

DANGEROUS DUST: IS OSHA DOING ENOUGH TO PROTECT WORKERS?

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BEFORE THE
SUBCOMMITTEE ON EMPLOYMENT AND WORKPLACE
SAFETY
OF THE
COMMITTEE ON HEALTH, EDUCATION,
LABOR, AND PENSIONS
UNITED STATES SENATE
ONE HUNDRED TENTH CONGRESS
SECOND SESSION
ON
EXAMINING THE OCCUPATIONAL SAFETY AND HEALTH ADMINISTRA-
TION (OSHA), FOCUSING ON PROTECTING WORKERS FROM DAN-
GEROUS DUST AT THE WORKPLACE

JULY 29, 2008

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DANGEROUS DUST: IS OSHA DOING ENOUGH TO PROTECT WORKERS?

TUESDAY, JULY 29, 2008

U.S. SENATE,
SUBCOMMITTEE ON EMPLOYMENT AND WORKPLACE SAFETY,
COMMITTEE ON HEALTH, EDUCATION, LABOR, AND PENSIONS,
Washington, DC.

The subcommittee met, pursuant to notice, at 10:00 a.m. in room SD-430, Dirksen Senate Office Building, Hon. Patty Murray, chairman of the subcommittee, presiding.

Present: Senators Murray, Brown, and Isakson.

Also Present: Senator Chambliss.

OPENING STATEMENT OF SENATOR MURRAY

Senator MURRAY. This subcommittee will come to order.

Before we begin, I want to recognize my Ranking Member, Senator Isakson, and extend a welcome to our colleague from Georgia, Senator Chambliss, who is going to be here shortly and will be participating in this hearing today as well.

Just 6½ months ago, a dangerous buildup of dust fueled the catastrophic explosion at an Imperial Sugar refinery in Port Wentworth, GA. Thirteen people were killed. Forty were injured, some sustaining life-threatening injuries. Three of those burn victims are still in the hospital today.

This horrific accident brought to the Nation's attention the danger that dust poses in industries from sugar refining to pharmaceutical manufacturing to textiles. The Imperial Sugar disaster was one of the worst industrial accidents in recent history. Tragically, the cause, like other such explosions, was preventable.

Yet despite the hazard it poses, the Occupational Safety and Health Administration still does not have regulations governing dust, and some workers are still not aware of how dangerous it can be. In 2006, the U.S. Chemical Safety and Hazard Investigation Board, or CSB, completed a study on combustible dust and made five safety recommendations to OSHA.

Most importantly, the CSB called for a regulatory standard for dust explosions in general industry, and it suggested that while developing a new standard, OSHA should improve training for its inspectors and do more to educate workers and their employers about dust hazards.

Since that time, 82 new dust explosions have occurred, but only one recommendation appears to have been implemented by OSHA. Its National Emphasis Program started in 2007. The program was

reissued March 11, 2008, to provide policies and procedures for inspecting workplaces which produce dust that is likely to cause fires or explosions.

We don't yet know the program's impact on worker safety, but we are particularly troubled that even though OSHA was specifically warned that its existing dust standards were inadequate and even though it was given guidance by the CSB on preventive steps to avoid future strategies, OSHA has failed to respond proactively.

I believe that each one of us here today shares the same goal—to ensure that every worker returns home safely to his or her family at the end of the day. That is why OSHA was created, to enforce workplace safety laws and regulations and to protect workers from injury, illness, and death on the job.

My colleagues and I are very concerned that OSHA has been dangerously ineffective in helping us to reach that goal. While OSHA last week cited Imperial Sugar a total of \$8.8 million for violations at the Port Wentworth plant and a sister plant in Gramercy, LA, those penalties come far too late for the 13 workers who died or for the workers who may be permanently damaged by that explosion.

Without a specific dust-related standard, OSHA's ability to levy specific citations or penalties is limited. Today, at this hearing, we are going to hear about steps that can be taken to regulate and prevent the dangerous buildup of dust so that we can prevent future disasters.

I want to thank all of our witnesses and our guests for being here today. This morning, we are going to hear from Edwin Foulke, Jr., Assistant Secretary of Labor for OSHA; John Bresland, Chairman and CEO of the U.S. Chemical Safety and Hazard Investigation Board; Amy Spencer, a senior chemical engineer at the National Fire Protection Association in Quincy, MA; Richard Prugh, a senior process safety specialist at Chilworth Technology in Plainsboro, NJ; and Graham Graham, Vice President for Operations at the Imperial Sugar Company in Sugarland, TX.

Mr. Graham will testify on his own behalf about the conditions he witnessed at the Port Wentworth facility. I ask that Mr. Foulke and Mr. Bresland, who are on the first panel, stay so you can listen to our second panel of witnesses in case we have additional questions for either of you.

We know that standards for combustible dust can work. OSHA responded in 1987 to a series of grain dust explosions by issuing a grain dust standard that has, according to OSHA's own figures, decreased the number of such explosions and fires by 60 percent. The grain industry helped sponsor the research leading to the standard, as well as the launch of a safety education program. Industry leaders tell us it has dramatically improved the grain and feed industry's safety record.

Today, we want to send a message to OSHA and to all industries in which dust buildup is a hazard. One worker's death or injury is unacceptable if it is preventable. I hope this hearing will leave us with a good idea of what should be done and how Congress can help ensure that OSHA does its job to protect all workers in the country.

With that, I will turn to my Ranking Member, Senator Isakson, and I want to thank him for working with us as we put this hearing together. I know it is extremely important to you and to your colleague Senator Chambliss, who has joined us today.

Senator Isakson.

OPENING STATEMENT OF SENATOR ISAKSON

Senator ISAKSON. Well, thank you very much, Chairman Murray.

It is always a pleasure to work with you, whether it is on mine safety, asbestos, or combustible dust. It has always been a privilege to work with you, and I appreciate your willingness to hold this hearing today. It is very important to Senator Chambliss and myself in particular because the lives that were lost were Georgians and the facility is in our State.

On Thursday, February 7, 2008, a massive explosion occurred at the Imperial Sugar refinery in a Savannah, GA, suburb called Port Wentworth. As a result of the explosion, 13 workers died, 15 went to the burn center, and 3 remain there today, 2 in very critical condition.

Days after the disaster, Senator Chambliss and I traveled to Port Wentworth and witnessed firsthand the absolute devastation and tragedy of the explosion. We met with the grieving families, all of them, at a gymnasium and assured them that we would work hard to understand fully the cause of the disaster so that we can prevent it and, hopefully, have it never happen again.

At that time, Senator Enzi, Senator Kennedy, Senator Murray, Senator Chambliss, and myself sent a letter to Secretary Chao at the Department of Labor and to the then-interim executive of the Chemical Safety Board, urging them to begin a comprehensive and thorough investigation of the explosion. On Friday, OSHA released its findings, which have been referred to by Senator Murray.

OSHA investigators concluded that Imperial egregiously and willfully violated safety and health standards. OSHA officials believe the employer in this case was aware of the hazard and did little to abate the problem. The agency has charged Imperial Sugar with violations of both existing standards and the general duty clause, the section of that act that obligates employers to maintain a safe workplace free from recognized hazards.

These are gravely serious charges that I do not take lightly, nor should anybody take lightly. The company has declined our invitation to testify today, but has responded in writing to OSHA's charges. I would ask unanimous consent that that response be entered in the record.

Senator MURRAY. Without objection.

[The information referred to can be found in Additional Material.]

Senator ISAKSON. I welcome our witnesses today. I thank them very much for their hard work, and I look forward to their testimony.

Thank you, Madam Chairman.

Senator MURRAY. Thank you, Senator Isakson.

Senator Chambliss.

STATEMENT OF SENATOR CHAMBLISS

Senator CHAMBLISS. Chairman Murray, thank you for giving me the opportunity, as someone who is not a member of this committee, to participate in this hearing that is so critically important to not just our State, but to other facilities around the country.

I thank you for your leadership on this issue. You and Senator Isakson have been great champions for workers, and the way you have conducted yourselves not just on this investigation, but previous ones going back to the Sago mine issue.

Thanks also to Senator Kennedy and Senator Enzi for their leadership, and I really appreciate the opportunity to be here today to look into the matter surrounding the tragedy that occurred at Port Wentworth and look forward to working with you and my colleague Senator Isakson in developing the types of policies that will ensure that we are doing everything possible to not allow something like this to happen again.

Thank you for letting me participate.

Senator MURRAY. Thank you very much.

With that, we will turn to our first two witnesses for their opening statements, and we will begin with Mr. Foulke.

STATEMENT OF EDWIN G. FOULKE, JR., ASSISTANT SECRETARY OF LABOR FOR OCCUPATIONAL SAFETY AND HEALTH, OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA), WASHINGTON, DC

Mr. FOULKE. Thank you. Madam Chairwoman, Senator Isakson, Senator Chambliss, thank you for the opportunity to appear here today to discuss the results of OSHA's investigation of the Imperial Sugar explosion and our ongoing efforts to protect employees from combustible dust hazards.

Before I begin my testimony, I would like to express, on behalf of everyone at OSHA, our deepest personal condolences to the families of those who were killed or injured in the explosion at the Imperial Sugar refinery. We at OSHA firmly believe that no employee should have to risk serious injury or death to earn a living. All of the employees at OSHA work tirelessly every day to ensure that every employee returns home safely to their loved ones.

Over the past 5½ months, OSHA has conducted a thorough investigation of the Imperial Sugar refinery explosion. After careful review and analysis of the evidence and the inspection of the two facilities, OSHA determined that, No. 1, the senior management of Imperial Sugar was aware of the combustible dust hazards at their facilities; No. 2, that they did not take the necessary steps to abate these hazards; and No. 3, because they did not control or eliminate the combustible dust hazards, the conditions existed to support the explosion that occurred on February 7.

Even after the February 7 explosion at Port Wentworth, where 13 people were killed and more than 40 injured, Imperial Sugar failed to ensure that their other facility in Gramercy, LA, would be free of combustible dust hazards. I personally sent a letter to the CEO of Imperial Sugar on March 7, urging him to take the appropriate steps to comply with OSHA safety and health standards.

Yet, on March 14, 2008, 5 weeks after the Port Wentworth explosion, the OSHA compliance officers sent to inspect the Gramercy facility discovered potential ignition sources along with massive quantities of combustible dust. Such complete disregard for the safety and health of their employees resulted in OSHA issuing the third-largest proposed penalty in the agency's history against Imperial Sugar.

Specifically, the Port Wentworth investigation resulted in proposed penalties of more than \$5 million, with citations alleging 61 egregious willful violations and 51 serious violations. As a result of the other inspection at Gramercy, OSHA issued an additional 47 egregious willful and 42 serious violations and the proposed penalty of approximately \$3.7 million. Combined, OSHA cited 218 citations of 60 different standards for a total proposed penalty against Imperial Sugar of more than \$8.7 million.

I know the subcommittee is very interested in the details of this case, but I would respectfully remind you that since Imperial Sugar has contested these citations, the matter is now in litigation. In addition, OSHA procedures call for a review of all willful fatality cases for potential referral to Department of Justice. As a result, I am not at liberty to discuss the underlying evidence of our investigation.

OSHA already has effective standards that address combustible dust hazards, including standards covering general requirements for the prevention of accumulation of combustible dust, electrical safety in hazardous locations, ventilation, and hazard communication. The agency continues to inspect facilities with a high probability of combustible dust explosion through its National Emphasis Program, having conducted more than 300 inspections. OSHA will also have inspected all sugar refineries by the end of the calendar year.

In addition, OSHA is addressing combustible dust hazards through education, outreach, and by proposing to amend existing standards to clarify employers' responsibilities concerning combustible dust. OSHA actions include:

1. The distribution of our 2005 Safety and Health Information Bulletin entitled "Combustible Dust in Industry: Preventing and Mitigating the Effects of Fire and Explosion" to 30,000 workplaces;
2. The release of a hazard alert to inform employers and employees how to identify and abate combustible dust;
3. The release of a poster to visually communicate hazard control measures;
4. The development of a dedicated and comprehensive Web page to educate stakeholders;
5. The development of guidance on hazard communication requirements as well as addressing any potential deficiencies through NEP inspection;
6. The modification of language in the housekeeping provision to clarify employer requirements to prevent the accumulation of combustible dust; and
7. The continuation of advanced combustible dust training for compliance officers.

Madam Chairwoman, Imperial Sugar is a tragic example of what happens when employers fail to uphold their obligations to protect

their employees as required by the Occupational Safety and Health Act. The OSH Act places the responsibility for providing a safe and healthy workplace on employers. OSHA will always provide assistance to those employers who want to meet their legal and, I believe, their moral responsibilities.

However, in extreme cases, such as Imperial Sugar, OSHA will use the appropriate penalties allowed by law when the evidence suggests that there is plain indifference or reckless disregard for the employees' safety.

Thank you, Madam Chairman, for inviting me here today, and I would be happy to answer any questions that you have.

[The prepared statement of Mr. Foulke follows:]

PREPARED STATEMENT OF EDWIN G. FOULKE, JR.

Madam Chairwoman, Ranking Member Isakson, and members of the committee, thank you for the opportunity to appear today to discuss the results of the Occupational Safety and Health Administration's (OSHA's) investigation of the Imperial Sugar explosion, OSHA's continued enforcement activities under our National Emphasis Program for combustible dust, and our ongoing efforts to protect the safety and health of the Nation's working men and women who are exposed to combustible dust hazards. The catastrophic accident at the Imperial Sugar refinery in Port Wentworth, GA, which occurred on February 7, and killed 13 and injured approximately 40 more employees, highlights the seriousness of the issue.

All of us at OSHA continue to be deeply saddened by the tragic consequences of the Port Wentworth explosion. What makes this event particularly troublesome to us is our belief that these consequences could so easily have been minimized, if not prevented. Last week, OSHA officials met with the victims' families to inform them of the findings of our investigation, including the determination that Imperial Sugar's failure to comply with existing OSHA standards directly contributed to the explosion. Had Imperial Sugar complied with OSHA safety standards and taken reasonable steps to mitigate a well-known hazard in this industry, the tragedy could have been prevented.

For a dust explosion to occur, five elements must come together. The first three are the "fire triangle" of fuel, heat, and oxygen. The fuel, in this case, is combustible dust, finely divided particles of a combustible substance that can burn rapidly—for example, sawdust created when wood is processed or, of particular concern here, sugar dust created through the production or transport of granulated or powdered sugar. If the dust particles are dispersed in sufficient quantity and concentration, ignition can cause rapid combustion known as a deflagration. If the event is confined by an enclosure such as a building, room, vessel, or process equipment, the resulting pressure rise may cause an explosion. These five factors (fuel, heat, oxygen, dispersion, and confinement) are known as the elements of the "Dust Explosion Pentagon." If even one element of the pentagon is missing, an explosion will not occur.

Due to poor housekeeping practices, an initial explosion may dislodge into the air the dust that is accumulated on the floors, beams, and other areas of a workplace. This dispersed dust, if ignited, may cause one or more secondary explosions. These secondary dust explosions can often be far more destructive than the primary explosion because of the larger and more diffuse dust clouds created by the successive explosions. In past accidents, many fatalities and serious injuries were caused by secondary explosions.

Through the course of our investigation, we discovered large quantities of combustible dust throughout the Port Wentworth facility, which we determined was primarily the result of poor housekeeping practices. Our accident investigation concluded that a spark, most likely caused by a metal bucket striking or hitting the inside of a metal bucket elevator shaft, ignited some of this dust, causing the primary explosion. The initial explosion caused the accumulated dust to become airborne. This created a series of secondary explosions through the silos, packaging house, and other parts of the facility. The chain reaction explosions were catastrophic with 13 employees losing their lives.

OSHA responded immediately. The agency's field office in Savannah, GA dispatched two safety and health compliance officers and opened its investigation within 2 hours. Over the course of the investigation, OSHA sent 18 personnel under the supervision of senior staff to the site. This included one attorney from the Depart-

ment of Labor's Solicitor's Office and an expert in explosion investigations from the National Office. OSHA retained an outside expert on combustible dust to provide additional technical assistance.

On February 9, the Bureau of Alcohol, Tobacco, Firearms and Explosives (ATF) assumed command of the accident site and a team of investigators from the Chemical Safety Board (CSB) arrived as well. OSHA coordinated its efforts with the ATF, the local fire marshal, and the CSB to ensure the investigation was conducted in a safe and efficient manner. OSHA helped to establish a clear understanding of roles, responsibilities, and expectations among the various local and national agencies by negotiating an agreement with all parties, which helped to ensure that evidence at the site was preserved for the investigation. The coordination also ensured that OSHA compliance officers were able to conduct a thorough inspection.

OSHA's response and investigation of the Imperial Sugar refinery explosion was successful for two primary reasons. First, despite hazardous conditions caused by the fires and extreme heat that continued for days after the explosion, there were no injuries or fatalities during the emergency response and subsequent investigation. Second, the agency was able to gather evidence showing the existence of workplace hazards prior to the explosion, many of which were either involved in the incident, or posed risks of further explosions at the worksite. As a result of its inspection of Port Wentworth, OSHA issued citations alleging 69 willful and 51 serious violations at that facility.

In the course of our investigation, we found that the management of Imperial Sugar was aware that there were hazards caused by combustible dust at its facilities, and knew that it had not been effectively managing dust accumulations for a number of years. Imperial Sugar demonstrated indifference to the serious problem by not implementing corrective measures to remove accumulations of sugar dust from the operating areas and not controlling potential ignition sources. Evidence gathered at the site also disclosed dust collection system inadequacies. Inadequate dust collection systems can contribute to the accumulation of dust and create or aggravate a combustible dust hazard.

The fatalities and injuries at the Port Wentworth sugar refinery probably could have been prevented, had Imperial Sugar complied with existing OSHA standards on housekeeping and other OSHA requirements. This finding is consistent with the results of other combustible dust accident investigations, in which we have found that if employers had complied with applicable standards, they would have mitigated these hazards and prevented the explosions. Imperial Sugar was aware that its facilities had combustible dust hazards. It failed, however, to take the necessary steps to abate these hazards. Because Imperial did not control and eliminate the combustible dust hazards, the conditions existed to support the catastrophic explosion that occurred on February 7. This evidence, plus the numerous violations documented during inspections of the Port Wentworth and Gramercy facilities led me to authorize the maximum penalties permitted by law through issuance of instance-by-instance citations. OSHA issues an instance-by-instance citation only after a thorough and careful analysis of the evidence shows that an employer's willful violations of OSHA requirements were committed in an especially egregious manner.

Imperial Sugar's conduct clearly met those criteria, and the Port Wentworth investigation resulted in proposed penalties of more than \$5 million in citations alleging 69 willful citations, 61 of which were instance-by-instance violations of OSHA standards directly related to reducing the risk of combustible dust explosions; that is, the failure to clean up combustible dust and the use of electrical equipment and gasoline and other fuel powered trucks that were not safe to use in combustible dust areas. OSHA also issued citations alleging 51 serious violations.

On March 7, as the investigation into the accident unfolded, I sent a letter to Mr. John Sheptor, CEO of Imperial Sugar, reminding him of the seriousness of the combustible dust hazard and urging him to ensure that Imperial Sugar take appropriate corrective actions to address any possible combustible dust hazards at its other refinery in Gramercy, LA. On March 14, approximately 5 weeks after the Port Wentworth explosion and 1 week after I sent that letter, OSHA initiated a separate inspection at the Gramercy refinery. On the first day of the on-site inspection, OSHA's compliance officers discovered massive quantities of combustible dust in the powder mill that also contained potential ignition sources. When Imperial Sugar did not take immediate action to remedy this situation, OSHA posted an imminent danger notice that resulted in a temporary shut-down of the powder mill room.

As a result of the Gramercy inspection, OSHA issued citations alleging 49 willful (47 instance-by-instance) and 42 serious violations, and proposed penalties of more than \$3.7 million. The cases against both Imperial Sugar refinery sites resulted in a combined total proposed penalty of more than \$8.7 million, the third highest proposed penalty in the agency's history. The violations cited at Port Wentworth and

Gramercy include violations of more than 60 OSHA standards. These include standards requiring machine guarding, fall protection, adequate exit routes, safe man lifts, and protection from exposure to lead paint, reflecting the breadth of the safety and health problems at the Port Wentworth sugar refinery.

In October 2007, approximately 5 months before the Imperial Sugar accident, OSHA initiated a comprehensive National Emphasis Program (NEP) on combustible dust. This NEP includes a strong enforcement component focused on existing OSHA standards and statutory requirements, as well as education and outreach components.

The NEP is based on OSHA's expertise and experience in identifying and mitigating combustible dust hazards, as well as on a regional Special Emphasis Program on combustible dust implemented in 2004. It focuses on workplaces where combustible dust hazards are likely to be found and lists the different types of materials that can generate combustible dust. Industries covered by the NEP include agriculture, food processing (including sugar), chemicals, textiles, forest products, metal processing, tire and rubber manufacturing, paper products, pharmaceuticals, recycling operations and coal handling and processing facilities. These industries deal with a wide range of combustible dusts with differing properties, including metal dusts such as aluminum and magnesium, wood dust, coal and carbon dust, plastic dusts, biosolids, certain textile materials and organic dusts such as paper, soap, dried blood and sugar.

The NEP focuses on enforcement of OSHA standards that address combustible dust. In particular, our inspectors look for violations of existing standards on dust accumulations and sources of ignition, which are basic ingredients of a combustible dust explosion. The existing standards being targeted by the NEP include:

- 1910.22 Housekeeping
- 1910.307 Electrical
- 1910.94 Ventilation
- 1910.119 Process Safety Management
- 1910.176 Housekeeping in storage areas
- 1910-156-157 Fire Protection
- 1910.272 Grain Handling
- 1910.269 Housekeeping at Coal-Handling Operations
- 1910.132 Personal Protective Equipment (PPE)
- 1910.178 Powered Industrial Trucks
- 1910.252 Welding, Cutting, and Brazing
- 1910.145 Warning Signs
- 1910.1200 Hazard Communication
- 1910.33-37 Means of Egress
- 1910.263 Bakery Equipment
- 1910. 265 Sawmills
- 1928.21 Hazard Communication for Agriculture

Among the most critical existing standards to reduce the risk of catastrophic combustible dust explosions are OSHA's Housekeeping (29 CFR 1910.22) and Electrical (29 CFR 1910.307) standards. Housekeeping is vital because without the accumulation of significant amounts of combustible dust, catastrophic secondary explosions will not occur. Compliance with the electrical standards will ensure that electrical ignition sources are not present in environments where combustible dust may become airborne. Simply stated, if you eliminate the accumulation of dust as the fuel source, and control ignition sources, then you vastly reduce the combustible dust hazard.

In March, OSHA expanded the Combustible Dust NEP to increase the number of planned inspections. As of early July, Federal OSHA and its State plan partners have opened 326 inspections under the NEP. Additionally, based on what we found at the Imperial Sugar facility, OSHA has determined that all sugar refineries (beet and sugarcane) in the Federal jurisdiction will be inspected under the Combustible Dust NEP. This requirement was outlined in a memorandum sent on June 6, 2008 to all Regional Administrators and State Designees. State Plan Program participation was highly recommended as well.

While the NEP enforcement activities help ensure compliance with OSHA's requirements at targeted sites with the greatest risk of exposure, the education and outreach efforts are also important so that even more employers and employees are aware of the hazards and how to abate them effectively. OSHA's Regional and Area offices are conducting outreach sessions to educate stakeholders on combustible dust hazards. OSHA has also reached out to the fire safety profession, as well as to our State plan and State consultation partners, and encouraged them to be proactive in their efforts related to combustible dust.

In 2005, OSHA issued a Safety and Health Information Bulletin (SHIB) titled *Combustible Dust in Industry: Preventing and Mitigating the Effects of Fire and Explosions*. This comprehensive guidance highlights the hazards associated with combustible dusts; the work practices and engineering controls that reduce the potential for a dust explosion and that reduce the danger to employees if such an explosion should occur; and the training needed to protect employees from these hazards. Following the tragedy at Port Wentworth, OSHA proactively mailed this SHIB to 30,000 workplaces at high risk for combustible dust hazards.

OSHA also disseminates other compliance assistance materials related to combustible dusts, including three different eTools that are available on the agency's Web site (www.osha.gov). These free eTools are "stand-alone," interactive, Web-based training tools on various occupational safety and health topics. They are highly illustrated and utilize graphical menus. OSHA has eTools on woodworking, sawmills and shipbuilding, all of which have components that address combustible dust hazards. OSHA has prepared an 80-page publication, also available on the Web site, entitled *Guide for Protecting Workers from Woodworking Hazards* that has a section that addresses dust hazards. Also, in 1998, OSHA released a Hazard Information Bulletin dealing with dust explosion hazards in the textile industry.

OSHA is providing other assistance to employers and employees to protect against combustible dust hazards. Specifically, OSHA developed a Web page dedicated to combustible dust hazards. The agency also produced a safety alert on combustible dust hazards as well as created a poster addressing how employers can abate combustible dust hazards.

OSHA is committed to training its own staff on the important issue of combustible dust. During the last 3 years, OSHA has placed a greater emphasis on training its compliance officers on combustible dust hazards than at any other time in the agency's history. For example, more than 2,400 participants have completed OSHA Training Institute (OTI) courses that included training on combustible dust. Most recently, in December 2007, OTI developed a comprehensive 3½ day course on Combustible Dust Hazards and Controls. Since the inception of this course, more than 100 Federal and State OSHA personnel have successfully completed this training and more classes are scheduled. This course will continue to be offered in future years. OTI also conducted two refresher seminars on combustible dust for nearly 1,400 Federal and State Plan personnel across the Nation. Course evaluation survey results revealed that the training sessions were successful with only 4 percent of the respondents providing negative feedback on this course. And, since 2000 almost 350 individuals have completed OTI's Process Safety Management courses, which also address combustible dust issues.

OSHA is taking, and will continue to take, strong action to address combustible dust hazards. The agency's focused and effective enforcement of applicable regulatory and statutory requirements combined with education and outreach to employers and employees is helping to protect the safety and health of working men and women who may be exposed to combustible dust hazards.

OSHA will be taking other steps as well. For example, we believe it will be useful to clarify how the OSHA Hazard Communication standard applies to combustible dust and the agency has begun work on appropriate guidance. In addition, OSHA is preparing to update its General Industry Housekeeping provision, 1910.22. OSHA intends to amend the Housekeeping requirement to state more explicitly what has always been true: that the standard applies to accumulations of dust that contribute to an explosion hazard. This clarification of language in the Housekeeping provision will eliminate any doubt that employers are obligated to prevent combustible dust from accumulating in their workplaces. The agency will consider other options, including the necessity of more comprehensive rulemaking, upon completion of the NEP inspections and evaluation of the data collected.

Make no mistake, however, that the tragedy at Port Wentworth was the result of willful violations of existing standards and a blatant disregard for safety, and would not have been prevented by the existence of another standard.

In the nearly 40 years of OSHA's existence, the agency has found that most employers make a good faith effort to comply with our safety and health standards. Most employers take their responsibilities under the OSH Act—which clearly places primary responsibility for workplace health and safety on employers—seriously. Imperial Sugar was a clear exception to this. The management of the company was well aware of the hazard of combustible dust, yet they did not take the necessary steps to abate the hazard and protect their employees. When employers take their responsibility to comply with OSHA standards seriously, they ensure that their workers are protected from hazards in the workplace. However, when an employer does not follow the basic requirements of the OSH Act or existing OSHA safety and health standards, the results can be tragic. I call on all employers—especially those

who know their workplaces could produce combustible dust—to take the necessary steps to ensure that the tragedy at Imperial Sugar not be repeated.

Thank you Madam Chairwoman. I would be happy to answer any questions.

Senator MURRAY. Thank you very much.

Mr. Bresland.

