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Chairman Boxer, Ranking Member Vitter, and distinguished members of the Committee – thank you for the opportunity to testify before you this morning. I am Dr. Rafael Moure-Eraso, and I am providing this testimony in my capacity as chairperson of the U.S. Chemical Safety Board, or CSB.

The CSB is an independent federal agency that investigates major chemical accidents and hazards, and develops safety recommendations to prevent their recurrence in the future. The Board is a non-regulatory, scientific, investigative agency. It has an annual budget, after the sequester, of $10.6 million and approximately 42 employees. In addition to investigations, safety studies, and recommendations, we do extensive outreach to companies and other organizations to inform them of our findings. Companies throughout the U.S. and the world use the information and recommendations developed by the CSB to help create what we hope are safer workplaces.

Congress frequently calls upon the CSB to investigate the root causes of some of the most complex and tragic industrial accidents across the country. Currently the CSB is involved in investigations of the Deepwater Horizon blowout in the Gulf of Mexico, the 2010 Tesoro refinery fire in Washington State, the 2012 Chevron refinery fire in California, and many other cases. Over the past two months, the CSB has begun investigations of the devastating explosion at West Fertilizer in West, Texas, on April 17, and the June 13 explosion at Williams Olefins in Geismar, Louisiana.

I will summarize the status of these two investigations and our preliminary findings, and then present some general thoughts on how the oversight of chemical safety might be improved.

West Fertilizer

West Fertilizer was a small retail distribution center that served farmers in the surrounding community and had approximately 15 employees. The facility was built in 1961, and at the time of the incident had a handful of buildings, including a warehouse where fertilizers and other materials were stored. The current owner, who operated an adjacent seed business, purchased the facility from liquidation in 2004.

No manufacturing occurred at the site, only blending of fertilizers for retail customers. Fertilizers such as ammonium nitrate and anhydrous ammonia were delivered to the site by rail car or truck. The ammonium nitrate, a granular solid, was stored in the facility's fertilizer warehouse building in wood-framed bins with wooden walls. Both the warehouse building and the bins were constructed of combustible wooden material, and the building also contained significant quantities of combustible materials such as seeds stored near the bins of ammonium nitrate. The building had no automatic sprinkler or fire suppression features.

The facility straddles the city limit in the northeast section of West, Texas. When it was first built, the area was rural and there were few other structures nearby. Over time, many residences, a nursing home, an apartment complex, a high school, and an intermediate school were constructed within a 2000-foot radius of West Fertilizer.

On the evening of April 17, a fire of undetermined origin broke out at the facility, which had already closed for the day and was unattended. At 7:30 p.m. the fire was observed and reported to 9-1-1 dispatchers, who deployed the community's volunteer firefighting force with four pieces of equipment. Firefighters found the warehouse building in flames and were in the process of extending hoses to fight the fire, and were applying some water to the blaze. Although the firefighters were aware of the hazard from the tanks of anhydrous ammonia as a result of previous releases, they were not informed of the explosion hazard from the approximately 60 tons of fertilizer grade ammonium nitrate inside the warehouse.

At about 7:50 p.m., while firefighters were positioned nearby, the ammonium nitrate suddenly detonated. A shock wave, traveling faster than the speed of sound, crushed buildings, flattened walls, and shattered windows. Innumerable projectiles of steel, wood, and concrete – some weighing hundreds of pounds – were hurled into neighborhoods. Twelve firefighters and emergency responders were killed. At least two members of the public died as well. More than 200 were injured. If this incident had occurred earlier in the day, many more people might have been killed or injured.

Residents of the West Rest Haven nursing home were severely affected, and according to nursing home officials 14 patients have passed away since the April 17 explosion, dying at twice the expected rate. The nursing home itself was destroyed, as was the apartment complex across the street. Two large schools – the high school and the intermediate school – were structurally damaged beyond repair and will be torn down, and a third school was also badly damaged. Because of the hour of day, all the schools were unoccupied. Had the explosion taken place during the day, severe casualties could have occurred in the intermediate school, which was devastated by both blast and fire. Post-explosion damage assessments indicate that it would have been difficult for children and others to escape from the building. The CSB is currently evaluating the vulnerability of this structure, to understand the potential consequences if the explosion had occurred when children were present and to inform future siting decisions.

