
# Statement of
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# U.S. Consumer Product Safety Commission

## Before the
## Senate Committee on Commerce, Science, and Transportation

## Subcommittee on Consumer Protection, Product Safety, and Insurance

## "Contaminated Drywall: Examining the Current Health, Housing and Product Safety Issues Facing Homeowners"

## December 6, 2011

Good morning, Chairman Pryor, Senator Wicker, and Members of the Committee. My name is Neal Cohen, and I currently serve as the Small Business Ombudsman in the Office of Education, Global Outreach, and Small Business Ombudsman at the U.S. Consumer Product Safety Commission (CPSC). Prior to assuming the Small Business Ombudsman position, I worked in the Office of General Counsel where I served as the lead attorney on the CPSC's Drywall Team. In my current position, I continue to work with the Drywall Team on legal issues.

I am pleased to be here today to discuss the CPSC's investigation into problem drywall. Before I begin, I would note that the testimony that I will give this morning is mine, has not been reviewed or approved by the Commission, and may not necessarily represent the views of the Commission.

## I. Background

CPSC began looking into reports of noxious odors, and corrosion of metal items inside of homes, especially air conditioner coils, and complaints of short term upper respiratory irritation in late January 2009. To date, the CPSC has received approximately 3,921 reports from residents of 43 states, the District of Columbia, American Samoa, and Puerto Rico who believe corrosion of certain metal components in their homes or health effects are related to problem drywall. After analysis of these reports and other data regarding imports of potentially problematic drywall from the People's Republic of China, CPSC staff believe there may be as many as 8,200 U.S. homes containing at least some problem drywall.

In our first report to Congress, in July 2009, we outlined what we then described as "a multi-pronged, concurrent approach . . . to include import investigations, field measurements in the affected homes, chamber studies to assess the possible health risks and corrosion to electrical, gas, and fire safety systems." In this testimony, I hope to outline the science-based investigation undertaken by CPSC and our agency partners, as well as our efforts to provide assistance to homeowners impacted by problem drywall.

## II. CPSC's Scientific Investigation of Problem Drywall

The principles in our strategic investigation plan, in place by June 2009, have been followed by CPSC staff throughout this investigation. Where scientific findings and the compliance investigation indicated a need for additional information, staff added multiple distinct, standalone studies to address those needs.

For more than two years, CPSC has worked with our interagency partners, including the U.S. Department of Housing and Urban Development (HUD), the Centers for Disease Control and Prevention (CDC), and the U.S. Environmental Protection Agency (EPA) (collectively the "Federal Interagency Task Force on Problem Drywall" or "Task Force") and has spent more than $6 million dollars from its general operating fund to conduct this investigation.

Briefly, I would like explain the paradigm we employed; it is one that is reliably used in scientific investigations:

1. Analyze the suspected source of the emissions, the drywall, in isolation to see what chemicals the source is emitting in a controlled environment;

2. Conduct indoor air testing in homes built or renovated with the suspected source of the emissions;

3. Test corroded household components that have been exposed to the emissions; and

4. Expose new metal household components in an accelerated aging corrosive environment to simulate long-term corrosion and analyze for potential safety hazards.

CPSC and our partners also engaged our nation's top laboratories – Lawrence Berkeley National Laboratories (LBNL), Sandia National Laboratories (Sandia), the National Institute of Standards and Technology (NIST), and the U.S. Geological Survey (USGS) – in addition to a well-regarded private company, Environmental Health & Engineering (EH&E).

This scientific paradigm – executed by these top laboratories and scientists – was methodical and iterative, with each step informing the next in the investigation. This rigorous process ensured that the Commission's investigation was based upon the best, quality-controlled and quality-assured results, each result informing the design and conduct of subsequent studies.

CPSC also shared the urgency felt by the homeowners, and we had to balance that sense of urgency with the exercise of caution to make certain that all scientific studies concerning the effects of the problem drywall were credible and defensible. To that end, in a somewhat unprecedented move in a CPSC-compliance investigation, we were transparent and posted all scientific investigations publicly on www.drywallresponse.gov, including the underlying raw data. We did so because we recognized the homeowners' need to understand what was going on in their home environments, because we were confident that our science was of the highest caliber and should be held up to public scrutiny, and because we felt that the public was entitled to make use of the information. Wherever feasible, and without jeopardizing the scientific process, investigations were conducted in parallel to increase our ability to deliver sound scientific results to the public in the timeliest manner.