**STATEMENT OF JOHN S. BRESLAND, CHAIRMAN, CEO OF U.S.
CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD,
WASHINGTON, DC**

Mr. BRESLAND. Thank you, Chairman Murray, Senator Isakson, Senator Chambliss, and Senator Brown. Thank you for inviting me to testify about the CSB's investigation of the Imperial Sugar explosion.

I have visited the Imperial Sugar refinery and witnessed firsthand the devastation there. The destruction was the most severe of any chemical accident I have seen in my 6 years with the Chemical Safety Board. Our hearts go out to the victims and to their families. This is a photograph of the refinery taken after the explosion.

Madam Chairwoman, this accident was preventable. Combustible dust is an insidious workplace hazard when it accumulates on surfaces, especially elevated surfaces. A wide range of common combustible materials can explode in finely powdered form, including wood, coal, flour, sugar, metals, plastics, and many chemicals and pharmaceuticals.

At Imperial Sugar, a catastrophic explosion resulted from massive accumulations of combustible dust on surfaces throughout the packaging plant. These are some photographs taken of the area in the packaging plant. My written testimony details what we have learned to date about this accident, but let me summarize a few key points.

The photographs on the easel were taken in September and October 2006 at different locations inside the sugar packaging building at Imperial's Savannah refinery. They confirm the existence of substantial dust accumulations on various ducts, motors, switch boxes, and processing equipment. These accumulations, ranging in depth from an inch or two up to several feet, far exceed the NFPA recommended limit of $\frac{1}{32}$ of an inch.

Witnesses told the CSB that large accumulations of dust were present until the day of the explosion. According to an employee near the powder, milled sugar accumulated on the floor to a mid-leg height. We were told that airborne sugar in this room made it difficult for workers to see each other. We obtained documents indicating that certain parts of Imperial's milling process were releasing tens of thousands of pounds of sugar per month into the work area.

Based on our evidence, Imperial did not have a written dust control program or a program for using safe dust removal methods, and the company lacked a formal training program to educate its workers about combustible dust hazards. I believe these findings are further evidence of the need for a comprehensive regulatory standard for combustible dust.

Since the CSB was established in 1998, three of the four deadliest accidents that we have investigated have been combustible

dust explosions. In November 2006, as you mentioned, the CSB completed a thorough study on combustible dust. The board called for a comprehensive OSHA regulatory standard to prevent dust explosions in general industry, improved training of OSHA inspectors to recognize dust hazards, and improvements to material safety data sheets to better communicate dust hazards to workers.

The CSB based its recommendations in part on the success of OSHA's 1987 grain dust standard, which has cut deaths and injuries from grain dust explosions and fires by 60 percent. This standard requires worker training, rigorous housekeeping, and limits grain dust accumulations to $\frac{1}{8}$ of an inch.

The NFPA has produced highly respected consensus standards about how best to prevent and mitigate combustible dust explosions. OSHA has recognized the importance of NFPA standards, and it references them numerous times in the National Emphasis Program for dust, a program which the CSB supports.

However, without a comprehensive standard for combustible dust, it is difficult for businesses to know which specific NFPA provisions or other requirements they may be subjected to. A company that experiences a major dust explosion can expect to receive a fine from OSHA, as Imperial has. But absent a standard, thousands of other companies that may be at risk do not benefit from clear instructions about what kinds of dust are the most hazardous and what training and controls should be put in place.

After witnessing the terrible human and physical toll from the Imperial explosion, I believe the urgency of a new combustible dust standard is greater than ever. A new standard, combined with enforcement and education, will save workers' lives.

Thank you for the opportunity to testify today.

[The prepared statement of Mr. Bresland follows:]

PREPARED STATEMENT OF JOHN S. BRESLAND

Thank you, Chairman Murray, Senator Isakson, and distinguished members of the committee. I am John S. Bresland, Chairman of the U.S. Chemical Safety Board (CSB).

The CSB is an independent Federal agency that investigates and determines the causes of major chemical accidents, conducts studies, and develops safety recommendations and outreach materials to prevent future accidents.

My testimony today is on my own behalf, and not necessarily for the Board as a whole.

I commend you for convening today's hearing on the issue of combustible dust hazards and the explosion at Imperial Sugar on February 7, 2008.

Like Senator Isakson, Senator Chambliss, and Secretary Foulke, I traveled to Port Wentworth and witnessed first-hand the tremendous devastation at the Imperial Sugar refinery (Figure 1).

Figure 1. Aerial photograph of Imperial Sugar Port Wentworth facility after explosion.



DUST EXPLOSIONS AFFECT MANY U.S. INDUSTRIES

Combustible dust can be a catastrophic explosion hazard at American workplaces. Since the CSB was established in 1998, three out of the four deadliest accidents we have investigated were determined to be combustible dust explosions.

Madam Chairman, such accidents—and the tremendous suffering they cause—do not need to happen.

In addition to the 13 workers who died from the explosion and fire at Imperial, six workers were killed in a polyethylene dust explosion at West Pharmaceutical Services in Kinston, NC, and seven were killed in a resin dust explosion at CTA Acoustics in Corbin, KY. Both the latter facilities—representing two major employers in two small American towns—were devastated and had to be demolished.

The CSB determined that both the West and CTA explosions could have been prevented if the companies had followed National Fire Protection Association (NFPA) recommendations for controlling dust hazards. However, neither company adequately implemented these standards. Although State OSHA personnel had inspected both plants, the dust hazards had never been identified or cited during those inspections.

In November 2006, the CSB completed a comprehensive study on the issue of combustible dust. We found that combustible dust explosions have been a recurrent cause of disasters at U.S. industrial facilities. Our study identified 281 dust fires and explosions that occurred at U.S. businesses between 1980 and 2005—not including primary grain handling or underground coal dust explosions. These fires and explosions resulted in 119 deaths and 718 injuries.

Dust explosions afflict many industries, including food products, plastics, automotive parts, drugs, chemicals, and electric utilities. A wide range of common combustible materials can explode in finely powdered form, including coal, wood, flour, sugar, and many chemicals, plastics, and metals. Many of these basic materials and chemicals are essential to commerce, and they can be handled safely with appropriate precautions. Sophisticated chemical and pharmaceutical companies have handled similar combustible powders safely for decades.

Even a material that is difficult to ignite in bulk form—like a block of solid wood or metal—can become a powerful explosive fuel when ground into a fine powder, dispersed in air, and exposed to an ignition source. Exactly such conditions can occur in factories where fine combustible dust has accumulated on horizontal surfaces—particularly on elevated surfaces that are difficult to reach and not frequently cleaned or even thought about.

Some minor event, such as a small fire, an unsafe cleaning operation, or a dust explosion inside equipment (called a primary dust explosion) may be all it takes to suddenly disperse the accumulated dust. This creates a dense, explosive atmosphere

inside the confines of a plant, and if an ignition source is present, the stage is set for disaster. The suddenly dislodged dust can fuel a powerful “secondary” dust explosion that cascades rapidly through even a large factory. It is these secondary dust explosions that are generally responsible for multi-fatality accidents and huge property losses.

82 NEW DUST EXPLOSIONS SINCE JANUARY 2006

When my CSB colleague William Wright appeared before the House Education and Labor Committee in March 2008, he testified that in the 2 years since the CSB compiled the data for the combustible dust study, media reports indicated the occurrence of approximately 67 additional dust fires and explosions.

Today, just 4 months later, that number has already grown to a total of 82. Dust explosions and fires that are significant enough to be reported in the media are now occurring at the rate of almost one a week at American businesses.

The CSB investigation found that good engineering and safety practices to prevent dust explosions have existed for decades. Current good practices are contained in National Fire Protection Association (NFPA) standards, such as NFPA 654, NFPA 484, NFPA 61, and NFPA 499.

Some State and local governments have adopted some or all of these NFPA standards as part of their fire codes, but many have not. Our study also found that enforcement of these codes at industrial facilities is, at best, uneven.

Code enforcement agencies heavily emphasize the inspection of high occupancy establishments such as hotels, schools, and nursing homes—not industrial facilities. These agencies often lack the training or staffing to inspect industrial sites or enforce technical standards for combustible dust. Because hundreds of different State and local jurisdictions are involved in code enforcement across the country, there is no straightforward way to improve this system.

CSB RECOMMENDED A NEW, COMPREHENSIVE OSHA STANDARD FOR COMBUSTIBLE DUST

In November 2006 the CSB study on combustible dust made five specific safety recommendations to OSHA. The Board called for a comprehensive regulatory standard for dust explosions in general industry, improved training of OSHA inspectors to recognize dust hazards, and better communication of dust hazards to workers using Material Safety Data Sheets (MSDSs). The CSB also asked OSHA to alert the United Nations Economic Commission for Europe of the need to amend the Globally Harmonized System to address combustible dust hazards.

The CSB recommended that, while a new standard was being developed, OSHA establish a national emphasis program on combustible dust hazards to better enforce existing standards—which OSHA began in 2007 and is continuing to implement.

A year and 3 months after the completion of the CSB dust study, the Imperial disaster occurred, and it caused even more death and destruction than any of the previous dust explosions we had studied. In fact, the 13 fatalities from the Imperial Sugar explosion place this accident among the very worst industrial disasters of any kind in the United States over the past two decades.

DUST EXPLOSIONS CAUSE SEVERE BURN INJURIES

In addition to the deaths and property damage, combustible dust explosions frequently cause massive burn injuries that forever scar even those who survive. The West and CTA dust explosions injured a total of 75 people, including some who were left severely disabled and disfigured.

At Imperial Sugar, there were 101 employees and contractors present on the evening of February 7, 2008. The explosion and fire left eight dead at the scene, and burned another five so severely that they later died in the hospital. In addition, a total of 39 people were injured, including 23 who were burned. Of these 23 burn victims, 15 had serious and life-threatening injuries requiring hospitalization at the Joseph M. Still Burn Center in Augusta, more than 100 miles from Port Wentworth. Today, more than 5 months later, three burn victims remain hospitalized in the Still Burn Center. As requested by the committee, additional information on the number and severity of the injuries is included in Table 1.

Table 1. Information on Fatal/Nonfatal Injuries From the Explosion and Fire at the Imperial Sugar Facility in Port Wentworth

Victim	Employer	Location at Time of Incident	Status/Condition	Nature of Injury
1	Imperial Sugar	Unknown	Burn center—critical	Thermal burns (45 percent)
2	Stokes Contracting	Unknown	Burn center—critical	Thermal burns (85 percent)
3	Imperial Sugar	2nd floor south packaging ..	Burn center—good	Thermal burns (45 percent)
4	Imperial Sugar	1st floor south packaging ...	Deceased at burn center	Thermal burns (60 percent)
5	Imperial Sugar	1st floor south packaging ...	Deceased at burn center	Thermal burns (90 percent)
6	Imperial Sugar	2nd floor south packaging ..	Deceased at burn center	Thermal burns (85 percent)
7	Imperial Sugar	3rd floor south packaging ...	Deceased at burn center	Thermal burns (20 percent)
8	Kerby Contracting	Palletizing	Deceased at burn center	Thermal burns (85 percent)
9	Imperial Sugar	2nd floor Bosch	Deceased at refinery	Thermal burns
10	Imperial Sugar	2nd floor Bosch	Deceased at refinery	Thermal burns
11	Imperial Sugar	2nd floor Bosch	Deceased at refinery	Thermal burns
12	Imperial Sugar	2nd floor break room	Deceased at refinery	Thermal burns
13	Imperial Sugar	2nd floor break room	Deceased at refinery	Thermal burns
14	Imperial Sugar	3rd floor south packaging ...	Deceased at refinery	Thermal burns
15	Imperial Sugar	4th floor south packaging ...	Deceased at refinery	Thermal burns
16	Stokes Contracting	4th floor south packaging ...	Deceased at refinery	Thermal burns
17	Imperial Sugar	1st floor south packaging ...	Released from burn center ..	Thermal burns (40 percent)
18	Imperial Sugar	1st floor south packaging ...	Released from burn center ..	Thermal burns (20 percent)
19	Imperial Sugar	2nd floor south packaging ..	Released from burn center ..	Thermal burns (25 percent)
20	Imperial Sugar	2nd floor south packaging ..	Released from burn center ..	Thermal burns (51 percent)
21	Imperial Sugar	2nd floor south packaging ..	Released from burn center ..	Thermal burns (24 percent)
22	Imperial Sugar	3rd floor south packaging ...	Released from burn center ..	Thermal burns (19.5 percent)
23	Imperial Sugar	3rd floor south packaging ...	Released from burn center ..	Thermal burns (24 percent)
24	Imperial Sugar	3rd floor south packaging ...	Released from burn center ..	Thermal burns (20 percent)
25	Imperial Sugar	3rd floor south packaging ...	Released from burn center ..	Thermal burns (12 percent)
26	Imperial Sugar	3rd floor south packaging ...	Released from burn center ..	Thermal burns (18 percent)
27	Imperial Sugar	3rd floor south packaging ...	Released from burn center ..	Thermal burns (12 percent)
28	Imperial Sugar	Electrical and instrumenta- tion shop.	Released from burn center ..	Thermal burns (1 percent), Frac- ture, Laceration
29	Imperial Sugar	2nd floor break room	Treated/released	Fracture
30	Stokes Contracting	2nd floor lab	Treated/released	Laceration, Contu- sions
31	Imperial Sugar	2nd floor lab	Treated/released	Contusions, Smoke inhalation
32	Imperial Sugar	2nd floor lab	Treated/released	Contusions
33	Imperial Sugar	2nd floor south packaging ..	Treated/released	Thermal burns, Contusions, Smoke inhala- tion
34	Imperial Sugar	3rd floor south packaging ...	Treated/released	Contusions, Smoke inhalation
35	Imperial Sugar	4th floor south packaging ...	Treated/released	Thermal burns
36	Imperial Sugar	Bulk sugar	Treated/released	Contusions

Table 1. Information on Fatal/Nonfatal Injuries From the Explosion and Fire at the Imperial Sugar Facility in Port Wentworth—Continued

Victim	Employer	Location at Time of Incident	Status/Condition	Nature of Injury
37	Imperial Sugar	Electrical and instrumentation shop.	Treated/released	Contusions
38	Kerby Contracting	Handstack—manual pallet loading.	Treated/released	Thermal burns, Hearing loss
39	Kerby Contracting	Handstack—manual pallet loading.	Treated/released	Contusions, Hearing loss
40	Imperial Sugar	Liquid sugar	Treated/released	Contusions
41	Imperial Sugar	Palletizing	Treated/released	Contusions
42	Imperial Sugar	Palletizing	Treated/released	Thermal burns
43	Imperial Sugar	Palletizing	Treated/released	Hearing loss
44	Imperial Sugar	Palletizing	Treated/released	Contusions
45	Imperial Sugar	Palletizing	Treated/released	Thermal burns
46	Imperial Sugar	Raw sugar	Treated/released	Contusions
47	Imperial Sugar	Unknown	Treated/released	Contusions
48	Imperial Sugar	White sugar stand	Treated/released	Thermal burns, Contusions
49	Imperial Sugar	White sugar stand	Treated/released	Contusions

CSB'S PRELIMINARY FINDINGS ABOUT THE EXPLOSION AT IMPERIAL SUGAR

The catastrophic explosion at Imperial Sugar in February resulted from massive accumulations of combustible sugar dust throughout the packaging plant at the refinery.

The CSB investigation to determine the causes of the accident at Imperial Sugar is ongoing. Our investigative team arrived in Savannah on February 8 and conducted work at the site almost continuously through June, and some field work still remains to be completed.

We have conducted detailed interviews with about 130 witnesses, including operators, managers, engineering staff, maintenance and cleaning contractors, and top executives. We have collected thousands of photographs and documents.

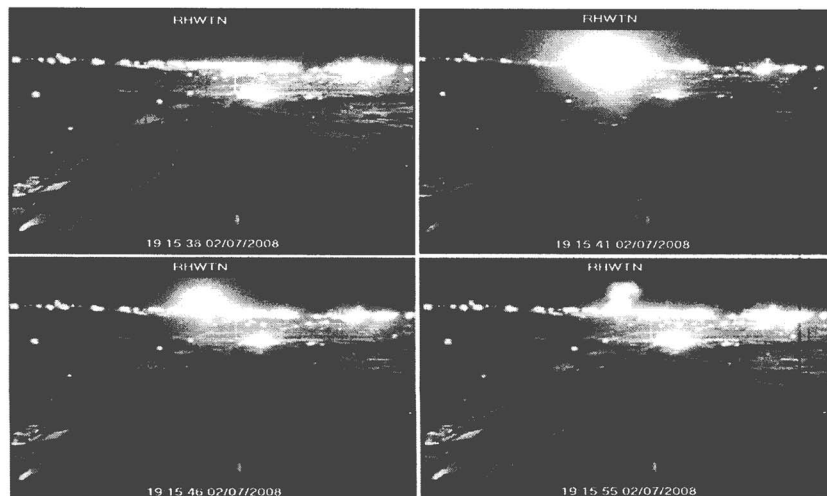
Let me briefly summarize our conclusions to this point, emphasizing that all information is preliminary and we continue to investigate.

The Imperial Sugar facility can trace its origins back to 1916. This was a large plant with hundreds of employees. Most of the employees we interviewed had worked at the site for the past 10 to 30 years. On the day of the explosion, it was the second largest sugar refinery in the United States.

Raw sugar arrived by ship and was stored in a warehouse. In the refinery section of the facility, the raw sugar was dissolved in water and purified by filtration and crystallization. The purified sugar crystals were then stored in three huge silos, which were surrounded by a large, four-story packaging plant. Within this plant, which was several hundred feet long, workers operated machinery that not only bagged and boxed sugar but also pulverized it in hammer mills to make powdered sugar.

Like most catastrophic dust explosions, what happened at Imperial was a multi-stage event. At 7:15 p.m. on the evening of February 7, there was a primary explosion in the packaging plant, followed 3 to 5 seconds later by a much larger secondary dust explosion. The explosion blew through the roof of the building and rose high into sky; the moment of the blast was captured in images from a surveillance camera almost 2 miles from the refinery (Figure 2).

Figure 2. Surveillance camera captures secondary dust explosion from two miles away.



There were about a hundred employees at the facility that evening. As the secondary explosion occurred, witnesses inside the packaging plant saw a fireball rolling overhead. Some were engulfed in fire and flaming debris; others were burned by a sudden burst of scorching hot air.

Thereafter, a large fire ensued and grew, fueled by sugar and combustible packaging materials. At least one victim became trapped and could not be rescued. He died in the advancing fire. Although the building had a sprinkler system, its water piping was immediately disabled by the explosion.

Had the accident occurred a few hours earlier during the day shift, about 300 people would have been present at the plant, and the number of deaths and injuries could have been far higher.

The nature of the primary explosion has not been conclusively determined. We do know that an explosion likely occurred underneath the sugar silos. Beneath the silos, there was a long, steel-enclosed sugar conveyor system, which carried granulated sugar from the silos to the packaging plant. This sugar could include fine combustible particles generated in processing and handling.

The explosion under the silos was strong enough to blow some of the steel enclosure panels of the conveyor system into the packaging building. To date, the immediate area of this explosion has remained largely inaccessible to investigators, and other possible primary explosions have not been ruled out.

ACCUMULATED SUGAR IN PACKAGING PLANT FUELED THE EXPLOSION

Inside the four-story packaging building, the secondary dust explosion was fueled by widespread accumulations of combustible sugar dust. It was this secondary dust explosion that caused the major loss of life at Imperial. Secondary dust explosions like this do not occur if dust has been prevented from accumulating on surfaces.

National Fire Protection Association guidance documents, such as NFPA 654, indicate that accumulations of combustible dust of $\frac{1}{32}$ of an inch—covering just 5 percent) of the available surface area—should be considered hazardous due to the possibility of a secondary dust explosion.

Multiple witnesses told CSB investigators of large accumulations of sugar at many locations throughout the packaging plant. Accumulations of dust were long-standing and were present until the day of the explosion, according to these witnesses. Near the powder mills, powdered sugar accumulated on the floor to a “mid-leg” height, according to a worker there. Airborne sugar in this room made it difficult for workers to see each other, we were told. On elevated surfaces, witnesses described seeing thick build-ups of sugar of around an inch.

PRE-EXPLOSION PHOTOGRAPHS FROM 2006 SHOW CONDITIONS INSIDE PLANT

The CSB obtained pre-explosion photographs taken at the Imperial facility by a third-party in September and October 2006. These photographs, which show different locations inside the packaging building, confirm the existence of substantial dust accumulations on various walls, pipes, ducts, motors, switch boxes, and pieces of processing equipment. The pictures show an inch or even more of accumulated sugar on elevated surfaces. On several production floors, the photographs show a foot or more of accumulated sugar (Figure 3).

Figure 3. Photographs of sugar accumulations inside the Imperial Sugar Port Wentworth facility from September – October 2006.



A July 2007 Imperial Sugar incident investigation report of a worker's skin injury stated that "Powder sugar [sic] was piled up on the floor below the mill approximately 18 inches high. When he stepped into the sugar it came up to around his knee." This internal report included photographs showing the accumulations of sugar, and stated that "The sugar on the floor in the Powder Mill Room is and has been a constant problem." Internal Imperial e-mail correspondence from December 2007 reported: "We clean up around 15,000 lbs weekly out of the mill room." And an internal Spill Control Team report dated December 5, 2007, describes conditions

in the Powder Mill Room as follows: “The 2 lb elevator in back of the room blows powder everywhere . . . Approximate losses in November = 34,000 lbs.”

After being shown the 2006 photographs, Imperial Sugar representatives asserted that the facility was clean immediately before the February 2008 explosion. However, the levels of sugar accumulation shown in the 2006 photographs are consistent with the July 2007 incident report as well as levels Imperial operators and contractors told the CSB existed at the time of the 2008 dust explosion. In addition, we are not aware of any significant change in Imperial’s housekeeping or maintenance practices which would account for a dramatic decrease in the amount of sugar accumulating on surfaces due to ongoing releases from operating equipment.

IMPERIAL LACKED FORMAL DUST TRAINING, CLEANING PROGRAMS

Imperial Sugar reported that its personnel conducted a weekly cleaning of the plant to collect and reprocess spilled sugar. In part, this cleaning was necessary to prevent employees from slipping and injuring themselves on accumulated sugar. However, Imperial Sugar did not have a written cleaning procedure or checklist and therefore could not assure the thoroughness of this program. Various witnesses told the CSB that the cleaning focused on accessible working surfaces and not on elevated surfaces. Interviewees also said the cleaning sometimes did not occur due to production needs. In addition, machines were commonly blown off with air, which contributed to the spread of sugar onto other horizontal and elevated surfaces.

Accumulations of dust on elevated surfaces are particularly hazardous, since they usually consist of the finest, most explosive material, are difficult to clean, and are prone to be dislodged into the atmosphere in the event of a fire or a primary explosion.

We asked Imperial Sugar for all policies and procedures related to dust control, records of weekly cleaning activities, and documentation of training on dust hazards, but the company was unable to produce any documents that were responsive to these requests. Based on the available evidence, Imperial did not have a written dust control program, a specific target level for the maximum dust accumulation, or a program for using safe dust cleaning methods, and the company did not impose combustible dust safety requirements on cleaning contractors. And the company produced no documentary evidence of any formal training program for educating its workers about combustible dust hazards.

Much of the electrical equipment in the sugar packaging plant was not dust-tight and therefore was not appropriate for use in plant areas where combustible dust could form an explosive atmosphere. Only a small portion of the building—the powder mill motor control room—was enclosed to prevent dust intrusion.

Finally, the packaging building on the south side of the silos was more than a half-century old, and the equipment did not incorporate effective design features to prevent the spread and accumulation of sugar dust. The building walls were of masonry construction and lacked provisions to safely vent the forces of an explosion. The 2008 dust explosion caused massive structural damage to the packaging building, which increased the human toll from the accident, as concrete floors heaved, brick walls blew out or collapsed, and windows flew hundreds of feet.

OPERATORS NOT INFORMED OF THE RISKS FROM COMBUSTIBLE DUST

Among operations-level personnel, we found no significant awareness or training about the hazards of catastrophic dust explosions. In interviews, some management-level personnel described varying but limited levels of familiarity with dust explosion hazards. Although we have found no indication that this particular facility had previously experienced a major explosion, 10 days prior to the February 7 disaster there was a small explosion inside a dust collector on the roof of the packaging building.

Employees reported another near-miss incident when a small fire erupted in the packaging building a few weeks before the February explosion. Accumulated sugar near a packaging machine was apparently ignited by an overheated motor or conveyor bearing.

NFPA RECOMMENDATIONS LIKELY WOULD HAVE PREVENTED MAJOR EXPLOSION

Madam Chairman, the standards developed by the National Fire Protection Association (NFPA) represent the consensus of industry’s own experts about how best to prevent and mitigate combustible dust explosions. However, Imperial Sugar did not have a program to follow relevant NFPA recommendations for preventing dust explosions—including NFPA 61, NFPA 654, and NFPA 499.

The principal standard, NFPA 654, was first developed between 1943 and 1945, and has since been updated and improved a number of times. NFPA 654 describes

a number of important safety practices and principles, which if diligently followed, would have made the catastrophic dust explosion at Imperial unlikely to occur. For example, NFPA 654 recommends that dust-producing activities such as powder milling be isolated from other operations—and that barriers be installed to prevent the migration and accumulation of dust.

Equipment should be designed and maintained to minimize the release of dust. New construction should be designed to facilitate cleaning, by minimizing horizontal surfaces where dust can collect and, wherever feasible, sealing areas that are inaccessible to cleaning. The standard also calls for regular cleaning—including overhead ducts, pipes, and beams—using safe cleaning methods such as vacuuming with appropriate equipment. Housekeeping should be comprehensive to control hazardous dust accumulations wherever they might occur, not just on walking and working surfaces.

The NFPA suggests immediate cleaning and removal of any dust accumulation over $\frac{1}{32}$ of an inch, about the thickness of a paperclip. More than $\frac{1}{32}$ of dust covering 5 percent) of the room area is enough to create an explosive atmosphere if the dust becomes suddenly dispersed.

The NFPA standard calls for designing process equipment to ensure that dust explosions inside the equipment vent to safe locations away from personnel, and not into work areas where life-threatening secondary explosions could occur. It also calls for controlling activities and equipment that may cause ignition and requires that electrical equipment be suitable for dust-containing atmospheres. And buildings should be designed to be evacuated quickly in an emergency.

Finally, the NFPA standard calls for a basic safety management system at facilities that handle combustible powders. This system is similar to what thousands of oil and chemical facilities already follow under the OSHA Process Safety Management (PSM) standard. The NFPA recommends that facilities with dust explosion hazards develop worker training, hazard analysis, and change management programs, and conduct regular inspections and maintenance.

Most of the fatalities and serious injuries from industrial dust explosions occur due to secondary explosions, which result from dust accumulations in work areas. These explosions—including the one at Imperial Sugar—can be prevented by adherence to the principles contained in the NFPA standards. Our investigation to date reveals numerous areas where Imperial was unfamiliar with and did not implement NFPA recommendations.

OSHA has recognized the importance of NFPA's dust standards and they are referenced numerous times in the National Emphasis Program that OSHA began last year and re-issued earlier this year. We support the NEP, and I commend Secretary Foulke for its establishment. The creation of an NEP would appear to satisfy one of the CSB's safety recommendations from 2006.

IMPERIAL DISASTER EMPHASIZES NEED FOR A COMPREHENSIVE OSHA STANDARD

A comprehensive OSHA dust standard is necessary to get businesses, government inspectors, and insurers to identify dust hazards and take appropriate actions to control them. Existing standards do not clearly identify what kinds of dust are hazardous and only address limited aspects of how to control those hazards.

OSHA's existing Walking-Working Surfaces standard (29 CFR 1910.22)—sometimes loosely referred to as “the housekeeping standard”—requires that “all places of employment be kept clean and orderly and in a sanitary condition.” Its primary purpose is to protect individual workers from slips, trips, and falls from water, debris, or sharp objects. It does not specifically address fire or explosion hazards, does not mention combustible dust, and does not impose any specific enforceable limitations, engineering controls, procedures, cleaning methods, or training requirements.