Nearly 200 homes were severely damaged or destroyed, a sizeable fraction of all the houses in West. Financial damage is still being assessed, but the cost to rebuild the schools alone will reportedly approach $100 million. Some reports suggest total damages to the town may exceed $230 million, an unimaginable blow to a town of just 2800 residents – more than $80,000 for each man, woman, and child living in West.

CSB Investigation

A large CSB investigation team was assembled in West the day after the incident, on April 18. To date the CSB has conducted detailed interviews of about 30 witnesses, and has issued approximately 13 document requests to West Fertilizer, contract firms, hospitals, and regulators.

The CSB has also engaged external experts in blast reconstruction, fire codes and fire protection, and explosion mechanisms.

West Fertilizer and other companies have cooperated fully with the investigation. The CSB has also received outstanding cooperation from the mayor of West and its police and fire departments, and from other local agencies. The investigation has faced significant challenges as well, since the accident site was treated as a criminal scene for approximately five weeks after April 17 and was extensively altered during that time period, including the removal of most surviving physical evidence.[1]

I visited West, Texas, on May 2, just a couple of weeks after the explosion. The damage to homes, schools, and businesses was almost beyond imagination – even by the standards of large-scale chemical disasters. My heart goes out to the people of West, as they work to rebuild their proud and historic community. But I can assure you that it will be years before even the physical scars of this terrible explosion begin to fade.

Ammonium nitrate (AN) is a crop nutrient that represents about 2% of the total applied nitrogen fertilizer in the U.S. It is used primarily on pasture and citrus; its use has been declining in recent years as security concerns have increased since the Oklahoma City bombing in 1995. Ammonium nitrate is a strong oxidizer that reacts energetically with organic materials; it is also reactive by itself and capable of a runaway decomposition reaction and detonation under certain conditions.

Ammonium nitrate has historically been involved in some of the most severe chemical accidents of the past century, including disastrous explosions in the United States, Germany, and France. Two of these accidents – in Oppau, Germany, in 1921 and in Texas City, Texas, in 1947 – each killed 500 or more people. Additional safeguards were adopted following the Texas City disaster, such as avoiding contamination with petroleum-based materials that sensitize AN. These changes are credited with reducing the risk of a mass explosion of AN, but the risk of detonation was not eliminated. In September 2001, for example, a large AN explosion occurred at a factory in Toulouse, France, killing 30, injuring thousands of others, and damaging up to 30,000 buildings. Other serious AN-related accidents have occurred in the U.S. and other countries over the years.

Heat, fire, shock, confinement, and contamination are all factors that can sensitize ammonium nitrate to detonation. To quote from a comprehensive 1985 review of the hazards of AN:

> *The main thrust of the safety precautions recommended in most literature is the minimization of the most likely hazard, namely, the risk of fire. Ammonium nitrate should not be stored where it can be affected by any source of heat or by combustible materials.*[2]

[1] Within the past three weeks, the ATF has begun producing records and evidence from its investigation to the CSB. The ATF released the remains of the West site from its control back to the company on May 24.

[2] Shah, K.D.; Roberts, A.G.; "Safety Considerations in the Processing, Handling, and Storage of Ammonium Nitrate;" In Keleti, C. (ed.); *Nitric Acid and Fertilizer Nitrates*; New York: Marcel Dekker Inc., 1985.

As simple as this sounds, this principle has not been fully adopted across the U.S., and was not implemented at West Fertilizer.

The CSB has made the following observations and preliminary findings to date, which are subject to further revision and development as the investigation unfolds:

1) The explosion at West Fertilizer resulted from an intense fire in a wooden warehouse building that led to the detonation of approximately 30 tons of AN stored inside in wooden bins. Not only were the warehouse and bins combustible, but the building also contained significant amounts of combustible seeds, which likely contributed to the intensity of the fire. According to available seismic data, the explosion was a very powerful event.