### A. Efforts to Diagnose and Pinpoint Critical Characteristics of Problem Drywall

In July 2009, CPSC staff contracted with EH&E to study gases present and corrosion effects within homes where problem drywall was installed. This was consistent

with our investigatory paradigm to conduct indoor air testing in homes with the suspected source of the emissions. The 51-home indoor-air study conducted by EH&E was released in November 2009, and allowed the development of certain corroborating factors forming the core of the Identification Guidance, building upon earlier work conducted by the EPA at the CPSC's request to identify chemicals present in certain drywall samples. The 51-home study also informed CPSC staff about low levels of certain sulfur gases and other compounds present in the homes.

While the 51-home study was being conducted, CPSC also worked closely with LBNL, part of the U.S. Department of Energy, to conduct advanced chamber emission studies to determine the types and amounts of gases emitted by certain drywall in controlled laboratory conditions. The chamber emission studies represented another important cornerstone of our investigatory paradigm. Those studies analyzed the drywall samples in question in isolation in order to capture which chemicals the samples were emitting in a controlled environment, apart from possible confounding sources in the home.

We released LBNL's initial results in November 2009 and March 2010, with the final report on the first round of testing issued in January 2011. Importantly, the findings from the chamber studies enabled CPSC to definitively identify those chemicals being emitted directly from the drywall, apart from the other confounding factors in the home. This work demonstrated the conclusive link between certain drywall and the corrosive emissions of hydrogen sulfide and other reactive sulfur gases. It also demonstrated that some, but not all, Chinese drywall emits hydrogen sulfide and other reactive sulfur gases at much more elevated rates compared to other Chinese and North American drywall.

CPSC staff knew that hydrogen sulfide corrodes copper and silver to produce the type of corrosion seen on those metals in affected homes. However, it was not until this work was completed that we could positively identify the problem drywall itself as the source of that hydrogen sulfide. The levels of reactive sulfur gases, specifically hydrogen sulfide, emitted from the drywall also informed our investigation into potential fire or electrical safety risks. This determination that certain drywall does in fact emit elevated levels of hydrogen sulfide and other reactive gasses also enabled CPSC and HUD to develop Identification Guidance and Remediation Guidance based on the common sense approach of removing the source of these emissions.

In January 2010, the CPSC and HUD issued Identification Guidance for homes affected by problem drywall. This Identification Guidance, which was updated in August 2010, was very important for potentially affected homeowners as it provided some common, scientific characteristics for homeowners to use in determining whether a specific dwelling contained problem drywall.

Remediation Guidance was first issued in April 2010 by the CPSC and HUD. In its first iteration, the Remediation Guidance was extra cautious in its approach to consumer's health and safety until the results of our scientific investigatory plan became available, including precautionary removal of certain building materials. As the results of

the scientific investigation became available, we updated the Remediation Guidance in March 2011 and again in September 2011 to provide consumers with a safe and more cost-effective approach to remediation.

In February 2010, we held a closed meeting with our staff, staff from our federal Task Force Partner agencies, including the CDC, our private contractor, and scientists from the leading national laboratories that conducted many of our studies. CPSC staff reviewed the strategic plan that we had set in motion and the preliminary results received to date. There was broad agreement amongst the attendees that CPSC staff had set forth a clearly defined, scientifically defensible plan and one which could also provide the basis for a solid legal case in the event one was warranted.

In the spring and summer of 2010, the CPSC worked with Sandia to design and execute experiments, detailed further below, that would accelerate the aging processes on electrical and fire safety components to simulate the effects of decades of exposure to the types of corrosion exhibited in problem drywall houses.

