become a member and would like out perhaps unavailable to the SOCMA guidance or unavailable to the awareness building that SOCMA might do.

MR. HOLMSTROM: That's correct. I think there were 15,000 submissions of data to the EPA under the RMP submission requirements.

CHAIR MERRITT: If there are no other questions, then --
DR. ROSENTHAL: One last question. Of course, I bet Gerry I would be last.

I noticed in all of your recommendations, besides looking at hazard evaluation and hazard identification, you dealt with one prevention measure; that was inherently safer processes.

But I didn't see any mention -- and was that just omission or just whatever -- of effective passive mitigation devices, which are emphasized in the EPA thing, such as diking and hardened control rooms.

Was this just an omission or just because we didn't do enough work on it or what?

MR. HOLMSTROM: Irv, can I ask, is that in relationship to the good-practice guidelines and industry initiatives section or in terms of the regulatory recommendations.

DR. ROSENTHAL: No. I'm thinking in -- when you mention in the guidance to industry.

MR. HOLMSTROM: Oh, the guidance to industry.

DR. ROSENTHAL: Yes.

MR. HOLMSTROM: What we tried to limit our recommendations to are those areas in the examination of the 167 incidents that -- where there was safety--
system or lessons-learned information of those safety systems or areas where the most incidents were occurring in those safety-system areas, so we tried to concentrate on those, although there are certainly other areas such as you've mentioned that are important; that's how we crafted the recommendations.

DR. ROSENTHAL: Okay.

You want to say something, John?

MR. MURPHY: Our data sources weren't adequate enough to look at passive mitigation and layers of protection. Had our data sources been better, we may have been able to address this more systematically.

DR. ROSENTHAL: I was just thinking of the fact that Morton might have been mitigated in part had an effective vent system been in place, like Dyer's [phonetic] design, which is basically a passive mitigation type of thing.

Thank you.

CHAIR MERRITT: With that, thank you very much, staff. I appreciate it, Don.

MR. HOLMSTROM: Thank you.

CHAIR MERRITT: We will take a ten-minute break and reconvene here at quarter after, in which we will then take public comment. And if you would like
to still register to comment, please do, and those will be brought to me, and we'll begin with that when we reconvene.

(Whereupon, a brief recess was taken.)

CHAIR MERRITT: At this time we have a number of people who have requested to comment. I'll call you as best I can pronounce your name on the list that we have been provided, and I would ask you to limit your comments to three minutes and, for our recorder and reporter, to speak your name clearly, and also give us your affiliation or interest in this proceeding.

First one registered was Glen Irwin. And we would ask you to come to this front podium, please, so that we can have good audio and video of you. And three minutes, please.

MR. IRWIN: I'm Glen Irwin, and I'm the health and safety coordinator for PACE International Union. I have a very strong tie to this study. We've encouraged it; we supported it, and I want to say I think they've done an outstanding job, from our perspective.

CHAIR MERRITT: Thank you.

MR. IRWIN: There's three things -- I've investigated several reactive incidents since working
with the international union, and there's three things that always happen; they're common to every incident that we've investigated, kind of golden threads that weave through.

The first one is we find a failure in the process-hazard analysis; had we have done a better process-hazard analysis, we could have prevented the incident.

The thing that happens is we don't look at the worst-case scenarios necessarily; we may look at just what happens in the case of fire, and we don't look at what could happen in an exothermic runaway reaction, because if we did, we might be able to design relief valves to where we could mitigate -- as Dr. Rosenthal mentioned, we could mitigate the effects before the incident got out of hand.

I believe that recommendation number 1 to OSHA and EPA will cover this. I think -- it may not be worded as strongly as I'd like to see it worded, but I believe that it will -- if they will implement the recommendations from the board, that that would correct that problem.

The second one -- the second fatal flaw that we've found is management of change. We find that when you change the proportions of the mixtures
or the temperatures of the mixtures, that that is where we run into trouble.

We try to do -- we try to operate using normal procedures to do abnormal operations, and when we do that, we end up having catastrophic accidents.

I believe that the recommendation that you made to CCPS and the ACC, American Chemistry Council, will cover this. I would much rather have seen it a recommendation to OSHA and EPA instead of a voluntary compliance, but if that's all we can get on this, why, I'll be happy to accept that, because I believe that if it is communicated to their member units and they do follow this, then the management of change would be able to prevent it.

The third one is incident investigation. Every incident had warning signs. I've not looked at any fatal incident that didn't have precursors leading up to it, and have we have investigated the minor incidents and had learned some lessons from the minor incidents and took corrective actions, then we would have been able to prevent the incidents from occurring.

I believe your recommendation number 2 to OSHA and EPA, where we set up a database of lessons learned -- and to set up a database of lessons
learned, they will have to investigate the incidents, so I think it kind of backdoors getting in there, and it's not as strongly worded as I would like to have seen it worded, but I believe it will meet the needs to be able to prevent the incident.

So on our major three things that we have, which is process-hazard analysis failures, management-of-change failures, and incident-investigations and lessons-learned failures, I think that you have addressed them, and we will support it, and I ask the board to support the staff's recommendations.

Thank you.

CHAIR MERRITT: Thank you, Mr. Irwin.

MR. IRWIN: Thank you very much. Good job.

CHAIR MERRITT: The next person on my list is Alan Goss. And if you would, state your name and give us your affiliation or interest in this session.

MR. GOSS: Yes. I'm Alan Goss. I was burned in the Phillips Chemical explosion on March 27, 2000. I was life-flighted to Hermann Hospital; spent 101 days on the burn unit. I was burned over 50 percent of my body with second- and third-degree burns.

I've gone through countless hours of
physical and emotional therapy. I've had 18 surgeries; right now I have one scheduled for next month and possibly one more after that, and hopefully that will be the end of the surgeries.

The things that you guys have done in the past several years working up to this day are very important to the working people. I know that I cannot go back and take back that day in my life that has changed my life forever, but possibly what gets accomplished here today can prevent future accidents like this from happening, and for that I want to say thank you.

CHAIR MERRITT: Thank you.

Mr. Roby Plemons.

MR. PLEMONS: Good morning. I'm Roby Plemons. I'm a PACE union worker. I think you all of the Chemical Safety Board for inviting us here to speak to you today.

I've worked at the Chevron Phillips plant in Pasadena, Texas, for the past 24 years, and the last 13 years I've lost the following coworkers and friends: Ruben Alamillo, James Allen, Burt Arcy, James Campbell, Eloy Gonzales, Mark Greesor, Jeff Harrison, Derbert Haskell, Scotty Hawkins, James Hubbard, Richard Leos, James Nichols, Jesse Northrup,

The last three involved reactive chemicals: Rodney Gott, Juan Martinez, Jose Rangel.

On March 27, 2000, my life was almost taken along with three of my friends. I received 42 percent burns. I, like Alan, was life-flighted to Hermann Hospital.

It did take the life of one of my friends, Rodney Gott. I'd worked with Rodney for 22 years. Rodney is one of the most Christian persons I've known in my life and rarely a day goes by that I don't think about him and the agony his family goes through.

The last two explosions at the plant involved reactive chemicals. There needs to be more understanding on the hazards and the potentials of these products. My friends' and our lives have changed forever.

When I look at my friends some days -- and you'll see Jeff here in a minute -- some days I just want to cry, and other days I just ask why.

In closing, I ask you to help move this industry forward when dealing with reactive chemicals.
and let us all feel that Rodney and the others did not
die in vain.

    Thank you.

CHAIR MERRITT: Thank you.

The next person for comment is Jeff Kuper.

Please speak your name and your affiliation.

MR. KUPER: My name is Jeff Kuper. I worked, two and a half years ago, as the construction site manager at Chevron Phillips Chemical Company. I set off for work that morning with total optimism in the future.

That morning -- or actually, at 1:25 that afternoon, everything changed. I, like you, had total innocence, and then I found out that things could change for the worse.

I went through extensive surgeries; I've been through the burn unit at Hermann, as my coworkers had said. But the toll on my family has been tremendous. And as we talk about the fatalities and we talk about the injuries today, there is a human toll that is there that is just unquestionably difficult.

Those that die leave behind a family that is in terrible need. And there isn't necessarily a
social infrastructure set up to capture those people.

We might be naive to think that, through insurance
and suits and through workers' comp and other things,
that there's adequate compensation for the death and
injuries that are incurred out there in the industry.

There's not.

So I came here today with no knowledge of
what the Chemical Safety Board was up to, and I'm very
couraged with what the board is asking of their
staff and what the staff has found.

I only regret today that they hadn't begun
this work or hadn't implemented it five and a half or
six years ago so it would have been enforced when I
needed it most. And I'm grateful to be here today.