There are also limitations in seeking to apply existing NFPA standards, as written, under the OSHA general duty clause. NFPA 654 does not include specific lists or criteria for what combustible powders are covered (although two related standards, NFPA 61 and NFPA 499, clearly identify sugar dust as an explosion hazard). NFPA 654 also contains a number of general provisions that may be subject to differing interpretations. For example, the standard says that decisions about applying safety recommendations retroactively to existing buildings must be made on a case-by-case basis to achieve an “acceptable degree of protection”—a term that is difficult to define.

Instead of the present patchwork of miscellaneous Federal, State, and local requirements, the Chemical Safety Board has recommended that OSHA develop a single, comprehensive, uniform standard—based on the sound, consensus-based technical principles and practices that are embodied in NFPA standards. Ambiguities

in the NFPA standards need to be resolved in clear, enforceable regulations developed by a thorough, public rulemaking process.

The House of Representatives took a similar approach in H.R. 5522, the Worker Protection Against Combustible Dust Explosions and Fires Act of 2008, which mandates an OSHA standard that is based on NFPA standards, but considers input from all parties.

OSHA GRAIN DUST STANDARD HAS CUT EXPLOSION DEATHS BY 60 PERCENT

Advocates of a new OSHA standard are encouraged by the success of the OSHA grain dust standard, 29 CFR 1910.272. In the 1970s and 1980s, the U.S. experienced a series of grain dust explosions that caused a number of deaths. OSHA responded in 1987 by issuing a comprehensive grain dust standard. This standard requires preventive maintenance, worker training, safe operating procedures, emergency planning, and formal dust-cleaning programs. In particular, grain-handling facilities (but not other industries) must adopt written cleaning schedules, identify priority housekeeping areas where combustible dusts are most likely to be present, immediately remove any dust accumulations over an eighth of an inch, and avoid using compressed air for cleaning.

According to OSHA's own review in 2003, this standard has cut deaths and injuries from grain dust explosions and fires by 60 percent. And as noted in the CSB study, the grain industry itself now credits the standard with helping to make the design of grain handling facilities safer.

Developing a new combustible dust standard will be a complex undertaking, and OSHA will face technical challenges along the way. A realistic timetable will need to be developed. But the time to start this important work is now. We should not await another tragedy on the scale of what we just witnessed in February before starting the rulemaking process.

In November 2006, when the combustible dust study and recommendations were before the Chemical Safety Board for approval, I had reservations about recommending a new OSHA dust standard for general industry. At that time, I hoped that the terrible dust explosions in 2003 would prove to be an anomaly, and that heightened awareness and vigilance by industry would make a new Federal regulation unnecessary.

NEW OSHA STANDARD, EDUCATION, AND ENFORCEMENT WILL PREVENT FUTURE DEATHS

Although I continue to believe that education and awareness are very important components, the tragic circumstances of the Imperial Sugar explosion have now convinced me that a comprehensive Federal standard should be enacted to help prevent future disasters.

Of course, a standard by itself will not prevent all accidents. Therefore, we need a new standard, an emphasis program, *and* an awareness campaign to tackle this problem. Without all three elements—strong regulations, education, and enforcement—workers will continue to be put at risk.

A combustible dust standard will save workers' lives. It will save many others from devastating burn injuries.

After witnessing the terrible human and physical toll from the Imperial explosion, I believe the time for further debate should draw to a close. It is time for all interested parties—industry, labor, and government—to move forward toward a standard that will protect workers, businesses, and communities well into the future.

Thank you for the opportunity to testify today.

Senator MURRAY. Thank you very much to both of you.

Before we move to questions, Senator Brown joined us a few minutes late and wanted to give a quick opening statement before we go to the questions.

Senator BROWN. Not necessary. I will wait for the questions.

Senator MURRAY. OK, very good.

Senator BROWN. Thank you, Madam Chair.

Senator MURRAY. All right. Thank you very much to both of you for being here and for your testimony. Let me ask this question to both of you.

I understand now that OSHA has issued citations proposing penalties of over \$8.7 million in safety violations to Imperial Sugar, which I understand is the third-largest fine in the history of the

agency. Those citations covered 118 instances of willful violations, a category in which OSHA can count each instance a violation occurs, because it is measured against a specific standard.

For many other citations, OSHA used a more general duty clause that allows it to cite unsafe practices not specifically addressed in the regulations. I would like to ask both of you if any critical hazards or life-threatening dangers were not included in the citations because they could not be specifically named.

Mr. Foulke, I would like to ask you first.

Mr. FOULKE. Not that I am aware of, Madam Chairman.

Senator MURRAY. Mr. Bresland, do you have any comment on that?

Mr. BRESLAND. Well, I think a general or a more specific standard for combustible dust control would be somewhat similar to the grain standard, and certainly one thing that would need to be done would be an assessment of the hazards of the particular dust.

There are tests that can be done on dusts that are relatively easy and straightforward and relatively inexpensive. They cost maybe \$1,200, \$1,500 to do. Once you have done that test, you, the employer, would have an idea of the relative danger of the dusts that you are dealing with.

Now keep in mind that not all dusts are explosive. I think there is a general impression out there or a general lack of awareness of the hazards of combustible dusts. If these tests were carried out, people would have an awareness of what the hazards are, and then an appropriate accident prevention program would be put in place.

Senator MURRAY. Well, I guess my question is, if we did have a specific standard for combustible dust, would the results of this investigation have been different? Would the situation with the penalties have changed any?

Mr. FOULKE. I don't believe so, Madam Chairwoman. If you would look at what we cited at Imperial Sugar, as I mentioned in my testimony, 60 specific OSHA standards were cited against Imperial Sugar. They were violations of 60 separate standards that are already on the books. There were only a few, only 7 general duty clause violations that were cited at Port Wentworth.

Once again, what that shows—and this is the important thing to recognize—is that Congress, when it initiated the act, understood that there would be situations where you would not be able to cover everything. They specifically put the general duty clause in there, which allows us at OSHA to be able to cite employers for other safety and health hazards.

It shows that the Imperial Sugar inspection and the citations demonstrate clearly that the system works, that we are citing employers, where we don't have a standard, under 5(a)(1). Yet we still have an additional 60 separate standards that were cited. To tell you the truth, here we have where the employer just violated 60 specific standards. I think if you had a combustible dust standard, there would have been 61 standards that would have been violated.

Senator MURRAY. Well, you have said that OSHA has 17 different standards that relate to combustible dust. Many of those standards that you point to don't even mention the word "dust," and none of those standards were designed specifically to prevent dust explosion. The housekeeping standard only applies to places

where people are working, passageways, storage rooms, and doesn't apply to many of the places where dust can accumulate, like sealed areas or perhaps suspended ceilings.

Wouldn't a single comprehensive standard be more effective in getting employers, first of all, to understand the hazard posed by accumulated dust?

Mr. FOULKE. Well, we have not ruled out looking at doing a standard, Madam Chairwoman. What we are looking at—and we have our National Emphasis Program, and what this is providing us with is the information. We are going out and examining a whole series of companies that have the potential for combustible dust. We are also looking at the types of substances that are involved, the types of industries that are involved, the types of processes that are involved. This is the information that we need.

The post that I have here, this is the post that OSHA has put out with respect to combustible dust. Their list, some of the substances they are dealing with, all this list is the substances. With the grain standard, you were dealing with one substance. As you can see from this list, we are dealing with a lot of different substances to deal with a combustible dust standard.

Senator MURRAY. Did you inspect Port Wentworth or Gramercy facilities prior to this February 7th explosion? Did any inspectors?

Mr. FOULKE. Yes.

Senator MURRAY. It was? What kind of citations were issued at that time?

Mr. FOULKE. Well, the Port Wentworth inspection was conducted in 2000 under a complaint inspection, and the difference between—

Senator MURRAY. Was there a citation at that time?

Mr. FOULKE. There was no citation because this inspector investigated where the complaint was. On complaint inspections, we are, under law, focused on a specific area that we need to look at. Obviously, there were no other safety and health hazards that were observed, but the complaint that was issued or the complaint that we received and the inspection that followed determined that there was no evidence of a violation based on the complaint.

Senator MURRAY. I am looking at these photos here. You didn't see anything like that? Or the supervisor or the inspector didn't see anything like this?

Mr. FOULKE. I am not sure exactly where the inspection was held. If it was a complaint inspection, it may have been held in a different area where—like in the warehouse or something. I am not sure of that.

Senator MURRAY. Well, my time is up, but I want to ask you, in your testimony, you say that the existence of a specific combustible dust standard would not have prevented the Imperial Sugar explosion because Imperial Sugar had a blatant disregard for safety. Yet now we have Imperial Sugar using the absence of a dust standard as the key to their appeal of OSHA citations, saying it is evidence that OSHA didn't know about the hazard of dust and didn't put the industry on notice.

Aren't you kind of inviting that kind of defense by failing to issue a specific dust standard?

Mr. FOULKE. Well, I know that Imperial Sugar has contested the citations. I don't know what their specific—what their defenses are going to be. But, I will say this very clearly. We had the things in place. There was clearly knowledge about combustible dust.

We put out a Safety and Health Information Bulletin on combustible dust in 2005. We had started a special emphasis program in our Region 3 in Philadelphia on combustible dust. We started our National Emphasis Program. That was actually started before this inspection went on, and I believe the evidence shows that Imperial Sugar was aware that we were doing the inspection.

We have—once again, too—you have always got to remember, the act passed by Congress puts the responsibility of having a safe work site on the employer. It does not say, "OSHA, you are now the corporate safety and health director for every company in the United States." It requires the employers to maintain a safe workplace. That is their responsibility under the act.

Now some people like to pass the buck, to be quite frank. When they want to try to put the blame, shift the blame away from them and put it on somebody else. The act puts the responsibility on the employer. We have been providing them plenty of—we had our SHIB. We put out our hazard alert. We had the poster. We have our Web page out there that they can go on and get all of this information.

For any employer in the United States to say that they don't understand that there is—they don't know anything about combustible dust hazards, especially in the sugar industry, is just not right. It is not true.

Senator MURRAY. Senator Isakson.

Senator ISAKSON. Thank you, Senator Murray.

Mr. Foulke, what triggers an OSHA compliance inspection?

Mr. FOULKE. Senator, it can be a number of different things.

Senator ISAKSON. Tell me what they are.

Mr. FOULKE. Well, one is obviously, in this particular case involving Imperial Sugar, when you have a fatality or the multiple hospitalization of three or more employees, then we do an automatic inspection. We also do inspections for complaints where an employee or a former employee or someone files a complaint with OSHA, citing a complaint about safety and health hazards. Then we will inspect those.

The third one is where we have program inspections, and we have a set group of targeting things, do our site-specific targeting on our National Emphasis Programs and local emphasis programs.

Senator ISAKSON. And your statement that by the end of this year, all refineries will be inspected as a program you put in place?

Mr. FOULKE. Sugar.

Senator ISAKSON. Sugar refineries.

Mr. FOULKE. Yes. Yes, we put that in place the beginning of this year, and we intend to inspect all the sugar refineries through our National Emphasis Program by the end of this year.

Senator ISAKSON. Mr. Bresland, would you give me—explain to me the difference between combustion and explosive? Combustible and explosive?

Mr. BRESLAND. That is—you mean in terms of combustible dust?

Senator ISAKSON. I mean just the two terms. One is an explosion. The other is combustible. Is there a difference in the two?

Mr. BRESLAND. Combustible is a term that is normally used with flammable liquid or combustible liquid, such as diesel, for example. It is something that can catch fire, and it is defined by the flash point of the particular liquid. An explosion is something that causes an overpressure and results in the sort of damage that you saw at the Port Wentworth refinery.

Senator ISAKSON. Wasn't there an explosion in Baltimore, MD, in November 2007?

Mr. BRESLAND. There was an explosion at the Domino Sugar factory in 2007.

Senator ISAKSON. Did you do an investigation of that?

Mr. BRESLAND. No, we didn't. No.

Senator ISAKSON. Sugar dust was the—

Mr. BRESLAND. From what I read in the press reports, and they were in the press yesterday, there were fines levied on Domino Sugar by the Maryland OSHA. I believe, as I recall, it was \$4,000.

Senator ISAKSON. The reason I am asking that question is in the testimony of Mr. Foulke, on page 4, it says,

“In the course of our investigation, we found the management of Imperial Sugar was aware that there were hazards caused by combustible dust at its facilities and knew that it had not been effectively managing dust accumulation for a number of years.”

Combustible is different from explosive. Throughout all the reading I have done, everybody is parsing those two words. I am just trying to get to the point of this specific reference.

Mr. BRESLAND. I think I understand your confusion, but I think in the sense that we are talking about today, I would say that combustible dusts and explosive dusts are somewhat interchangeable as a term.

Senator ISAKSON. Does it take combustion to have an explosion?

Mr. BRESLAND. Yes, it does. Yes. If I can use as an example, just to describe how this works, if you take a piece, a block of wood and try to set fire to it, it is not going to catch fire. If you take wood kindling and put a match to it, it probably will catch fire, but relatively with some difficulty. If you take dust, very finely divided wood dust and under the right circumstances, it will explode.

You can go from a piece of wood, which is relatively innocuous, to the same wood as a very finely divided material, let us say confined inside a room like this, at a sufficient concentration, it would explode.

Senator ISAKSON. I think Senator Chambliss and I come from the pine tree capital of the United States, and we are very familiar with sawdust explosions and combustion. That is a great example.

It just seems to me like, in all of this, I keep reading about how we didn't know whether something would explode or whether it was combustible or whether it was flammable or not. When we had all these 281 explosions in 30 years of dust explosions that it seems like everybody ought to know that organic dust is explosive.

Different properties have different intensities, I would think. It seems to me like that is just almost common knowledge. To that

end, are the National Fire Protection Association regs, by nature, are they adopted as a part of OSHA standard?

Mr. BRESLAND. Are you asking—

Senator ISAKSON. I am asking Mr. Foulke. I am sorry.

Mr. FOULKE. Oh, I am sorry.

Senator ISAKSON. The National Fire Protection Association standards?

Mr. FOULKE. Sir, some of our standards are—have consensus standards that are incorporated by reference.

Senator ISAKSON. Are their standards as it relates to dust a part of OSHA standards, either by incorporation?

Mr. FOULKE. We have not incorporated the National Fire Protection code standards specifically.

Senator ISAKSON. In that combustible dust posting that you have, does it reference the National Fire Protection Association standards?

Mr. FOULKE. We do reference the National Fire Protection code standards in a number of things, including on our Web site, where our combustible dust Web site outlines what standards are applicable, but also what reference materials are available.

Senator ISAKSON. Thank you, Madam Chairman.

Senator MURRAY. Senator Brown.

Senator BROWN. Thank you, Madam Chair.

Mr. Bresland, thank you for your independence and your courage. Thank you.

Mr. Foulke, OSHA's own response to earlier combustible dust crises in the grain industry, as Mr. Bresland pointed out, demonstrates a dust-specific standard works. During the Reagan administration, in 1987, after a series of deadly grain dust explosions, OSHA issued the standard that you both mentioned on combustible grain dust that applies mainly to grain elevators, feed and flour mills, and certain soybean processing plants.

The standard has been extremely successful in reducing grain dust explosions from 1987 to 2003. Over 16 years, those explosions decreased by 43 percent, and related injuries and fatalities dropped by some 60 percent.

I understand the Bush administration's view that voluntary standards are the way to go. For whatever ideological reasons, they have come to that conclusion. Why has OSHA been so slow on the dust in sugar and metal and wood and pharmaceutical manufacturing?

Mr. FOULKE. Well, I don't think we have been slow. I think one of the things—clearly, our position is we are looking at whether the data would show us that we need to do some type of rulemaking. We are looking at that. First of all, I think if you see the Imperial Sugar, the citations there show that we have a lot of standards that are applicable to combustible dust hazards, and clearly, we cited Imperial Sugar for that.

The grain standard, I can't deny that it hasn't been successful, but you have to also recognize the grain standard does not just deal with explosives. It also deals with engulfments, and that is one thing—that is part of where the reduction in fatalities has occurred. Also if you look prior to the enactment of the grain stand-

ard, which took 8 years to enact, there was already a steady decline in the number of explosions and the number of fatalities.

Once again, and it kind of was what you pointed out there in your question, grain standard deals with one element, grain. A comprehensive combustible dust standard would have to deal with all those specific items and also dealing with specific industries and specific processes. This is not—this is a complicated standard.

I know there has been the discussion that we should go and adopt the National Fire Protection code as our—as a basis. If you want to look at the National Fire Protection code, it has five different combustible dust standards. It is not one. These are the five here.

Each one of these also references, mandatory references—like 654 is probably the main, general combustible dust standard. It references 40 others. If you take all the mandatory references in the National Fire Protection code, combustible dust standards, this is what you get right here.

In developing a comprehensive standard, first of all, even the National Fire Protection Code has not set a specific one standard, nor do they have a specific standard for dust. Each one of these has its own different discussion of dust. Plus, it incorporates all these other items. In developing a standard, we are going to have to see how all this integrates together and how it impacts on our standard.

Senator BROWN. Yes, I would like to accept your answer, but it has been 16 years that we have seen the grain standard. I have heard the differences, and I accept those, mostly. It has been 2 years since the Chemical Safety Board issued the study that identified hundreds of combustible dust incidents over the past three decades that resulted in more than 100 worker deaths. They found no rules exist to control the risk of dust explosion. They recommended that OSHA move on it.

I heard your comments that it is ultimately the employer who is responsible. What that says to workers in this country is you are on your own because the Government is not on your side. We are just hoping employers do it. We believe that employers should have a voluntary standard. I mean, that has really been the message out of OSHA for the last half dozen years or so.

It sort of begs the issue that the worker is on his own in this. I look at what has happened in Marion, OH, in my State, and the popcorn workers at a company in Marion. The danger is called "popcorn lung" from diacetyl exposure.

There was a petition for a standard to regulate diacetyl. OSHA denied it. It was supported by 42 of the country's leading occupational safety and health scientists and experts. I mean, we have just seen too much of this from OSHA. Listen to people like Mr. Bresland and listen to the representatives of these workers, whether they are union or nonunion, listen to people on this committee that OSHA needs to get more serious about siding with the worker, not doing the company's bidding so often.

Mr. FOULKE. Well, I have to disagree with your premise, though, that, first of all, there is no such thing as a voluntary standard. OSHA has on the books numerous safety and health standards that cover a whole variety of things.

I think you can look at the fact that looking at the Imperial Sugar citations, this clearly demonstrates \$8.7 million in penalties, 61 different specific standards, on-the-book standards cited, 218 different violations. It wouldn't have mattered if we had another combustible dust standard. This accident would have happened. I personally believe that they would not have complied with a combustible dust standard.

The other question you brought up about diacetyl. First of all, I will mention we are working on a diacetyl standard. Second, we did deny the emergency temporary standard for diacetyl, and the reason was that there are two—the courts require two criteria for an emergency temporary standard. There has to be a grave danger, and you have to be able to show that there is a necessity for the emergency standard.

Through our history, we have issued nine emergency temporary standards. Of those, six were challenged in court, and five were vacated by the court. The last time we issued an emergency temporary standard was in 1983 for asbestos, and that was vacated by the court. The burden on an emergency temporary standard is extremely high for us.

Senator BROWN. I can expect that OSHA, by what date, will come up with a diacetyl standard for the popcorn workers?

Mr. FOULKE. We are working on that. We have moved forward. We are in the process of the—we have briefed the SBRFA panel. We are getting ready to do the SBRFA panel. We are moving forward with it. Once the SBRFA panel is completed, then we will have a notice of proposed rulemaking.

Senator BROWN. That is roughly—timetable? When would that be, roughly?

Mr. FOULKE. I would suspect sometime the end of next year maybe.

Senator BROWN. End of 2009?

Mr. FOULKE. Right.

Senator BROWN. Thank you.

Senator MURRAY. Senator Chambliss.

Senator CHAMBLISS. Thank you, Madam Chairman.

Gentlemen, thank you for your service on this. Obviously, from the testimony of both of you, combustible dust exists in any number of manufacturing facilities, a lot of which are listed on your chart here, Mr. Foulke. Is it the position of OSHA, as well as the Chemical Safety Board, that you seek to eliminate dust in these manufacturing operations, or should manufacturers seek to control their operations with that dust?

Mr. BRESLAND. Let me respond to that. I think everybody should be aware that in the pharmaceutical industry and in the chemical industry in particular, dust and particulates are part of the process. When you buy a pharmaceutical tablet, it is originally a dust, and it possibly could have been a combustible dust. Those industries deal with combustible dusts on a day-to-day basis, and they deal with them safely.

The sort of issue that we are talking about in our program and our reports are the dust that you see here, that if this was a pharmaceutical company, you wouldn't be throwing dust all over the

place. Because sugar is relatively low value, I guess they consider that you clean it up, put it back in the process, recycle it, it is OK.

The issue is that under certain—in many industries, combustible dust has been dealt with and sometimes quite dangerous combustible dust has been dealt with in a very appropriate way with the appropriate training of the employees, the appropriate equipment to either prevent or mitigate the dust explosions. Let me just refer to something that Mr. Foulke said.

I agree with him on the issue of who is responsible for making sure that facilities are run in a safe manner. I worked in industry for 35 years. It is the industry company who has a basic responsibility. However, for industry to run safely, they do need some guidance. They need guidance in the way of regulations.

From my perspective, having worked in the chemical industry, a good starting point for a combustible dust program would be something similar to the one that OSHA has for chemicals and refineries, the process safety regulation. It wouldn't take exactly the same thing, but you could—that would be a good starting point for them, where you have operator training and mechanical integrity programs, making sure the place is kept appropriate, doing process hazard analysis to determine if you have a particularly dangerous dust.

Senator CHAMBLISS. Mr. Foulke, anything you want to comment, on that?

Mr. FOULKE. Well, you know, it is clear and our position has always been and the act clearly states it is the employer's responsibility. 5(a)(1) of the act says an employer is responsible to provide a safe and healthy workplace for its employees as free from safety and health hazards that can cause death or serious injuries.

I mean, the act—you can't make it any clearer than that. And then to say that we provide a lot of information and guidance. That is part of what our responsibility is to provide guidance to employers to be able to have a safe and healthy workplace. That is why we put out the SHIB in 2005 dealing with combustible dust. It is numerous pages, but it outlines all the items that are responsible—it outlines all the different processes.

It talks about accumulation of dust. It talks about ignition sources. It talks about those type of things that you have to do to be able to eliminate—

Senator CHAMBLISS. I hear what you are saying. Let me move on because my time is going to run out. You just mentioned really what I want to get to. There is no way to operate a sugar manufacturing facility like Port Wentworth or, for that matter, Gramercy, which I have never seen, without some dust being in the air. Chemical, pharmaceutical plants, I assume, is the same.

In addition to having the dust, there has got to be some control over what ignites that dust. What did you find here from a fault standpoint relative to creating the spark that ignited this dust?

Mr. FOULKE. Yes, we found a number of instances, 42 per-instance citations were on 44 pieces of spark-producing, nondust proof electrical equipment in combustible dust areas. Our electrical standard, 1910.307 specifically states and talks about having dust-proof, spark-proof equipment in combustible dust areas.

Clearly, here if you are able to eliminate the ignition source, there is basically a couple of things you can do to eliminate all combustible dust hazards. You eliminate the combustible dust, and that comes under a housekeeping standard. Also if you eliminate the ignition sources, which our electrical equipment standard covers, then you have eliminated the potential for an explosion.

Senator CHAMBLISS. Thank you.

Senator MURRAY. Mr. Bresland, I wanted you to respond to Mr. Foulke's statements about the adequacy of the current OSHA standards and need for a single dust standard. Do you believe that we need a single dust standard?

Mr. BRESLAND. Yes, I do. Especially if you compare the current OSHA housekeeping standard, which is—I have it somewhere in here. This is the totality of OSHA's regulations for general industry. If you look at the housekeeping standard in there, it is one paragraph in that whole book. If you look at the grain dust standard, there is more detail in the grain dust standard—things like emergency action plans, training for employees, hot work permits, appropriate safe entry activities.

Certainly, one major one is a requirement for a written program for housekeeping. If there had been a written program for housekeeping in Port Wentworth, I don't think you would be seeing the sort of photographs that you see here today.

Senator MURRAY. What about the training issue? Mr. Foulke, are OSHA inspectors trained specifically on dust standards today?

Mr. FOULKE. Yes, Madam Chairwoman. We have a program—the training program that we have on combustible dust, all of our new COSHOs have received initial training, basic training on combustible dust as part of their overall initial training as they begin their work with OSHA.

Then there are additional courses that are taken that deal more specifically with combustible dust, such as our hazard communication standard, the electrical standard training course. Then, of course, we have now a 3½ day course specifically on combustible dust training.

We have a broad scope of training for all our compliance officers.

Senator MURRAY. Required? Is the training required?

Mr. FOULKE. The initial training, certain of the training is required, yes.

Senator MURRAY. There was a recent 60 Minutes show, where a former OSHA inspector said he was never trained on dust standards and didn't recognize these hazards during investigations. Were you aware of his comments on that?

Mr. FOULKE. I saw the show, yes.

Senator MURRAY. And?

Mr. FOULKE. Well, it kind of surprised me because I would say—of course, he was a retired compliance officer. I know that for at least the last decade, we have been—the initial training for compliance officers has included a segment dealing with combustible dust.

Senator MURRAY. For how long back, I am sorry?

Mr. FOULKE. At least a decade.

Senator MURRAY. OK, and so how many are trained today?

Mr. FOULKE. Well, all of our COSHOs have initial training as part of their—we have also done refresher training for 1,400

COSHOs and employees both of the Federal OSHA and State plans OSHA. We did refresher training on that. We also——

Senator MURRAY. Do you have a plan-specific in place to have everyone trained?

Mr. FOULKE. On?

Senator MURRAY. On the——

Mr. FOULKE. They do receive some training on combustible dust. With respect—are you saying that we are going to have training on the 3½ day course just on combustible dust?

Senator MURRAY. Yes, specifically, are all of our OSHA inspectors going to be trained at a specific point so that we don't see this in the future?

Mr. FOULKE. I don't know what you mean by "see this in the future." I think we had our compliance officers go in on Imperial Sugar and they were able to cite them, and we are very familiar with all the combustible dust hazards and all the things associated with combustible dust. What we are doing is, we are moving forward to make sure that at least one person——

Senator MURRAY. Are you telling us that all of the OSHA inspectors that you have today are properly trained to deal with combustible dust?

Mr. FOULKE. All of our COSHOs, I believe, have had training on—initial training on combustible dust. Some of them have had additional training, more extensive training on combustible dust, including the 3½ day training course.

Senator MURRAY. Let's go back to the proposed standard, which is what this committee is trying to look at, and the housekeeping standard that you cite doesn't apply to many places in these facilities. Are your OSHA people being trained to look beyond just the housekeeping standards, or do we need another standard so that we get the training in place to make sure inspectors know what they have to be looking for?

Mr. FOULKE. Well, the standard normally, any OSHA standard normally does not cover training of the COSHOs. What it does is training of employees of employers.

Senator MURRAY. If there is a standard?

Mr. FOULKE. What we would do is we would train them on that. Right now, we already have training that they have received, all the new COSHOs coming onboard and that have been onboard for the last decade have received, as part of their initial training, training on combustible dust.

We have had more extensive training. For those that have been trained on process safety management, there is a component of combustible dust training in there. We have had 350 people trained since 2000. On hazardous materials, there is a section on that. Three hundred forty-one have been trained since 2000.

Chemical process safety also has a component of combustible dust, and we have had 331 employees trained. Since December 2007, the 2½ day course, we have trained over 101 COSHOs on that combustible——

Senator MURRAY. OK, Mr. Bresland, if we had a specific standard for combustible dust, would we have better training, and would we have more focus at OSHA on that training? Is that what I understood you were saying?