2) Whether additional factors such as material characteristics, shock, or contamination contributed to the incident remains to be determined. Company employees described a PVC plastic pipe that was located directly above the AN bin that detonated, and likely would have been melted by the fire. Additionally, large amounts of potentially flammable anhydrous ammonia were stored along the southern edge of the warehouse building.

3) The building lacked a sprinkler system or other systems to automatically detect or suppress fire, especially when the building was unoccupied after hours. By the time firefighters were able to reach the site, the fire was intense and out of control. Just 20 minutes after the first notification to the West Volunteer Fire Department, the detonation occurred.

4) Both National Fire Protection Association (NFPA) and the International Code Council (ICC), private organizations that develop fire codes that are widely applied across the U.S., have written code provisions for the safety of ammonium nitrate. Many of these safety provisions are quite old[3] and appear to be confusing or contradictory, even to code experts, and are in need of a comprehensive review in light of the West disaster and other recent accidents. For example the ICC's International Fire Code directs users to a defunct code for ammonium nitrate (NFPA 490, last issued in 2002) rather than the current code, known as NFPA 400.

5) The existing fire codes do contain some useful provisions; for example the codes do require a fire resistant barrier between AN and any stored flammable or combustible materials and have provisions to avoid AN confinement and promote ventilation during fire conditions. However, even the most current NFPA 400 standard *allows* AN to be stored in wooden buildings and in wooden bins, and does not mandate automatic sprinkler systems unless more than 2500 tons of AN is being stored – vastly more than the approximately 30 tons that was sufficient to devastate much of the town of West. In addition, the standard contains a "grandfathering" provision that allows existing buildings that were constructed prior to code adoption – and fail to meet all of its provisions – to continue in use.

[3] NFPA 400 refers users to a 1953 publication by the U.S. Bureau of Mines for information on the explosive properties of AN.

6) Texas has not adopted a statewide fire code, and state law actually prohibits most smaller rural counties from adopting a fire code. McLennan County, where the West facility was located, had not adopted a fire code, although it technically had the authority to do so because of its proximity to the more populous Bell County. The West Fertilizer facility was thus not required to follow any NFPA or ICC recommendations for the storage of AN.

7) Although some U.S. distributors have constructed fire-resistant concrete structures for storing AN, fertilizer industry officials have reported to the CSB that wooden buildings are still the norm for the distribution of AN fertilizer across the U.S.

8) Industry has developed other forms of ammonium nitrate that are reported to reduce or eliminate the risk of accidental detonation. For example, compounding the ammonium nitrate with calcium carbonate (limestone) "practically eliminates any risk of explosion its storage, transportation, and handling," while preserving the AN's nutritive value.[4] Calcium ammonium nitrate fertilizers have been widely used in Europe. Ammonium sulfate nitrate also has been found to be non-explosive provided the percentage of AN is held below about 37%.[5]

9) The federal OSHA standard for "Explosives and Blasting Agents" (29 CFR 1910.109) does have requirements for ammonium nitrate fertilizer; its provisions are similar to the NFPA codes. Unlike the NFPA codes – which West was not legally required to follow under any fire code – the OSHA standard would have applied. Like NFPA, however, the OSHA standard does not prohibit wooden bins or wooden construction, and does not require sprinklers unless more than 2500 tons of AN is present. However, OSHA public records indicate that OSHA last inspected the facility in 1985, and no citations were issued under the "Explosives and Blasting Agents" standard.

10) OSHA's Process Safety Management standard (29 CFR 1910.119) or PSM was adopted in 1992 and is designed to prevent catastrophic workplace incidents involving highly hazardous chemicals. PSM requires companies to have a variety of management elements to prevent catastrophic incidents, such as conducting hazard analyses and developing emergency plans. Ammonium nitrate is not, however, one of the listed chemicals that triggers PSM coverage. The PSM standard also contains an exemption for retail facilities.