It was nip and tuck whether I was going to make it or
not, but I'm very grateful that I am here, and I'm
very grateful for what you're trying to accomplish.

And I plead with you to please pass the
recommendation of your staff. Thank you.

CHAIR MERRITT: Thank you, gentlemen, all
of you. You put a very human face on numbers, and
when we see a number like three injuries, we may be
tempted to think, Well, that's only three injuries.

But when we hear the depth of the
suffering that is represented by those numbers by your
courage to come and speak with us today, it helps to put an emphasis and an urgency on the work that we do. And we appreciate very much your willingness to speak with us this morning.

Next, George Freda.

MR. FREDA: Thank you. My name is George Freda. I'm a consultant -- safety environmental consultant with about 45 years of industrial experience in the chemical, refining, and related industries.

I'm also chairman of one of the major local emergency planning committees that we have here in Harris County, responsible for the whole unincorporated area.

Another one of the hats that I wear is I'm the president of the local chapter of the Institute for Certified Hazardous Materials Managers, the professionals, some 6000 of which in the United States handle and plan around hazardous materials; the kinds of professionals that are involved with reactive chemicals on a daily basis.

My main comment is twofold: I have two comments I want to make. Number one, I didn't hear any comment -- perhaps one side comment -- about material safety data sheets, MSDSs.
I know of databases where there are more than 100,000 MSDSs registered, including on federal and other governmental database sites. And so I'm wondering why MSDSs were not looked at as a resource for determining hazards of chemicals.

In my experience, on an MSDS you will find information -- for example, what materials it's compatible with and also what conditions to avoid. I recommend that MSDSs be used in a more formal way than they have been in the past.

The second comment I want to make -- and I'll make it very brief -- in my years of experience of investigating incidents using the method of determining root cause, invariably, nearly 100 percent of root-cause analyses of serious incidents in the industry comes down to unsafe acts.

I didn't hear any comments or any part of the investigation that determined whether or not there were unsafe acts as part of the root causes for these terrible incidents.

And I recommend that, for those industries that do not use root cause to determine unsafe acts, that this technique be used; it's a very powerful one.

Thank you.

CHAIR MERRITT: Thank you.
Our last speaker is Marc Levin.

MR. LEVIN: Good morning. My name is Marc Levin. I'm with Shell Global Solutions in the US, located on the other side of Houston, west side, at the West Hall of Technology Center.

And I am the reactive hazards assessment program manager for Shell Global Solutions, and I've been doing this kind of work for about ten years now, and I do appreciate the opportunity to speak to the Chemical Safety Board and for the opportunity to attend this meeting.

And I also have to say it's very difficult to get up here and speak, especially after hearing from those who have directly experienced this kind of event. I myself have been involved in investigations for many reactive hazards related events, including some that involved fatalities, and it is a very sobering experience.

Overall I just have a few comments. I'd like to say that I strongly support the conclusions from this team, particularly the one that says there's no single list of reactive chemicals or any sort of chemicals that will tell you what the reactivity is going to be.

If you look at the number of chemicals you
can see in any given process unit -- you know, 50, 100 or so -- and look at all the combinations, you end up with an astronomical number of combinations, and then dial in the conditions; it is really a mind-boggling feat to try to just put together a list that will cover everything.

And so, yes, this is something that is strongly dependent on the conditions as well as what other species are around.

I would like to emphasize the need to look at decompositions, which were alluded to -- polymers, hydroxylamines, other classes of materials -- because that's an area that I find my colleagues often overlook: Heat something up high enough, and it will fall apart, and frequently it will be exothermic, but not always.

Lastly, on the subject of incompatibilities, which I did touch about briefly earlier, I'd like to encourage use of the EPA waste compatibility document that was published in 1980 from Berkeley, which I believe is the heart of the NOAA chemical reactivity worksheet.

It basically predicts incompatibilities based on chemical functional groups on molecules. The list of functional groups could be expanded, but
nevertheless it's a great start, and years before NOAA had their item on the website, we actually programmed our own version to predict incompatibilities, and it's an easy way to screen through that kind of -- those interactions.

And lastly I'd like to expand or say a few words on the scope of incompatibilities. You need to look at not only process streams, but utility streams, additives, catalysts, feed lines that may be coming from other units, vent lines in common, because you can get ingress from other parts of a unit or process that can end up with a catastrophic result. We blew up a plant in England that way about ten years ago.

Thank you very much.

CHAIR MERRITT: Thank you.

I would encourage all of you -- this is just the beginning of the process to have a change in regulation that would improve and cover process safety of reactive hazards.

I would encourage all of you and those listening on the worldwide web as well to participate in the rulemaking process and to contribute all of your expertise when that finally comes to be, and we hope that that will be soon. With that, I appreciate and thank you for your comments.
I at this time would like to ask the board, was there anything that was raised in the comments that you feel would not allow us to go forward with a proposed acceptance or vote on the recommendations?

VOICES: No.

CHAIR MERRITT: With none being stated, then I would -- I think the best way to do this will be to go for each recommendation and take a voice vote, which is required -- the recommendation.

I'll call for a motion and ask for a second, and if there is one, then we'll open for discussion.

So at this point I would like turn to recommendation number 1 and ask if a motion can be made for that recommendation.

DR. TAYLOR: Madam Chair, I move that we accept recommendation number 1 to the Occupational Safety & Health Administration.

CHAIR MERRITT: Dr. Taylor makes that motion to accept.

Is there a second?

MR. BRESLAND: Yes, I second.

CHAIR MERRITT: And Mr. Bresland seconds.

At this point we would open it to the board members
for any discussion. Is there anyone who has any
discussion concerning this recommendation number 1?

DR. ROSENTHAL: Yes, I do. I'm in general
agreement with the thrust of the regulation, but I
believe that we can create value by expanding it and
perhaps making it a little more specific in what I
believe the intent was.

So to that end, I would like to offer
recommendations along the -- what is being projected.
And because that recommendation has four bullets
under it, I think it's best, since they tie together,
that I do it in the form three motions. Okay?

CHAIR MERRITT: Okay. That's fine. We'll
take each one individually.

DR. ROSENTHAL: So if that's all right,
I'll proceed, go through one, say two words about it,
and then go on to the -- we'll perhaps act on the
first one, and then I can go on to the second and
third parts of this. Okay? We'll vote, then, in
three ways?

CHAIR MERRITT: Yes.

DR. ROSENTHAL: Okay. So let me start in
and say my first part of the recommendation would
read, To amend the process-safety management standard
to achieve more comprehensive control of reactive
hazards that could produce catastrophic releases -- and I use that term in the sense that OSHA does: serious injury to workers.

And the two bullets that I would like to include in that first thing are to broaden coverage of the reactive hazards by creating a class of highly reactive substances that would include chemicals, singly or in combinations, that pose a substantial reactive hazards in addition to presently covered self-reactive chemicals.

The second bullet I'd like to attach on to that, again, is implied in the previous one, but I'd like to emphasize it more to OSHA: Define membership in the class of highly reactive substances using a combination of one or more objective criteria that relate to the potential for catastrophic release due to uncontrolled reaction of the materials intentionally charged to the process.

And I'll comment on that: Consider objective criteria that characterize the hazard, such as the specific heat of reaction, pressure changes under prescribed conditions, and the toxicity of reaction products.

Now, that is the first part of that --

CHAIR MERRITT: I understand.
Are there any comments or further discussion from the board with regard to this -- these two word changes or these two paragraph changes?

Dr. Taylor.

DR. TAYLOR: Madam Chair, while what Dr. Rosenthal has mentioned is one possibility of regulation that OSHA should consider -- and I understand that -- I'm basing my information on what I received from the staff, and their recommendation is that we not recommend one particular regulatory approach, which, when I viewed the change in the language, this appears to be a regulatory approach that OSHA should adopt.

My suggestion would be that we still consider, as the staff has recommended, that our recommendations not be outcome-based -- I mean, that they be outcome-based and not specific and let OSHA determine whether this is the approach they'd like to use, or another such approach.

CHAIR MERRITT: Okay. Any other -- yes, Dr. Rosenthal -- I'm sorry -- Poje? I looked at you.

DR. POJE: I'm honored.

(General laughter.)

DR. POJE: I have looked at this carefully, and I'm also persuaded that I think the
work that has been brought forward today and brought forward in May characterized the problems, and I think we can make a little bit more progress by being more specific in the direction that we would point the Occupational Safety & Health Administration towards.

I am persuaded by the approach taken earlier in defining classes of flammable materials, and I think broadening the concept to specifically push for a class of highly reactive substances that again have the restrictions -- speaking to the process conditions and intentionally mixed defines and narrows the situation in a way that's more likely to draw the specific action from the Occupational Safety & Health Administration.

