



**PDHonline Course C748 (6 PDH)**

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## **Chinese Drywall**

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**2020**

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# Chinese Drywall

*Disclaimer: This seminar covers a subject within which there is much information currently being developed. The material, procedures, and policies contained herein represent information that is current as of September 2014.*

## Module A. Introduction

### **The Problem**

From 2004 through 2006, the housing boom and rebuilding efforts necessitated by various hurricanes led to a shortage of construction materials, including drywall. As a result, drywall manufactured in China was brought into the United States and used in the construction and refurbishing of homes in coastal areas of the country, notably the Gulf Coast and East Coast. Sometime after the installation of the Chinese drywall, homeowners began to complain of emissions of smelly gasses, the corrosion and blackening of metal wiring, surfaces, and objects, and the breaking down of appliances and electrical devices in their homes. Many of these homeowners also began to complain of various physical afflictions believed to be caused by the Chinese drywall. Accordingly, these homeowners began to file suit in various state and federal courts against homebuilders, developers, installers, realtors, brokers, suppliers, importers, exporters, distributors, and manufacturers who were involved with the Chinese drywall.

The Chinese drywall controversy is an alleged health and safety issue involving defective drywall manufactured in China and imported by the United States starting in 2004. Laboratory tests of samples for volatile chemicals have identified emissions of the sulfurous gases carbon disulfide, carbonyl sulfide, and hydrogen sulfide. Between 2004 and 2007, it has been estimated that 250,000 tons of this Chinese drywall was imported by the United States based on shipping records. This would equate to as many as 100,000 homes in the United States that could be impacted with Chinese drywall.

As of March 13, 2014, only 4,051 cases have been reported to the Consumer Product Safety Commission (CPSC). So where are the remaining 96,000+ homes? They may not be homes; they may be commercial properties that for various reasons are not being reported. Why are the reported incidents of Chinese drywall in commercial properties so low? Presumably, many commercial property owners do not believe that Chinese drywall was installed in their structures because imported 5/8-inch drywall (which is used in many commercial applications) has not been problematic like the half-inch drywall typically installed in homes. As we now know, contractors did not always use 5/8-inch drywall, even when specified.

Another reason is that indoor environments in commercial properties tend to be cooler and less humid. As a result, off-gassing and corrosive effects may be delayed or lessened, making it take longer to discover the tainted Chinese drywall. In addition, some commercial property owners may be reluctant to confirm the presence of Chinese drywall or pursue the matter because of the economic and legal implications, particularly in a landlord/tenant situation.

Most probably, there have been thousands of unreported cases that have been settled privately with the major home builders.

For political correctness there have been several titles associated with Chinese drywall, namely reactive drywall, defective drywall, problem drywall, tainted drywall, corrosive drywall, and toxic drywall.

### **Drywall Background**

Drywall is a widely used construction material that is also known as gypsum board, wallboard, plasterboard, sheetrock, and gyproc. A drywall panel is composed of a layer of hardened gypsum plaster sandwiched between two layers of paper liner. Gypsum is a hydrated calcium sulfate, composed of two molecules of water (H<sub>2</sub>O) and one of calcium sulfate (CaSO<sub>4</sub>). The gypsum used to make drywall can be created both naturally and synthetically.

Naturally occurring gypsum is a deposit largely the result of the evaporation of water in ancient inland seas which contains large amounts of dissolved gypsum.

Synthetic gypsum is chemically identical to mineral gypsum, but the amount and types of trace materials and unreacted sorbents found in the source material can vary among power plants and among mines from which it originates. Synthetic gypsum is generally obtained in the final stage of industrial processes, where sulfuric acid is neutralized by a calcium salt; for example it is produced as a byproduct of coal combustion power plants. To make drywall from gypsum, first gypsum is crushed or ground up and heated to about 350 degrees Fahrenheit to remove approximately seventy-five percent (75%) of its water content in a process called calcining, thereafter becoming a fine white powder. Second, the calcined gypsum is mixed with water, foam, and other additives to form a slurry which is fed between continuous sheets of paper on a continuous belt line. Third, as the board moves down the belt line, the calcined gypsum recrystallizes or rehydrates, reverting to its original gypsum state, and the paper sheets become firmly bonded to the rehydrated core. Finally, the board is cut to length and conveyed through dryers to remove free moisture.