11) The EPA's Risk Management Program rule (40 CFR Part 68) or RMP was adopted in 1996 and is designed to prevent catastrophic offsite and environmental damage from extremely hazardous substances. As the name suggests, the rule requires covered facilities to develop a Risk Management Plan, implement various safety programs, and analyze offsite consequences from potential accidents. Once again, however, ammonium nitrate is not one of the listed chemicals that triggers RMP coverage. West Fertilizer was RMP-covered due to its stored ammonia, and the company's offsite consequence analysis considered only the possibility of an ammonia leak, not an explosion of ammonium nitrate.

[4] Calcium ammonium nitrate (CAN) must still be protected from contamination with other chemicals that can re-sensitize it to detonation. See Popovici Ipochim, N.N.; Icechim, M.M.; "Other Ammonium Nitrate Fertilizers;" In Keleti, C. (ed.); *Nitric Acid and Fertilizer Nitrates*; New York: Marcel Dekker Inc., 1985.
[5] *Ibid.*

12) OSHA considered adding ammonium nitrate along with other highly reactive chemicals to its list of PSM-covered substances in the late 1990's. However, this proposal was shelved in 2001. In developing the RMP regulation, the EPA did not explicitly include explosives or reactive chemicals in the list of covered chemicals. In 2002, the CSB issued a study on reactive hazards, identifying 167 prior reactive incidents (including a 1994 explosion at an ammonium nitrate manufacturer). The Board recommended that both OSHA and EPA expand their standards to include reactive chemicals and hazards. However, neither agency has yet acted upon the recommendations.

13) No federal, state, or local standards have been identified that restrict the siting of ammonium nitrate storage facilities in the vicinity of homes, schools, businesses, and health care facilities. In West, Texas, there were hundreds of such buildings within a mile radius, which were exposed to serious or life-threatening hazards when the explosion occurred on April 17.

14) West volunteer firefighters were not made aware of the explosion hazard from the AN stored at West Fertilizer, and were caught in harm's way when the blast occurred. NFPA recommends that firefighters evacuate from AN fires of "massive and uncontrollable proportions." Federal DOT guidance contained the Emergency Response Guidebook, which is widely used by firefighters, suggests fighting even large ammonium nitrate fertilizer fires by "flood[ing] the area with water from a distance." However, the response guidance appears to be vague since terms such as "massive," "uncontrollable," "large," and "distance" are not clearly defined. All of these provisions should be reviewed and harmonized in light of the West disaster to ensure that firefighters are adequately protected and are not put into danger protecting property alone.

15) While U.S. standards for ammonium nitrate have apparently remained static for decades, other countries have more rigorous standards covering both storage and siting of nearby buildings. For example, the U.K.'s Health and Safety Executive states in guidance dating to 1996 that "ammonium nitrate should normally be stored in single storey, dedicated, well-ventilated buildings that are constructed from materials that will not burn, such as concrete, bricks or steel."[6] The U.K. guidance calls for storage bays "constructed of a material that does not burn, preferably concrete."

16) CF Industries, a principal manufacturer of AN that was one of the suppliers to West, also recommends more rigorous safeguards in its Material Safety Data Sheet (MSDS) for the chemical. In the section entitled "Handling and Storage," CF recommends that "Storage construction should be of non-combustible materials and preferably equipped with an automatic sprinkler system."[7] Although companies are required to issue MSDS's, the recipients of this information like West Fertilizer are not obligated to follow the recommended safety precautions. West lacked these safeguards.

17) The Bureau of Alcohol, Tobacco, Firearms, and Explosives (ATF) has regulations for ammonium nitrate used as an explosive but these do not apply to ammonium nitrate used as fertilizer. The U.S. Department of Homeland Security has reporting

[6] U.K. Health and Safety Executive; "Storing and Handling Ammonium Nitrate;" Available from http://www.hse.gov.uk/pubns/indg230.pdf
[7] http://www.cfindustries.com/pdf/Ammonium-Nitrate-Amtrate-MSDS.pdf

requirements for companies that have a threshold amount of fertilizer grade ammonium nitrate. However, the authority of DHS is to require security measures to protect against theft, diversion, or other intentional acts; DHS does not regulate the safety of ammonium nitrate to prevent conditions leading to accidental detonation.