While we worked with Sandia, we also conducted additional studies to refine how we characterized the problem drywall and to address other concerns that had arisen including the concern regarding the possibility that sulfur reducing microbiological elements may have been a potential root cause of the emissions. In March 2010, the CPSC, in conjunction with EH&E, released a report on a microbiological assessment of a limited number of drywall samples. No difference was found in the presence or absence of sulfur-reducing bacteria between imported Chinese drywall and U.S. domestic drywall tested, including those Chinese samples found by LBNL to have some of the highest reactive sulfur gas emissions in the chamber tests.

In May 2011, the CPSC, in conjunction with EH&E, released a longitudinal study of the temporal effects of seasonality and elapsed time on the gaseous emissions and rate of corrosion formation in problem drywall and control homes. This limited study of six homes found that emissions increased during periods of elevated heat and humidity and were markedly reduced in cooler and drier periods.

In June 2010, the CPSC, contracting with EH&E, released a study titled *Identification of Problem Drywall: Source Markers and Detection Methods.* This study confirmed the association between elemental sulfur and the characteristic corrosion associated with problem drywall, and it also provided new information indicating that strontium (when used alone as a marker) possibly could lead to misidentification of problem drywall.

In September 2011, LBNL completed a second round of emissions studies focusing on the effects of heat, humidity, and surface treatments like paint, upon the emissions rates of the problem drywall. The additional testing found that emissions increase with elevated temperature and humidity. Importantly, however, the testing also found that the emissions actually *decreased* significantly over time for the samples, compared to when they had been tested during the first round of testing in 2009-2010.

Importantly, all of our modeling and accelerated aging had been based on a worst-case assumption that these levels do not decrease over time.

Also, in September 2011, the CPSC, through an interagency agreement with USGS, conducted additional microbiological assessments of drywall samples and gypsum rocks from relevant mines. Throughout the investigation, there had been many claims of sulfur reducing bacteria actively converting the gypsum in drywall into corrosive sulfur gases. Like the prior EH&E study, the USGS study found no evidence indicating the presence of active bacteria of these types.

In sum, the analysis of chemical content and chemical emissions from problem drywall determined that certain brands of drywall produced around the year 2005-2006 contain elevated levels of elemental sulfur (octahedral sulfur, $S_8$) and have elevated emission factors for hydrogen sulfide ($H_2S$) and other reactive sulfur gases known to corrode copper and silver. It also was found that over time, the emission rates for these reactive sulfur gases decreased and that increases and decreases in emission rates corresponded to increases and decreases in temperature and humidity.

B. Potential Health Impacts of Problem Drywall

The report on the 51-home study included discussion of health impacts for the compounds found in the home environment. In analyzing the results in that study, CPSC staff relied on the actual measurements of reactive gases taken in the 51-home study as the best approximation of the levels of gases to which homeowners may have been exposed. However, the concentrations of individual chemicals found in the homes were below levels where health effects have been reported in the toxicology literature and did not provide the CPSC with enough evidence to determine that a substantial or imminent product hazard or significant injury or illness occurs due to problem drywall.

Although those concentration levels did not permit the CPSC to make a health or safety finding, it is possible that health effects might occur when consumers are exposed to combinations of chemicals, as found in all indoor environments. The study of health effects related to exposures to chemical mixtures is scientifically complex due to the interactions between and amongst chemicals, as well as the fact that responses to chemical exposures can vary tremendously from person to person. Much more study and analysis – beyond the current staff and monetary resources of the CPSC – would be necessary to develop the evidence necessary to conclusively establish the health case.

CPSC staff also used mathematical modeling to predict possible exposures that might result from the reactive sulfur compound emissions measured in the LBNL chamber testing. As with most modeling exercises, this undertaking was complicated by the many assumptions that had to be made about some of the environmental conditions and interactions between chemicals that were occurring in the homes.

In light of staff and resource constraints, the CPSC formally requested that the CDC consider conducting a long-term health study on the effects of problem drywall. In making the request, CPSC staff felt that such a study or series of studies by the CDC could seek to address some of the deficiencies in the data outlined above. In January 2011, the CDC indicated that it had "carefully considered" a long-term health effects study and concluded that "the best scientific evidence available to [CDC] today does not support" such a study. While CPSC staff hoped the available scientific evidence would allow the CDC to conduct a long-term health effects study, CPSC staff was encouraged to learn that CDC staff took the time to carefully consider the merits of such a study before deciding not to proceed.