Mr. BRESLAND. Yes, if there was a specific standard for combustible dust and if it was similar to either the process safety management standard—and it doesn't have to be as detailed as that—or if it was similar to the grain standard. There would be a requirement in there for training of employers and employees on the hazards of combustible dust.

Senator BROWN. Madam Chair, could I ask a question related to that?

Senator MURRAY. Let me just follow up with Mr. Foulke, and then I am happy to give you a quick moment.

My understanding is that you did testify to the House Education and Labor Committee, Mr. Foulke, that you were considering proposing a comprehensive combustible dust standard. Are you?

Mr. FOULKE. Yes, ma'am. We have not ruled out a combustible dust standard. What we are doing is we are taking the information that we get from our National Emphasis Program. Anytime we do a standard, we normally go out and do research into those industries and those facilities that we would be regulating as part of that standard.

Part of our National Emphasis Program on dealing with combustible dust, we are getting to go out and identify those facilities that have all these types of different combustible dust—

Senator MURRAY. Well, to answer my question, are we going to see a comprehensive dust standard from OSHA?

Mr. FOULKE. We are going to consider—what we are looking at, when we get the information back from the NEP. The NEP has not been completed. Two thirds of the inspections that we had done for combustible dust under the NEP have not been completed. They have been opened, and they have been investigated, but we haven't completed them.

Once we get the data from these inspections and are able to determine it—we are not losing any ground here because if we had to go and do a rulemaking, we would have to go out to these different facilities to determine how a standard would impact it and how to write the standard. The NEP is actually helping us get ahead if we do go forward with a standard.

Senator MURRAY. Did you have really quick question?

Senator BROWN. If the Chair would yield for a second, I want to follow up on that.

The report from Mr. Bresland from 2006 has provided obviously a good deal of information for what might be a proposed rule on a dust standard, Mr. Foulke. If diacetyl—I don't know how long you have been working on that—wouldn't come out, wouldn't be published even until late 2009, what would you expect, if you had answered yes to Chairwoman Murray's question? We will pursue a standard, how long would you expect that would take you to do?

Mr. FOULKE. It would be hard for me to speculate. I would say that the—I point out that the grain standard took 8 years to complete.

Senator MURRAY. Senator Isakson.

Senator ISAKSON. How many standards have you had vacated by judicial order? Because you referred earlier—

Mr. FOULKE. Oh, I was talking about the emergency temporary standards.

Senator ISAKSON. OK.

Mr. FOULKE. Where we put in emergency temporary standard, which would require us under—this is a provision that is in the act that allows us, when we find a grave hazard—

Senator ISAKSON. I understand what it is. How many of those were vacated? You made a reference to it in your opening.

Mr. FOULKE. Of the nine that we have done, six were contested. Five were vacated, were thrown out by the courts.

Senator ISAKSON. Five out of six?

Mr. FOULKE. Five out of six that were contested.

Senator ISAKSON. OK. Mr. Bresland, I commend your report. It has seven pages of explanations of acronyms. I so much appreciate your including those. The problem is I have to keep going back and forth to remember which one I am reading.

In one site, you made finding No. 7, your finding, you say, 41 percent of the 140 combustible powder MSDSs the CSB surveyed did not warn users about explosive hazards, and only 7 percent referenced appropriate NFPA dust standards to prevent dust explosions. And then MSDS is defined as “material safety data sheets.” Who produces those?

Mr. BRESLAND. They are produced by the company that is either manufacturing or selling the chemical involved.

Senator ISAKSON. It would be an MSDS of Imperial’s with regard to sugar dust?

Mr. BRESLAND. Theoretically, there should be a material safety data sheet for sugar and for sugar dust and—

Senator ISAKSON. And it is proprietary to the refiner?

Mr. BRESLAND. No. No, it is a public document.

Senator ISAKSON. It is a public document?

Mr. BRESLAND. Yes.

Senator ISAKSON. Who is responsible for making it public and developing it?

Mr. BRESLAND. It is developed by the company based on research and looking at the particular properties, either the hazardous properties or the dangerous properties of the chemical involved. Most of them are available on the Internet. If you want an MSDS, you can click on—

Senator ISAKSON. It is general information then that somebody in that particular business that might deal with that particular property should seek out and find for themselves? It is not a part of a regulatory rule or anything like that?

Mr. BRESLAND. There is a regulatory requirement, and I don’t have a lot of detailed information on that, that an MSDS should be prepared, has to be prepared before it goes into commerce.

Senator ISAKSON. You said in your testimony that $\frac{1}{32}$ of an inch was a generally accepted standard for accumulation of dust. Is that correct?

Mr. BRESLAND. Correct, yes.

Senator ISAKSON. Do you know how deep the dust is in that particular series of pictures?

Mr. BRESLAND. Oh, in the bottom right, it looks like it is several feet deep.

Senator ISAKSON. Several feet deep?

Mr. BRESLAND. Yes. We didn't take these photographs. These were taken by either someone from Imperial or someone doing an audit.

Senator ISAKSON. And $\frac{1}{32}$ is an accepted standard?

Mr. BRESLAND. $\frac{1}{32}$ is the National Fire Protection Association standard for 5 percent of a covered surface.

Senator ISAKSON. If I were a company, I would insure my plant, and the insurance company would have a risk management officer, I am sure. Do you know how much, and I really wish I had thought of this, of having somebody from the insurance industry testify, because they can be the big losers in these things, so to speak, because they are assuming a lot of the risk up to the amount of—

Do you know if they do periodic inspections on dust accumulation?

Mr. BRESLAND. I don't know, and that is something that we will be looking into as our investigation continues, looking into what—assuming that insurance inspectors came into that facility, did they look at this and make a recommendation or a judgment as to the hazards of having as much accumulated sugar dust lying around the facility? I would hope they would look at that and say that is not acceptable.

Senator ISAKSON. Well, my experience is that many of your findings and your investigations end up being a part of risk management calculations by insurers anyway. Isn't that correct?

Mr. BRESLAND. Our investigations are read by a wide variety of people around the world, and certainly, they are read carefully by insurance companies.

Senator ISAKSON. Which goes back, I guess, Mr. Foulke, to the incorporation of the general duty clause of the original Occupational Safety and Health Administration Act?

Mr. FOULKE. That is correct. Yes, Senator. What you have here is the act was intended, once again, to put the responsibility on the employers to provide a safe work site. The only way you can provide a safe work site is to identify the hazards that are in your work site.

To me, I think a reasonable person, if I am in business, a reasonable person would try to figure out what hazards you have in your business if you are supposed to be running a business in this particular industry. The insurance companies do—to answer your other question about the insurance companies, the answer is, yes, they do go out and look into these facilities. They do provide audits for all industries.

Senator ISAKSON. Last, I have a question that you won't be able to answer, but if you would get me an answer to this, Mr. Foulke, I would appreciate it. I would like to know how many times in the last 10 years OSHA has received a complaint by an employee against an employer for accumulation of dust?

Mr. FOULKE. I don't have that information, but I am sure—

Senator ISAKSON. I know, but would you get that for me? I would be interested in knowing how many times that has happened.

Mr. FOULKE. Yes.

Senator ISAKSON. Thank you. Thank you, Madam Chairman.

Senator MURRAY. Senator Chambliss.

Senator CHAMBLISS. Thank you, Madam Chairman.

Mr. Foulke, I want to go back to the igniting of this dust issue because in my reading of your report, talking to your folks, there apparently is a conclusion that the most likely source of the igniting of the dust in this case came out of the, I guess, collision we will say of a bucket that is used to hold sugar, processed sugar that is one of any number of buckets that goes along a conveyor belt, and that that bucket came into contact with another metal object.

You know, that is a process that without knowing exactly how long it has been in operation at this particular facility or other facilities that are similar, it has been there for decades. Is there anything in your regulations that addresses the ignition side of it from that standpoint of equipment like that that is operated?

Mr. FOULKE. Well, we do have, like I said, our electrical standard requires dust-proof, explosive-proof equipment.

Senator CHAMBLISS. Well, I understand from an electrical standpoint, but I am talking about metal-on-metal type ignition.

Mr. FOULKE. Right. Well, no, what you would be doing here really is just preventive maintenance or maintenance of the equipment, the proper maintenance of the equipment. There would be a requirement—manufacturing requirement to have equipment properly maintained so that you wouldn't have this occurring.

The other thing in this particular case, most likely, this explosion or this initial explosion is what triggered the massive explosions that caused the secondary explosions. Usually in combustible dust, these situations, it is the secondary explosions that cause all the—or most of the damage and the loss of life.

If the company had been following the housekeeping requirements on accumulation of dust, if they had eliminated that, clearly the secondary explosions would not have occurred, and we would not have had the devastation nor the loss of life that we had.

Senator CHAMBLISS. Yes. And that goes to my second question I was going to get to. It looks to me like, from what Senator Isakson and I were told the other day and what you just talked about, this secondary explosion, if there had been a mechanism in place that was sucking that dust out through some exhaust fan or whatever, you wouldn't have had the concentration of dust throughout the plant subject to being ignited. Is that a fair statement?

Mr. FOULKE. If it had been removed? If they would have had a dust collection system that brought the dust outside the plant, and we did cite them under—for not having a proper dust collection system and also venting out to the outside, if the venting had occurred outside.

Those are the things. If you had pushed the dust outside, then obviously you can't have the explosion. Because one of the—in combustible dust explosions, you have basically a pentagon. You have to have oxygen. You have to have ignition source. You have to have combustible dust. The two things, the other things you have to have is confinement. If you have this being vented out and if you have vents venting out, you can't have the accumulation. If you are venting all the dust out, then you can't have the dust cloud to assemble.

Clearly, we have one of the pictures here, and I can't see which one it is here, but where it shows that, clearly, you have a dust—in the operation at the Gramercy plant, you have a dust cloud

there at the time we were doing the inspection. I think it ties into Mr. Bresland's discussion and his testimony about it was so hard that you couldn't even see. Well, you can see from the picture that it was difficult—you can see that there is a haze of sugar dust in the air.

Senator CHAMBLISS. You made the statement that a safe work site burden is on the employer, and I agree with that. I think that is an accurate statement and where the burden should be obviously.

In your testimony on page 4, you say,

“Imperial Sugar was aware that there were hazards caused by combustible dust at its facilities and knew that it had not been effectively managing dust accumulations for a number of years.”

What are the factual—what facts do you base that statement on?

Mr. FOULKE. Well, Senator, I am sorry. I really cannot—because the case is under litigation, I am limited as to what I can discuss about the facts of the case that may impact on how we do it. I think the pictures speak for themselves in that, and I think you can see, this accumulation of dust did not occur overnight.

Senator CHAMBLISS. Well, the pictures here that show a pile of sugar in several different areas, that is not the problem as compared to the dust that is in the air. Is that a fair statement?

Mr. Bresland, let me address that to you since those are—

Mr. BRESLAND. What I would worry about when I see the photographs where you are seeing maybe a foot or two of dust, as Mr. Foulke said, these dust explosions typically take place in two parts. The first part is some sort of a minor or relatively minor explosion in the facility, and it may have been caused by a spark. That minor explosion causes the dust that you see here, the buildup, it causes that to roof up. If it was inside this room, it would turn into a floating dust, and I probably wouldn't be able to see you because it would be so strong.

Senator CHAMBLISS. It would be just like a gust of wind coming through—

Mr. BRESLAND. It would blow it up.

Senator CHAMBLISS [continuing]. And blows it up?

Mr. BRESLAND. It would blow it up. Then the secondary explosion, which is caused by another ignition source, that is the one that causes the most damage. You take this material here that looks fairly innocuous lying there, and it can lie there as an innocuous material for years. Then when this one-of-a-kind explosion, small explosion takes place, it causes this to be distributed inside—especially inside a confined space, and then the secondary explosion takes place.

Senator CHAMBLISS. Then if you had an exhaust system that we just talked about that really was doing its job, if you did have this kind of accumulation that we see in these photographs there, that exhaust system might, in fact, even contribute to dust in the air. Is that a fair statement?

Mr. BRESLAND. Not necessarily. What I worry about when I see dust like this, this isn't cleaned up by an exhaust system. It is cleaned up by—

Senator CHAMBLISS. I understand that, but it is more indication that you shouldn't have this.

Mr. BRESLAND. Oh, no, absolutely not.

Senator CHAMBLISS. If you have got an exhaust system that is working, it is going to pull up some of that sugar into the air.

Mr. BRESLAND. I agree. I agree.

Senator CHAMBLISS. Thank you.

Senator MURRAY. Thank you very much.

Mr. Bresland, I just want to ask you really quickly, in your written testimony, you said that you were previously unsupportive of a Federal combustible dust standard and you now are. Can you share with us why you have changed your mind?

Mr. BRESLAND. Back when the committee voted on this, back in November 2006, my concern was that having read the report and having been to the scene of at least two major dust explosions, that there was an issue out there that required a speedy response from OSHA. By a speedy response, I mean a very strong education program to get out there and tell the world you really need to do something about this.

My concern about the regulatory side of it was a regulation could take, as in the case of the grain standard, 8 years. I wanted something that was going to happen immediately and quickly so that people would become aware.

Senator MURRAY. OK.

Mr. BRESLAND. Having seen, having gone to Imperial Sugar and gone to Port Wentworth and having seen that and also having heard of the terrible effect that it is having not only obviously on the people who were killed, but the people who were grievously injured and grievously burned, my current thinking in this is that a standard that we can get as quickly as possible would be the appropriate way to go.

Senator MURRAY. I appreciate that.

Mr. Foulke, I have one more question for you on a different subject while you are before our committee before we turn to our next panel, unless my colleagues have any other questions.

I wanted to ask you about a disturbing issue that came to our attention last week when the *Washington Post* ran an article that the Department of Labor submitted a proposed regulation entitled "Requirements for DOL Agencies' Assessment of Occupational Health Risks" to OMB for review. That really concerns me and the members of this HELP Committee, who have been waiting now for DOL and OSHA to submit proposed rules to protect workers from well-known hazards, sometimes in the case of years.

Two examples that quickly come to mind is the crane and derricks standard that has now been languishing for more than 4 years after a consensus standard was developed. We recently wrote a letter to Secretary Chao about that. Of course, the combustible dust standard that we are looking at now.

It was surprising to many of us that the Department of Labor now has a priority to pass a standard that wasn't even on the department's Spring 2007 priority list of 38 potential workplace safety regulations and one that could potentially make it even harder to protect employees. I wanted to ask you why the Department of Labor considers this standard that we are hearing about now more

important than the 38 other potential regulations that we have been waiting for?

Mr. FOULKE. Well, Madam Chairwoman, I would say this with respect to your comment about—we are moving quickly on all our standards. We are pushing all of them. You mentioned about the cranes and derricks standard languishing. It hasn't languished. It is just an extremely extensive standard. The committee that worked on it, the negotiating and rulemaking committee that worked on cranes and derricks just drafted the text. We had to go——

Senator MURRAY. OK. Now we are hearing about another regulation that is going to jump ahead of all the work on other regulations. Did your department consult with any of OSHA's career scientific staff during the development of this standard? Has that been in the works? Have we been hearing about it?

Mr. FOULKE. Well, we have been—with respect to the risk assessment, rulemaking, we have been involved in providing comments to the text. As I understand it, the purpose of the rulemaking is to establish policies and procedures for the department's agencies to follow when conducting risk assessments.

Senator MURRAY. You are telling us at this hearing that in order to do crane and derrick standards or combustible dust standards, you have to go out in the field. You have to do all this extensive work. Was that done with this new standard that is being pushed through OMB now?

Mr. FOULKE. This is an internal rulemaking. It deals with the department's policies and procedures. It is not—this could have been done as a guidance document.

Senator MURRAY. It will have, as I understand it, severe impact on worker safety should it move forward. You haven't gone out in the field to ask questions about it?

Mr. FOULKE. I would disagree. The thing is, I am unable to comment because it is under current review by the OMB. I can't comment on the specifics of it.

Senator MURRAY. But your department sent it to OMB, I understand?

Mr. FOULKE. The Department of Labor sent it, yes.

Senator MURRAY. Department of Labor sent it to them. OK.

Senator Isakson and Senator Chambliss, do either of you have any additional questions?

Senator Isakson.

Senator ISAKSON. Just one question. Mr. Bresland, there are approximately 125 different items on this list up here, everything from zinc and magnesium to sugar and wood dust. Are the properties similar enough to where a single standard could apply to all of them, or would you have to have a standard for each of them?

Mr. BRESLAND. I think the properties that we are talking about, the properties of explosivity are similar enough and the testing is similar enough that a test or maybe one or two different tests could be used to determine the relative dangers of these materials, such as the minimum ignition energy or the particle size or another property called KST.

Senator ISAKSON. I——

Mr. BRESLAND. Excuse me, Senator. I think this question might be better addressed to one of the people on the next panel who is an expert on the issue.

Senator ISAKSON. I am going to do that. One other question, who does those tests now?

Mr. BRESLAND. There are companies that are specialized.

Senator ISAKSON. Who initiates them to get those companies to do them?

Mr. BRESLAND. It would have to be initialized by the manufacturer.

Senator ISAKSON. Would you think if we did a standard that we would need to initiate those tests first to determine those properties?

Mr. BRESLAND. That would be part of the standard, where you would require—I don't know that you would require, but there would be something in the standard that would say you have to find out if this material is dangerous or not. You would take a sample and send it off to the company. Then if it is dangerous, you would take the appropriate preventive actions.

Senator ISAKSON. In that example, when you say you would have to do a test to determine the properties, you are talking about the company?

Mr. BRESLAND. Correct, yes.

Senator ISAKSON. The burden goes back on the company to hire the test to determine the volatility of the dust?

Mr. BRESLAND. That is typical of industry, certainly the chemical and refining industry.

If I may make just one quick comment on a question you had originally on material safety data sheets? I am not sure if my answer was completely accurate. We need to follow up on the issue of material safety data sheets for sugar, which is a product that is regulated by the FDA, and we will get back to you on that.

Senator ISAKSON. Please, I would appreciate it. Thank you, Madam Chairman.

Senator MURRAY. Senator Chambliss, do you have any additional questions? OK.

We thank both of you for your testimony. Again, if you could please stay in case we do have additional questions after listening to the testimony of the second panel.

If the second panel could please come forward to present your testimony?

Thank you very much to all of our next panelists. Is Amy Spencer here? Yes, there you are. OK. We are going to begin with Amy Spencer, then turn to Richard Prugh, and then to Graham Graham for his testimony.

Ms. Spencer, as soon as you are seated.

Go ahead. You can begin.

**STATEMENT OF AMY SPENCER, SENIOR CHEMICAL ENGINEER,
NATIONAL FIRE PROTECTION ASSOCIATION, QUINCY, MA**

Ms. SPENCER. Good morning, Chair Murray, Ranking Member Isakson, Senator Chambliss, Senator Brown. I appreciate the opportunity to speak with you about combustible dust and what NFPA can do to help workers.

I am Amy Beasley Spencer, a senior chemical engineer representing the National Fire Protection Association (NFPA), and I have been with the association for 12 years. I serve as the staff liaison to several NFPA technical committees responsible for dust documents.

The title of this hearing is "Dangerous Dust: Is OSHA Doing Enough to Protect Workers?" Without slighting the many successes of OSHA, when answering the question with respect to combustible dust, the answer is no. NFPA believes OSHA must develop regulations to address and mitigate dust hazards by incorporating by reference the relevant NFPA codes and standards.

OSHA, like NFPA, has a record of saving lives. However, we cannot allow past successes to breed complacency, especially when mounting evidence suggests there is more that can be done, more lives that can be saved. Lives that would inevitably and predictably be lost during preventable dust explosions such as the 13 lives lost at Imperial Sugar.

The NFPA standards that could have prevented those explosions were never made mandatory nationwide. OSHA doesn't have to reinvent the wheel. The tools exist in NFPA documents to prevent these tragedies. We wouldn't need the 8 years that Assistant Secretary Foulke testified about this morning with the grain standard to come to fruition if the NFPA codes and standards were adopted.

Today, I will start by providing a brief background of NFPA and a description of the relevant codes and standards. NFPA is an international membership organization that develops voluntary consensus codes and standards that are adopted by State and local jurisdictions throughout the United States and internationally. The NFPA consensus process and the periodic revisions of all documents ensure state-of-the-art practices and safeguards are included.

NFPA has more than 250 committees made up of about 4,000 experts who represent diverse interests such as enforcers, users, consumers, manufacturers, designers, research, insurance, and labor. They develop nearly 300 codes and standards. The NFPA documents are updated on a 3- to 5-year basis through a consensus process involving a balance of stakeholders. In fact, one of the NFPA dust committees has technical committee members from both the Department of Labor and the Chemical Safety Board, CSB.

Many NFPA codes and standards appear as mandatory references cited throughout Federal agency regulations, including OSHA. NFPA's principal dust document, NFPA 654, covers the fundamentals of protecting dust hazard processes and is also often referenced in other dust documents.

We also have commodity-specific documents covering coal, sulfur, combustible metals, wood dust facilities, and agricultural dust. I won't bore you with the long names and the numerical designations. NFPA provides comprehensive coverage of dust hazards in seven dust-related documents originating as early as 1923. Assistant Secretary Foulke pointed to the large stack of documents on the side. If you adopt NFPA documents, you are also adopting all those.

I took a quick look at the 40 that were referenced. Some were mom and apple pie, and I would be happy to address what those are, like the National Electrical Code, sprinkler standards, exiting standards that you are going to be doing anyway. I would love to discuss that later.

The NFPA documents were highlighted in the recently passed Worker Protection Against Combustible Dust Explosions and Fires Act, H.R. 5522, as well as the CSB recommendations and industrial peer-reviewed journals. OSHA highlights these same documents in their National Emphasis Program and their Safety and Health Information Bulletin. All our desk documents address the hazards of combustible dust in three simple steps.

First, hazard recognition. You have to know that you have the hazard. Second, an evaluation, which includes examining the processes and equipment. And last, hazard control.

In conclusion, OSHA cites statistics that show that there are fewer injuries and deaths in the workplace. People often think of these statistics as if they are just part of the natural evolution of society. Not true.

The declining number of accidents is the result of decades of hard work by dedicated technical experts, the enforcement community, first responders, safety advocates, and many others, including legislators such as you. Preventing those tragedies is the reason that NFPA exists, and that purpose is what brings to this hearing today. Let us not ignore the combustible dust problem by assuming OSHA has it covered already or attempt to reinvent the wheel by having OSHA write new regulations when the information already exists in NFPA documents.

The challenge for us all is to effectively disseminate the information, provide sufficient training and enforcement. Moreover, I believe the best method to accomplish this safety goal is for OSHA to develop a regulation to address and mitigate dust hazards by incorporating by reference NFPA codes and standards.

NFPA is committed to assist where appropriate in these activities. For all these reasons, we respectfully urge the Senate to take any action to ensure that OSHA mandates combustible dust safety through the use of NFPA codes and standards.

Thank you for your attention and the opportunity to testify.

[The prepared statement of Ms. Spencer follows:]

PREPARED STATEMENT OF AMY BEASLEY SPENCER

Good morning. Chairman Murray, Ranking Member Isakson and committee members, I appreciate the opportunity to speak to you about combustible dusts.

I am Amy Beasley Spencer, a Senior Chemical Engineer representing the National Fire Protection Association (NFPA) and have worked at the Association for 12 years. I serve as the Staff Liaison to several NFPA Technical Committees responsible for combustible dust documents.

The title of this hearing is "*Dangerous Dust: Is OSHA Doing Enough to Protect Workers?*" Without slighting the many successes of OSHA, when answering the question with respect to combustible dusts, the answer is "no". NFPA believes OSHA must develop regulations to address and mitigate dust hazards by incorporating by reference the relevant NFPA codes and standards.

OSHA, like NFPA, has a record of saving lives; however, we cannot allow past successes to breed complacency, especially when mounting evidence suggests there is more that can be done. More lives can be saved. Lives that would inevitably and predictably be lost during preventable dust explosions such as the 13 lives lost at Imperial Sugar. The NFPA standards that could have prevented those explosions

were never made mandatory nationwide. OSHA doesn't have to reinvent the wheel—the tools exist in NFPA documents to prevent these tragedies.

Today I will provide a brief background of NFPA, a description of the relevant codes and standards that address dust hazard processes, and conclude with discussion on how I believe these documents could provide a safe and effective strategy for identifying and controlling processes that store, handle or use combustible dusts or other combustible particulate solids.

NFPA is an international membership organization that develops voluntary consensus codes and standards that are adopted by State and local jurisdictions throughout the United States and the rest of the world. The NFPA consensus process and the periodic revisions of all documents ensure state-of-the-art practices and safeguards are included.

NFPA has more than 250 committees made up of about 4,000 experts, who represent diverse interests (such as enforcers, users, consumers, manufacturers, designers, researchers, insurance and labor) and they develop nearly 300 codes and standards. These NFPA documents are updated on a 3–5 year basis through a consensus process involving a balance of stakeholders. In fact, one of the NFPA dust committees has technical members from both the Department of Labor and the Chemical Safety Board (CSB).

Many NFPA codes and standards appear as mandatory references cited throughout Federal agency regulations, including OSHA. NFPA codes and standards provide a broad-based and comprehensive set of requirements applicable to many hazards, including combustible dusts.

NFPA's principal dust document NFPA 654, *Standard for the Prevention of Fires and Explosions from the Manufacturing, Processing, and Handling of Combustible Particulate Solids* covers the fundamentals of protecting dust hazard processes, and its handling and conveying requirements are often referenced in other dust documents. We also have commodity-specific dust documents covering coal, sulfur, combustible metals, wood dust facilities and agricultural dust. I don't want to bore you with the long names and numerical designations, but NFPA provides comprehensive coverage of dust hazards in 7 dust-related documents originating as early as 1923.

The NFPA documents were highlighted in the recently passed *Worker Protection Against Combustible Dust Explosion and Fires Act* (H.R. 5522), as well as the CSB recommendations and industrial peer-reviewed journals. OSHA highlights these same documents in their National Emphasis Program and their Safety and Health Information Bulletin. All our dust documents address the hazards of combustible dusts in three simple steps—hazard identification (starting with knowing you have a hazard), hazard evaluation (examining the processes and equipment), and lastly, hazard control.

In conclusion, OSHA cites statistics that show that there are fewer injuries and deaths in the workplace. People often think of these statistics as if they are just part of the natural evolution of society. Not true. The declining number of accidents is the result of decades of hard work by dedicated technical experts, the enforcement community, first responders, safety advocates and many others, including legislators such as you. Preventing those tragedies is the reason that NFPA exists, and that purpose is what brings us to this hearing today. Let's not ignore the combustible dust problem by assuming "OSHA has it covered already" or attempt to reinvent the wheel by having OSHA write new regulations when the information already exists in NFPA documents.

The challenge for us all is to effectively disseminate the information, to provide sufficient training and ensure consistent enforcement. Moreover, I believe the best method to accomplish this safety goal is for OSHA to develop a mandatory standard to address and mitigate dust hazards by incorporating by reference the relevant NFPA codes and standards. NFPA is committed to assist where appropriate in these activities and for all these reasons, we respectfully urge the Senate to take any action to ensure that OSHA mandates combustible dust safety through the use of NFPA codes and standards.

Thank you for your attention and the opportunity to testify.

Senator MURRAY. Thank you very much.
Mr. Prugh.

**STATEMENT OF RICHARD W. PRUGH, SENIOR PROCESS
SAFETY SPECIALIST, CHILWORTH TECHNOLOGY, INC.,
PLAINSBORO, NJ**

Mr. PRUGH. Good morning. I should preface my remarks with the following statement. Chilworth is recognized around the world as a leading expert in combustible dust testing and consulting, and we have been working with Imperial on the rebuild of the plant in Port Wentworth, GA.