I do believe that this is in concert with the spirit of the original recommendation by the staff, but I think it gives a much greater degree of guidance to the agency on how to proceed down the pathway over a matter that, for more than a decade, has languished. I think this is a stronger way of putting the terms to the agency.

CHAIR MERRITT: Dr. Taylor.

DR. TAYLOR: But this is only one specific approach that still, if implemented by OSHA, would not possibly cover all reactive chemicals or reactive
processes. This is one way.

And, again, from the investigation that we conducted, there were insufficient findings for us to define a particular class of chemicals; that's what our staff stated.

So while this is one alternative, I do feel that we should not be specific in making a recommendation to OSHA that this is what they should adopt. One is, for us, we're going to have to advocate for our recommendations, and I think we need to stick with outcome-based measures versus specific recommendations and let OSHA, as an agency, determine which one is best for them to use.

CHAIR MERRITT: Okay. Thank you.

Mr. Bresland.

MR. BRESLAND: My thoughts on this are that we have listened to the staff today, and we've heard the issue, and I think everybody who is the board recognizes that there is a problem with the issue of reactive chemicals; however, my feeling is that in making a recommendation to OSHA, I would agree with Dr. Taylor that there's a -- it's better to give them the broad authority of writing a new regulation without being prescriptive to them, and I would hope that when OSHA, in its wisdom, decides to write this
regulation, that they would come to people -- for example, people in the audience here who are the experts in this area, and use their expertise in coming up with what is the best way to write this regulation; what should be done in terms of writing a regulation.

So I'm quite happy with the regulation as -- or with the recommendation as originally written by the staff.

CHAIR MERRITT: Is there any other comment?

Dr. Rosenthal.

DR. ROSENTHAL: Just one closing comment.

CHAIR MERRITT: You have to be last.

DR. ROSENTHAL: I'm going to just comment I believe that I would like OSHA to know my opinion. They can perfectly easily disregard it; they haven't listened to me in the past.

(General laughter.)

DR. ROSENTHAL: So I'd like to share it.

CHAIR MERRITT: So you want to be 100 percent.

DR. ROSENTHAL: Yes. And so I would like to be a little more specific, recognizing that. But I think that what's still as worded is outcome-based;
it's catastrophic releases; it doesn't say if we lean
towards $\delta h$ what a $\delta h$ value should be, which $\delta p$, which
combination.

So I would like to be a little more
specific, and I stand, as I've just suggested, of
sticking my personal nose in, but since I'm going to
sign it, that's what I want to do.

CHAIR MERRITT: Well, this is the benefit
of five independent board members, and I think it's
extremely important that each of you are expressing
where you are with this and also that I add that this
is not a done process; we're just beginning, and so
the outcome certainly is just the beginning of a
process in which we'll have more avenue for comment.

Dr. Poje.

DR. POJE: If I could just make one short
rejoinder to that, I also do believe in pushing for a
more pointed direction for the agency. I do want to
recognize, though, that the board, as a whole, will
judge the recommendation as either being met or not
met through a process of more formal evaluation by the
staff.

And it's my belief that if we project into
a very specific direction, we'll be able to hear the
agency come back with a better alternative, and our
staff will analyze that and propose back to the board, whether we accept that alternative or not, but I do share Dr. Rosenthal's sense of a more specific pathway of direction; still outcome-based would be helpful in this situation right now.

DR. TAYLOR: But it's not outcome-based when we say define membership in the class of highly reactive substances; broaden coverage by creating a class of highly reactive substances.

That's basically telling OSHA how to regulate, and I'm saying that we -- this is one possibility that we can include in our report as a possibility but not make it as specific as it is stated here in our recommendations.

CHAIR MERRITT: And to avoid a circular discussion here --

DR. TAYLOR: Right.

CHAIR MERRITT: -- I would call for a motion, then, to accept this amendment and a second.

DR. POJE: I make the motion to accept the amendment as presented.

DR. ROSENTHAL: Can I second?

CHAIR MERRITT: You can.

DR. ROSENTHAL: I second it.

CHAIR MERRITT: You second. But you
always want to be first.

DR. ROSENTHAL: Just goes to show you my deep humility.

CHAIR MERRITT: Thank you. At that time I would call for a voice vote, please, concerning this amendment.

Dr. Taylor.

DR. TAYLOR: Disapprove.

CHAIR MERRITT: Dr. Rosenthal.

DR. ROSENTHAL: Approve.

CHAIR MERRITT: Dr. Poje.

DR. POJE: Approve.

CHAIR MERRITT: Mr. Bresland.

MR. BRESLAND: Disapprove.

CHAIR MERRITT: And I disapprove. So then we can move on to the -- open again the floor to any other discussion that there might be concerning the rest of your comments on that first bullet.

DR. ROSENTHAL: Yes. I'll go on to the next thing. I would like to, with the same heading, add a third bullet item as an amendment, and that is to adjust the elements of the PSM applicable to a covered process to better address accident scenarios that reflect the nature of the process: pure storage versus intended physical or chemical transformation
processes.

And what I'm intending to say is that I think that, whereas as the PSM with the full process has an analysis and all the elements in there are effective and cost-effective for a process in which there is the possibility of opening and deliberately seeking to make chemical or physical change, that the elements of a PSM that are applied to a process in which the intent is to receive and trans-ship materials should be different, and OSHA should make allowances for this type of difference in process.

So that's the amendment.

CHAIR MERRITT: Okay.

DR. TAYLOR: Can I ask a question about that for clarification?

CHAIR MERRITT: On this particular recommendation, given that we've disapproved the first portion, would this then be added after "broadened the application" of the original staff?

DR. ROSENTHAL: It could be right after that, the bullet item.

CHAIR MERRITT: Okay.

MR. WARNER: Just for clarification, so you would be accepting the staff language and then adding this right at the bottom of the staff bullet
DR. ROSENTHAL: Well, the board would be accepting it, and this would be added under that.

DR. TAYLOR: Under bullet number 1. Okay.

DR. POJE: It would not be absent some broader coverage request.

DR. ROSENTHAL: No.

CHAIR MERRITT: Okay. Are there any comments? What my comment is is that I feel that -- you know, I tend to want broader language instead of more specific language. While I think this is an important potential, I don't feel it's necessary at this point to change the language in order to have the potential of this occurring during rulemaking, so I don't think by adding this we've really --

DR. TAYLOR: Added anything to it.

CHAIR MERRITT: -- added much of anything.

Dr. Poje, do you --

DR. POJE: If I could just say, I am also persuaded by this proposal from Dr. Rosenthal. Again, I see the incidents that we have evaluated indicating two very important domains of problems; one that involve the chemical-process industries and the others involving primarily a storage function and capacity, and I think bringing that clarity to a proposal to the
agency might enable a much more specific and aggressive approach by the agency, should it accept the wisdom of our recommendation to amend PSM, so I do feel comfortable with this proposition.

CHAIR MERRITT: Okay.

Mr. Bresland.

MR. BRESLAND: My thoughts on this are similar to Madam Chair's, in that I guess I don't really understand what the purpose of this is. To me it would seem it would unnecessarily complicate the OSHA PSM regulation to differentiate between pure storage and chemical transformations.

My feeling is if there's a chemical in there that's covered by the PSM regulation, it's covered by the PSM regulation regardless of whether it's being used -- whether it's being stored or whether it's being used in a chemical process.

And applying different criteria for different types of operations, to me, would just make the PSM regulation even more complicated than it currently is, even though I feel it's a good regulation as currently regulation.

DR. TAYLOR: That's what I had some question about as well. I'm not understanding the need to be specific, again, in this case.
CHAIR MERRITT: Are there any other points of comment?

(No response.)

CHAIR MERRITT: Then if not, someone please make a motion to accept this.

DR. POJE: I make a motion to accept the amendment as proposed.

CHAIR MERRITT: And a second?

DR. ROSENTHAL: Second.

CHAIR MERRITT: Then I would call for a voice vote.

Dr. Taylor.

DR. TAYLOR: Disapprove.

CHAIR MERRITT: Dr. Rosenthal.

DR. ROSENTHAL: Approve.

CHAIR MERRITT: Dr. Poje.

DR. POJE: Approve.

CHAIR MERRITT: Mr. Bresland.

MR. BRESLAND: Disapprove.

CHAIR MERRITT: And I disapprove. So the vote is three to two to disapprove this motion to amend the recommendation.

There's one more?

DR. ROSENTHAL: One more.

CHAIR MERRITT: One more. Okay.
DR. ROSENTHAL: Again, this would have to be added. It says, To stimulate the use of inherently safer designs or passive mitigation measures by reducing regulatory requirements for processes that use these approaches to eliminate any reasonable likelihood of catastrophic releases in the event of a prescribed worst-case scenario.