18) The Emergency Planning and Community Right-to-Know Act of 1986 (EPCRA) contains an exemption from hazardous chemical reporting for "fertilizer held for sale by a retailer to the ultimate customer." The EPA has interpreted this provision as not applying to firms, like West, that make custom blends of bulk fertilizer for customers' use. In 2012, West Fertilizer filed an EPCRA Tier II report with the McLennan County Local Emergency Planning Committee (LEPC). West reported the presence of up to 270 tons of ammonium nitrate, as well as anhydrous ammonia, at the site. The company did not provide the LEPC or the West Fire Department with an ammonium nitrate MSDS indicating the material's hazards, nor does EPCRA automatically require that information to be provided. There is no indication that West's filing with local authorities resulted in an effort to plan for an ammonium nitrate emergency.

It is important to bear in mind the limitations on Local Emergency Planning Committees that operate in communities around the country. While these committees are required to exist under EPCRA, they are largely staffed by either volunteers or local officials who likely have many collateral duties. The law did not establish any funding stream for the LEPC's, and they do not have any regulatory authority over chemical facilities. Their fundamental role is in emergency preparedness and coordination. The primary responsibility for developing and enforcing safety standards belongs to other federal and state agencies.

To summarize, the safety of ammonium nitrate fertilizer storage falls under a patchwork of U.S. regulatory standards and guidance – a patchwork that has many large holes. Specifically, the CSB has not identified any U.S. standards or guidance that prohibit or discourage many of the factors that likely contributed to the West disaster. Combustible wooden buildings and storage bins are permitted for storing AN across the U.S. – exposing AN to the threat of fire. Sprinklers are generally not required unless very large quantities of AN are being stored or fire authorities order sprinklers to be installed. Federal, state, and local rules do not prohibit the siting of AN storage near homes and other vulnerable facilities such as schools and hospitals.

The CSB has had a number of discussions with fertilizer industry representatives since April 17, including officials from The Fertilizer Institute and the Agricultural Retailers Association. We believe the industry has a strong and sincere interest in learning from the tragedy in West and taking steps to prevent future incidents involving ammonium nitrate, including the development of new audit tools and product stewardship programs. I applaud these efforts and encourage these organizations to draw upon the best science as well as the strongest safety recommendations from the U.S. and overseas, to ensure that U.S. fertilizer firms are applying the highest safety standards available anywhere in the world.

These voluntary programs should complement a thorough effort by the federal government to review and improve the comprehensive safety oversight of ammonium nitrate fertilizer distribution. The time for that effort is now.

Williams Olefins Explosion

On June 13, an explosion and fire occurred at the Williams Olefins plant in Geismar, Louisiana. This plant produces ethylene and propylene, which are raw materials for common plastics, and employs over one hundred workers. At the time of the incident, hundreds of contract workers were also present at the site for a major expansion project.

The CSB deployed a team of seven to the site, and CSB investigators have had a continuous presence in Geismar since June 15. The team has interviewed at least 28 witnesses and has reviewed documents and other information obtained from the company. Williams Olefins and other companies at the site have provided excellent cooperation with the investigation.

The incident involved a large distillation tower that processes propylene, propane, and other highly flammable hydrocarbons. The equipment was in normal operation on June 13. At 8:36 a.m. there was a sudden catastrophic failure involving a heat exchanger and associated piping attached to the distillation tower. The steel shell of the heat exchanger ripped open, and piping detached where it connected to the tower. The exact sequence and cause of these events remains to be determined.

In any event, there was a large-scale release of propylene, propane, and other hydrocarbons from multiple release points, forming a vapor cloud more than 200 feet high that is visible in surveillance video from the site. Within four seconds the vapor cloud ignited. Two Williams employees were fatally burned and approximately 105 other Williams employees and contractors were injured. The resulting fire burned for over four hours.