In February 2011, CDC staff requested that the CPSC staff provide all information on the addresses and reported health effects associated with problem drywall homes so that the CDC could map the scope and consider the potential health effects. In response to that request, CPSC staff provided the requested information to the CDC to assist in their evaluation of the potential health effects of problem drywall. It is the understanding of CPSC staff that CDC work continues on this health consultation project, and CPSC staff looks forward to reviewing the results when that project is complete.

### C. Examination of Any Potential Fire or Electrical Safety Implications of Problem Drywall

In an effort to determine whether problem drywall presented any fire or electrical safety risks that could be quantified as presenting a serious safety hazard, the CPSC also hired Sandia and NIST to conduct engineering studies of the effects of corrosion on electrical and fire safety systems.

Sandia subjected samples to accelerated aging processes to simulate the effects of decades of exposure to the types of corrosion exhibited in problem drywall houses on components, including electrical wiring, receptacles, switches, plus smoke alarms, fire suppression sprinkler systems, and gas service piping. Sandia also conducted engineering analyses of the electrical systems that were aged in these conditions, as well as other electrical components harvested from affected homes. Sandia provided the exposed fire safety system samples to NIST to complete similar engineering analyses of those systems.

The CPSC's study, conducted with Sandia, on the impact of accelerated corrosion on electrical components, which simulated 40 years of corrosion, was completed in March 2011. The results of the Sandia study led the Task Force to modify the Remediation Guidance and to remove the earlier recommendation that all electrical wiring be removed. This study found visual evidence of corrosion but found that the corrosion did not significantly reduce the overall cross section of copper nor did it decrease the wire's ability to carry its rated current. No acute or long-term safety events such as smoking or fire were observed during the course of the experiment.

In September 2011, the CPSC, working with NIST, released a series of staff reports on the effects of problem drywall and related corrosion on fire safety systems and natural gas service piping.

The first report was a study on the effects of simulated 10 years of corrosion of the type exhibited in problem drywall homes on a variety of smoke alarms. NIST also studied smoke alarms collected from homes where they had been exposed to the emissions from problem drywall. There were small but significant changes to performance in some cases, although each set of the smoke alarms continued to meet applicable safety standards. In any case, the CPSC recommends replacement of smoke alarms every 10 years and carbon monoxide alarms after their limited lifespan, typically every five to seven years. Therefore, as part of remediation, it is recommended that all smoke alarms and carbon monoxide alarms be replaced because they have a limited life span and cost little to replace.

The second report was a study on the effects of simulated 20 years of corrosion of the type exhibited in problem drywall homes on a variety of fire sprinkler heads. In addition, NIST studied fire sprinkler heads collected from homes where they had been exposed to the emissions from problem drywall. Fire sprinkler heads showed small effects due to accelerated corrosion, but were generally within accepted industry standards.[1] Fire suppression sprinkler systems are present only in a very small fraction of problem-drywall homes.

The third report was a study on the effects of problem drywall emissions on gas service piping. The CPSC collected gas service pipes from homes where they had been exposed to the emissions from problem drywall. NIST also studied copper alloys commonly employed in the manufacturing of gas service piping after exposure to the simulated corrosion chamber to achieve 40 years of simulated exposure. The results showed that corrosion of gas service piping was uniform and minimal compared to the thickness of pipes. No acute or long-term safety events were observed during the course of the experiment. Gas service pipes are present only in a very small fraction of problem-drywall homes.

D. Additional Targeted Scientific Studies

Additional studies were conducted for targeted investigations on an as-needed basis as new issues emerged during the overall investigation, including (A) investigating the limited claims of problems due to domestic drywall in homes, (B) investigating the indoor environments in two homes at Fort Bragg where multiple infant deaths had been reported and (C) investigating deaths reportedly related to problem drywall.

[1] A single fusible-type fire sprinkler head that had been exposed to accelerated corrosion did not activate when tested. Out of an abundance of caution, CPSC staff recommend the replacement of fusible-type fire sprinkler heads as part of remediation. However, we note that this type of sprinkler head is generally found in commercial, rather than residential, applications and that the sole failure could not be causally linked to the problem drywall at this time.