This would be an attempt -- my belief that we ought to attempt to do what EPA does in Program 1, where a process can be shown to be absent impacts on workers -- in their case, the public -- that there ought to be regulatory relief not requiring complete adherence to things which then become secondary for the main purpose of protecting workers, the public, or the environment.

CHAIR MERRITT: Okay. Thank you.

Any other comments?

Dr. Taylor?

DR. TAYLOR: Given my experience with OSHA and the fact that they are a regulatory agency, they've not adopted, in my knowledge, as a member of NACOSH [phonetic] and working with OSHA, reducing regulatory requirements for regulation or exempting companies from regulation -- that language would be very troubling to me if we are making a recommendation
specifically to do that as a result of inherent safer design.

So from my perspective I would think that, again, we don't want to tell them how to regulate or what to do; that we not adopt this particular section.

CHAIR MERRITT: Dr. Poje.

DR. POJE: Yes. If I could just speak, again I find myself allied with Dr. Rosenthal in this proposition.

I do believe that the evolution of policy for managing chemical safety is one that has now had iterations that have involved Occupational Safety & Health Administration and the Environmental Protection Agency, and I believe that this would allow us to be benefited from all the dialogue that occurred between 1992 and 1996 in seeking to make a more reasonable approach towards what we already know will be a quite complicated and very difficult area.

As was pointed out by one of the commenters, enormous numbers of combinations and permutations require some degree of rationalization that I think this language, while still quite general, works in concert with what has become an expectation in chemical process policy, of having some ability to mitigate the need for furthering documentation of
aggressive pursuit of every aspect of process-safety management, if you can opt out on the early end by demonstrating you've used appropriately inherently safer designs and passive mitigation measures.

So, again, I speak for it.

DR. TAYLOR: A question, though, I have. How would -- from a regulatory standpoint, it's very hard for me to envision how OSHA would regulate companies on inherently safer design and how that would work.

And, again, it would go back to my initial comments regarding specificity versus letting OSHA decide on how they're going to regulate. This is hard for me to conceive.

DR. ROSENTHAL: May I respond to that?

CHAIR MERRITT: Certainly.

DR. ROSENTHAL: As a matter of fact, EPA has managed to do it for 15,000 facilities, and the -- all the countries under the Seveso directive --

DR. TAYLOR: But EPA has more money.

CHAIR MERRITT: Dr. Taylor, please let Dr. Rosenthal finish.

DR. TAYLOR: Sorry.

DR. ROSENTHAL: And the countries under the Seveso directive also grant a similar exemption
upon the demonstration of doing this, and EPA, in a long letter from one of counsel, as well as the European community, have chosen this in an effort to make their regulations more cost-effective and to endorse what exists as essentially elimination of hazards rather than management, to go for engineering controls of exposures rather than personal protective equipment.

So I'm saying that this principle has well been founded, has been successfully enforced by EPA and by the European community and, I might add, has been proposed by the State of New Jersey as well.

CHAIR MERRITT: Thank you.

Dr. Taylor.

DR. TAYLOR: Again, though, EPA and OSHA are somewhat different in their structure, and when we're talking about compliance officers going out to the field to investigate, the question again comes back in my mind: How would OSHA regulate such a suggestion coming from us.

And I do have problems with the language as well as removing or reducing regulatory requirements. They've not done that in the past, and it's very hard for me to envision them doing that, given their staff, given how it would have to be
regulated or how that would be done, and it's also a
more specific requirement that we're recommending.

CHAIR MERRITT: All right. Any other
comment?

MR. BRESLAND: Yes.

CHAIR MERRITT: Mr. Bresland?

MR. BRESLAND: Yes. Well, number one, I'm
in favor of the use of inherently safer designs and
also of passive mitigation. I doubt if there's
anybody in this room who would speak against that.
I'm also in favor of reducing regulatory requirements
where it's appropriate, but in reading this part off,
I just don't understand the connection, or I think it
will be difficult for OSHA to understand the
connection between the two.

And also, in the study done by the staff,
I don't believe that they did any study on the issue
of inherently safer design or passive mitigation as
related to this issue, and perhaps that something that
the safety board may want to investigate sometime in
the future as to what would the impact be and is there
a rationale for reducing regulatory requirements based
on that, but I think it would have to be done in a
much more serious and detailed manner than what we've
heard today.
CHAIR MERRITT: If there are no other comments, then I'd like to call for a motion to accept the amendment.

DR. POJE: I make the motion to accept the amendment as proposed.

CHAIR MERRITT: Is there a second?

DR. ROSENTHAL: Second.

CHAIR MERRITT: Then it has been -- the motion has been made and seconded. A call for a voice vote:

Dr. Taylor.

DR. TAYLOR: Disapprove.

CHAIR MERRITT: Dr. Rosenthal.

MR. BRESLAND: Approve.

CHAIR MERRITT: Dr. Poje.

DR. POJE: Approve.

CHAIR MERRITT: Mr. Bresland.

MR. BRESLAND: Disapprove.

CHAIR MERRITT: And I disapprove. The changes to the amendment, then, are -- vote is for disapproval, three to two.

So now, Mr. Warner, could you give us a restatement now of recommendation 1 as it was --

MR. WARNER: Recommendation 1 stands as presented by the staff in the executive summary.
CHAIR MERRITT: Okay. And having been seconded -- the motion made and seconded, I now call for a vote for recommendation number 1.

Dr. Taylor.

DR. TAYLOR: Approve.

CHAIR MERRITT: Dr. Rosenthal.

DR. ROSENTHAL: Approve.

CHAIR MERRITT: Dr. Poje.

DR. POJE: Approve.

CHAIR MERRITT: Mr. Bresland.

MR. BRESLAND: Approve.

CHAIR MERRITT: And I approve. So the amendment [sic] 1 is approved unanimously by the board.

MR. JEFFRESS: No, the motion.

CHAIR MERRITT: I'm sorry. The recommendation. The original -- thank you; it takes three of us to do this.

So then I bring, then, the second amendment --

MR. JEFFRESS: Second recommendation.

CHAIR MERRITT: -- second recommendation.

This is the recommendation to OSHA.

And at this point I would -- you know, it would help -- is there a possibility you could put
those on the screen so that folks from the audience
can maybe follow along a little bit better with what
we're doing?

I would call for a motion, then, to accept
amendment 2 -- I'm sorry -- recommendation 2.

DR. TAYLOR: Madam Chair, so moved.

CHAIR MERRITT: Thank you, Dr. Taylor.

Is there a second?

MR. BRESLAND: I second.

CHAIR MERRITT: Mr. Bresland seconds, and
with that, I open the floor to discussion. Is there
any discussion concerning recommendation 2?

DR. POJE: Madam Chair, I'd like propose
an amendment to recommendation number 2.

The amendment would be a modification to
the language in part; it would state: Number 2,
implement a program to define and record information
on reactive incidents that OSHA investigates or
requires to be investigated under OSHA regulations.
Structure the collected information so that it can be
used to measure progress in the prevention of reactive
incidents that give rise to catastrophic releases.

Can I offer some comments about this?

CHAIR MERRITT: Yes, please.

DR. POJE: Again, this would seek to build
upon what is proposed by the staff at this moment in
time. They would recommend, as I would join them in
doing so, that we capture the -- that we encourage our
sister agency, OSHA, to more effectively capture
information on reactive hazard incidents through any
incident that they may investigate.

In this instance, though, I would seek to
expand upon that and to make it also incumbent upon
them to consider the capture of additional information
as is already required under the OSHA PSM standard for
facilities to investigate incidents of significance in
their own domain and to maintain records of such for
five years at that facility.

Here I would seek to have a broader access
to information beyond that that is currently
investigated by OSHA.

CHAIR MERRITT: So then do we have a
motion to accept this amendment?

DR. ROSENTHAL: I would like to just
comment and say that, considering that the facilities
now have to investigate the accidents, which is the
bulk of the resources being devoted to the added
feature that Dr. Poje suggested be collected, I think
it would be very cost-effective for OSHA to collect
that information and share it with the other parties
who may experience similar things so that they can learn from it.

CHAIR MERRITT: Is there other comment?

DR. POJE: If I could just make a comment on top of that, though, again, I'm working within the strict language as stated here, to implement a program to define. Again, I don't want to prejudge the resource base of the agency to comprehensively gather all such information but rather the program that I would seek to have us consider would be that the agency would be responsible for examining that very question.

The ability of our own staff to pursue databases to try to give us a record of the past two decades was an enormous effort and a very valuable and valiant effort on their part, but I would see the primary regulatory agency in this case also needing to begin to better command the information required by this regulation.

So please do not -- the intention is not to automatically mandate that that become delivered data to the agency, but it certainly would encompass the potentiality for such, based upon further evaluation and study.

CHAIR MERRITT: Is there further comment?
Mr. Bresland?