I am testifying today as to my general expertise on the issue of combustible dust and not as Imperial's witness. And as such, I cannot answer specific questions pertaining to Imperial's particular situation before or after the February 7 incident.

Thank you for the opportunity to present some of the technical details that are involved in the control of dust explosions. The fire triangle shows the necessary components of a fire. Similarly, the explosion pentagon shows the necessary components of a combustible dust explosion.

The concentration of fuel in the oxidant is very important. For example, the lower flammable limit, the so-called lean limit for gasoline is about 1 percent in the air. The upper flammable limit, the rich limit is about 6 percent. If the concentration is not between these limits, the mixture will not burn.

There is also a lower limit for combustible dust, and it is termed the minimal explosible concentration. For example, the lower limit for many dusts corresponds to about 2 pounds of very fine dust suspended in a 10 foot by 12 foot by 8 foot room, like a small bedroom. There is a rule of thumb for explosible dust concentrations. If you can see the thumb at the end of your outstretched arm, the concentration of dust is too low to propagate combustion. That is too low to cause an explosion or a flash fire.

All materials that are combustible can explode under the right set of conditions. Concentrations above the minimum explosible concentration occur in many items or process equipment and are dust collectors when the collected dusts are shaken or blown back from the filters. Very high concentration of dust within rooms or buildings can occur when accumulations of dust are dispersed from mechanical shock, a blast of air, dumping bags of powder, and vigorous sweeping.

Dense dust clouds also can occur when accumulations of dust at high elevations in rooms or buildings are disturbed by a primary explosion, and ignition of the descending and suspended dust cloud can result in a damaging secondary explosion.

High elevation accumulations of dust can result from the use of compressed air for cleaning equipment and services. This results in lofting of very small particles to upper elevations, where they may settle onto horizontal surfaces. Such accumulations are a secondary explosion waiting to happen.

If the energy of an ignition source is not sufficient, propagating combustion cannot be initiated. For many combustible dusts, the minimum ignition energy is very low, such that the electrostatic energy on the human body can cause propagating combustion. Other ignition sources are electrical arcs, flames, hot surfaces, and the electrostatic energy on ungrounded equipment.

If the combustible mixture of dust and air is confined, the resulting hot combustion gases can generate very high pressures. Such pressures can rupture equipment, destroy walls and ceilings of rooms and buildings, and threaten personnel. The oxidant, the oxygen in the air, can be forced out of process equipment by an inert gas. An inert powder or mist can quench or suppress the combustion.

The process equipment can be constructed to contain the maximum pressure that could be developed by a dust air explosion. Local exhaust ventilation can be provided at equipment openings where dust is generated or released. The explosion can be vented to minimize the pressure generated by the combustion gases.

When combustion of a small, dense dust cloud occurs in an unconfined space, the result can be a flash fire. Persons inside the flash fire are at risk of serious injury, particularly if they are wearing combustible clothing. Thus, persons who handle dusty, combustible powder should be wearing flame-resistant clothing.

At the present time, there exists several legislated and guidance documents that could serve as models for Federal rules for dust hazard controls. The general duty clause is often used by OSHA when there is no specific standard that applies to a recognized hazard in the workplace.

OSHA frequently cites housekeeping standards, but these standards do not address the need for preventing and removing accumulations of dust on elevated surfaces or address many important ignition sources such as hot surfaces, static electricity, and open flames or welding sparks.

The problem—a very high percentage of dusts are combustible, including solid hydrocarbons such as polyethylene, carbohydrates such as grains, and many metals such as aluminum. Every combustible material will create an explosion with the right conditions. At present, all 50 States “administer” the International Building Code, which contains extensive requirements for explosion protection for combustible dust, but there is very modest enforcement of this code.

The solution—companies that produce, process, or handle combustible dusts and powders need to determine the explosibility properties of their materials. These data should then be formally communicated within their organizations and to their customers. Plant operators should assess the hazards that are associated with processes that are operated in their plants.

Existing today are the technology and knowledge, codes, standards and guidelines, and engineering expertise that are needed to protect personnel and property from combustible dust explosions. An objective of the proposed Federal legislation should be to require plant operators to adopt and abide by the above guidance toward solution of the existing dust explosion problem.

Thank you.

[The prepared statement of Mr. Prugh follows:]

PREPARED STATEMENT OF RICHARD W. PRUGH

INTRODUCTION

Thank you for the opportunity to present some of the technical details that are involved in dust explosions and in methods for preventing such incidents, with some discussion of existing hazard-control rules and regulations.

As stated in the "Background" to the National Emphasis Program of the Occupational Safety and Health Administration:

"Dust deflagration, and other fire and explosion hazards in industries are covered by several OSHA standards and the general duty clause. A chemical dust deflagration occurs when the right concentration of finely divided chemical dust suspended in air is exposed to a sufficient source of ignition to cause ignition (combustion) of the dust. If the deflagration is in a confined area, an explosion potential exists. These materials can also cause other fires. Combustible dust is often either organic or metal dust that is finely ground into very small particles. The actual quantity of dust that may accumulate in an affected area may vary, depending upon air movement, particle size, or any number of other factors." [Reference 1]

Recent incidents have indicated that the hazards of combustible materials in dust form either:

- (1) have not been recognized by the persons that have a responsibility to protect employees, or
- (2) adequate precautions—in the form of engineering or administrative controls—to minimize the hazards have not been taken. Aside from exposures to toxic dusts, the most serious of worker exposures to dusts involves explosion and flash-fire of clouds of combustible dust.

The most-basic premise in the control of dust-explosion hazards is that all materials that are combustible can explode, under "the right" set of conditions. Thus, it is essential that managers study processes that generate dust, to determine the properties of the materials involved, identify the conditions that could lead to dust explosions, and then take action to prevent such incidents.

THE RIGHT CONCENTRATION

Like flammable gases and vapors, there is a lower limit to dust-cloud concentrations that can result in propagating combustion, if a strong ignition source is present. The lower limit is termed the Minimum Explosible Concentration [MEC], as distinguished from the Lower Explosive Limit [LEL] for gases and vapors. Whereas LELs usually are expressed in terms of volume percent, the MECs are expressed in terms of grams per cubic meter of air.

Mixtures of combustible dust and air at and above the Minimum Explosible Concentration are very dense. The "rule of thumb" for such mixtures is that the thumb cannot be seen at the end of an outstretched arm. Concentrations above the Minimum Explosible Concentration occur in some items of process equipment, such as mills and grinders, mixers and blenders, and screeners and sifters, and in dust collectors when the collected dusts are shaken or blown-back from the filters.

However, it is very unlikely that such high concentrations would occur in rooms or buildings. Typically, such mixers occur only when accumulations of dust are disturbed or dispersed; as examples, by mechanical shock, a blast of air, dumping bags of powder, and vigorous sweeping. Dense dust clouds also can occur when accumulations of dust at high elevations in rooms or buildings are disturbed by a "primary" explosion, and ignition of the dense dust cloud can result in a damaging "secondary" explosion.

High-elevation accumulations of dust can result from use of compressed air for cleaning equipment and surfaces. This type of cleaning results in "classification" of the dust, such that the larger particles descend to the floor and the very small particles may remain in suspension. Air currents can then loft the small particles to upper elevations, where they may settle onto horizontal surfaces, such as roof supports, ductwork, tall equipment, process piping, and cable trays.

Unlike flammable gases and vapors, which have rather sharp Upper Explosive Limits, most dusts do not have an upper limit for explosible concentrations. Flammable gases and vapors at very high concentrations in air form a mixture that is "too rich" to allow propagating combustion. That is, the heat capacity of the "extra" gas or vapor absorbs the heat of combustion, and flame does not propagate. For high concentrations of combustible dust in air, however, the burning dust can consume most of the available oxygen in the mixture, but combustion may not completely stop. Thus, venting of an explosion from a ruptured process vessel or from a dust

collector can result in a very large fireball, with the size of the fireball being several times the volume of the original container.

There is an "ideal" concentration for each mixture of combustible dust and air, and ignition of this concentration yields the maximum explosion pressure, the fastest burning rate, and—typically—this mixture is easiest to ignite. For some dusts, this concentration can be calculated and is termed the "stoichiometric" concentration. For example, the stoichiometric concentration for sugar/sucrose is about 245 grams per cubic meter; this corresponds to at least 20 million dust particles in every cubic foot of air and would be a very dense dust cloud.

Prevention of dust clouds is attained by good design of equipment—to provide containment of powders and dusts—and good housekeeping—including prompt and careful removal of spilled powders and dusts.

A SUFFICIENT SOURCE OF IGNITION

If the energy of an ignition source is not sufficient, propagating combustion cannot occur. For many combustible dusts, the Minimum Ignition Energy is very low, such that the electrostatic energy on the human body can cause propagating combustion. It is more typical, however, that somewhat greater energies are required, such as the energy in an electrical arc, a flame, a hot surface, or the electrostatic energy on ungrounded equipment.

Preventing ignition of possible dust clouds is attained by grounding and bonding of equipment, to prevent accumulation of electrostatic charges; installing electrical equipment that will prevent intrusion of dusts, with compliance to the National Electrical Code; ensuring absence of flames and high-energy arcs, with a "hot work" permit system; prohibiting smoking in potentially dusty areas; insulating or otherwise protecting hot surfaces; and good preventive-maintenance and mechanical-integrity programs, to prevent friction and impact-caused ignition sources.

CONFINEMENT OF COMBUSTION

If the combustion of a mixture of dust and air is confined, the resulting hot combustion gases can generate very high pressures. Typically, the pressures resulting from dust/air explosions are near 100 pounds per square inch. Such pressures can rupture equipment, destroy walls and ceilings of rooms, severely damage walls and roofs of buildings, and threaten personnel.

Preventing confined combustion of dust/air mixtures can be accomplished by installing explosion vents on equipment that could contain explosible mixtures. The size of the required explosion vent depends primarily on the volume of the equipment—or room, or building—and the ability of the equipment—or room or building—to withstand internal pressure, and the speed of the combustion reaction.

PREVENTING EXPLOSIVE COMBUSTION OF DUST/AIR MIXTURES

There are several methods for preventing damaging dust explosions, in addition to the explosion-venting described above.

In one method, the oxidant (the oxygen in air) can be removed from processing equipment through the use of an inert gas (such as nitrogen or carbon dioxide) to purge the air from the equipment. For many dusts, reducing the oxygen concentration by about one-half prevents propagating combustion. However, the oxygen concentration must be reduced much further for some metal dusts (such as aluminum and magnesium).

Another method utilizes an inert powder or mist to quench or suppress the combustion, such that the combustion pressure is limited to a few percent of the unsuppressed explosion pressure. Discharge of the suppressant can be triggered by flame detectors or the small pressure increase that signals the beginning of combustion.

A third method involves constructing the process equipment to withstand the maximum pressure that could be developed by a dust/air explosion; thus, "containing" the explosion. This method is used infrequently, due to the cost of constructing equipment to withstand the high pressures attained by dust/air explosions.

A fourth method involves "combustible concentration reduction," by preventing the formation of large high-concentration dust clouds. This is accomplished by providing local exhaust ventilation at equipment openings where dust is generated or released, with the objective of reducing the concentration below one-quarter of the MEC. For flammable gases and vapors, floor-level exhaust ventilation and general area ventilation (with wall and roof fans) are very effective in diluting flammable vapors and preventing the formation of large explosible clouds; however, dilution ventilation is not very effective for dusts, since particles can settle on surfaces that are outside the areas that are swept by the entering and exiting air stream.

Unfortunately, this fourth method—preventing the formation of small-particle dust clouds having high concentrations—cannot be used reliably within process equipment because of the variability of powder-handling processes. For example, attrition and grinding of coarse powders during handling, mixing or blending, and conveying usually results in formation of more-hazardous small-particle dusts.

However, use of this fourth method—combustible concentration reduction—is important in preventing secondary explosions within rooms and buildings. Frequent inspections of areas where combustible dust can accumulate, and frequent removal of accumulated dust—thus, “good housekeeping”—can minimize the secondary-explosion hazard.

UNCONFINED COMBUSTION

When combustion of a small dense dust cloud occurs in an unconfined space, the result can be a flash-fire, often without pressure effects. Although persons outside the flash-fire might not be seriously affected, persons inside the flash-fire are at risk of serious injury, particularly if they are wearing combustible clothing. Thus, persons who handle dusty and combustible powders—or are otherwise exposed to flash-fire hazards—should be wearing flame-resistant clothing.

SUGGESTIONS FOR PRESCRIPTIVE AND/OR PERFORMANCE-BASED LEGISLATION

There are several existing “models” for control of combustible-dust hazards, ranging from the “simple and non-specific” General Duty Clause, to the “all-inclusive” recent legislation of the State of Georgia.

1. *General Duty Clause* Section 5(a)(1) of the Occupational Safety and Health Act of 1970

“Each employer shall furnish to each of his employees employment and a place of employment which is free from recognized hazards that are causing or are likely to cause death or serious physical harm to his employees.”

The General Duty Clause is often used by OSHA when there is no specific standard that applies to a recognized hazard in the workplace. OSHA may also use the General Duty Clause when a standard exists, but it is clear that the hazards involved warrant additional precautions beyond what the current safety standards require [Reference 2].

Other OSHA standards that can be referenced as a “general duty” in citations are 29 CFR 1910.22:

“(a) *Housekeeping*. All places of employment, passageways, storerooms, and service rooms shall be kept clean and orderly and in a sanitary condition.”

and 29 CFR 1910.176:

“(c) *Housekeeping*. Storage areas shall be kept free from accumulation of materials that constitute hazards from tripping, fire, explosion, or pest harborage.”

and 29 CFR 1910.307:

“(a) *Scope*. This section covers the requirements for electric equipment and wiring in locations which are classified depending on the properties of the flammable vapors, liquids or gases, or combustible dusts or fibers which may be present therein and the likelihood that a flammable or combustible concentration of quantity is present. Hazardous (classified) locations may be found in occupancies such as, but not limited to, the following: . . . agricultural or other facilities where excessive combustible dusts may be present, . . .”

These “general duty” requirements provide very limited guidance to owners/operators who generate or handle combustible dusts. For example, the housekeeping standards do not address the need for preventing and removing accumulations of dusts on elevated surfaces, and the electrical standard does not address other types of ignition sources, such as hot surfaces and static electricity—outside or inside equipment—and open flames or welding sparks.

2. *OSHA Process Safety Management Standard* 29 CFR 1910.119

“*Purpose*. This section contains requirements for preventing or minimizing the consequences of catastrophic releases of toxic, reactive, flammable, or explosive chemicals. These releases may result in toxic, fire or explosion hazards.”

“*Application*. (1) This section applies to the following: . . .”

Combustible dusts are not included in the scope of this section, but at least six of the listed chemicals are solids at room temperature and could form explosible dusts. This standard provides good guidance concerning 14 aspects of process safety, and all could be applied to control of combustible-dust hazards.

3. *OSHA Grain Handling Facilities Standard* 29 CFR 1910.272

“*Scope.* This section contains requirements for the control of grain dust fires and explosions, and certain other safety hazards associated with grain handling facilities.”

“*Application.* Paragraphs (a) through (n) of this section apply to grain elevators, feed mills, flour mills, rice mills, dust palletizing plants, dry corn mills, soybean flaking operations, and the dry grinding operations of soy cake.”

This standard is limited to control of hazards in grain operations, but could be modified to serve as guidance for control of combustible-dust hazards, generally.

4. *NFPA 654, “Standard for the Prevention of Fire and Dust Explosions From the Manufacturing, Processing, and Handling of Combustible Particulate Solids”*

“*Scope.* This standard shall apply to all phases of the manufacturing, processing, blending, pneumatic conveying, repackaging, and handling of combustible particulate solids or hybrid mixtures, regardless of concentration or particle size, where the materials present a fire or explosion hazard.” [This standard excludes—but references—the following similar standards: NFPA 61 (Food Processing Facilities); NFPA 484 (Combustible Metals); NFPA 655 (Sulfur); and NFPA 664 (Woodworking Facilities).]

These standards contain both prescriptive and performance-based recommendations concerning the typical operations and equipment in dust-generating and dust-handling processes. Alternative approaches to hazard control are offered in “performance-based design options” of NFPA 654 and NFPA 664.

5. *Factory Mutual Engineering Corp., Property Loss Prevention Data Sheets 7–76, “Prevention and Mitigation of Combustible Dust Explosions and Fires” (2000).*

“*Scope.* This data sheet provides preventive measures to reduce the frequency of combustible dust explosions, and protection features to minimize damage from a combustible dust explosion.”

This document references NFPA publications but provides much more prescriptive and quantitative guidance concerning dust-explosion prevention and mitigation.

6. *Georgia Rules and Regulations of the Safety Fire Commissioner* Chapter 120–3–24–0.8

“*Promulgation and Purpose:* A primary purpose of these rules and regulations is to establish the State minimum fire safety standards and requirements for the prevention of loss of life and property from fire and explosions in facilities that have operations involving the manufacturing, processing, and/or handling combustible particulate solids including manufacturing processes that create combustible dust.”

This document lists 76 NFPA Codes and Standards, but (perhaps inadvertently) omits NFPA 499, “Recommended Practice for the Classification of Combustible Dusts and of Hazardous (Classified) Locations for Electrical Installations in Chemical Process Areas.” New subsections have been added to several of the referenced Codes and Standards to change a recommended practice to “Facilities . . . shall comply with this standard as a mandatory requirement.”

Thus, at the present time, there exist several legislated and guidance documents that could serve as models for Federal rules for dust-hazard controls. The attached document illustrates how the Grain-Dust standard could be modified for combustible dusts in general. However, it is likely that further modifications would be needed to cover the wide range of dusts that are encountered in U.S. industries, which include coal, pharmaceuticals, plastics, basic chemicals, explosives, and many other combustible materials, in addition to foodstuffs and grains.

KEY POINTS IN THE PREVENTION OF COMBUSTIBLE-DUST EXPLOSIONS

A. *The Problem*

1. A very high percentage of dusts are combustible, including solid hydrocarbons (such as polyethylene and polystyrene), carbohydrates (such as sugar and grains), and many metals (such as magnesium and aluminum); exceptions are materials such as dirt and clay dust, sand, limestone and other carbonates, and most oxides.

2. Every combustible material will create an explosion with the right conditions: particle size [fuel], dispersion in air, concentration in air [oxidant], ignition energy, and confinement [thus, the “dust-explosion pentagon”].

3. Existing today are: the technology and knowledge; codes, standards, and guidelines; and engineering expertise that are needed to prevent and mitigate combustible-dust explosions.

4. Limited generic data are available concerning the properties of combustible dusts; data for the specific powders and dusts that are involved in the processes of owners/operators usually need to be developed, primarily through testing.

5. At present, there apparently is very-modest enforcement of the consensus codes and standards that apply to combustible dusts, although all 50 States “administer” the International Building Code [<http://www.iccsafe.org/images/pmg/map-IBC.jpg>]. The IBC includes the requirements of the predecessor Uniform Building Code, the BOCA Building Code, and the Southern Building Code. As such, there are extensive requirements for explosion prevention and mitigation for combustible dusts. Similarly, 25 States have adopted the International Fire Code [IFC], and municipalities in an additional 16 States have adopted parts or all of the IFC [<http://www.iccsafe.org/images/pmg/map-IFC.jpg>], although there is limited specific guidance for control of dust-explosion hazards in the IFC.

6. The National Fire Protection Association has published compilations of several of the Fire Codes, in NFPA 1 [Uniform Fire Code] and NFPA 5000 [Building Construction and Safety Code]. Relatively few States and municipalities have formally adopted these more-recent Codes.

B. The Solution

1. Companies that produce, process, or handle dusts and powders need to generate data concerning the explosibility properties of their materials.

2. The data that are obtained by these companies should be formally communicated within their organizations and to their customers via media such as Material Safety Data Sheets.

3. Using the explosion-hazards data, owners/operators should assess the hazards that are associated with processes that are operating in their plant.

4. Based on the dust-explosion hazards assessments, owners/operators should implement preventive and explosion-mitigating measures that will protect personnel and property.

5. An objective of the proposed Federal legislation should be to require owners/operators to adopt and abide by the above guidance toward solution of the existing dust-explosion “problem.”

SUMMARY

Combustible powders and dusts present significant hazards, but the risk of injury and/or property loss can be controlled by “recognized and generally-accepted good engineering practices”, as expressed in existing Codes and Standards. The owners/operators of facilities that generate or handle such materials should be expected to recognize dust-explosion and flash-fire hazards in their operations and minimize the risk of such incidents, for protection of their employees. Several models of prescriptive and performance-based methods for control of combustible-dust hazards are available and are in use in many industries; these models could serve as the basis for appropriate Federal legislation.

REFERENCES

1. U.S. Department of Labor, Occupational Safety and Health Administration, “Combustible Dust National Emphasis Program” [re-issued], CPL 03-00-008 (March 11, 2008).
2. J.J. Keller & Associates, Inc., “OSHA Compliance Manual”, page OSHA-25 (June 2006).

Senator MURRAY. Thank you.
Mr. Graham.

STATEMENT OF GRAHAM H. GRAHAM, VICE PRESIDENT FOR OPERATIONS, IMPERIAL SUGAR COMPANY, SUGARLAND, TX

Mr. GRAHAM. Good morning. Madam Chair, Senator Chambliss, Senator Isakson, Senator Brown, my name is Graham Harris Graham. My counsel with me today is Philip Hilder.

At the committee’s request, I will address my experience as Vice President of Operations at Imperial Sugar Company. I will focus on the conditions I witnessed at the Port Wentworth and Gramercy Imperial Sugar facilities.

I will further address actions that I took and recommended to abate unsafe working conditions, and for the record, I am still employed as Vice President of Operations for the company.

If I can just give you a few moments of my background. In 1987, I graduated with a degree in electrical and electronics engineering at the University of Strathclyde in Glasgow, Scotland. I have multinational experience in civil industries, including steel, pulp and paper, packaging, automation, and food and drink. In recent years, I have helped turn around distressed companies by improving their operations, efficiency, and financial performance.

I began my current position in November 2007. As Vice President of Operations, I am responsible for many areas in the company, not limited to manufacturing, logistics, quality, and customer service. Within a few weeks of joining the company, I began to tour its facilities in Georgia and Louisiana. I spent 5 days walking through the 300-acre Port Wentworth, GA, refinery in early December 2007.

The conditions were shocking. It was, without doubt, the dirtiest and most dangerous manufacturing plant I had ever come to. The refinery was littered with discarded materials, piles of sugar dust, puddles of liquid sugar, airborne sugar dust. Electric motors and controls were encrusted with solidified sugar. Electrical safety covers and doors were missing from live electrical switch gear panels, and a combustible environment certainly existed.

Fire protection equipment was sheathed in dust so thick it was impossible to determine if it was operable. Fire huts, faded in the sun, stored rotting fire hoses. Fire hoses, fire extinguishers had not been checked in recent years, and employees could not remember the last time they participated in a fire drill or had hands-on fire fighting experience.

Due to these dangerous conditions, I recommended firing the plant manager. Mr. Sheptor, the Chief Operating Officer at the time, and Ms. Hastings, Senior Vice President of HR, agreed with my recommendation.

After firing the plant manager, I instructed the operations manager at Port Wentworth to identify all known safety violations, initiate a housekeeping blitz, and begin a site-wide cleanup. I sent Mr. Sheptor and Mr. Robert Peiser, Imperial Sugar's Chief Executive Officer at the time, a bulleted list of my observations, recommendations, and actions.

The following week, I spent 5 days at the Gramercy, LA, refinery. I found the same problems—accumulations of sugar, sugar dust, airborne sugar dust, unlocked electrical rooms, missing safety apparatus, to name but a few. At the end of the week, I sent another bulleted list to Mr. Sheptor and Mr. Peiser regarding my findings there.

In mid-January, I was called to a formal meeting with Mr. Sheptor and Ms. Hastings. During that meeting, I was told I was too passionate. An employee had complained about language I had used caused by a near slip and fall caused by the disgraceful conditions on the ground floor of the refinery. I was accused of ruining the Chief Operating Officer's relationship with the plant. I was instructed to make a peace offering to the management teams at Port Wentworth and Gramercy.

I departed that meeting disappointed and confused. I went back to Port Wentworth 2 weeks later or 2 weeks—I am sorry—before the explosion. Housekeeping efforts had certainly improved. They couldn't get any worse. Port Wentworth safety coordinators had,

under my direction, identified over 400 safety violations since my previous visit.

During a meeting with the management team there, I congratulated them on the progress. However, the job was not done. I reminded the management team of the November 2007 Domino Sugar explosion, which was caused by accumulated sugar dust. I also used the Texas City BP explosion, where workers were killed, to stress the consequences of a fatal explosion to Imperial, the workers, and their families. Safety and housekeeping had to be the No. 1 priority.

The next day I went to the Gramercy facility. Gramercy's management team achieved similar improvements. There were still many, many issues to address, especially those related to accumulated sugar, sugar dust, and other critical safety-related matters.

As with my previous visits, I sent Mr. Sheptor and Mr. Peiser summaries of my observations, actions, and my expressed concern for the employees' safety, especially those at Port Wentworth. I said that I believed a fatal disaster would befall the refinery if a fundamental change in the way the plant was being operated did not take place.

On the evening of Thursday, February 7, I took a phone call and was informed that the refinery at Port Wentworth had exploded. I flew to Georgia the next day and spent a week observing the fires being put out, watching bodies being recovered from the charred remains.

Tony Thomas, one of the managers I had met previously 2 weeks earlier, was the last body to be recovered from the site. Over the next few weeks, I attended funerals for those that died in the explosion.

Since the explosion, I have not participated in senior management teams or discussions regarding the disaster, the recovery, the investigation, or the reconstruction. Rather, Mr. Sheptor tasked me with addressing Gramercy deficiencies and maximizing productivity.

At Gramercy, I overhauled the safety culture, systems, processes, and procedures, led a massive housekeeping blitz, corrected hundreds of safety defects, initiated monthly fire drills, and developed and practiced an emergency evacuation plan. In March, I assisted OSHA during its inspection of the refinery and promptly corrected more violations and infractions as they came to light.

I intend to fully cooperate with this committee. I welcome the opportunity to answer any questions the Senators may have.

[The prepared statement of Mr. Graham follows:]

PREPARED STATEMENT OF GRAHAM HARRIS GRAHAM

Good morning, Mr. Chairman and committee members. I am Graham Harris Graham. My counsel, with me today, is Philip Hilder. At the committee's request, I will address my experiences as Vice President of Operations at Imperial Sugar Company and focus on the conditions that I witnessed at the Port Wentworth and Gramercy Imperial Sugar facilities. I will further address description of any actions that I recommended to abate unsafe work conditions. I am still employed as the Vice President of Operations for the Imperial Sugar Company.

By way of background, in 1987 I graduated with a degree in electrical and electronics engineering from, University of Strathclyde, in Glasgow, Scotland. I have multi-national experience in several different industries, including steel, pulp & paper, packaging, automation and food & drink. In more recent years, I have helped

turn around distressed companies by improving their operations, efficiency, and financial performance.

I began my current position in November 2007. As Vice President of Operations, I am responsible for many areas within the company, including manufacturing, logistics, quality and customer service. Within a few weeks of joining Imperial's upper management team, I began touring its facilities in Georgia and Louisiana.

I spent five (5) days walking through the 300 acre Port Wentworth, Georgia refinery in early December 2007; the conditions were shocking. Port Wentworth was a dirty and dangerous facility. The refinery was littered with discarded materials, piles of sugar dust, puddles of liquid sugar and airborne sugar dust. Electrical motors and controls were encrusted with solidified sugar, while safety covers and doors were missing from live electrical switchgear and panels. A combustible environment existed.

Fire protection equipment was sheathed in dust so thick it was impossible to determine if it was operable. Fire fighting huts, in faded, red paint, stored rotting hoses, fire extinguishers had not been checked in recent years, and employees could not remember the last time they participated in a fire drill or fire fighting training.