1. Domestic Drywall Study

While the majority of the complaints to the CPSC have been for imported drywall, approximately one to two percent of the total reported incidents came from homeowners who have alleged that corrosion and other problems have resulted from the installation of domestic, problem drywall. In response, CPSC staff conducted in-depth investigations (IDIs) on a number of these homes and found that some appeared to have Chinese drywall and others did not appear to have the characteristic problems associated with problem drywall.

In addition, the CPSC undertook a limited study on 11 homes believed to best represent the types of reports we had received. In April 2011, the CPSC released a study on these 11 homes for which the presence of problem domestic drywall could not be ruled out, and the results were inconclusive. Some of the homes in the study were found to have characteristics of problem drywall, but the actual country of origin could not be determined conclusively for all of the drywall in those homes. Other homes in the study exhibited corrosive characteristics that were different than those that the CPSC had observed in homes with imported, problem drywall. However, none of the findings resulted in the need to change the Task Force's recommendations in the identification or remediation guidance documents.

2. Investigation Into Deaths at Ft. Bragg, North Carolina

The CPSC provided substantial support to the U.S. Army in the Army's investigation into deaths at Ft. Bragg. CPSC conducted a comprehensive and independent investigation into the indoor environments in two homes at Fort Bragg where multiple infant deaths had been reported. The results of our study, released on February 10, 2011, concluded that problem drywall was not present in the homes. For the benefit of the Army, our contractor conducted additional environmental testing while in the homes and did not find an environmental cause of these tragedies. Somewhat elevated levels of two pesticides, permethrin and cypermethrin, were found in one of the homes, and the Army is continuing to investigate these pesticide issues on its own. Both of these pesticides are approved by the EPA under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) for use inside of homes. The Army paid to have EH&E continue to investigate the slightly elevated pesticide levels.

3. Investigation of Deaths Reportedly Related to Problem Drywall

On January 31, 2011, the CPSC released the CDC's review of state medical examiners' investigations into reports of deaths in homes alleged to contain problem drywall. The report found no connection between the 11 deaths and the drywall; instead it found several other contributing factors that specifically included pre-existing health conditions. CPSC staff also found no connection between the subject homes and problem drywall in our investigation.

## III. CPSC and Private Efforts to Assist Impacted Homeowners

### A. Problem Drywall Identification and Remediation Guidance

As discussed earlier, Identification Guidance for homes affected by problem drywall was first issued in January 2010, and updated in August 2010. Remediation Guidance was issued in April 2010 and updated in March 2011 and again in September 2011.

The updated documents clarify that the Remediation Guidance represents an effective protocol on which a homeowner may rely to make appropriate decisions about remediating their home comprehensively. The current guidance documents are comprehensive and integrate the results of all scientific studies completed as part of this investigation.

### B. Development of Standards for Drywall Labeling and Content

During the course of the investigation, one substantial impediment encountered by CPSC staff was the lack of uniform labeling on both domestic and foreign drywall. The bulk of problem drywall examined by staff contained no marking detailing manufacturer, brand, or country of origin. This substantially hindered CPSC staff efforts to determine the exact source of problem drywall, as well as the scope of the problem.

In an effort to prevent similar problems in the future, CPSC staff worked with ASTM International on a new gypsum board voluntary labeling standard that would require manufacturer name and country of original on the product. We are pleased to note that, as a result of these efforts, ASTM recently approved a revision to the C1264 gypsum board standard.

The revised C1264 standard, which was effective as of last month, requires that manufacturers place either names or unique codes identifying the name of the manufacturing company, facility and production line, date and time of manufacture, and country of origin on each sheet of finished gypsum products. The revised standard also specifies that this identifying information be reproduced at regular intervals on each sheet of finished gypsum products. CPSC staff believe that this voluntary labeling standard should help builders and consumers better understand the origin and source of gypsum products in the future.

CPSC staff also continue to work with ASTM and other industry associations on standards regarding gypsum board content. That work is currently ongoing, and we hope for further progress on that voluntary standard in the near future.