MR. BRESLAND: Yes. I guess I don't entirely -- based on Dr. Poje's most recent comment, I don't entirely understand what we'd be voting on here.

Currently you've got, what, 15,000 RMP facilities that are required to submit accident history every five years, and EPA tells us that that costs maybe 1 to $2 million a year to implement that program.

OSHA, by their estimate, has 25,000 facilities that are covered by the PSM regulation, and if we were to, as the word says here, implement this program, you would have 25,000 facilities that would be required to -- at least as my understanding of what Dr. Poje is suggesting, you would have 25,000 facilities that would be required to submit information on their reactive incidents to OSHA, so perhaps four or five a year for each of them, maybe 100,000 incident reports being sent in to a database, which I think would probably overwhelm OSHA's current ability to collect such information.

So it seems to me that we're going from collecting very, very little information about reactive chemicals, which I don't think is good, to collecting huge amounts, which may not -- just may not
be practical in today's world with the amount of funding and manpower that OSHA has to oversee the OSHA PSM program.

DR. TAYLOR: I wanted just to get a point of clarification as a followup, John -- Gerry -- I mean, Dr. Poje, on this --

DR. POJE: Sure.

DR. TAYLOR: On the last sentence -- it appears that from the original text you're removing the last sentence which says, At a minimum, identify industry sectors that experience the incidents, chemicals and processes involved, and consequences.

Right? And you're removing that and saying that it should be broader for all of industry or -- all of the chemical industry? I'm a little confused on that.

DR. POJE: I'm just saying that I think that that will be a logical outcome from this.

DR. TAYLOR: Okay.

DR. POJE: And, again, in the same spirit of being more general on that aspect, that was sufficient for me to structure the collected information so that it can be used to measure progress.

Progress will be defined by the gathering
of such information, but I'm presuming there will be many more such avenues to explore.

If I could just -- having clarified why didn't include that, can I just respond also to John.

Again, I hope you understand the nature of the specificity that I was making this recommendation. It's my belief that the implement of program does not automatically into a recommendation.

I'm not specifying, Collect every piece of investigations already done to date. I believe it is incumbent upon us to provide clarity of direction to this agency who has heretofore not made abundant use of investigative activities that are required under the process-safety management regulation.

And I'm seeking to go one step broader than the staff's proposal to us, which is to seek to have the Occupational Safety & Health Administration begin to grapple with how to best increase the value of what we understand to be quite valuable, at this board, the value of investigations, to better inform entities and agencies on how to better manage process safety.

CHAIR MERRITT: Is there any other discussion?

(No response.)
CHAIR MERRITT: Then if not, I would -- the amendment, as it stands, is to implement a program to define and record information on reactive incidents that OSHA investigates or requires to be investigated under OSHA regulations; structure the collected information so that it can be used to measure progress in prevention of reactive incidents that give rise to catastrophic releases.

DR. TAYLOR: So moved.

CHAIR MERRITT: So moved. Is there a second?

DR. ROSENTHAL: Do we vote on Gerry's amendment?

CHAIR MERRITT: This is it.

DR. TAYLOR: I moved.

DR. ROSENTHAL: Okay. Very good.

CHAIR MERRITT: Do you second?

DR. ROSENTHAL: I'll second.

CHAIR MERRITT: Okay. And then I would call for a vote.

Dr. Taylor.

DR. TAYLOR: Approve.

CHAIR MERRITT: Dr. Rosenthal.

DR. ROSENTHAL: Approve.

CHAIR MERRITT: Dr. Poje.
DR. POJE: Approve.

CHAIR MERRITT: John Bresland.

MR. BRESLAND: Approve.

CHAIR MERRITT: Carolyn Merritt: I approve.

And so these changes carry with a unanimous vote.

Then we go to the recommendations to EPA, and recommendation number 1 is -- do I have a motion to accept?

DR. TAYLOR: So moved; accept the recommendation.

CHAIR MERRITT: Do I need to go back?

MR. JEFFRESS: Wait a minute. We voted on the amendment.

CHAIR MERRITT: Yes. Now I need to go back and approve number 2 altogether. Thank you.

All right. Do we have a motion, then, to accept, as amended, the recommendation number 2 to OSHA.

DR. ROSENTHAL: So moved.

DR. TAYLOR: Second.

CHAIR MERRITT: Very good. And then we have a voice vote for that.

Dr. Taylor.
DR. TAYLOR: Approve.

CHAIR MERRITT: Dr. Rosenthal.

DR. ROSENTHAL: Approve.

DR. POJE: Approve.

MR. BRESLAND: Approve.

CHAIR MERRITT: Approve.

So it's carried five to approve.

All right. Then we move on, then, to recommendation number 1 to the EPA. Right? And do I have a motion to accept this amendment -- this recommendation, and a second?

DR. TAYLOR: I move that we accept the recommendation from the staff.

CHAIR MERRITT: Okay. And is there a second?

MR. BRESLAND: I second.

CHAIR MERRITT: John Bresland seconds.

This is open for discussion. Is there any discussion concerning this recommendation?

DR. ROSENTHAL: Once again I'll overcome my natural shyness and offer a suggested change.

I've looked at these two recommendations. I know the thrust of them. I believe, however, they are unnecessarily complex and include some elements which can be expressed more clearly and more
succinctly in a different fashion, which I would like to put forward and defend or to explain why I believe it does it.

I propose that this recommendation be revised to read as follows: Revise the chemical accident prevention programs, 40 CFR 68, to explicitly cover catastrophic hazards that have the potential to seriously impact the public, including those resulting from self-reactive accidents and combinations. Take into account -- no, let's see.

Take into account --

CHAIR MERRITT: The recommendations this report has made --

DR. ROSENTHAL: Yes, right -- recommendations this report has made to OSHA on reactive hazard coverage. Seek congressional authority, if necessary, to amend the regulation; this is deemed necessary.

Okay. That one is the first one.

CHAIR MERRITT: That's the only one we're going to take at this time.

So is there --

DR. POJE: Can I speak to --

CHAIR MERRITT: Yes. You want to speak to that?
DR. POJE: The rationale.

CHAIR MERRITT: What's the rationale for that, Irv, the change?

DR. ROSENTHAL: Well, I think that we should ask EPA to take into account the recommendations that OSHA has made or will make when they go through this regulation, so that we don't have two incompatible lists.

CHAIR MERRITT: Okay. Are there any other discussion on this?

DR. POJE: Again, if I can just repeat what I said earlier, I believe there has been an iteration of policy development at the federal level that has involved sequentially action by OSHA and subsequent action by EPA.

I believe that we would also be seeking through this, particularly in the language that would say "take into account the recommendation that this report has made to OSHA on reactive hazard coverage" -- again, seeking to have a degree of harmony between the two agencies in their approach to managing the common problem of reactive hazards, whether it be to protect the workforce or to protect the public at large.

CHAIR MERRITT: Is there any other
discussion on this?

MR. BRESLAND: As I understand it, Irv, the significant change that you've made in this is you've included the section on explicitly covering catastrophic reactive hazards that have the potential to seriously impact the public.

DR. ROSENTHAL: Right. That's implicit. I put it in because EPA [indiscernible] the public, but just as they have gone to toxics and flammables without specifically stating that, it's implicit in the regulation.

I think the point is for them to explicitly cover reactives, and I should say that affect the public, but that's implied, because they can't do anything else, and that they should take into account what OSHA is doing.

MR. BRESLAND: But in the staff recommendations they also ask that it be taken into account what OSHA's doing.

DR. ROSENTHAL: Yes.

MR. BRESLAND: Okay.

DR. TAYLOR: So it basically sounds like it's a change in wording a little bit to make it stronger, explicitly cover --

DR. ROSENTHAL: To include catastrophic --
seek congressional authority, if necessary, to amend the regulation.

Again, I will leave it up to them to do that, since I think there is a question I've heard expressed of opinion as to whether they need it or not need it, and I am stating the end condition.

CHAIR MERRITT: All right. Is there any other discussion?

DR. POJE: Just one other point that I think is elevated in Dr. Rosenthal's proposal, is that also more explicitly states, in parallelism to the issues raised in the OSHA recommendation, those resulting from self-reactive chemicals and combinations of chemicals and process-specific conditions.

So it does step one further step to encompass all of the potentialities.

CHAIR MERRITT: Okay. Then do we have a motion to --

DR. POJE: I make a motion to accept the amendment as proposed.

MR. WARNER: Madam Chair, could I read the amendment --

CHAIR MERRITT: Yes.

MR. WARNER: -- just to clarify the
language.

The amendment now reads -- I believe, Dr. Rosenthal -- Revise the chemical accident prevention programs, 40 CFR 68, to explicitly cover catastrophic reactive hazards that have the potential to seriously impact the public, including those resulting from self-reactive chemicals and combination of chemicals and process-specific conditions.