Historically, gypsum was used as far back as 3700 B.C. by the Egyptians as a base to preserve the wall murals in the pyramids. The Roman Empire used gypsum for interior

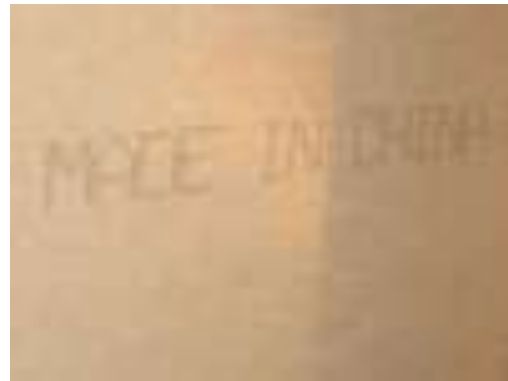
purposes, such as the interior walls of Pompeii. There is little information of the use of gypsum plaster during the Middle Ages. The modern science of gypsum began with the discoveries by Antoine Lavoisier outlined in his two papers on gypsum presented to the French Academy of Sciences in 1765 and 1766. In the United States, the use of gypsum board started in the early 1950s and was driven by the following issues, (1) avoiding the drying time of plaster which allowed earlier occupancy of buildings, and (2) the lack of skilled plasterers in many locations. Gypsum is fire resistant, thus making it a preferable material for drywall.

### How did this happen

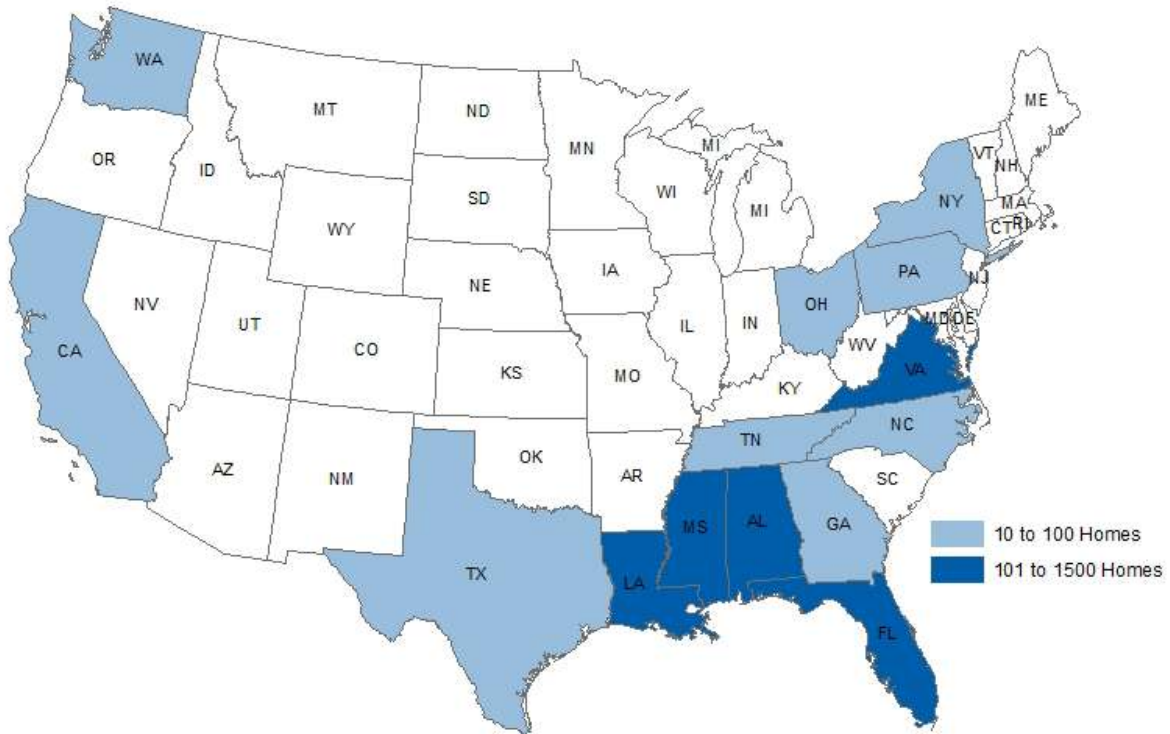
While the material source of the problem is known, a complete understanding of the cause of the problem remains unknown, which is likely due in part because different mines were involved, there were different manufacturing processes, and different types of construction and building materials were used.