Due to the dangerous conditions, customs and practices, I recommended firing the plant manager. Mr. John Sheptor, the Chief Operating Officer at the time, and Ms. Kay Hastings, the Senior Vice President of Human Resources, agreed with my recommendation. After firing the plant manager, I instructed the Operations Manager to identify safety violations, initiate a housekeeping blitz and begin a site-wide clean up. I sent Mr. Sheptor and Mr. Robert Peiser, Imperial's Chief Executive Officer, a bulleted list of my observations and recommendations.

The following week I spent five (5) days at the Gramercy, Louisiana refinery. I found similar problems; accumulations of sugar, sugar dust, airborne sugar, unlocked electrical rooms and missing safety apparatus, to name a few. I sent another bulleted list to Mr. Sheptor and Mr. Peiser regarding my findings at Gramercy.

In mid-January, I was called to a formal meeting with Mr. Sheptor and Ms. Hastings. During that meeting, I was told an employee complained about language I used after a near slip and fall that I had while walking through Port Wentworth's basement. I was also informed that I was excessively eager in addressing the refinery's problems. Mr. Sheptor accused me of ruining his 11-month relationship with Port Wentworth's management team, which he supposedly developed after two site visits. I was further instructed to make a peace offering to management at Port Wentworth and Gramercy.

I visited Port Wentworth approximately 2 weeks before the explosion. Housekeeping efforts were much improved. Port Wentworth's Safety Coordinators had identified over 400 safety violations since December. During a meeting I congratulated the management team on their efforts; however, there was still a long way to go. I reminded the management team of the November 2007 Domino Sugar explosion, which was caused by accumulated sugar dust. I also used the Texas City BP explosion where several workers were killed to stress the consequences of a fatal explosion to Imperial, the workers, and their families. Safety and housekeeping had to be a priority.

The next day I went to the Gramercy Plant. Gramercy's management team achieved similar improvements, but there were still issues to address, especially those related to accumulated sugar, sugar dust, and other critical safety-related matters. As with my prior visits, I sent Mr. Sheptor and Mr. Peiser summaries of my observations and expressed concerns for the employees' safety, especially those at Port Wentworth.

On the evening of Thursday, February 7, I was informed of the Port Wentworth explosion. I flew to Georgia the next day and spent a week observing the fires being put out and watching bodies being recovered from Port Wentworth's charred remains. Tony Thomas, one of the managers I met with 2 weeks earlier, was the last body recovered from the site. Over the next few weeks, I attended funerals for those that died in the explosion.

Since Port Wentworth's explosion, I have not participated in senior management team meetings and/or discussions regarding the disaster, the recovery, the investigation or the reconstruction. Rather, Mr. Sheptor tasked me with addressing Gramercy's deficiencies. At Gramercy, I overhauled the safety culture, systems, processes and procedures; led a massive housekeeping blitz; corrected hundreds of safety defects, initiated monthly fire drills; and developed and practiced an emergency evacuation plan. In March, I assisted OSHA during its inspection of the refinery, promptly correcting violations and infractions.

I intend to fully cooperate with this committee and welcome the opportunity to answer any questions that the Senators may have.

Senator MURRAY. Thank you very much to all of you for your testimony.

Mr. Graham, let me talk to you first. During Mr. Bresland's testimony, we saw pictures of dust accumulation at the Imperial Sugar plant at Port Wentworth. They are still in front of us. I don't know if you can see them here, but it looks like several feet of dust. Is this representative of the conditions that you saw prior to the explosion?

Mr. GRAHAM. Sugar and sugar dust, depending on which area I visited, was either ankle, knee, or waist deep.

Senator MURRAY. Say that again. Ankle?

Mr. GRAHAM. Ankle, waist—ankle, knee, and waist deep.

Senator MURRAY. You saw sugar up to waist deep?

Mr. GRAHAM. Yes, ma'am.

Senator MURRAY. How do you think the quantity of accumulated sugar and airborne dust contributed then to Port Wentworth's explosion, in your opinion?

Mr. GRAHAM. Well, the more fuel in the environment and the more fuel that had the potential to become airborne, clearly contributed significantly to the detonation when the dust ignited.

Senator MURRAY. I assume it would take a while for waist deep dust to accumulate?

Mr. GRAHAM. That would be the intuitive thought. In actual fact, due to the quantities of sugar being manufactured and due to the deficiencies in the apparatus, it would surprise one how quickly several thousand pounds of sugar and sugar dust could accumulate inside the refineries.

Senator MURRAY. If there is, as you say, deficiencies in apparatus, then something is blowing it out the wrong way, and it is accumulating fairly quickly?

Mr. GRAHAM. Well, there is about six key areas or systems that need to be in place in order to protect the building, the apparatus, and the people working inside. You need to have a regular, frequent, and thorough housekeeping policy in place so that the dust, if it accumulates, is removed.

You need effective plant maintenance schedules to make sure the apparatus is dust tight and prevent sugar dust from getting into the general work environment.

The electrical and mechanical apparatus needs to be installed in compliance with the NFPA codes of which there are many that accurately describe the standard the apparatus needs to be not only designed, but installed to minimize or eliminate the risk of an ignition source and the potentially hazardous environment.

You need sufficient ventilation in the unlikely event, after doing all of that, should dust get into the environment, ventilation will take that out of the environment and push it into the general outside atmosphere.

You need fire and explosion suppression systems installed in those hazardous environments, should all of those safety measures fail, to prevent an ignition source from propagating and causing further destruction.

Last, but not least, the employees, managers, and operators of the refinery need to have an effective evacuation plan, should all of the five previous systems fail.

Senator MURRAY. Well, we have seen references that you warned other Imperial managers about the conditions at the plants. What you just listed out, many of those were not being done. My understanding is you warned other Imperial managers about the conditions. We have seen the e-mails released between you and the Imperial Sugar CEO Mr. Sheptor about your concerns prior to the explosion on February 7.

Do you think the plant managers properly addressed the concerns you identified about the conditions that you observed?

Mr. GRAHAM. You have to remember, I had just started in November. My first visit to the plants was in early December. That is 8 weeks before the explosion. Such was the quantity and severity of the problems that I uncovered on each subsequent visit, I don't think it was possible in 8 weeks to solve all of these problems.

Senator MURRAY. During any of the meetings or correspondence that you had with Imperial Sugar, did you warn them about the dangers in the amount of dust that you saw at this facility?

Mr. GRAHAM. Absolutely.

Senator MURRAY. What type of reception did you get to those warnings?

Mr. GRAHAM. I had a collective meeting with the management team at Port Wentworth in the middle of January. I had approximately 18 people in the room, and I told them quite categorically that some of them would probably not be coming home soon because they would be at the city morgue due to the potential explosive properties that we all found ourselves working amongst, due to the excessive volume of dust and, indeed, other hazards that I had identified during my visit there.

Senator MURRAY. You believe that they understood the magnitude of what you were explaining to them?

Mr. GRAHAM. I suspect that some of them had never been told that before. Some of them have been told but have become so accustomed to working in such conditions, they have become normalized to it.

Senator MURRAY. Do you believe they were taking your warnings seriously at that time?

Mr. GRAHAM. After I fired the plant manager, I appointed an interim plant manager, and that individual had started also in November 2007. And he clearly got it.

They did, indeed, remove thousands of pounds of sugar in the environment. Unfortunately, due to the very short time constraint, it was clearly not possible to put in all of the systems that I previously described in such a way that it would have mitigated this disaster in just the short space of 8 weeks.

Senator MURRAY. Well, thank you very much.

Senator Isakson.

Senator ISAKSON. Thank you, Chair Murray.

Mr. Prugh, as a professional trained in this science, how long has it been your knowledge that sugar dust would explode? How long have you known that?

Mr. PRUGH. This goes back to the original statement that all combustible materials can explode if they are divided sufficiently, all combustible materials.

Senator ISAKSON. Following up on that question, Ms. Spencer, you said you don't have to reinvent the wheel here to test for properties, and then you went to refer to NFPA 654, which is your comprehensive series of rules, regulations, and findings and, I guess, test results on combustible particulate solids. Is that correct?

Ms. SPENCER. It is our fundamentals of dust document. Yes, Senator Isakson.

Senator ISAKSON. Your reference to not re-creating the wheel, I mean, I think you were referring to OSHA and Mr. Foulke's statement is that if 654 were incorporated as the combustible dust standard, it would be sufficient on its own. Was that a fair understanding?

Ms. SPENCER. Senator Isakson, the NFPA 654 addressed the fundamentals of dust, and there has been a lot of talk today about there are so many different types of dust that could be a problem. It isn't just sugar dust, and I think we all have an understanding of that now. NFPA 654 provides all the fundamental basic requirements that you would need to prevent a dust explosion.

Then we have other documents that if you have a specialized kind of dust, like a combustible metal, we have additional requirements on top of the fundamental requirements. Where there are special needs of a different type of particulate, we have other documents to address that—sulfur, coal, combustible metals, agricultural dust, and wood dust.

Senator ISAKSON. Do you have a commodity-specific dust document with regard to sugar?

Ms. SPENCER. Sugar would be covered under NFPA 61, which covers all agricultural dust, and specifically sugar is noted in the document.

Senator ISAKSON. Agricultural dust is common enough to where the properties would be about the same for all of them?

Ms. SPENCER. Absolutely. There are different properties, as Mr. Bresland alluded to earlier, that would make one dust more hazardous than another, and that is discussed quite a bit in NFPA documents.

Senator ISAKSON. Mr. Graham, how long have you known that sugar dust was explosive?

Mr. GRAHAM. From the age of 16. It was common in Scottish schools to conduct sugar and starch dust experiments to demonstrate the energy contained within that carbohydrate and to show the explosive properties of such materials. I have worked in other industries, such as the paper industry, and have seen it firsthand the consequences of fires caused by excessive accumulations of paper dust.

Senator ISAKSON. You were hired in November 2007?

Mr. GRAHAM. Yes, sir.

Senator ISAKSON. Is that correct? And the explosion in Baltimore was 2007?

Mr. GRAHAM. About 2 weeks before I started.

Senator ISAKSON. Two weeks before. In your resume, you have done extensive turnaround work in other industries. Is that correct?

Mr. GRAHAM. Yes. Yes.

Senator ISAKSON. Out of curiosity, did you respond to an advertisement, or were you sought out when you were employed? How did you come to this job?

Mr. GRAHAM. I was living in Las Vegas at the time and had spent nearly 4 years doing turnaround work. The travel is quite extensive. I had flown 300,000 miles last year.

Senator ISAKSON. Did you seek the job out, or did they seek you out?

Mr. GRAHAM. No, I sought out this company. I had multiple different opportunities I was exploring, and I de-selected all of those to arrive at this one.

Senator ISAKSON. OK. When you were trained in Scotland in electrical engineering, do you recall any—during that training talking about the explosive properties of dust in manufacturing and the cause that electricity could be to an accelerant?

Mr. GRAHAM. No, the education for electrical engineering at university level is purely on the mathematics and the philosophy of electricity and the control of it and how it is distributed. The environmental impact of dusts coming into contact with potential sources of combustion is an experience learned through work.

Senator ISAKSON. Based on your knowledge, yourself and the job responsibility that you had, when you did the inspections, the standards that you applied to make the recommendations for what needed to be done to improve the safety were standards based on your own knowledge. Is that correct?

Mr. GRAHAM. Based upon my knowledge and references to existing code that currently resides in NFPA 654, the National Electrical Code, which none of them are rocket science. They have been around for decades, and those are standard—commonly referred to standards for any installer or designer of electrical apparatus.

Senator ISAKSON. Which I guess takes us all the way back to the general duty standard that OSHA applied in the citations they made at Port Wentworth and at Gramercy?

Mr. GRAHAM. Yes, I have still to read the whole citation because of its enormity, but I will be spending the rest of this week at Gramercy, for example, getting to grips exactly what the inferences are there.

Senator ISAKSON. We thank all of you for testifying.

Mr. GRAHAM. Thank you.

Senator MURRAY. Senator Chambliss.

Senator CHAMBLISS. Mr. Prugh, is there anyway to manufacture sugar the way it was being manufactured at Port Wentworth without creating dust?

Mr. PRUGH. A principle of dust explosion prevention is containment. If you can design equipment to contain sugar powder, sugar dust, then there wouldn't be that kind of a hazard.

Senator CHAMBLISS. Well, my question is in the manufacture of certain products, you are going to have dust?

Mr. PRUGH. Yes.

Senator CHAMBLISS. The issue is how do you control it? Can you design an exhaust system or a ventilation system of some sort that should remove dust from a facility like a sugar manufacturing plant that will get it below that minimum standard you referred to for making it combustible?

Mr. PRUGH. If containment is difficult for some reason, then you can provide what is called local exhaust ventilation, some sort of an elephant trunk or other device that will suck dust away from the point where it is being released.

Senator CHAMBLISS. OK. Mr. Graham, when you were hired by Imperial Sugar, what was your job description as was given to you?

Mr. GRAHAM. My job description was primarily to run the operations of the two refineries at Gramercy and Port Wentworth, a sugar re-melt station in Ludlow, KY, to oversee production, efficiency, output, as well as customer service, quality, distribution, logistics, and also keep track of normal manufacturing costs—labor, overhead, etc.

Senator CHAMBLISS. Well, I am looking at your statement here, on page 1, you say, "As Vice President of Operations, I am responsible for many areas within the company, including safety and quality control." Were you the chief safety operator or, excuse me, chief safety official of Imperial Sugar Company, in your opinion?

Mr. GRAHAM. No, sir. The company appointed or had appointed for some time a corporate safety manager, who has a staff of people at both plants. That function did not report to me when I joined the company.

Senator CHAMBLISS. Well, why do you say you were responsible for safety? I am reading your statement here.

Mr. GRAHAM. Every employee, every manager, every supervisor in any company I have ever worked for all contribute to the safety of the work environment. The corporate safety function is typically a function that provides policies and procedures with which the managers, supervisors, and employees execute. My job was to execute, where possible, to the best of my ability those policies and procedures.

Senator CHAMBLISS. You went into the Port Wentworth plant in December, found any number of egregious violations, which you referred to as "shocking. The facility was dirty and dangerous." You then made certain recommendations to management, recommendations including firing the plant manager, correct?

Mr. GRAHAM. Yes, sir.

Senator CHAMBLISS. What action was taken?

Mr. GRAHAM. He was fired.

Senator CHAMBLISS. You made recommendations for any number of safety violation corrections. What action was taken based upon that?

Mr. GRAHAM. Even though the safety function did not report to me, I superseded the authority of the people in that department and instructed them to work with every functional manager at the refinery and immediately that day—starting that very day—to go into the refinery in every area, identify every known hazard due to electrical covers being exposed, insulation missing from steam pipes, safety barriers missing, guardrails missing, including obviously the housekeeping, and instructed those people to identify what they were, take immediate responsive action to either eliminate the risk or mitigate until such time they had the resources to fix it.

Senator CHAMBLISS. Did they act on your recommendation there?

Mr. GRAHAM. Yes, sir, because when I came back—

Senator CHAMBLISS. Now I hear you. I think you have already answered that.

Now, you had this meeting with employees at the Port Wentworth plant in which you, Mr. Graham, having gone into this facility, having identified a shocking and dangerous facility at Port Wentworth, you made recommendations to the company which they followed. You told these folks that if they didn't take some corrective action immediately, according to your words, some of these folks wouldn't be back, they would be in a morgue.

Why didn't you, Mr. Graham, go to the management of Imperial Sugar Company and say, "By golly, if you don't shut this plant down now and clean this up, you are going to have a dangerous situation to occur," which did occur 2 weeks after you said you made that statement? Why didn't you do that?

Mr. GRAHAM. I did do that. I told Mr. Sheptor that I was surprised that we hadn't killed anybody already because the plants were so dangerous. I was told that my passion was extreme and I had to temper it. I was told to prepare a board presentation for the end of January, during which I was going to recommend asking for a significant change in the way we operated the plant, and I was prevented from doing so.

Senator CHAMBLISS. Well, Mr. Graham, here we are 6 months almost after the incident occurred, and you are still working for the same company that you said you gave that kind of mandate to? It gives me cause to question your sincerity in what you have had to say about this.

This has been a very emotional, tragic situation that occurred in south Georgia and is one in which we want to get to the bottom of, obviously, from the standpoint of what happened. The ultimate result needs to be safety measures put in.

I respect what you say about the fact that you made recommendations to them, but I really have cause to question your sincerity in that. Because if you were, I can't imagine after what did happen and you say you made the statements you did, why are you still working for this company?

Thank you, Madam Chairman.

Senator MURRAY. Well, Senator Chambliss, I appreciate your comments.

Mr. Graham, I do appreciate your coming and speaking today, and I think it is fair for you to be able to respond to those questions, and I would give you that opportunity.

Mr. GRAHAM. Well, thank you. All of the conditions I described pre-existed my appointment. My objective today was to bring forth the facts laid out before me so that we can collectively decide what needs to be done to prevent this sort of tragedy happening again.

The employees of both refineries and, indeed, in the industry deserve a safe working environment. The reason I am still there is because I believe I can continue to contribute to achieving that goal, and I will be taking OSHA's findings and moving forward to continue fixing the deficiencies so that we can put these people into an environment which they know is safe and clean. I will continue to work on that over the next several months.

Senator MURRAY. Thank you very much.

Mr. Prugh, can I go back to you? You said that OSHA's house-keeping standards are insufficient to address the dust standard and that the general duty standard is not specific. Doesn't that mean that we need a dust specific OSHA standard, in your opinion, to ensure employees know what they need to do to prevent explosions?

Mr. PRUGH. Yes, some additional standard is needed. The process safety management standard is a good standard, and it could be a good model for a dust explosion prevention standard.

Senator MURRAY. Ms. Spencer, the pile of paper on the end of the desk here was referred to several times as, if we adopted a standard, we would have to review all of that. You referenced it in your testimony. If OSHA were to adopt a standard, would you or would NFPA provide assistance to non-NFPA adopting States to work their way through all that paper?

Ms. SPENCER. NFPA's record on code assistance is incredibly well established, and the assistance that we would provide, as I see it, are in three general areas. First, for the enforcers, and that would include authorities having jurisdiction, State fire marshals, and others.

And specifically, with respect to dust—I am not even talking about all the other hundreds of assistance courses or meetings that we have had with enforcers. Just regarding dust, we have met with enforcers in Kentucky after the CTA Acoustics explosion to educate them about the hazards of dust. We have met with authorities having jurisdiction in Massachusetts, and that was a proactive. They wanted to learn about the combustible dust hazards.

Most recently, we did a 2-day training seminar at the request of the Georgia State fire marshal at the Georgia Fire Safety Symposium, where we taught about 100 State fire marshals about the hazards of dust. Would we assist with non-NFPA States? Georgia is a non-NFPA-1 adopting State. I think our record on that is clear.

Additionally, NFPA committee members are training OSHA compliance officers. NFPA has worked extensively with OSHA on numerous projects, including dust. We have OSHA members on many of our committees, and we assisted with reviewing their Safety and Health Information Bulletin. We have trained OSHA compliance officers on electrical issues relating to 70(e).

With respect to industry, a lot of these places where we go to talk to enforcers, they invite the local industries in to come and learn about dust as well, and that was the case in Georgia. We also have seminars, as well as contract seminars where NFPA—

Senator MURRAY. So you do provide that training?

Ms. SPENCER. We do.

Senator MURRAY. Yes, and let me ask you one other quick question that I want to understand myself. We have heard some concerns that the OSHA dust standards won't work because a single rule can't cover all the different materials. Is that concern that the NFPA standard is a one-size-fits-all, or does NFPA have the capability to look at this in terms of the different levels of concern?

Ms. SPENCER. Senator Murray, I believe that with the adoption of NFPA 654, it does reference the other special hazards with the other special commodities that I mentioned, such as dust and combustible metals.

Senator MURRAY. So you can deal with a variety of materials?

Ms. SPENCER. It absolutely will cover a variety of materials.

Senator MURRAY. OK. Mr. Graham, let me ask you, in your time at Imperial, are you aware of any training provided to management or workers about potential dust dangers? Was there any training?

Mr. GRAHAM. Currently, right now, in fact, in a few days, we should have completed a training program on the OSHA National Emphasis Program for the employees at Gramercy in particular. That should be completed by—

Senator MURRAY. Was there any training prior to that explosion, was there any training being done on dust standards?

Mr. GRAHAM. I can only speak from the moment that I started, which was in the middle of November. I am not aware that any specific training programs were in place at that time. There may have been before I joined, and I can't say that is the case or not.

Senator MURRAY. But, you are now putting together a training program?

Mr. GRAHAM. We have already educated the employees at Gramercy actually several months ago on a very short refresher course. We took Mr. Foulke's advice and retrained the people using his National Emphasis Program on combustible dust. Every employee at that refinery should be re-educated by the end of this month.

Senator MURRAY. OK. One final question for you. Were you aware of anyone else who expressed concerns to management about the conditions at the plant?

Mr. GRAHAM. I can't obviously speak for the actions of other people. It was certainly expressed to me by my operations manager at Port Wentworth because he was a new employee himself, and he was certainly alarmed, which is why he was effective at getting rid of a lot of the housekeeping problems. Unfortunately, not enough to prevent this disaster.

Senator MURRAY. OK. Senator Isakson.

Senator ISAKSON. Ms. Spencer, did I hear you say Georgia wasn't an NFPA State?

Ms. SPENCER. It does not adopt NFPA-1. That is correct. It adopts the International Fire Code.

Senator ISAKSON. Mr. Prugh, in your written testimony, you cite Georgia's adoption of the NFPA standards.

Mr. PRUGH. May I add to my previous comment?

Senator ISAKSON. Yes, you can.

Mr. PRUGH. The Georgia rules and regulations of the safety fire commissioner list 76 NFPA codes and standards, many with the statement, concerning these recommendations of the NFPA, "Facilities shall comply with the standards as a mandatory requirement." They have said this about several of the NFPA codes.

Senator ISAKSON. They have incorporated those 76 in their standards within the Georgia law?

Mr. PRUGH. Yes.

Senator ISAKSON. Is one of those 654?

Mr. PRUGH. It is. Yes.

Senator ISAKSON. So Georgia has responded within the State with regard to the explosive properties of dust?

Mr. PRUGH. They have.

Senator ISAKSON. In so doing, they did so by adopting NFPA's 76 different opines or rules?

Mr. PRUGH. Yes.

Senator ISAKSON. OK. I have no further questions, Madam Chair.

Senator MURRAY. Thank you very much, Senator Isakson.

I want to thank all of our witnesses for being here today. Mr. Graham, I want you to know that your future employment is of great interest to Senator Kennedy, who could not be here today, as well as Senator Isakson and myself.

With that, I want everyone to know that the record for this hearing will be open for 10 business days. We may have additional questions that we would ask people to respond to. Those will be submitted to you in writing.

And with that, this hearing of the subcommittee is adjourned.

[Additional material follows.]

ADDITIONAL MATERIAL

PREPARED STATEMENT OF SENATOR HARKIN

I thank our dedicated subcommittee Chair, Senator Murray, for holding this critically important hearing today. It is simply unacceptable that almost 2 years after receiving the U.S. Chemical Safety and Hazard Investigation Board's ("CSB") eye-opening combustible dust hazard study, we still have no standard for dust levels or remediation. Despite the fact that this report describes hundreds of preventable injuries and deaths every year, and the fact that the National Fire Protection Association has already developed implementable standards that would save lives and property in explosions, the Occupational Safety and Health Administration (OSHA) has yet to issue a proposed rule to specifically address these dust hazards.

At the time this report came out in 2006, I was shocked to learn that my home State of Iowa was on the list of a handful of States with 15 dust explosions during the period of the report. I come from a State with a lot of agriculture. We saw a steady increase in grain dust explosions in the 1970s and 1980s, so OSHA issued a standard for grain handling facilities. As a result of something as simple as spraying water or mineral oil on the grain to keep the dust down, fatalities from grain dust explosions have decreased by 60 percent.

Unfortunately, as the CSB's report indicates, most workers and their employers are not aware of the serious danger posed by something as seemingly innocuous as dust. Anyone who has tried to start a campfire in the woods knows, however, that big logs are difficult to ignite, while smaller brambles are much easier to burn, and can be used to light a larger fire. As particles of any combustible or explosive substance get smaller and smaller, the easier it is for them to catch fire. That means small enough particles of almost anything can be combustible under the right circumstances. And sometimes, the explosion can start somewhere else, and ignite accumulated dust.

Work place safety is an issue that I take very seriously. My father worked for many years as a coal miner in one of the dozens of coal mines that were located in south-central Iowa. They knew all about coal dust, which is highly explosive. Of course; it is a fuel source. We have come a long way since those days, with the creation of OSHA and MSHA. But we have a long way to go. In 2006 there were 5,700 workers killed on the job in the United States. And every single day, 12,000 workers become sick or are seriously injured at work. It's heartbreaking to realize that often these tragedies were completely preventable, but weren't in the name of higher productivity and increased profits. Today's workers face longer hours, intensification of work due to downsizing, increased work pace and other changes in work technologies and work processes. It's about time that we put that technology to work to increase worker safety.

I thank our guests for coming to testify about this critical issue today. I know that workers want a safe environment, and employers could use a comprehensive standard to clarify their obligations

to keep their workers and their facilities safe from these preventable fires and explosions.

PREPARED STATEMENT OF SENATOR CLINTON

It has been nearly four decades since the *Occupational Safety and Health Act* was enacted into law. And while we have made great strides in improving the safety of the working environment for the Nation's workers, there is still a great deal of improvement to be made. One area in particular where there is an urgent need for action is the issue of combustible dust.

Catastrophic explosions of dust have become all too common in our Nation's factories. When materials in a factory are ground into small enough particles and allowed to collect on the floor in high concentrations and then dispersed into the air, even a small spark can lead to devastating results. There have been more than 300 combustible dust explosions in American factories since 1980. More than 120 workers have been killed and 800 workers injured due to combustible dust in factories across the country.

The Occupational Safety and Health Administration (OSHA) has failed to take the steps necessary to protect these workers. According to one report, there were 67 dust explosions in the last 2 years, and OSHA missed the problem in almost every case, citing only a single factory for a dust hazard prior to a blast. One retired OSHA inspector told 60 Minutes that he had never received training on industrial dust, and that he routinely ignored dust problems at factories in his inspections.

And even though the U.S. Chemical Safety and Hazard Investigation Board issued a report almost 2 years ago finding that combustible dust explosions are a "serious hazard" and strongly recommending that OSHA issue safety standards that would track the voluntary standards developed by the National Fire Protection Association. However, OSHA has failed to issue any such regulations. Decades ago, when grain elevators were exploding at an alarming rate, OSHA issued safety standards confined to the handling of grain dust. As a result, dust explosions decreased by more than 40 percent, and fatalities dropped by 60 percent.

Unfortunately, the reluctance of OSHA to act in this area is only all too typical of the Department of Labor in this Administration. The Administration has dragged its heels for years on regulations not only for combustible dust, but also cranes and derricks, personal protective gear, diacetyl, and mine safety, to name just a few. OSHA has also consistently failed to enforce the laws and regulations that are on the books. And yet, in the closing months of the Administration, political appointees have rushed to issue a secret rule sought by the business community to make it more difficult to regulate workers' exposure to chemicals and toxins.

Too many workers are dying unnecessarily. And yet we can take concrete steps to address this problem. Earlier this year, the House passed legislation that would require OSHA to act in 90 days to implement the recommendation that OSHA issue a dust standard. The legislation awaits action in the Senate. An ever growing chorus of experts, industry leaders, and newspapers are urging OSHA to act to provide guidance on the hazards of combustible dust. I

pledge to work with my colleagues to add Congress's voice to this chorus.