### C. The Multi-District Drywall Litigation

Some private parties impacted by problem drywall are engaged in extensive federal and state litigation, which has largely been consolidated in the federal Chinese-

Manufactured Drywall Products Liability Multi-District Litigation (MDL) in the Eastern District of Louisiana.[2] The CPSC has never been a party to this litigation, although Commission staff has tracked the progress of the case through discussions with parties and stakeholders. Despite the lack of CPSC's formal involvement in the case, the agency's scientific findings have been relied upon universally by the various parties as representing a credible and serious effort to understand and explain the issues associated with problem drywall.

Unlike a potential CPSC recall, which would require the CPSC to demonstrate health or safety hazards satisfying the high burdens set forth in CPSC's controlling statutes (*e.g.*, that the drywall presents an imminent hazard or substantial risk of serious injury or death), the private civil cases are primarily economic in nature and need only prove, for example, that the drywall was not fit for its originally intended purpose. As part of this process, one of the potentially responsible producers of problem Chinese drywall, Knauf Plasterboard (Tianjin), announced a pilot settlement on October 14, 2010. In that pilot settlement, Knauf and certain American companies in the distribution chain of commerce, agreed to voluntarily remediate 300 homes in Alabama, Florida, Louisiana, and Mississippi containing its drywall. Knauf's remediation protocols for this pilot program conform to the CPSC's interim remediation guidance.

During the week of February 14, 2011, Knauf's contractor broke ground on the first such remediation project. The Court and all parties have also sought to broaden the number of homes covered in this pilot settlement beyond the original 300 homes. Some private estimates indicate that Knauf manufactured drywall may be present in 40 to 45 percent of all homes impacted by problem drywall. In addition, almost all impacted homes in Alabama, Louisiana and Mississippi contain drywall manufactured by Knauf.

The MDL Court has also directed the parties in the case to proceed with discovery and depositions, which are presently underway, concerning certain other Chinese manufacturers and certain American companies in the supply chain. The MDL Court represents a credible process addressing claims of economic loss from the plaintiffs, and it will proceed and likely provide a substantial level of relief to a number of homeowners with problem drywall manufactured by Knauf (and possibly a few other companies). It is, however, unlikely to cover all homeowners impacted by problem drywall.

### D. CPSC Efforts to Seek Compensation from Potentially Responsible Chinese Manufacturers Outside of the MDL Case

Throughout the problem drywall investigation, the CPSC has continually engaged with our counterpart agency in China, the General Administration for Quality Supervision, Inspection, and Quarantine (AQSIQ), to share information and arrange a meeting between the CPSC and Chinese manufacturers. Specifically, CPSC personnel have engaged in the following face-to-face meetings (in addition to numerous

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[2] MDL 2047, Chinese Manufactured Drywall Products Liability Litigation, http://www.laed.uscourts.gov/drywall/drywall.htm.

videoconferences and conference calls) with high-level AQSIQ personnel to seek resolution to the problem drywall issue:

- August 2009. CPSC staff traveled to China to investigate the possible origin of problem drywall and to meet with AQSIQ staff regarding the issue.

- Second Trilateral U.S.-EU-China Consumer Product Safety Summit, October 25-26, 2010, Shanghai, China. CPSC Chairman Inez M. Tenenbaum personally discussed the issue with AQSIQ Minister Zhi Shuping and urged the Chinese Government to facilitate a "fair and just" resolution to the issue.

- The Third Bilateral United States – China Consumer Product Safety Summit, held in Washington, DC on October 13-14, 2011. At this meeting, the Chairman again publically called on the Chinese Government to come to the table, resolve this issue and provide relief to impacted homeowners.

To date, the CPSC has used all of the resources available to it, including high-level international contacts by the Chairman and other international diplomatic efforts with the U.S. Departments of State and Commerce to push this item to the front of the agenda with the Chinese government. Throughout many months of diplomatic efforts, the Chinese manufacturers have continued to signal their reluctance to meet with us. The principal Chinese trade associations have stated that their members are being singled out, and refuse to accept CPSC assurances that all responsible parties would be included in a possible settlement.

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Mr. Chairman, thank you again for the opportunity to testify regarding the CPSC's scientific investigation of problem drywall, as well as efforts to assist impacted homeowners. I would be happy to answer any questions at this time.