Initially, the most common theory was that the drywall was manufactured in gypsum mines in China which used fly ash, a waste material that is a byproduct from power plants using coal. Samples of Chinese drywall tested by United Engineering, however, consisted of 5-15% organic material, which contradicts the theory that Chinese drywall was made of waste from coal fired power plants. It is now believed that the tainted drywall from China comes from mined gypsum, not synthetic gypsum which is made from coal ash. Mined gypsum contains high levels of strontium, which is visible as inclusions in electron scanning microscopy.

Another theory is that Chinese drywall contains bacteria (possibly from the water source used to manufacture the drywall) which is degrading iron and sulfur compounds to produce sulfur odors, although a CPSC's recent report disputes this theory.



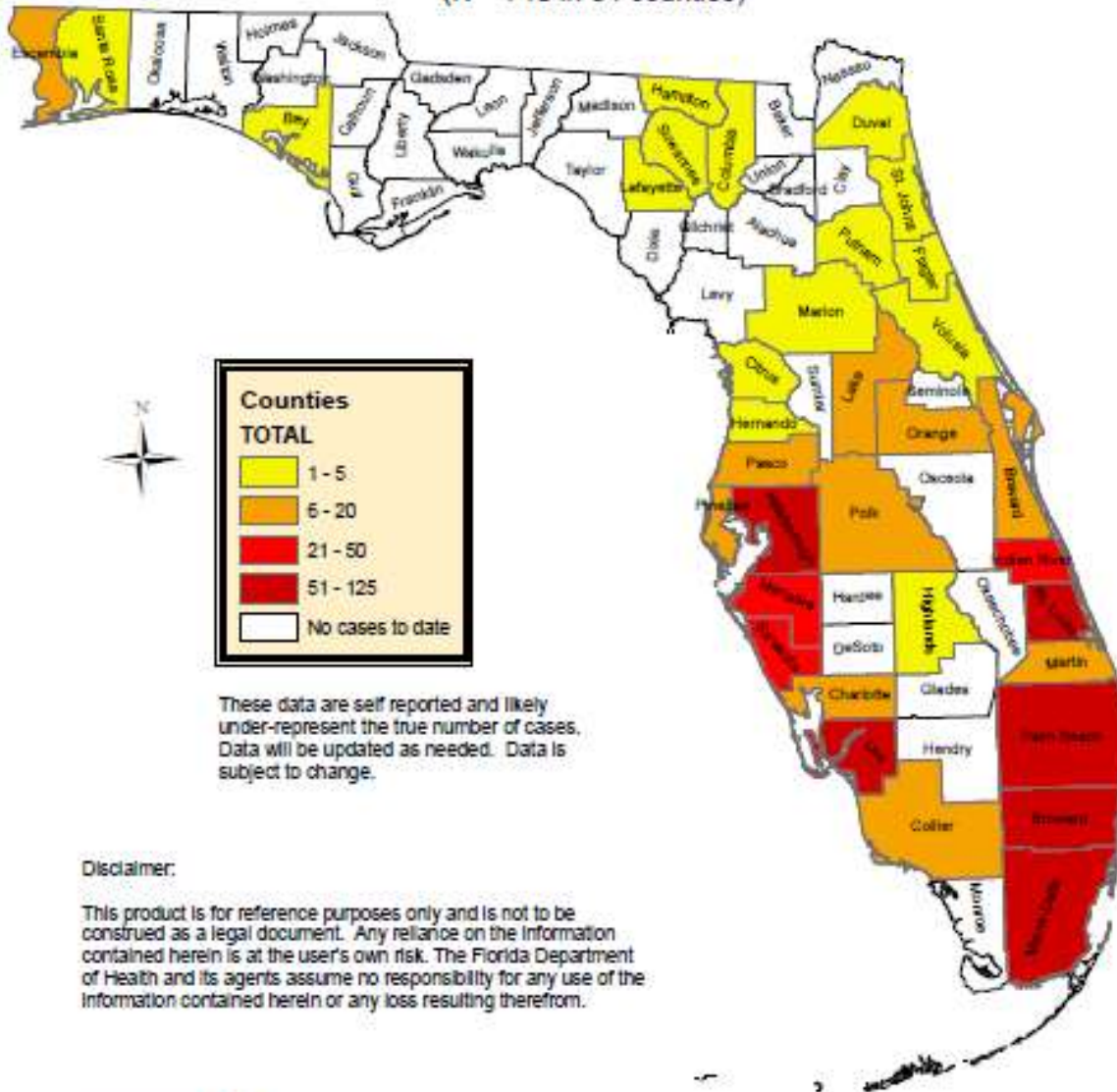
### Current Location of Chinese Drywall



*States where problem drywall has been reported to CPSC (as of April 2014)*

# Reports of Drywall "Cases" to DOH County Health Departments

September 11, 2012  
(N = 740 in 34 counties)