PREPARED STATEMENT OF SENATOR OBAMA

I thank the Chair for holding this hearing and continuing to demand that the Administration enforce the laws that protect workers. In 2006, the U.S. Chemical Safety and Hazard Investigation Board (CSB) issued an investigative report recommending that the Occupational Safety and Health Administration (OSHA) quickly issue a combustible dust standard to prevent and mitigate the seriousness of dust explosions in the workplace. CSB had found that from 1980 to 2005, 281 dust explosions in the United States had killed 119 workers and injured 718. Despite this mounting death toll, OSHA rejected the recommendation. Since that time, there have been 82 more serious combustible dust explosions.

The most serious of these explosions happened on February 7, 2008, when there was a massive explosion at the Imperial Sugar refinery in Port Wentworth, GA. Thirteen workers were killed and several are still in the hospital burn unit. The CSB and OSHA have confirmed that combustible dust caused the disaster.

It is past time to issue a standard to prevent these kinds of accidents and if the agency will not do so, then Congress must legislate one.

As I have said before, this Department of Labor has used its regulatory authority as if its mandate were to err on the side of corporations over the public interest—even when its decisions undermine the spirit of the law and puts workers' lives at risk. And the evidence that this Department is failing to fulfill its mission continues to grow.

Earlier this year, the majority staff prepared a report titled, "Discounting Death: OSHA's Failure to Punish Safety Violations That Kill Workers," showing that OSHA systematically imposes small fines on employers, even in cases where safety violations led to a worker's death. And it almost immediately discounts a fine if the employer contests it.

Unfortunately, this record of lapsed or absentee enforcement efforts appears to be systemic, as two recent Government Accountability Office (GAO) reports shed light on serious problems at the Wage and Hour Division (WHD). One report addressed the overall effectiveness of the Division's enforcement procedures, finding that WHD is not adequately assuring employer compliance. It found that the WHD did not effectively take advantage of available information and tools in planning and conducting its compliance activities; WHD failed to use key data on complaints and input from external groups—such as employer and worker advocacy organizations—to inform its planning process. This report also found that WHD focused on the same four industries from 1997 to 2007, despite information from its own commissioned studies that there were other low-wage industries that had equally high rates of potential wage and hour violations. Finally, GAO concluded that the agency does not sufficiently leverage its existing tools and partnerships to encourage employers to comply with the law.

Another GAO report found alarming lapses in the Department's handling of individual worker complaints. GAO found frequent in-

stances where WHD: (1) inappropriately rejected complaints based on incorrect information provided by employers; (2) failed to make adequate attempts to locate employers; (3) did not thoroughly investigate and resolve complaints, and (4) delayed initiating investigations for excessive periods of time.

By some estimates, more than 50,000 Americans lose their lives every year due to workplace accidents or job-related diseases. For American workers, that's about one work-related fatality every 10 minutes—or 150 working families every single day that suffer a terrible tragedy, losing a father or mother, a husband or wife, a son or a daughter. In the report issued by this committee, a few of those husbands and wives and fathers and mothers expressed their pain of loss and deep distress that OSHA has refused to penalize firms to a level necessary to lead to safer workplaces and discourage additional deaths.

And occasional large fines in isolated cases like Imperial Sugar will not solve the problem. Fines and penalties have to be applied systemically when violations occur to encourage compliance by other employers, and the agency needs to issue standards in a timely and effective manner. In this case it did not.

The Department of Labor is suffering from a dangerous lack of leadership and focus, and workers are paying the price. This hearing is only the latest in a series of events that make it clear that the Secretary and her team need to re-double their efforts to enforce the protections workers are due under the law.

Thank you.

PREPARED STATEMENT OF THE AMERICAN SOCIETY OF SAFETY ENGINEERS (ASSE)

On behalf of its 32,000 member safety, health and environmental (SH&E) professionals, the American Society of Safety Engineers (ASSE) commends Congress for its efforts to address the occupational risks posed by combustible dust. On job sites in various industries across the country, our members work with their employers to manage hazards associated with combustible dust from the wide variety of sources it is derived. Based on their front-line experience and training, ASSE urges caution in moving ahead to address this issue legislatively without developing a deeper understanding of current Occupational Safety and Health Administration (OSHA) standards, their enforcement by OSHA and State occupational safety and health plans, and the approach taken to manage combustible dust risks through national consensus standards.

The risks to workers and employer property and communities posed by combustible dust are significant. The 2006 study by the U.S. Chemical and Safety Hazard Investigation Board (CSB) identified 281 dust fires and explosions that occurred at U.S. businesses between 1980 and 2005—not including primary grain handling or underground coal dust explosions. (The CSB study can be found at http://www.csb.gov/index.cfm?folder=completed_investigations&page=info&INV_ID=53.) These incidents killed 119 workers, injured 718, and extensively damaged industrial facilities. Injuries or fatalities occurred in 71 percent of these incidents. Now, given recent news accounts of the Georgia dust explosion that killed 13 workers and injured 40 and threatened the economic well-being of a community, ASSE understands the urge to find a legislative solution, as reflected in the “Combustible Dust Explosion and Fire Prevention Act of 2008” (H.R. 5522) introduced by House Committee on Education and Labor Committee Chairman George Miller. If, after thoughtful deliberation, Congress determines legislation is needed to address failures in regulating combustible dust, there is much in Chairman Miller’s approach that ASSE can support.

Most importantly, ASSE supports the assurance contained in H.R. 5522 that any new OSHA rule concerning combustible dust will not be less effective than the National Fire Protection Association (NFPA) voluntary consensus standards. This requirement is consistent with the duty established under Public Law 104–113, “The National Technology Transfer and Advancement Act of 1995,” and OMB Circular A119. In Public Law 104–113, Congress ordered that:

(A)ll Federal agencies and departments shall use technical standards that are developed or adopted by voluntary consensus standards bodies, using such technical standards as a means to carry out policy objectives or activities determined by the agencies and departments.

H.R. 5522 appropriately identifies NFPA's *Standard on Prevention of Fire and Dust Explosions from the Manufacturing, Processing and Handling of Combustible Particulate Solids* (NFPA 654) and its Standard for Combustible Metals (NFPA 484). To be consistent and thorough, the bill needs likewise to reference NFPA's *Standard on Prevention of Fires and Explosions in Wood Processing and Woodworking Facilities* (NFPA 664), its *Standard on Prevention of Fires and Dust Explosions in Agriculture and Food Processing Facilities*, (NFPA 61) and other widely adopted NFPA consensus standards addressing deflagration venting (NFPA 68), electrical classification (NFPA 70 and 499), static electricity (NFPA 77) and explosion prevention/protection systems (NFPA 69).

Where ASSE has difficulty in any approach by Congress to address regulatory issues is setting unrealistic dates for action by Federal agencies. H.R. 5522 would require an interim final standard to be promulgated by OSHA within 90 days of enactment followed by a final standard with 18 months. No doubt, the feeling that Congress needs to compel action in this case is fueled by the lack of standard-setting activity by occupational safety and health agencies under the current Administration. However, ASSE's own assessment of the complexities of this issue coupled with the complexities unfortunately posed by the current statutory obligations under the Administrative Procedure Act, the Small Business Regulatory Fairness Act (SBRFA) and the regulatory and economic impact analyses required under Executive Order 12866 lead ASSE to conclude that completion of a final rule within 24 months is a more realistic goal. Further, ASSE advises that the technical and policy issues involved here are so complex that Congress would be well advised to mandate that OSHA approach the issue in a way that mirrors the successful voluntary consensus-building process successfully used by industry and the occupational safety and health community to address combustible dust, which is available to OSHA through negotiated rulemaking.

If this were an issue not already addressed by OSHA, industry and the safety and health community in a largely adequate way, ASSE could understand the need for immediate action by Congress. But, from all reports of our members working to address combustible dust hazards, there is no simple glaring failure that quick action by Congress would easily fix. In fact, our members report largely adequate action on OSHA's part, given the limits of its resources.

Currently, 17 different OSHA regulations address combustible dust hazards. In addition to Section 5(a)(1) of the OSH Act (General Duty Clause), OSHA lists the following standards as applicable to regulating different aspects of the combustible dust issue: *1910.22*, Housekeeping; *1910.38*, Emergency action plans; *1910.94*, Ventilation; *1910.119*, Process Safety Management; *1910.132*, Personal Protective Equipment; *1910.146*, Permit-required confined spaces; *1910.157*, Portable fire extinguishers; *1910.165*, Employee alarm systems; *1910.176*, Handling materials—general; *1910.178*, Powered industrial trucks; *1910.263*, Bakery Equipment; *1910.265*, Sawmill Operations; *1910.269*, Electric power generation, transmission, and distribution; *1910.272*, Grain handling facilities; *1910.307*, Hazardous (classified) locations; and *1910.1200*, Hazard communication. Further, the National Special Emphasis program for combustible dust that OSHA re-issued in 2008 is a commendable resource for bringing notice and attention to this issue among employers and the occupational safety and health community.

In ASSE's own informal discussion with its members who are experts managing combustible dust risks, we have not been able to identify any recent incident whose hazards were not already addressed by these standards and the outreach information that OSHA already has in place. In addition, workplaces' protections from dust hazards are enhanced through NFPA's widely adopted and understood voluntary consensus standards, which are enforced not only by employers working with SH&E professionals but often also by fire departments that take an interest in working with employers to avoid hazards with the assistance of the NFPA standards. Also, design engineers and architects working on new production facilities look to the NFPA standards if such facilities are not covered by local or State fire prevention and building codes.

These resources should give Congress some assurance that a reasonable amount of time can be taken to ensure that a legislative approach not only takes into account the measures proposed by H.R. 5522, but also several other issues not addressed by the current legislative proposal.

Perhaps the most important issue not addressed by current legislation is the adequacy of OSHA's resources to conduct inspections. OSHA's ability to inspect this Na-

tion's workplaces with the limited number of inspectors it is able to employ is a long-standing issue of concern. Inadequate inspection resources not only causes OSHA to miss dangerous workplaces, but inspections that are hurried or done without an adequate basis in training can also result. With regard to dust, if only 50 of OSHA's 1029 inspectors have had "extensive dust training," as Assistant Secretary Edwin Foulke, Jr., told *60 Minutes* recently (http://www.cbsnews.com/stories/2008/06/05/60minutes/main4157170_page3.shtml), then a bill that does not address OSHA's resources to inspect workplaces competently where combustible dust can be a hazard will not address any current failure to prevent future explosions. It is critical that OSHA's compliance officers receive adequate training in order to identify and address combustible dust risks. More standards, no matter how effective, without the adequate capability to enforce them will not be adequate to address this hazard when workers' lives are at stake.

Reasonably adequate time also would allow Congress working with OSHA and the occupational safety and health community to address what may be the key underlying difficulty with the current regulatory approach to combustible dust. Given 17 different regulations impacting combustible dust risks, it is reasonable to expect difficulties in employers' efforts to establish a cohesive and effective combustible dust hazard management program in a workplace. A cooperative effort driven by congressional commitment to this issue should ideally look for a way to examine OSHA's regulations and outreach resources addressing combustible dust in light of the NFPA consensus standards and CSB's recommendations on this issue. While no simple answer to the complexities involved in managing combustible dust exists, a more organized, comprehensive approach by OSHA is needed to facilitate compliance.

Whether the ultimate answer is expansion of the process safety management standard, utilization of applicable sections of the grain dust standard for other industry sectors, or development of a stand-alone combustible dust standard is not clear at this point. ASSE's primary concern is that an answer to the current difficulties involving combustible dust risk management be based on sound science and done in a way that affords all stakeholders due process, without any undue delay.

As always, ASSE stands ready to offer the expertise and front-line experience of our members in managing worksite hazards as this subcommittee grapples with the best way to help ensure all workers are adequately protected from risk factors associated with combustible dust.

PREPARED STATEMENT OF WILLIAM J. HARGRAVES

My name is William J. Hargraves. I am providing this statement voluntarily for consideration by the U.S. Senate Health, Education, Labor, and Pension Subcommittee on Employment and Workplace Safety. This statement is based on my personal knowledge of the facts stated herein.

Until my retirement in January 2008, I was employed by the U.S. Occupational Safety and Health Administration (OSHA). During the past 28 years, I worked as an OSHA inspector, assigned to the Springfield, MA OSHA Area Office. My job classification and concentration was in the field of Industrial Hygiene.

As an OSHA inspector, I received extensive training on OSHA's general and specific industry standards. I also received training on inspection methods and procedures. In my 28 years as an inspector, however, I never received training on the potential hazards of combustible dust in the workplace. I was never provided an opportunity to attend or provide training on the hazards of combustible dust. As described below, my knowledge of combustible dust hazards was achieved only as a result of my experience in personally investigating a multiple fatality accident caused by a combustible dust explosion.

It was my experience as an OSHA inspector that any knowledge of the hazards of combustible dusts was retained locally within OSHA Area Offices and Regions. The local knowledge and expertise developed from investigations often remained only within the area offices and it was not routinely shared with other offices. For example, OSHA Regions where agricultural activities were more concentrated may have had wider knowledge of combustible dust hazards due to the long history of grain dust explosions. OSHA responded to grain dust hazards in 1987 by issuing a health and safety standard, 29 CFR 1910.272—Grain Handling.

On February 25, 1999, an explosion and fire occurred in the Shell Molding Department of Jahn (pronounced "yon") Foundry in Springfield, MA. Three employees died and nine were severely burned. A joint foundry investigation team, led by OSHA compliance officers of the Springfield Area Office, determined that the most likely cause was a machine malfunction that provided a source of ignition for the eventual dust explosion of a phenol-formaldehyde resin dust used in the molding

process. I served as the co-lead investigator for OSHA. The OSHA lead investigators wrote the final report of the events.

Jahn Foundry had been inspected by OSHA compliance officers repeatedly during my time in the Springfield Area Office. I was one of the compliance officers who went to the foundry within 3 years of the tragic dust explosion. The inspection I conducted (approximately 1996) was generated by an employee complaint of oil mist in the machine shop. Other plant areas were visited, including the Shell Molding Department, and my memory of the housekeeping was unremarkable given that the nature of the foundry business is dust-producing and visibly dirty. However, the conditions were not excessively so obvious that it caught my attention. I did not give any regard to the nature of the dust and its potential hazards because it was unknown to me as dangerous. At the conclusion of my inspection, Jahn Foundry received no citation for any violation of OSHA standards.

Returning to Jahn Foundry after the 1999 explosion and fire, the role of dust in the events leading up to the conflagration was clearly obvious. Our investigation found that shell molding stations were inches-deep in sand and resin; horizontal surfaces were covered in similar accumulations; and internal ducts of the ventilation system had several inches of resin and fine dust accumulation. The initiating event was either an ignition of resin dust particles by the open flame of a shell molding machine, or a failure of natural gas valves in the machine, which provided another source of ignition. The flame front entered the ducts, causing an internal explosion inside the ducts, which caused the combustible resin dust on horizontal surfaces of the steel framework (where the ducts were attached) to become suspended in the air. The blow back of the duct work explosion ignited the suspended resin dust, causing the roof to lift and the walls to fail, resulting in severe injuries to 12 workers. The shell mold operator at the station that was identified as the most likely to be the source of ignition died of burns within hours of the event.

The resin dust remained easily observable after the explosion. The resin dust was explosive as a finely divided powder. It could not sustain a fire. After exploding, the settled resin dust simply charred and extinguished itself. Breaking of the charred surface revealed the distinguishing yellow color of the resin underneath.

Following the Jahn Foundry explosion, the company received a citation with 22 violations and a total penalty of \$115,000. For the conditions related to the resin dust and fatalities, OSHA cited a "Willful" violation of 29 CFR 1910.22(a)(1): "All places of employment, passageways, storerooms, and service rooms shall be kept clean and orderly and in a sanitary condition." In issuing this "housekeeping" violation, we relied on the *National Fire Protection Association (NFPA) Standard 654—Standard for the Prevention of Fire and Dust Explosions from the Manufacturing, Processing and Handling of Combustible Particulate Solids*. OSHA did not have, nor does it currently have, a comprehensive standard directly relating to combustible dusts.

In my opinion, the lack of a comprehensive standard that directly addresses the hazards of combustible dust in General Industry leaves a significant number of employers and employees without knowledge of how to identify, evaluate and resolve potential combustible dust explosions. Having a comprehensive standard for combustible dust would aid OSHA Compliance Officers as much as it would employers. During the rulemaking process, employers, manufacturers, scientists, and other regulators would have an opportunity to review and comment on the proposed standard. The rulemaking process and final comprehensive standard would eliminate the problems with OSHA's use of general and vague standards, such as the General Duty Clause (Section (5)(a)(1) of the OSH Act of 1970) and references to nongovernmental entity consensus standards (like NFPA) to cite employers for dust hazards. Moreover, a peer-reviewed standard for combustible dust would mean: (1) everyone starts from the same point; (2) OSHA will publish clear notification to employers; (3) OSHA will publish an inspection directive for compliance officers to follow and for employers to reference on the OSHA Web site; and (4) OSHA would include with the standard a "Combustible Dust Compliance Program," with guidance as to how employers could manage and control the hazards of combustible dust.

In my opinion, I also believe OSHA should address potential deficiencies in manufacturer's Material Safety Data Sheets (MSDS) under 29 CFR 1910.1200—Hazard Communication. The MSD sheet has been a part of OSHA regulation for almost 20 years. I determined during the inspection following the Jahn Foundry explosion that the MSD sheet for the phenolformaldehyde resin did not adequately address the explosion potential. The MSD sheet provides the first source of knowledge of hazards. Manufacturers use the MSD sheet to provide minimum information with product liability the most obvious reason. Because the extent of the combustible dust hazard is so wide, it would be appropriate for OSHA to begin revised rulemaking to update 29 CFR 1910.1200.

I have reviewed OSHA's recently published National Emphasis Program (NEP) on combustible dust hazards. When OSHA published the NEP in October 2007, it was the first time that I and other compliance officers witnessed an attempt by OSHA to address a long-standing issue. It was acutely apparent to me that seeing this effort 9 years after Jahn Foundry that OSHA was under scrutiny. In the review of the NEP, I did note that it was a "re-issuance." I could not recall the original issuance, so I questioned fellow compliance officers. Indeed, they also did not recall an original issuance.

According to the NEP, OSHA claims to have regulated combustible dust hazards through multiple existing standards, such as the housekeeping standard, electrical standards, and the general duty clause. In my experience as an OSHA inspector, I believe this shot gun approach, using general and vague standards that do not directly address dust hazards, has been an insufficient means to educate employers about how to control these hazards and prevent combustible dust explosions.

From my experience as an OSHA inspector, I know that employers are not aware that the General Requirements for Walking-Working Surfaces (29 CFR 1910.22) contains a housekeeping regulation that OSHA applies to the management of combustible dust hazards. The housekeeping part of the General Requirements for Walking-Working Surfaces (29 CFR 1910.22) does not even address dust, and certainly does not address the hazards of combustible dust. The General Requirements for Walking-Working Surfaces (29 CFR 1910.22) is a general and broad standard that does not provide specific information for employer compliance. Employers who have had dust explosions followed by an OSHA inspection learn only after the fact that this standard will be applied by OSHA. For example, the Jahn Foundry dust explosion citations were issued under the General Requirements for Walking-Working Surfaces (29 CFR 1910.22). To show a recognized industry hazard of combustible dusts, OSHA relied on a consensus standard, the National Fire Protection Association standard 654—Standard for the Prevention of Fire and Dust Explosions from the Manufacturing, Processing and Handling of Combustible Particulate Solids.

The NEP relies on references to 13 different consensus standards by the National Fire Protection Association (NFPA). In my experience as an OSHA inspector, employers are not knowledgeable about consensus standards unless such standards are specifically adopted as OSHA standards. Therefore, I believe OSHA's reference to consensus standards is ineffective as a means to educate employers on the hazards of combustible dust.

I have inspected hundreds of workplaces where combustible dust may have been present. Only subsequent to my experience with the Jahn Foundry explosion did the potential hazards of combustible dusts become an integral part of my inspection process. In fact, it became a part of my Area Office compliance staff's knowledge and concern. After February 1999 (Jahn Foundry), the Springfield Area Office proposed and issued citations using either the General Requirements for Walking-Working Surfaces (29 CFR 1910.22) (referencing NFPA 654) or the General Duty Clause (OSH Act § 5(a)(1)) (referencing NFPA 654). For example, in one case, a manufacturer of desktops and seats for school furniture utilized a combination of wood flour and melamine-formaldehyde resin. Dust in the Blending Area was inches thick on horizontal surfaces. The dust migration to the steel support beams throughout the plant created a severe combustible dust hazard.

The presence of combustible dusts in manufacturing is pervasive and crosses the spectrum of processes. Jahn Foundry and the school furniture manufacturer noted above are just representatives of the potential breadth of the problem. The processes are different between them, yet the same hazard potential exists for both.

Based on my experiences when inspecting workplaces over the past 28 years, I know employers are not knowledgeable about the hazards of combustible dusts. In my opinion, this lack of knowledge shows that OSHA's current approach is ineffective and inadequate. The scattered method of relying on existing vague OSHA standards, combined with a failure to provide employers a means to identify, evaluate and control combustible dust hazards, is not working.

I support the efforts of Congress to require a comprehensive standard that gives clear guidance to employers regarding dust hazards and the methods to control those hazards. I believe employers and workers would greatly benefit from the enactment of a comprehensive combustible dust standard.

Thank you for considering this statement in connection with this hearing. If I can provide further information or assistance to the subcommittee, please let me know.

PREPARED STATEMENT OF IMPERIAL SUGAR COMPANY

On February 7, 2008, the employees and contractors of Imperial Sugar Company experienced a workplace tragedy at our sugar refinery in Port Wentworth, GA,

which we now believe was related to combustible sugar dust. We lost 13 members of the Imperial Sugar family as a result of this tragic event, and many more were severely injured. Many lives were saved, however, by the heroic efforts of the first responders, emergency services personnel, and medical professionals in Port Wentworth and surrounding areas. Words cannot express the Company's appreciation to these individuals for their service in our time of crisis.

Imperial Sugar Company is also deeply thankful for all of those who have come to the aid of our employees, contractors and their families in this time of great suffering and loss. Local, State and Federal officials, including our elected representatives in Georgia, and others have shown tremendous support for our Company family, and we very much appreciate their continued support. We are grateful to everyone who has helped us along the long road to recovery.

Imperial Sugar Company offers its deep appreciation to Chairwoman Murray and Ranking Member Isakson for holding this hearing on the need for health and safety standards regarding combustible dust in American workplaces. Imperial Sugar Company **supports** Congress's desire for combustible dust standards that will make workplaces safer. There is no doubt that the sugar industry would benefit from the enactment of combustible dust standards. It is our view that a clear standard would assist employers in understanding the hazards of combustible dust and the means to reduce or prevent such hazards. We believe that prior to February 7, there was an insufficient understanding of the hazards of combustible dusts both within the sugar industry and within the Occupational Safety and Health Administration.

Prior to the February 7, 2008 tragedy at Port Wentworth, Imperial Sugar was working diligently regarding the safety and health of our employees and contractors.

- At the time of the February 7, 2008 accident, the Port Wentworth plant's total rate of recordable injuries had been steadily reduced by 33 percent since 2005.
- The last time OSHA had inspected the Port Wentworth plant was in 2000, when it conducted two inspections during May and June of that year. Neither of those inspections resulted in any citations against Imperial Sugar.
- At the time of the February 7 accident, almost half of the Port Wentworth plant managers and supervisors had completed OSHA's 30-Hour Course for general industry, in addition to plant-specific safety training. Developed by OSHA, this 30-hour course trains employees in a wide range of safety and health hazard recognition and prevention.
- At the time of the February 7 accident, Port Wentworth maintained a First Responder Team of 50 employees. These employees attend an intensive 40-hour initial course on such topics as incident command, emergency response, first aid/CPR, fire prevention and protection, incipient fire response, hazardous materials, and high angle rescue. They also attend an annual 24-hour refresher course.
- In early 2007, the Port Wentworth facility embarked on an aggressive plan to develop a written job safety analysis for every job function at the Port Wentworth plant.
- In 2007, the Port Wentworth facility implemented new requirements for personal protective equipment (PPE), including the mandatory wearing of hard hats, safety glasses, and steel-toed shoes—all provided at no cost to employees.
- In fiscal year 2007, the Port Wentworth plant spent over \$1.7 million on safety-related capital improvements to the facility.

OSHA first published its National Emphasis Program regarding combustible dust (NEP) on October 18, 2007. After the publication of OSHA's NEP, some of the activities either completed or ongoing at Port Wentworth regarding combustible dust included the following:

- refocusing our efforts on housekeeping, including conducting daily walkthroughs focusing on both safety and quality, with a particular emphasis on housekeeping;
- focusing on the most critical and dust-prone production areas with personnel and resources in the areas of safety, quality, operations, maintenance and engineering; and
- purchasing industrial vacuums, as recommended by the NEP, for use in cleaning dust and to minimize airborne disbursement (as potentially caused by blowing and sweeping).

The efforts described above continued through the end of 2007 and were ongoing at the time of the February 2008 accident.

Imperial Sugar's efforts regarding safety and health, including housekeeping, continued after Graham H. Graham joined Imperial Sugar in November 2007. Mr. Graham was recruited into Imperial Sugar by then-Chief Operating Officer and now Chief Executive Officer John Sheptor because of Mr. Graham's experience with innovative manufacturing principles, including Total Productive Maintenance, Six Sigma, LEAN, and others. After Mr. Sheptor brought Mr. Graham on board last No-

vember, Mr. Graham was immediately dispatched to improve our facilities on all fronts, including safety.

Shortly after joining the Company, Mr. Graham visited the Company's Port Wentworth facility in November and December 2007, and identified many areas for improvement. Mr. Graham reported to Mr. Sheptor his initial impressions and findings regarding our Port Wentworth facility, which were lengthy. Mr. Graham concluded this report to Mr. Sheptor with "Here's the good news: it's all fixable." (See Attachment A, a November 16, 2007 e-mail from Mr. Graham to Mr. Sheptor). In response, Mr. Sheptor indicated as follows: "Thanks Graham—no surprises. You have my full support." (See Attachment A). Mr. Graham forwarded Mr. Sheptor another report of his findings regarding his December 2007 visit, and Mr. Sheptor continued to offer him his full support.

Under Mr. Graham's direction, the management and hourly employees at Port Wentworth went to work on a variety of projects, including focusing on housekeeping efforts, electrical improvements and other enhancements. The plant also increased the number and frequency of safety inspections conducted by all levels of supervision.

Mr. Graham returned to the Port Wentworth facility in late January 2008 and reported that significant progress had been made in many areas in the month since his December visit. His communications regarding that time period included the following:

- In a January 21, 2008 operations report, Mr. Graham noted that "[t]here is already a noticeable and significant improvement in housekeeping at both facilities. In particular, exposure to live electrical conductors has been eliminated or severely restricted."
- In response to Mr. Sheptor's e-mail inquiry on how Mr. Graham's plant visits had been in January 2008, Mr. Graham responded with "Very successful . . . plants have made enormous improvement especially in housekeeping. Actually even better than I expected at Savannah." (See Attachment B, a January 25, 2008 e-mail from Mr. Graham to Mr. Sheptor).
- On January 31, 2008, seven (7) days prior to the explosion at Port Wentworth, Mr. Graham forwarded data regarding injury and illness rates to the plant safety personnel, stating "Please share this excellent progress with the managers and associates. Well done to everyone." (See Attachment C, a January 31, 2008 e-mail from Mr. Graham).

As a result of the tragic accident at Port Wentworth, OSHA also began an inspection of Imperial Sugar's facility in Gramercy, LA. In connection with OSHA citations that were issued related to that inspection, Mr. Graham reported as follows:

"Even before OSHA showed up, hundreds of defects have been identified and corrected (too many to mention here) going back to December 07 but inevitably when 8 inspectors spend significant amount of time looking for defects they are bound to come up with some that have not yet been identified or yet corrected."