All of us at the CSB offer our deepest condolences and prayers for the families of the victims and for the injured. We are committed to a thorough investigation to determine why this horrible accident occurred.

CSB investigators have surveyed the scene from ground level and from the air, but currently the immediate area of the ruptured equipment remains too hazardous for entry due to overhanging debris. During the course of this week the area will be made safe for human entry, and this will allow investigators to observe the positions of key valves and obtain other important information. In addition we plan to recover and perform metallurgical tests on the heat exchanger and other piping. This testing will help determine whether the equipment that failed had weakened or deteriorated prior to the rupture, or some other factors were at play.

We are also working with the company to recover electronic control system data that will reveal process conditions at the time of the incident, such as material flows, pressures, and temperatures as well as valve positions. These data will also be important to understanding what occurred.

The assessment of the site and equipment is occurring in close coordination with federal OSHA inspectors. Within a few days of the incident, the CSB, OSHA, and the company entered into a written site and evidence control agreement to ensure that the evidence at the site is properly preserved in as-found condition, and all parties participate in the identification and testing of evidence. So far it has been a good model for how all incident sites should be handled.

CSB Investigative Capacity

The recent tragedies in West and Geismar have further taxed the CSB's already overstretched staffing and resources. When the Congress requested that the CSB conduct a root-cause investigation of the Deepwater Horizon blowout, we informed Congress that this vital work would have unavoidable adverse effects on many other cases the CSB had already begun. The CSB already faced a record backlog of cases in 2010, when I became the chair. Not only have these adverse effects occurred, but Transocean – the operator of the Deepwater Horizon – has engaged in a lengthy legal challenge to the CSB's authority to investigate the incident. On April 1, 2013, a federal district court in Houston ruled completely in the CSB's favor and confirmed our offshore jurisdiction, but Transocean has indicated its intention to appeal the decision and seek a stay of enforcement. This unfortunate legal situation has continued to delay the CSB's access to many documents and witnesses relevant to the investigation of the blowout.

The West and Geismar investigations have very significant financial costs associated with them and West in particular has required the diversion of a very large percentage of CSB's investigators, who already had many months of work in the pipeline ahead of them when the tragedy struck. I would like to engage in a discussion with the Committee over the coming weeks about the impact of these new investigations on the CSB's capacity to finish existing investigations – many of which have important stakeholders who have already been waiting a long time for answers. I also wish to notify the Committee that I believe the CSB has no capacity at this point to undertake any new investigative work, beyond what has already been promised and begun.

Possible Approaches for Reducing Risk

Since the CSB was established in 1998, the Board has made a number of safety recommendations for improving the oversight of facilities that handle hazardous substances. The CSB has made a number of recommendations to the Environmental Protection Agency, including the above-mentioned recommendation to broaden the application of the Risk Management Program to encompass reactive hazards that could have an impact on communities. The CSB has also recently recommended that the EPA strengthen the safety provisions for disposing of hazardous waste; this followed a recent tragedy in Hawaii where five federal subcontractors were killed disposing of illegal fireworks seized by the government.

In another recent case, the CSB urged the EPA to make greater use of its general duty clause authorities under the Clean Air Act by warning operators of their responsibility to safeguard remote oil and gas production sites; the CSB investigation found that 44 members of the public – children and young adults – died in explosions at these unsecured hazardous sites.

The Board has made a number of safety recommendations to OSHA as well. Among the improvements we have sought are a new regulatory standard for combustible dust; broadening the PSM standard to cover reactive chemicals and atmospheric storage tanks and to require more effective management of change reviews; modernization of standards for acetylene and compressed gases; and developing a new safety standard for fuel gases.

The majority of the CSB's recommendations have not been directed to federal regulators but rather to other organizations around the country, including state and local governments, labor unions, trade associations, and the bodies like the ICC and NFPA that are responsible for developing consensus standards. The overall acceptance rate for CSB recommendations now exceeds 70%, and we track all recommendations to completion.