Take into account the recommendations this report has made to OSHA on reactive hazard coverage. Seek congressional authority, if necessary, to amend the regulation if this is deemed necessary.

CHAIR MERRITT: And we have a motion to accept the amendment as read?

DR. TAYLOR: I --

CHAIR MERRITT: You so move? We already did that. Second?

DR. ROSENTHAL: I do.

CHAIR MERRITT: All right. And then I call a voice vote.

Dr. Taylor.

DR. TAYLOR: Approve.

CHAIR MERRITT: Dr. Rosenthal.

DR. ROSENTHAL: Approve.

CHAIR MERRITT: Dr. Poje.
DR. POJE: Approve.

CHAIR MERRITT: Mr. Bresland.

MR. BRESLAND: Approve.

CHAIR MERRITT: And I approve. It's carried. Then the amendment is carried.

Now we --

DR. POJE: May I make a motion to accept the amendment as the recommendation to OSHA -- to EPA? I think that's what we did on the --

CHAIR MERRITT: Yes. The recommendation as amended.

DR. POJE: The recommendation as amended. I make a motion we accept that.

DR. TAYLOR: Second.

CHAIR MERRITT: That's already been done, so -- oh, yes, thank you. That's right. We do require that.

One more step is to vote.

DR. TAYLOR: Approve.

DR. ROSENTHAL: Approve.

DR. POJE: Approved.

MR. BRESLAND: Approved.

CHAIR MERRITT: Approve.

All right. So that one is approved.

Thank you. I hope some of these are simpler.
All right. Then we move to recommendation number 2 from the EPA, and that's up on the board; thank you. Is there a motion to accept the recommendation 2 to the EPA? We need to make that motion first and then second it and then if there are any amendments --

DR. TAYLOR: Oh, I make a motion to accept; sorry.

CHAIR MERRITT: Thank you. And is there a second?

MR. BRESLAND: Second.

CHAIR MERRITT: John Bresland seconded it. And then I open the floor to discussion. Is there any discussion concerning this recommendation?

DR. ROSENTHAL: Yes. I have some -- an amendment I would like to offer. Now, there are two bullet items under that recommendation. Could you show those, please. Yes.

Of course, the recommendation that I want to offer encompasses the two bullet items as well as the paragraph.

CHAIR MERRITT: Yes. Okay. Good. Thank you for that clarification.

DR. ROSENTHAL: So I think it's necessary to have that for clarity.
And I would like to suggest the following, and then I'll state why: Modify the accident reporting requirements, the RMP info, to define and record reactive incidents. Consider adding the term reactive incident to the four existing release elements in EPA's current five-year accident reporting requirements, which I just list for information: gas, liquid, fire, and explosion.

Structure this information collection to allow EPA and its stakeholders to identify and focus resources on industry sectors that experience the incidents, chemicals and processes involved, impact on the public, the workforce, and the environment.

What I'd like to say as a note is that the RMP infodata system now could do all of this as it's presently structured, provided there was a class of -- for around which this was collected which was reactive. They don't have reactive things now.

If they put this in, then the same number of forms, the same number of investigations; it would be no additional cost. They would just have a place in which they entered information which presumably would be available.

I think that the requirements that they require reporting of reactive incidents that involve
both regulated and nonregulated reactive hazards is somewhat confusing, because, as we discussed during our questions of the staff, once and if they regulate reactive hazards, those will be the ones they can collect on.

If they don't ever regulate them, they will have to get a new bill, not just authority, in order to get data on things that they do not regulate. So I think the amendment as I stated basically has the same thing; it says involve those which are regulated chemicals and have reactive incidents, even though they're not classified as reactive, and as well as any reactive hazards that they had as a result of our first recommendation to EPA.

CHAIR MERRITT: Are there comments?

DR. TAYLOR: We are also including, At a minimum, identify --

CHAIR MERRITT: Yes.

DR. TAYLOR: Correct? That goes on there.

DR. ROSENTHAL: Yes.

MR. WARNER: I thought you said this replaces all of this.

CHAIR MERRITT: No.

DR. ROSENTHAL: Yes, it does. Of course,
it does say -- it says, Identify and focus resources on industry sectors that experience the incidents, chemicals and processes involved. That's in my amendment.

DR. TAYLOR: So it's all there. Okay.

CHAIR MERRITT: So it's all in here without having to have those two --

DR. POJE: The second bullet is amended.

CHAIR MERRITT: Okay.

MR. BRESLAND: So this is a more narrowly focused recommendation than the staff's recommendation?

DR. ROSENTHAL: In that sense, yes.

MR. BRESLAND: Because the staff is recommending that EPA would require reporting for both regulated and nonregulated --

DR. ROSENTHAL: I don't know how you require reporting for nonregulated, but --

MR. BRESLAND: So in your amendment you would require just the incidents that are reported every five years as part of RMP --

DR. ROSENTHAL: The ones that are presently reported, and if they add reactive hazards, those that would be required when these chemicals were added to the list.
MR. BRESLAND: But some of those incidents may move from, let's say, a fire of an explosion category into reactive --

DR. ROSENTHAL: Yes. It will just be a better classification, John.

MR. BRESLAND: Okay.

CHAIR MERRITT: Is there any other discussion?

(No response.)

CHAIR MERRITT: Then I call for a motion to accept the amendment.

DR. POJE: I make a motion to accept the amendment as proposed?

CHAIR MERRITT: A second.

DR. TAYLOR: I was confused. I second, I guess.

CHAIR MERRITT: Okay. Then I would call for a voice vote on the amendment to recommendation number 2, which actually replaces recommendation number 2. Correct?

VOICES: Yes.

CHAIR MERRITT: Dr. Taylor.

DR. TAYLOR: Approve.

CHAIR MERRITT: Dr. Rosenthal.

DR. ROSENTHAL: Approve.
CHAIR MERRITT: Dr. Poje.

DR. POJE: Approved.

CHAIR MERRITT: Mr. Bresland.

MR. BRESLAND: Approved.

CHAIR MERRITT: And I disapprove. So the amendment is carried, four to one.

All right. So we have a motion, now, to accept the amendment as the recommendation and a vote on the recommendation?

DR. POJE: I so move that we accept the amended language as the recommendation to EPA on the matters of incident reporting.

CHAIR MERRITT: Thank you. Is there a second?

DR. TAYLOR: Second.

CHAIR MERRITT: All right. And then, Dr. Taylor?

DR. TAYLOR: Approve.

CHAIR MERRITT: Dr. Rosenthal.

DR. ROSENTHAL: Approve.

CHAIR MERRITT: Dr. Poje.

DR. POJE: Approved.

CHAIR MERRITT: John Bresland.

MR. BRESLAND: Approved.

CHAIR MERRITT: And I approve.
All right. Let's see. Where are we? Now we go to the National Institute of Standards and Technologies. And may I make a recommendation that we accept it -- we take these en masse because there are so many, and if I'm not mistaken, unless there are recommendations for amendments that we can bring up at the time of discussion, if there are none, then we'll vote on them in masse.

If not, then we'll take out whichever one has to be amended.

So I call for a motion to accept recommendations to the National Institute of Technology, Center for Process Safety, American Chemistry Council --


CHAIR MERRITT: Yes -- SOCMA, and the --

DR. POJE: National Association of Chemical Distributors, the International Association of Firefighters --

CHAIR MERRITT: Yes.

DR. POJE: -- the Paper, Allied-Industrial, Chemical and Energy Workers International Union --

CHAIR MERRITT: Yes.
DR. POJE: -- the United Steelworkers of America --

CHAIR MERRITT: Yes.

DR. POJE: Union of Needle Trades Industrial and Textile Employees; United Food and Commercial Workers International Union; and the American Society of Safety Engineers.

CHAIR MERRITT: Thank you; so nicely stated. Is there a second?

DR. ROSENTHAL: Second.

CHAIR MERRITT: Is there any discussion on any one or any of these recommendations?

DR. TAYLOR: Based on the recommendation that Irv asked earlier, perhaps where we say, Communicate to your membership, such as ASSE, we can either say, And other professional associations, or add the American Industrial Hygiene Association.

DR. POJE: If I could make a recommendation on that, I would rather be specific right now to the American Industrial Hygiene Association --

DR. TAYLOR: Okay.

DR. POJE: -- but I also would like to observe that I think the board at any time can seek to reopen its discussion about recommendations emanating
from this report.

And if there is a logical redirection that we could have, particularly on this issue of building awareness, we can certainly entertain that at a future date.

DR. TAYLOR: Okay.

DR. POJE: So rather than say, in general, to others, I would rather be specific.

DR. TAYLOR: Okay. Since they're left out, and there are representatives here: American Industrial Hygiene Association.