(See Attachment D, a March 23, 2008 e-mail from Mr. Graham to Mr. Sheptor).

In short, prior to the February 7, 2008 explosion at the Port Wentworth facility, Imperial Sugar was focused on safety and health, including housekeeping, and believed that much progress was being made.

After the February 7, 2008 explosion, contrary to allegations recently leveled by OSHA, Imperial Sugar promptly undertook a thorough inspection and review of its Gramercy facility to ensure that there were no combustible dust or other hazards present there. These efforts were initiated at the highest level of Imperial Sugar's management. Indeed, Mr. Sheptor directed Mr. Graham, as the Vice-President of all of the Company's operations, to temporarily relocate to the Gramercy facility and personally oversee the identification and resolution of issues found there. (See Attachment E, a February 26, 2008 e-mail from Mr. Sheptor to Mr. Graham establishing this as Mr. Graham's top priority). Mr. Sheptor also forwarded to Mr. Graham a March 7, 2008 letter from OSHA advising Imperial Sugar to ensure that its Gramercy plant was in compliance with OSHA standards, reiterated to Mr. Graham that ensuring the safety of workers at all Imperial Sugar facilities remained the Company's top priority, and directed him to periodically report to Mr. Sheptor on the status of the work being done at Gramercy. In short, the Company took prompt and reasonable actions in response to the explosion at Port Wentworth to ensure that its ongoing operations were safe.

Whether or not OSHA promulgates a combustible dust standard, Imperial Sugar has taken, and will, on its own initiative, continue to take substantial steps in response to our explosion to ensure our workplaces are safe and that nothing remotely similar to what happened on February 7 ever happens again. For example,

- Imperial Sugar has retained consultants from Chilworth Technology, who are the world's leading experts on combustible dust fire prevention and control, and one of your witnesses today. Chilworth is working with our inside and outside designers and engineers to ensure that our Port Wentworth facility is designed according to the latest U.S. and international guidelines and best engineering practices as they relate to dust hazards.

- In addition to guiding Imperial Sugar's design process, Chilworth has provided training to all of our Port Wentworth employees on combustible dust hazards.

- Imperial has engaged Chilworth to develop a process safety system of internal standards for Imperial at both the Port Wentworth and Gramercy plants. This system will (1) ensure compliance with applicable safety standards and guidelines; (2) provide guidance on equipment selection, maintenance and operating practices; and (3) include tools on evaluating and controlling hazards. We intend that this process will be above and beyond anything required by applicable OSHA standards and will incorporate both the U.S. NFPA standards as well as the European Union's ATEX directives.

- Imperial Sugar is similarly working with Chilworth with respect to its Gramercy, LA facility in connection with improvements and training there. Imperial Sugar has already committed \$1.8 million in capital expenditures related to safety at Gramercy and expects to commit even more in expenditures in the coming months.

- Imperial Sugar is continuing its internal safety training, audits and efforts at its facilities, including relating to emergency response and hazard control.

Thank you again for holding this important hearing on legislation that is vital to the safety of American workplaces, and thank you for considering this statement in connection with the hearing.

ATTACHMENT A

From: Sheptor, John C. (/O=IMPERIAL SUGAR COMPANY/OU=IHC/CN=RECIPIENTS/CN=SHEPTORJ)

To: Graham, Graham H.

Subject: Re: Initial Impression of Savannah

Thanks Graham—no surprises. You have my full support.

From: Graham, Graham H.

To: Sheptor, John C.

Subject: Initial Impression of Savannah

Here's a summary of my first impressions of the operation at Savannah:

ENVIRONMENT

- Initial kerb side visual appeal is poor.
- Considering this is a food grade facility, cleanliness & contamination control is also poor.
- Offices and work areas scruffy, untidy and somewhat disorganized.
- Lack of signage to indicate use, direction, purpose or location.
- Poor lighting and demarcation of pedestrian/work/maintenance areas.
- Not easy to identify role of employee (many not wearing corporate colors, some due to temp labor of course and some because their contracted but they should still wear something).
- Road surfaces/working surfaces very rough and uneven.

PEOPLE & MANAGEMENT

- Stunningly high head count.
- Absenteeism not apparently reported/broadcasted.
- Excessive overtime >50 percent.
- Excessive use of contracted labor.
- Lots of supervisors.
- Functional heads unsure of specific manufacturing direction.
- Functional heads lack customer focus/awareness.
- QA given responsibility but lack authority and accountability.
- General sense of lack of strong leadership & accountability.
- Willingness to recognize deficiencies and learn alternative methodology.
- Strong technical knowledge.
- Way too many attendees at meetings (18 at one of them !).

PROCESS & MACHINERY

- Waste sugar/liquids everywhere.
- Leaks, poor containment across the site.
- Frequent unplanned downtime.
- Hard to see visual effect of significant CAPEX spending.
- Packaging/carton lines suffer frequent interruptions/stoppages.
- Inconsistent bag sealing.
- Significant use of manual labor in stacking & palletizing area.
- Control systems may benefit from 3rd party examination using sophisticated recipe/stability/control/performance envelope analysis.

SYSTEMS & PROCEDURES

- Confusing, disjointed work schedules; few overlaps making communication difficult.
- Lack of WAR ROOM to focus/connect bottom line metrics to corporate/strategic plan.
- Management meetings (CAPEX, P&L, Safety) felt superficial and lacking in real accountability for achievements and progress.
- Too frequent use of phrases such as “we hope to get that done,” “we hope that will happen,” “we hope it works out,” etc.
- No headline/banner performance improvement objectives visible.
- Plant performance metrics displayed but graphs too small, hidden in conference room; Metrics not displayed and shared with hourly employees (i.e. little use of line of site metrics).

Here's the good news: it's all fixable. Much of it is affecting the bottom line. I expect a similar experience at Gramercy. So when that's over, I'll be selecting a few topics that both plants will focus on which I'll use to contribute to my 90-day review.

Regards,

GRAHAM.

ATTACHMENT B

From: Graham, Graham H. (/O=IMPERIAL SUGAR COMPANY/OU=IHC/CN=RECIPIENTS/CN=GRAHAMG)

To: Sheptor, John C.

Subject: Re: Six Sigma and LEAN Training

JOHN: Very successful . . . plants have made enormous improvement especially in housekeeping. Actually even better than I expected at Savannah.

People fired up and eager to move forward with reductions in costs, improvements in productivity, etc.

I'll write up summary when I get back to Houston tonight and pass on web links/resource details for six sigma courses.

Regards,

GRAHAM.

From: Sheptor, John C.

To: Graham, Graham H.

Subject: Six Sigma and LEAN Training

Hi GRAHAM: How have your visits to the refineries been this week? What are your observations?

When you get a chance, please forward to me the Web sites for the online six sigma and LEAN training that you are recommending.

Thanks,

JOHN.

ATTACHMENT C.—OSHA RECORDABLES 2004 TO Q1, 2008.PPT

From: Pevey, Darren (/O=IMPERIAL SUGAR COMPANY/OU=SFI/CN=RECIPIENTS/CN=PEVEYD)

To: # SSR Sugar Refinery; Braddy Electric; Don Ogle; Kerby Contractors; P & L Transport; Savannah Bridge; Stokes Contractors; Wilder, John

Subject: Safety Numbers—1st Quarter

cc: Graham, Graham H.

Supervisors please print out the chart and post in break rooms for all employees to see.

EVERYONE: These are the slides from John's presentation on safety in yesterday's Town Hall Meeting. These slides show that the company (all sites) has had (6) OSHA Recordables, (4) Restricted Duty Cases, (0) LTA's and an OSHA Rate of 2.53. This is close to a 50% reduction from our numbers in the first quarter of last year and includes all contractor numbers as well. Great job to all the teams on this effort.

Safety will continue to perform department inspections including supervisors and master mechanics performing them as well. JSA training will continue each week on the top at risk jobs with help from members of each department with the development and implementation. Again, great job to everyone, you are making a difference.

From: Graham, Graham H.
To: Sikes, Doug; Pevey, Darren; Zeringue, Joel
Subject: OSHA Recordables 2004 to Q1, 2008.ppt

GENTS: Please share this excellent progress with the managers and associates. Well done to everyone.

Regards,

GRAHAM.

ATTACHMENT D.—IMPERIAL SUGAR.PDF

From: Graham, Graham H.
To: Sheptor, John C.
Subject: FW: Imperial Sugar Citation and Notification of Penalty
cc: Sikes, Doug; Brannen, Oscar

You've probably already been copied by the lawyer but this attachment is a list of citations issued Friday.

All of them will be fixed by Monday or Tuesday next week except for the two dust management systems which OSHA expects us to modify to move the residual air outside of the work area. This will require engineering and some civil work if we are to proceed without contesting the citations.

Even before OSHA showed up, hundreds of defects have been identified and corrected (too many to mention here) going back to December 2007 but inevitably when 8 inspectors spend significant amount of time looking for defects they are bound to come up with some that have not yet been identified or yet corrected.

Regards,

GRAHAM.

From: Boyd, Stephen—OSHA [mailto:Boyd.Stephen@dol.gov]
To: Graham, Graham H.; Veters, Pat
Subject: Imperial Sugar Citation and Notification of Penalty

As discussed, here is a scanned copy of the current Citation and Notification of Penalty. Thank you.

NOTICE

This e-mail message and any attachments to it may contain confidential information. The information contained in this transmission is intended solely for the use of the individual(s) or entities to which the e-mail is addressed. If you are not the intended recipient, or an employee or agent responsible for delivering this message to the intended recipient, you are hereby notified that you are prohibited from reviewing, retransmitting, converting to hard copy, copying, disseminating, or otherwise using in any manner this e-mail or any attachments to it. If you have received this message in error, please notify the sender by replying to this message and delete it from your computer.

ATTACHMENT E

From: Sheptor, John C. (/O=IMPERIAL SUGAR COMPANY/OU=IHC/CN=RECIPIENTS/CN=SHEPTORJ)

To: Graham, Graham H.

Subject: Gramercy Observations

GRAHAM: I have re-read your Gramercy observations and accordingly, I request that you make an extended visit to the site for you personally to oversee the resolution of these concerns. I will make a visit to the site myself as soon as possible to review your progress. Your response needs to take priority over your other activities to bring urgent attention to these issues. You can reach alignment with Brian on an organization recommendation via teleconference.

Please schedule a call with me next week to update me regarding the site.

I also encourage you to continue to work with the site towards a shared vision and joint collaboration with your objectives as we have previously discussed. Performance standards will become more sustainable if you work together with your team to make the improvements. Critique alone is not adequate leadership. You will make faster and more significant progress if you join your team at the site to effectualize these improvements.

Thank you,

JOHN.
USMWF.ORG, INC.
LEXINGTON, KY,
June 17, 2008.

Committee on Health, Education, Labor, and Pensions,
428 Senate Dirksen Office Building,
Washington, DC 20510.

DEAR SENATORS: USMWF and many family members have been involved in the Combustible Dust Explosion and Fire Prevention Act (H.R. 5522). We have gained over 500 signatures of friends and families that support H.R. 5522. Many have told us that this is considered a political issue but we are hopeful that this will not be used for political gains as it is a matter of life or death. Behind each one of these workers killed and injured is a family in mourning—a family in need of answers, resources and support. These families and the ones still left in the 30,000 facilities need your support.

Since 1980, there have been over 350 dust explosions resulting in the deaths of more than 130 people. Despite the tragedies that have occurred, OSHA refuses to implement a standard for controlling combustible dust. At this point, getting safety standards passed to help prevent future accidents is of paramount importance.

In the late 1970s and early 1980s, the U.S. grain industry experienced a rise in explosions due to grain dust. In response to this, OSHA issued a grain dust safety standard. After the standard was introduced, injuries and fatalities as a result of dust explosions fell 60 percent. Unfortunately the standard applies only to grain dust, while there are many other materials that create equally dangerous dusts such as aluminum, coal, sawdust, etc. American workers need a standard that applies to all types of combustible dust in various work environments.

The House has already voted and passed the Combustible Dust Explosion and Fire Prevention Act (H.R. 5522). It now awaits approval by the Senate. This legislation would require OSHA to set a standard on combustible dust, which would mitigate the probability of accidental explosions. We respectfully ask that you sign the bill if it passes in the House and Senate. Please sign this bill for the sake of the workers and their families who are currently employed by more than 30,000 U.S. factories vulnerable to dust explosions. We look forward to hearing from you on this matter.

Sincerely,

TAMMY MISER,
Founder and President, USMWF
and the undersigned Families and Friends.

Give Us Combustible Dust Standards

Between 1980 and 2005, 119 workers were killed and more than 700 injured in combustible dust explosions.

These explosions were preventable -- but even though the U.S. Chemical Safety Board recommended in 2006 that regulations needed to be put in place to protect workers from death or injury from combustible dust accidents, OSHA chose instead to maintain its program of voluntary corporate compliance. But as Former CSB Chairman Carolyn W. Merritt put it, "the problem with voluntary standards is not everyone volunteers."

Preventable combustible dust accidents take the lives of American workers every year. We can and should do everything possible to prevent them.

To that end, we the undersigned call for the following steps to be taken immediately:

- * Issuance of an emergency temporary standard (ETS) to require immediate controls instituted by employers where combustible dust hazards exist;
- * Expedited action by OSHA to put a new permanent standard in place for control of combustible dust hazards in general industry;
- * Use of the technical principles embodied in two National Fire Protection Association (NFPA) consensus standards (NFPA 654, Standard for the Prevention of Fire and Dust Explosions from the Manufacturing, Processing, and Handling of Combustible Particulate Solids, and NFPA 484, Standard for Combustible Metals-2006) as the basis for a new OSHA standard;
- * The new standard include a provision requiring that covered employers report to OSHA critical information that would allow OSHA to know that the employer a) is covered by the standard at a specific establishment, and b) has assessed the potential exposures;
- * Immediate inspections be undertaken of sugar processing plants utilizing inspection guidance provided in the OSHA National Emphasis Program Directive (CPL 03-00-006);
- * While the above steps are being taken, immediately implement a Special Emphasis Program on combustible dust hazards, including inspection of worksites where combustible dust hazards exist and dissemination of the information contained in the July 2005 federal OSHA produced Safety and Health Information Bulletin (Smb), Combustible Dust in Industry: Preventing and Mitigating the Effects of Fire and Explosions.

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2/9/2008	Kris	Warner	Erie	Pennsylvania	United States
2/9/2008	Ron	Partridge	fenton	Missouri	United States
2/9/2008	James	Novak	Cornell	Wisconsin	United States
2/9/2008	Mary	Vivenzi	rohnert park	California	United States
2/9/2008	Warren	Rasmussen	Cuyahoga Falls	Ohio	United States
2/9/2008	Pearl	Barkley	New York	New York	United States
2/9/2008	Sharon	Nichols	Blacksburg	South Carolina	United States
2/9/2008	Mark	Miser	Lexington	Kentucky	United States
2/9/2008	kirk	johnson	worcester	Massachusetts	United States
2/9/2008	David	Whittington	Granite City	Illinois	United States
2/9/2008	Randi	nemerowsky	brooklyn	New York	United States
2/9/2008	Rory	O'Neill	Keighley		United Kingdom
2/9/2008	Steven	Heaver	Newark	New Jersey	United States
2/9/2008	ROBERT	STREBECK	Eulless	Texas	United States
2/9/2008	David	Dunkleberger	Doylestown	Pennsylvania	United States
2/9/2008	John	Smith	Ellensburg Dep	New York	United States
2/9/2008	Karen	Gray	Indianapolis	Indiana	United States
2/9/2008	Lynn	Haineau	Sheffield		United Kingdom
2/9/2008	*	Zentura	Casper	Wyoming	United States
2/9/2008	violet	jessica	Cercy La Tour		France
2/9/2008	LISA	GARZA	WELLINGTON	Florida	United States
2/9/2008	Jacolin	Schultz	Genoa	Wisconsin	United States
2/9/2008	Steve	Klein	Montreal		Canada
2/9/2008	Izzy	Wilhelmsen	Oslo		Norway
2/9/2008	JT	Belk	Kansas City	Missouri	United States
2/9/2008	ALPHA	WI	Ww		Germany
2/9/2008	Franziska	Eber	Oldenburg		Germany
2/9/2008	Thomas	Pirovano	Bern		Switzerland
2/9/2008	Marla	De Vries	Eibergen		Netherlands
2/9/2008	Darren	Seute	Edgerton	Kansas	United States

2/9/2008	Ron	Oliver	St. Maries	Idaho	United States
2/9/2008	Jillyanne	Michelle Cape	Independence	Missouri	United States
2/9/2008	NettaUK	Tammaro	Leeds		United Kingdom
2/9/2008	Tania	Reynolds	Benton City	Washington	United States
2/9/2008	John	Astad	Santa Fe	Texas	United States
2/9/2008	Pam	Boland	Grovetown	Georgia	United States
2/9/2008	Tania	Naim	Beirut		Lebanon
2/9/2008	Shane	Kirby	Lexington	Kentucky	United States
2/9/2008	Anthony	Montapert	N Hollywood	California	United States
2/9/2008	Michael	Farrar	Springfield	Massachusetts	United States
2/9/2008	Art	Deco	Kennebunk	Maine	United States
2/9/2008	terry	I. west	Morgantown	West Virginia	United States
2/9/2008	Sheena	Miser	Lexington	Kentucky	United States
2/9/2008	CHARLOTTE	Ford	Houston	Texas	United States
2/9/2008	Hope	Mock	Roann	Indiana	United States
2/9/2008	mark	niziolek	glen burnie	Maryland	United States
2/9/2008	Karen	Lubanty	Stony Point	New York	United States
2/9/2008	James	Rudy	Hilton	New York	United States
2/9/2008	Juliana	Farah	Beirut		Lebanon
2/9/2008	Dorothy	Asbury	Moro	Illinois	United States
2/9/2008	Amber	Griffin	Halifax		Canada
2/9/2008	Thomas	Ryan	Granite City	Illinois	United States
2/9/2008	Gale	Weaner	Duncanville	Texas	United States
2/9/2008	Julie	M Glenn	Saint Louis	Missouri	United States
2/9/2008	Ben	Rall	Portland	Oregon	United States
2/9/2008	Marie	Alabiso	Plymouth	Massachusetts	United States
2/9/2008	Amanda	Riley	Lincoln Park	New Jersey	United States
2/9/2008	Ginger	Geronimo	Birmingham	Alabama	United States
2/9/2008	Steve	Dale	Frankston,victoria		Australia
2/9/2008	Daniel	Seney	Castleton	New York	United States
2/9/2008	Jill	Gordon	Bridgewater	New Jersey	United States
2/9/2008	Becky	Foster	Danville	Arkansas	United States
2/9/2008	Betty	McCombs	Columbia	Illinois	United States

2/9/2008	Jackie	Ary	Hagatna	Guam	United States
2/9/2008	Jason	Vickery	Pontoon Beach	Illinois	United States
2/9/2008	Jason	Turgeon	South Portland	Maine	United States
2/9/2008	Joe	Davenport	Seattle	Washington	United States
2/9/2008	Deborah	Escalet	Port Matilda	Pennsylvania	United States
2/9/2008	sonia	baker	memphis	Tennessee	United States
2/9/2008	Darrel	McLaughlin	Lynnwood	Washington	United States
2/9/2008	daryl	mccarty	chelsea	Alabama	United States
2/9/2008	cara	gubrud	milaca	Minnesota	United States
2/9/2008	Robert	Daraio	Ossining	New York	United States
2/9/2008	Mike	McClain	Terre Haute	Indiana	United States
2/9/2008	Mariya	Strauss	Washington	Washington D.C.	United States
2/9/2008	Clay	Hodge	pacific	Missouri	United States
2/9/2008	Michelle	Lewis	South Burlington	Vermont	United States
2/9/2008	Laurel	Watson	Maricopa	Arizona	United States
2/9/2008	Darlene	Parker	Goshen	Ohio	United States
2/9/2008	Steve	Stallone	Oakland	California	United States
2/9/2008	Peter	Lambing	Fairless Hills	Pennsylvania	United States
2/9/2008	Jeremy	Thompson	Jamaica Plain	Massachusetts	United States
2/9/2008	Jennifer	Badgley	San Diego	California	United States
2/9/2008	Paul	Paine	Chiefland	Florida	United States
2/9/2008	Rosann	Barker	Erie	Pennsylvania	United States
2/9/2008	Alicia	Knight	stafford	Virginia	United States
2/9/2008	Randy	Knop ANNIE	Union	Oregon	United States
2/9/2008	JOCELYNE	STROKOWSKI	Saint-augustin De Desmaures-		Canada
2/9/2008	Mario	Vicchiullo	Las Vegas	Nevada	United States
2/9/2008	Mike	Maury	Kalamazoo	Michigan	United States
2/9/2008	Douglas	Castle	Greenwood	Indiana	United States
2/9/2008	Rebecca	Everhart	Scottsburg	Indiana	United States
2/9/2008	Patrice	Woepfel	Haydenville	Massachusetts	United States
2/9/2008	Stephen	Rice	Waterbury	Connecticut	United States
2/9/2008	Brenda	Rea	Sullivan	Indiana	United States
2/9/2008	Tim	Birch	Kalamazoo	Michigan	United States

2/9/2008	DAVID	DUNCKHURST	FARMINGTON	New Mexico	United States
2/9/2008	John	Logan	Cedar Hill	Missouri	United States
2/9/2008	Ronald	Krinock	Landenberg	Pennsylvania	United States
2/9/2008	Marlene	Carey	Granite City	Illinois	United States
2/9/2008	Carl	Voyles	Sorento	Illinois	United States
2/9/2008	Elena	Marschino	New York	New York	United States
2/9/2008	ernie	gs	Columbus	Ohio	United States
2/9/2008	Terri	Uravich	Saint Paul	Minnesota	United States
3/1/2008	Steven	Dawes	Bellevue	Nebraska	United States
3/1/2008	Cindy	Lewis	Rising Sun	Maryland	United States
3/2/2008	Jim	Moran	Phila.	Pennsylvania	United States
3/2/2008	chris	campbell	Parksville		Canada
3/3/2008	Doug	McKinney	gadsden	Alabama	United States
3/3/2008	Frank	Chizmar	Derby Line	Vermont	United States
3/3/2008	Christine	Dubuque	Houston	Texas	United States
3/3/2008	Todd	Jordan	kokomo	Indiana	United States
3/4/2008	sharon	grugel	moorhead	Minnesota	United States
3/4/2008	Daniel	Hollander	Irvine	California	United States
3/5/2008	Paul	Dobosz	Shelton	Washington	United States
3/5/2008	Rebecca	Ferrell	Blacksburg	Virginia	United States
3/5/2008	Robert	michael Andrews	Fort Lauderdale	Florida	United States
3/6/2008	Barbara	Rahke	Philadelphia	Pennsylvania	United States
3/6/2008	ronnie	bracewell	sugar land	Texas	United States
3/6/2008	alison	selle	st. Johnsbury	Vermont	United States
3/6/2008	Peg	Franzen	Montpelier	Vermont	United States
3/6/2008	Dawn	Stanger	Underhill	Vermont	United States
3/6/2008	Christina	Wells	Starksboro	Vermont	United States
3/6/2008	Angela	DiGiulio	Burlington	Vermont	United States
3/6/2008	Jennifer	Kirkpatrick	Rincon	Georgia	United States
3/6/2008	Kristin	Eisensmith	Burlington	Vermont	United States
3/6/2008	TAYLOR	WEIDNER	Lakewood	Colorado	United States
3/7/2008	Roger	Cook	Buffalo	New York	United States
3/7/2008	Ronnie	Kindrick	Gas City	Indiana	United States

3/7/2008	Damon	Hall	Swanton	Vermont	United States
3/7/2008	Melissa	Hendrickson	Huntington	Vermont	United States
3/7/2008	Courtney	Utton	Burlington	Vermont	United States
3/7/2008	Julie	Petscher	Holiday	Florida	United States
3/7/2008	Angela	Causby	Largo	Florida	United States
3/8/2008	Adam	Deyo	Williston	Vermont	United States
3/8/2008	John	Craig	Santa Barbara	California	United States
3/9/2008	Deborah	Bloom	Hermantown	Minnesota	United States
3/9/2008	Bob	Simpson	Oak Park	Illinois	United States
3/9/2008	paul	richard	leominster	Massachusetts	United States
3/9/2008	Yehudah	Petscher	Holiday	Florida	United States
3/9/2008	christopher	newell	danville	Illinois	United States
3/9/2008	Nicholas	Parrish	Burlington	Vermont	United States
3/9/2008	Jason	Burch	sinton	Texas	United States
3/9/2008	Ricky	Massicott	Higganum	Connecticut	United States
3/9/2008	Tracey	Schmidt	St. Petersburg	Florida	United States
3/9/2008	Jen	Butson	s. burlington	Vermont	United States
3/9/2008	Kathryn	Wiktorski	McKenna	Washington	United States
3/9/2008	Kathleen	Epstein	west roxbury	Massachusetts	United States
3/9/2008	Richard	Negri	Takoma Park	Maryland	United States
3/9/2008	Alicia	Butson	Destin	Florida	United States
3/9/2008	ernest	rosenthal	los angeles	California	United States
3/9/2008	Kirsten	Burgard	washington	Washington D.C.	United States
3/9/2008	JB	Carr	Cincinnati	Ohio	United States
3/9/2008	Rosemary	Bezy	Monongahela	Pennsylvania	United States
3/9/2008	Steven	Elardo	shirley	New York	United States
3/9/2008	Kelsey	Turk	Paris	Texas	United States
3/9/2008	regina	habersham	savannah	Georgia	United States
3/9/2008	Bruce	Wheeler	Pooler	Georgia	United States
3/9/2008	Tynita	Blythe	Philadelphia	Pennsylvania	United States
3/9/2008	Peter	Crockett	Argyle Twp .	Maine	United States
3/9/2008	Linda	Tribble	Lexington	Kentucky	United States
3/9/2008	Kathleen	Imre	Haslett	Michigan	United States

3/9/2008	Will	Scott	Alhambra	California	United States
3/9/2008	Joseph J.	Berrigan	Savannah	Georgia	United States
3/9/2008	Terry	Gibbs	Newnan	Georgia	United States
3/9/2008	dave	livingston	Nelson		Canada
3/9/2008	Shannon	Sultan	Milwaukee	Wisconsin	United States
3/9/2008	Elizabeth	Will	Stoughton	Massachusetts	United States
3/9/2008	Jason	Lefkowitz	Alexandria	Virginia	United States
3/9/2008	Brian	Kanowsky	Bloomington	Indiana	United States
3/9/2008	Geoff	Earle	Elizabethtown		Canada
3/9/2008	Emanuel	Gambino	Springfield	Massachusetts	United States
3/9/2008	Salvatore	Gravano	brooklyn	New York	United States
3/9/2008	Thomas	Luchese	Brooklyn	New York	United States
3/9/2008	Bill	O'Connor	New York	New York	United States
3/9/2008	Travis	Northrup	Tulsa	Oklahoma	United States
3/9/2008	Thomas	Vassilaros	Fort Smith	Arkansas	United States
3/9/2008	James	Odom	Snellville	Georgia	United States
3/9/2008	BOB	WHITMORE	COLUMBIA	Maryland	United States
3/9/2008	Helen	Siler	Macomb	Michigan	United States
3/9/2008	Robin	Gerrmann	North Richland Hills	Texas	United States
3/9/2008	kevin	mcnamara	rio vista	California	United States
3/9/2008	Michael	D'Amico	Shelton	Connecticut	United States
3/9/2008	Kevin	Boughter	Elverson	Pennsylvania	United States
3/9/2008	lisa	blade	detroit	Michigan	United States
3/9/2008	Ehren	Gerdes	Fort Wayne	Indiana	United States
3/9/2008	Michelle	Krever	Rockville	Maryland	United States

[Whereupon, at 12:07 p.m., the hearing was adjourned.]

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