Improved enforcement efforts are just as important as having effective standards. In the CSB's 2007 report on the explosion at BP's Texas City refinery, the Board called for OSHA to expand its enforcement of process safety requirements by "hiring or developing a sufficient cadre of highly trained and experienced inspectors." The Board report observed that there were few comprehensive OSHA inspections of refineries and other chemical sites, and OSHA had only a handful of inspectors with industrial process experience. By comparison, other countries like the U.K. had developed large bodies of specialized inspectors to perform ongoing, detailed safety inspections of hazardous facilities. OSHA responded in part to the recommendation by creating a new National Emphasis Program for refineries; the program was considered very effective by OSHA leaders, uncovering many safety problems in refineries. Unfortunately, OSHA did not have adequate resources to continue the program for more than a temporary period.

The EPA has also lacked the dedicated resources to conduct extensive enforcement of RMP program requirements. When this Committee conducted oversight of the program in 2007, the EPA told the late Senator Lautenberg that the total RMP-related fines collected for the entire country over nearly a four-year period (from fiscal year 2004-2007) were just over $3.5 million,[8] a modest sum for a program that covers over 12,000 facilities.

The CSB believes there are a number of serious challenges for improving industrial process safety in the U.S. As noted above, both OSHA and EPA process safety standards rely heavily upon list-based approaches for determining which facilities and companies have to comply with the most rigorous requirements. This concept of a hazardous chemical list was largely borrowed from environmental statutes of the 1970's and 1980's. However, process safety experts generally recognize that process hazards are a function of chemistry itself, and it makes little sense to assert that the overall risks from chemical processing and handling can be adequately captured using small lists of chemicals. Time and again the CSB has found large chemical hazards – capable of causing major disasters – residing in facilities that have largely escaped regulatory scrutiny. These facilities – of which West Fertilizer is but one example – fall outside the scope of existing regulatory standards, which were developed in the 1990's and have seen few updates since then. All too often, a tragedy like the one at West suddenly exposes the hazards of a chemical or process that had somehow been overlooked.

The effects of these regulatory and enforcement challenges are evident in the accident rates for U.S. refineries and petrochemical sites. In 2008, a leading reinsurance company, Swiss Re, told the CSB and federal regulatory agencies that property losses from U.S. refinery accidents were occurring at approximately four times the rate of the rest of the world. In a follow-up briefing, Swiss Re officials asserted the gap between refinery safety performance in the U.S. and in the

[8] Christopher P. Bliley, Associate Administrator, EPA; Letter to Senator Barbara Boxer, Chairman, Committee on Environment and Public Works, August 22, 2007.

rest of the world was continuing to widen. Many developed nations have adopted a different approach for controlling major process hazards. For example, nations in Europe and elsewhere have implemented a "safety case" regime, that requires hazardous facilities to continuously meet higher standards and reduce risk. Companies work directly with the regulator to identify the most appropriate safety standards from around the world, which they then are required to follow as a condition of operating. The focus is on preventing accidents in highly complex, technological systems rather than post-accident punishment.