CHAIR MERRITT: All right. But we have a -- you would need to make that a specific amendment.

DR. TAYLOR: I move that we amend the list of recommendations and add, after the American Society of Safety Engineers, the American Industrial Hygiene Association, AIHA.

CHAIR MERRITT: And is there a second?

DR. ROSENTHAL: Second.

CHAIR MERRITT: Then let's have a voice vote that we add the organization that Dr. Taylor recommended in her amendment.

Dr. Taylor.

DR. TAYLOR: I move that we --

CHAIR MERRITT: No. You approve?
DR. TAYLOR: Approve.

DR. ROSENTHAL: Approve.

DR. POJE: Approve.

MR. BRESLAND: Approve.

CHAIR MERRITT: Approve.

All right. And then we can go to the motion that accepts as amended --

MR. BRESLAND: Can I -- a point of clarification on two of the recommendations, and they're both -- they're similar wording. One is to the American Chemistry Council, and the other is to SOCMA, and it's recommendation 2 in each case.

And I'll just read the first few words; it says, Develop and implement a program for reporting reactive incidents.

My understanding of that is that is internal reporting within the organizations, and it's not external reporting to the agency -- to any agencies.

CHAIR MERRITT: Yes. That is correct.

MR. BRESLAND: Is that everybody else's understanding?

DR. POJE: That's my understanding of that.

DR. ROSENTHAL: Yes.
MR. BRESLAND: Okay.

MR. JEFFRESS: But you might want to read the rest of that sentence, though. The rest of the sentence says that includes the sharing of the relevant safety knowledge and lessons learned with your membership, the public, and the government.

So the individual reports would not be shared, but the lessons learned would be.

DR. ROSENTHAL: Yes. Which I presently believe is now being done by those associations now as a matter of public policy; they share the lessons learned.

DR. POJE: But most explicitly we would not be asking them to share those reports.

DR. ROSENTHAL: To share the individual reports, which are treated as confidential. But I believe that the general information is matter of public policy, and the ACC and the CMA and everyone before them always tried to do that. They wouldn't always succeed, but --

CHAIR MERRITT: Does that answer your question?

MR. BRESLAND: Yes.

CHAIR MERRITT: Then can we proceed to a vote to accept the recommendations as amended?
DR. POJE: I make a motion to accept the recommendations as amended.

DR. TAYLOR: Second.

CHAIR MERRITT: Okay.

Dr. Taylor.

DR. TAYLOR: Approve.

DR. ROSENTHAL: Approve.

DR. POJE: Approved.

MR. BRESLAND: Approved.

CHAIR MERRITT: Approved.

The next step, then, is to do a board vote on the executive summary and the recommendations as amended, en masse, and so I would call for a motion to accept the executive summary and the amendments -- the recommendations as amended.

DR. POJE: So moved.

DR. TAYLOR: Second.

DR. ROSENTHAL: Just with the provision that any minor editorial changes will be included in your motion, Gerry?

DR. POJE: Yes.

DR. ROSENTHAL: Okay.

CHAIR MERRITT: Okay.

MR. BRESLAND: And also the executive summary does include the recommendations as originally
written by the staff.

CHAIR MERRITT: Yes. That's what it would do, is we would --

MR. BRESLAND: Oh, amended?

CHAIR MERRITT: -- change that to the amended.

MR. BRESLAND: Okay.

CHAIR MERRITT: So we're recommending -- we're -- the motion is to accept the recommendations with the -- accept the executive summary with the recommendations as amended.

MR. WARNER: Just to clarify, we have amended the recommendation number 2 to OSHA, recommendation number 1 to EPA and number 2 to EPA, and we have added the American Hygiene [sic] Association as one of the associations getting the report and distributing it to its membership.

CHAIR MERRITT: Okay. That has been moved and seconded, and so we would call for a vote.

Dr. Taylor.

DR. TAYLOR: I have a question. Is this the part where we ask?

CHAIR MERRITT: Yes.

DR. TAYLOR: It would be. Okay. Are we going to also approve the report, too, or no?
CHAIR MERRITT: No, not yet.

DR. TAYLOR: Okay.

CHAIR MERRITT: That will be done in a --
as a notation.

DR. TAYLOR: Okay.

CHAIR MERRITT: The final report will be
done as a notation.

DR. TAYLOR: Okay. Then I approve.

DR. ROSENTHAL: Approve.

DR. POJE: Approve.

MR. BRESLAND: Approve.

CHAIR MERRITT: Approve.

So the vote for the acceptance of the
executive summary with the recommendations as amended
is, Approved unanimously.

At this point -- Dr. Taylor, you have a
question?

DR. TAYLOR: I still have a question
regarding the approval of the report. I see the staff
over saying, Oh, does that mean there are a whole lot
of changes coming to the actual report document?

I think what we're saying, there are still
just some editorial things that have to be changed in
the report before we have a notation item to vote.

CHAIR MERRITT: That's right.
DR. TAYLOR: Okay. Minor editorial changes.

CHAIR MERRITT: This report and its recommendations are a landmark for the board. In time I hope that they'll be seen as a landmark for the progress of the chemical -- of chemical safety as well.

Since the process safety regulations were first promulgated a decade ago, there's been a notable hole in the coverage of reactive hazards. The board's recommendations today mark a first step in closing that hole and implementing new standards that ultimately will save lives.

In my view the board's recommendations strike an appropriate balance, calling for robust and specific regulatory actions, while giving the regulators sufficient flexibility to craft effective solutions.

Our recommendations also emphasize the vital role that industry itself must play in reducing the severity of reactive hazards.

I look forward to working closely with ACC, SOCMA, NACD, and CCPS to further their efforts in controlling reactive hazards.

Under the terms of the Clean Air Act, OSHA
and EPA now will have 180 days to consider the board's new recommendations. I'll begin an immediate dialogue with Secretary Henshaw and Administrator Whitman to promote the implementation of board's recommendations and course of action.

While I'm optimistic that the EPA and the Labor Department will react positively, I remain fully cognizant of the difficult road that lies ahead. Achieving effective comprehensive coverage of reactive hazards is not an easy proposition. If it were, it would have been done a long time ago.

The board's investigation makes a compelling case for changing the way reactive hazards are regulated and managed, but our work is primarily technical and scientific in nature.

I'm extremely pleased, therefore, at the positive response that we have had from bipartisan political leaders for pursuing improvements to process safety.

Representative Mike Castle and Senator Joe Biden and Senator Jon Corzine have appeared recently at board meetings, and they have spoken of the need for additional measures to prevent chemical accidents.

This past July Senator Paul Wellstone convened an OSHA oversight hearing where he stressed
his desire for continued development of new OSHA safety standards. He specifically cited the need to expand process safety coverage to include reactive hazards.

I believe there's significant recognition within the industry also that more needs to be done, and I look forward to continuing to work with all parties to achieve that common goal.

The reactive hazards investigation was a collective effort that has involved many and every corner of our agency. I'd like to single out Mr. William Hoyle, director of investigations and safety programs, for his outstanding work in designing, directing, and overseeing this complex and lengthy investigation. Bill, you have the gratitude of the entire board, and there he is right there.

I'd like to equally thank the investigative team: lead investigator John Murphy; staff investigator Lisa Long and Giby Josephs, and also Kevin Mitchell. All of them made a significant contribution over the last two years. This is a piece of work you can all be proud of.

I'd also like to recognize the important contribution of Mr. Don Holmstrom, the agency lead recommendations specialist. Never has the agency
faced a more daunting challenge in developing recommendations and, as usual, Don, you have stepped up and you have done an exemplary job.

Finally, the chair and the board owe a debt, again, of gratitude to Dr. Poje and to Chris Warner, who was interim leader in responsibility for the investigation until this past summer, when Mr. Jeffress came on.

Likewise, Dr. Rosenthal has made many invaluable technical contributions to this work. To all of you I offer my sincere thanks.

Now, with that, I know everyone's hungry and hoping for a break. We have a brief bit of other board business that we must conclude, and with no other comments, I'd like to move to the next part of our business, and that is the consideration of our revised performance plan for fiscal year 2003.

Mr. Jeffress will give the board a presentation on that, and then we will put it to a vote.

MR. JEFFRESS: Thank you, Madam Chair. And in the interests of time, I will make this very brief.

Members of the board and the staff and those of you in the audience who are on the CBS
 automailer list have seen the revised performance plan/action plan for this coming fiscal year that we have been working on.

The strategic plan that the board adopted in the year 2000 covered a strategic list of actions and the strategic plans for the next five years.

We have revised that plan, with more experience, so that for the fiscal year 2003 we have a specific set of strategic actions which we propose to engage in, and this action plan requires the board approval.

The plan was developed by the staff; notices were emailed to our automailer list. A number of public comments were received; we adopted a number of those comments. Some of those public comments are more appropriate for a five-year plan than for the next year, so we will reserve them for consideration of our five-year plan.

I will go over briefly -- this is in your notebooks under the tab that says Strategic Plan. You'll find the plan for action. Again, just briefly covering the highlights of it, the CSB mission core purpose is to protect workers, the public, and the environment by investigating and preventing chemical accidents.
Our mission goal one: to produce timely high-quality investigation reports, bulletins and studies and use them as a basis for effective prevention recommendations.

Under that mission goal I would point out the key strategies which we are adopting for this coming year. First: attract, develop, and retain a team of highly skilled staff, such as you see before you, to implement and update our investigative protocols, action selection procedures, and data utilization as needed. And finally the key strategy under mission goal one: to establish effective working relationships within the agency and with key stakeholders to improve the efficiency and effectiveness of chemical safety investigations.

Now, we have eleven specific actions under that mission goal one. I'm not going to read all of them. I would call your attention to two significant ones, I think.

First, we'll be hiring six new investigators for the fiscal year, which will almost double our investigatory capacity of the agency. And we are working and will work this coming year to develop the Chemical Safety Board's appropriate role in the vulnerability assessments of plants to
terrorism -- potential terrorist threats.

Mission goal two: Again, overall mission goal is to achieve wide industry implementation of the CSB recommendations and related accident prevention measures. The key strategies here, again: developing effective relationships with stakeholder groups, aimed at achieving implementation of our accident-investigation recommendations.

And also, for the first time, this year we will develop and implement a tailored multiyear approach for each CSB investigation. This is targeted at a sharing, adoption, and strategic dissemination of the CSB recommendations.

So for the first time, for each time we do an investigation and develop recommendations, we'll also develop an outreach plan to reach out and make sure that the implementation -- that the recommendations are understood and implemented.

And I would point -- again there are a number of specific actions. I would point to two to highlight for you. First we're going to establish a system to track CSB safety accomplishments and, secondly, that we will successfully close 75 percent of the recommendations that the board makes.

Our final goal, number three, maintain a
high-performing work environment to ensure effective mission accomplishment. And again this relates primarily to our internal operations of the agency.

I would point to two specific initiatives this year: One, establishing a comprehensive human resources program for the agency that would encompass incentives and awards, training and development for the staff; recruitment, hiring, diversity awareness; a list of appropriate human resource goals.

And secondly, and important perhaps for people in the audience and others who follow our activities, that we expect this year to develop a new plan for the next five years; to develop a strategic plan to go from 2003 to 2008.

And we'll be asking not only, of course, for board and staff participation but for public participation in that process.

Madam Chair, I submit this action plan to you and to the board for your approval.

CHAIR MERRITT: Thank you, Mr. Jeffress. Is there a motion to accept the plan for 2003?

DR. POJE: So moved.

DR. ROSENTHAL: Just one comment --

CHAIR MERRITT: Is there a second?
DR. ROSENTHAL: Yes.

CHAIR MERRITT: You second?

DR. ROSENTHAL: Yes.

CHAIR MERRITT: Okay. Are there any -- is there any discussion?

DR. ROSENTHAL: Yes.

(General laughter.)

DR. ROSENTHAL: I think the goals set forth are quite good, but I think that we do need to get greater stakeholder inputs and emphasis on the second goal. I think mission goal one is difficult, but I think the quality of reports we put out show that we’ve learned how to master that; perhaps we should be more cost-effective and et cetera, et cetera.

But I think it is in the second one that we can benefit by inputs and discussion and development, and so I agree with it, but I just suggest that as an area which needs amplification and greater input.

CHAIR MERRITT: Do you have any specific recommendation that we need to consider at this point?

DR. ROSENTHAL: No. I think wait further discussion that can take place, but I don't think it should be done as a specific thing. I would like to,
after discussion with the board members, consider holding roundtables or public meetings or collecting, systematically, inputs from other stakeholders on how to do this.

CHAIR MERRITT: But you're not making an amendment --

DR. ROSENTHAL: I'm not making it in the form of a motion --

CHAIR MERRITT: -- to the plan at this point.

DR. ROSENTHAL: -- until I've had a chance to get input from the other board members.

DR. POJE: Madam Chair, just to emphasize on that point, when we did prepare our first five-year strategic plan, we did hold roundtable discussions with others about the plan before we finally adopted it.

CHAIR MERRITT: Then if there is no other discussion or not amendments or recommendations to the plan, then I call for a vote.

Dr. Taylor.

DR. TAYLOR: Approve.

CHAIR MERRITT: Dr. Rosenthal.

DR. ROSENTHAL: Approve.

CHAIR MERRITT: Dr. Poje.
DR. POJE: Approved.

CHAIR MERRITT: Mr. Bresland.

MR. BRESLAND: Approved.

CHAIR MERRITT: And I approve. It's carried unanimously. Thank you.

So then -- excuse me for rushing along, but what I would like to do -- we have -- the next point of business is open status of recommendations to the different --

MR. HOLMSTROM: Recipients.

CHAIR MERRITT: Yes. And I guess my question -- in the matter of time, is there a way that we can take these en masse without having to go through each one of them?

MR. HOLMSTROM: I know the hour is late, and I'm sure people are hungry. I think we could -- each recommendation there's different proposed status assignments to several different recommendations.

We can either do it at this particular meeting, or if the time is short, perhaps we could postpone this and include these -- the recommendations status designation at the next public meeting.

CHAIR MERRITT: Go ahead and speak loud and explain how we could do this in a proper way.

MR. WARNER: The board could vote on this
in a variety of ways. They could take these recommendations back, review them and, through a notation item, vote individually on them.

Or we could defer this action until the next public meeting if that was a suggestion from the board.

DR. POJE: May I ask a question? Is it possible for us to, after we review them, talk to other board members individually about their opinion on this and have not heard any disagreement with the staff's proposition -- is there a way for us to approve them en banc?

CHAIR MERRITT: Yes. We can do it through notation item with the board, and if you -- I think what we would probably want to do is make a recommendation or a motion, then, to take these items in a notation with the board vote done that way.

DR. ROSENTHAL: I just would like to -- I think I would agree with that, but may I ask just one question, which would be, are there any issues in here which are controversial which you absolutely -- well, not absolutely -- which you need board inputs presently, or is there -- are these actions such that there will be no significant impact on safety, health or progress if we delay a week and do it by notation
MR. HOLMSTROM: Irv, I think there's issues here that probably deserve some discussion, and I would say whether it's deferred to a notation, that individual board members can approach the recommendation staff individually, and we can raise those issues.

Or if it's deferred to the next meeting, we can more fully develop those at that time.

DR. ROSENTHAL: My question: Is there anything that would significantly impact if it's delayed a week?

MR. HOLMSTROM: I guess I'm answering the question a different way. I'm saying there's issues that need to -- that would need to be raised, I think, and discussed.

CHAIR MERRITT: I think --

MR. BRESLAND: May I make a comment? I -- this is my first opportunity to review recommendations, and I think it would be worthwhile at some -- not today, because we are running out of time here -- at some later date in the near term future, take a little more time to hear what you have to say about them and describe them to us.

MR. HOLMSTROM: Okay.
DR. TAYLOR: I was going to make a motion that we hold on them and they be presented at our next public meeting, which is in October.

CHAIR MERRITT: No. Our next public meeting is in November.

DR. TAYLOR: Oh. Well, then --

DR. ROSENTHAL: It has to be done by notation item.

CHAIR MERRITT: I think it has to be done by notation item.

DR. TAYLOR: Okay. I move that we --

CHAIR MERRITT: You move that we --

DR. TAYLOR: -- do notation items.

CHAIR MERRITT: -- table the discussion today --

DR. TAYLOR: Table the discussion.

CHAIR MERRITT: -- and do a notation item vote on these recommendations within the next two weeks.

DR. TAYLOR: Yes.

DR. POJE: Second it.

CHAIR MERRITT: Second it.

And I would ask for a vote, then.

Dr. Taylor.

DR. TAYLOR: Approve.
DR. ROSENTHAL: Approved.

DR. POJE: Approved.

MR. BRESLAND: Approved.

CHAIR MERRITT: Approved.

Then I thank you all for your -- I know you were prepared to give us a presentation on that, and we will have to meet with you individually before our notation, then, on items that you feel are things you need to raise to our attention, and then we will schedule that with the staff within the next two weeks and have the vote complete, then, by two weeks from today.

Thank you.

With that, I congratulate all of you for hanging in there. This is a public board meeting; it is not a public hearing. And I hope that you learned something and you appreciate a little better working of your board. And we do work for you, and we appreciate your participation in this meeting.

And with that, I declare this meeting closed.

(Whereupon, at 1:00 p.m., the public board meeting was concluded.)