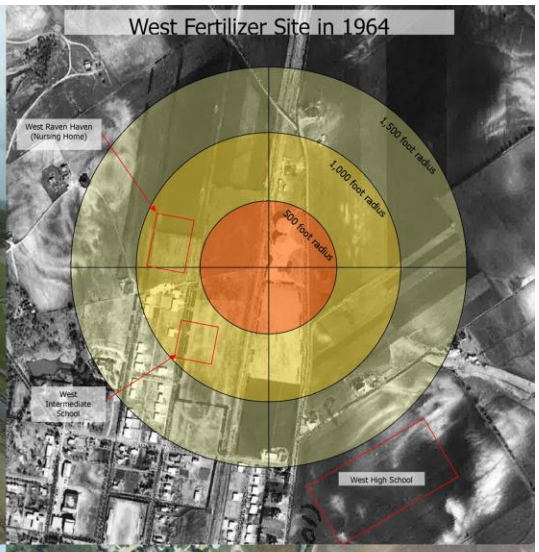
Implementing an effective regulatory regime such as the safety case, with the ability to manage and regulate high hazard industries and prevent serious accidents, requires a number of inter-dependent features. First, the regulatory regime must be truly goal-setting in nature; another term for this is a performance-based regulatory regime. This approach provides industry the opportunity to tailor the regulations to its specific facilities with the goal of continuous risk reduction and incident prevention. The safety case regime also imposes a general duty on industry to reduce all risks in its operations to as low as reasonably practicable (ALARP). Such an approach places the impetus on industry to evolve with current best safety practices, wherever they have been developed anywhere in the world, to ensure that process hazards have been adequately identified, evaluated, and controlled. Furthermore, this regime requires industry to utilize leading and lagging indicators to drive risks involved in major hazard facilities to as low as reasonably practicable. Finally, for effective implementation, this type of regime requires an independent, competent, and well-funded regulator. Experience and competence in technical areas such as chemical engineering, human factors, and process safety management are necessary to provide effective auditing and regulatory oversight for prevention. In a recent federal OSHA forum on reforming process safety regulations, noted safety expert Andrew Hopkins pointed out that all of these elements are essential for an effective major accident prevention regime. Dr. Hopkins emphasized that the whole package of the safety case system needs to be introduced to make it work, including a competent, well-funded regulator.[9]

The CSB has begun to examine these alternative regulatory systems in the context of investigating the recent Chevron refinery fire in California and the Deepwater Horizon blowout in the Gulf. This April, the CSB issued its interim report on the Chevron refinery fire, which sent over 15,000 Richmond residents to the hospital in August 2012. California legislators have responded proactively to the accident and to the CSB's recent findings and recommendations. A bill now before the California governor for signature would effectively triple the number of dedicated process safety inspectors in the state. This expansion will be funded by fees collected from the industry, and will not significantly burden taxpayers. And state legislators as well as leaders from Contra Costa County, where the refinery is located, have been working to implement other CSB recommendations for safer equipment designs and materials, reporting of process safety indicators, and improved maintenance procedures. California's actions should be closely examined, we believe, as a potential model for other states and the federal government to follow.

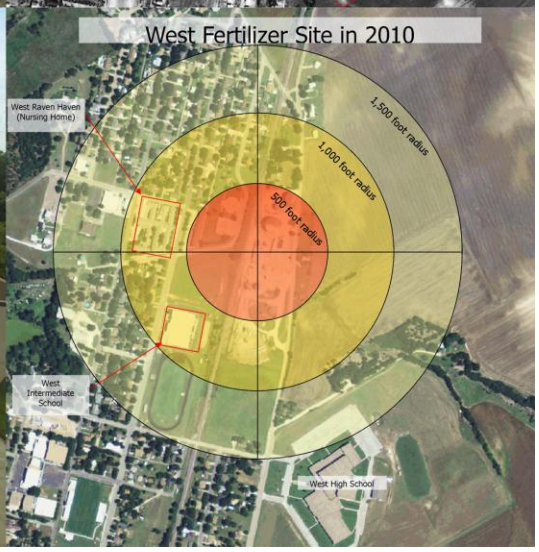
Thank you again, Chairman Boxer and Ranking Member Vitter, for the opportunity to testify today.

[9] OSHA Expert Forum on the Use of Performance-Based Regulatory Models in the U.S. Oil and Gas Industry, Offshore and Onshore; Texas City, Texas; September 20, 2012.


West Fertilizer Explosion and Fire
West Facility Following the April 17, 2013, Incident
CSB


West Fertilizer Site in 1964
West Raven Haven (Nursing Home)
1,500 foot radius
1,000 foot radius
500 foot radius
West Intermediate School
West High School


Intermediate School Following the April 17, 2013, Incident
CSB


West Fertilizer Site in 2010
West Raven Haven (Nursing Home)
1,500 foot radius
1,000 foot radius
500 foot radius
West Intermediate School
West High School


Photos from the June 13, 2013,
Williams Olefins Incident
Geismar, LA


CSB