<http://www.doh.state.fl.us/environment/community/indoor-air/drywall.html>

## Residential Impact

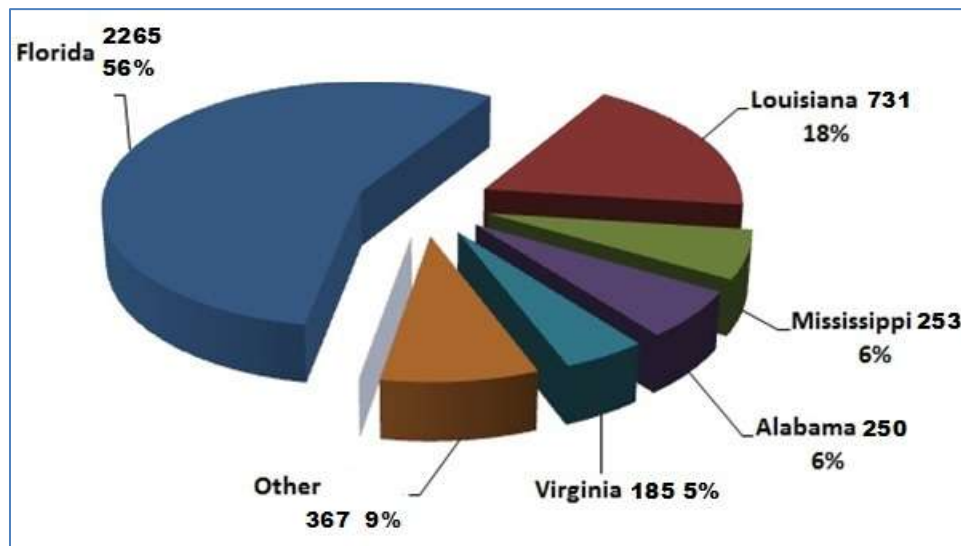
The exact amount of drywall imported from China is not known at this time. Published reports have referenced more than 550 million pounds, enough to build about 60,000 to

100,000 average homes. The issue first became prominent in Florida, but reports of CDS have been received from more than 44 states to date. Which buildings had Chinese drywall installed is not known at this time.

Some information of this type may become available as the records of importers and distributors are examined in greater detail. It is unlikely many builders or drywall contractors kept records of where individual sheets or loads of drywall were installed.

In the United States, most complaints have come from states in the Southeast, where a warm and humid climate seems to encourage the emissions. Florida may have been the most heavily affected by the drywall.

### Five States contain 91% of all reported cases



## **Module B The Problem**

### **What makes Chinese Drywall different?**

According to the “GENERAL SCIENTIFIC FINDINGS ON CHINESE DRYWALL WHICH DISTINGUISH IT FROM TYPICAL, BENIGN DRYWALL” in *Germano, et al. v. Taishan Gypsum Co. Ltd., et al.*, Chinese drywall is different from typical, benign drywall for the following reasons:

1. Chinese drywall has a significantly higher average concentration of strontium and significantly more detectable levels of elemental sulfur.
2. Chinese drywall releases reduced sulfur gases. The three main gases that are released from CDW are hydrogen sulfide (H<sub>2</sub>S), carbonyl sulfide (COS), and carbon disulfide (CS<sub>2</sub>). The CDW also releases elemental sulfur. These emissions are also confirmed by strong odors. The fact that Chinese drywall emits sulfur gases has also been reported by the U.S. Consumer Products Safety Commission, the Florida Department of Health, and other investigatory agencies and firms.
3. The sulfur gases released by Chinese drywall are irritating to the human body. Exposed individuals reported irritation of the eyes, respiratory system, and skin, among other things.
4. The sulfur gases released by Chinese drywall cause offending odors in homes, making them hard if not impossible to live in.
5. The sulfur gases released by Chinese drywall are corrosive to metals, particularly copper and silver. “Corrosion” is defined by the ASTM as the chemical or electrochemical reaction between a material, usually a metal, and its environment that produces a deterioration of the materials and its properties. The sulfur gases, in reacting with metals, form sulfide deposits on the surfaces of the metals. For example, a reaction of sulfur gases with copper pipes will form copper sulfide on the metals. The reaction of sulfur gases with metals can be said to be “consuming” the useful, pure metals by replacing those metals with sulfides.
6. The corrosion on metals caused by the sulfur gases emitted by Chinese drywall causes premature failure of electrical & mechanical devices. The Plaintiff-intervenors have reported many premature failures of major appliances and consumer electronics in their homes during their first three years of use of these homes. Laboratory analysis of these copper and silver components from the Virginia homes identified the corrosion as the cause of an HVAC coil failure and severe corrosion deposits at the operative connections in the appliances and in consumer electronics. Mechanical, electrical, and electronic failures have been shown to have occurred prematurely due to the severe



industrial corrosive environments in these Chinese Drywall homes. Evaluation of comparable HVAC systems, appliances, and electronics in *control* homes (e.g., similar homes without Chinese Drywall) do not show premature failures of HVAC systems, appliances, and electronics, and the wires do not have corrosion product thicknesses that would predict premature failures.

7. The corrosion on metals caused by the sulfur gases emitted by Chinese drywall poses a fire risk. The corrosion increases resistance in the circuitry of appliances and electronics. Increased resistance increases heat in appliances and electronics. This increased resistance can cause excessive heating of the connection when energized. Complete failure of a switch can lead to fires or other life safety problems, depending on the intended function of the switch.

## Identifying the Problem

### Florida Department of Health Case Definition for Drywall Associated Corrosion in Residences (12-18-09).

This revision of the 03-31-09 Case Definition reflects our current understanding of this emerging problem and the results of recently released information regarding corrosive drywall testing. The sole purpose of this case definition is to help identify homes that are affected by corrosion associated with drywall emissions. The case definition is NOT intended to evaluate the health risks for occupants or to evaluate occupant exposures to corrosive emissions. This case definition is NOT regulatory in nature or required to be used by those inspecting homes. This case definition is provided to the public for informational purposes only and its use is strictly voluntary. Adoption of this case definition for purposes beyond its intended use is at the risk of the user. Criteria to demonstrate that a home is not affected by corrosive drywall emissions may require a different approach and inspection criteria that are not described in this document.

This version of the case definition enables the user to rank homes as a possible, probable, or confirmed case. Homes that exhibit the sentinel indicators of drywall associated corrosion are defined as possible cases. All three sentinel indicators of Criteria 1 **must** be met for the home to be considered as a possible case. Criteria that define a probable or confirmed case are described in later sections.

### For Homeowners

#### **Criteria 1:**

#### **Sentinel Indicators of Drywall Associated Corrosion (Possible Case = all 3)**

1. The home was constructed or renovated with new drywall since 2001.

2. Observed corrosion of air conditioner evaporator coil exemplified by black corrosion on copper tubing components. The corrosion can result in refrigerant leakage making it impossible to cool the home requiring coil replacement. Coil failures indicative of this problem typically occur every 6-14 months
3. Observed metal corrosion, indicated by blackening of **one or more** of the following:
  - copper wires, ground wires, and electrical connectors
  - un-insulated and un-coated copper pipes and fittings
  - chrome-plated bathroom fixtures
  - silver and copper jewelry
  - mirror backing in bathrooms

If you have answered yes to all three of the above indicators, the home meets the criteria for “possible case”. Continue to Criteria 2 or 3 **only** if home meets the criteria for “possible case”. Trained professionals performing home assessments based upon this case definition should use their experience, training, and professional judgment to establish their inspection procedures and sampling strategies. Professional judgment is necessary to determine the number of samples and weight of evidence needed to meet each set of criteria. A trained professional, not the homeowner, should conduct inspections and testing described in Criteria 2 and 3.

### **For Trained Professionals**

#### **Criteria 2:**

#### **Supporting Indicators of Drywall Associated Corrosion (Probable Case = 1 or more)**

1. Observed markings on the back of drywall indicating the country of origin is China.
2. Objective analysis of drywall in home finds Strontium levels exceed 2,000 mg/kg (ppm), indicating the gypsum used in the drywall was probably mined in China. Analytical methods commonly used for this include XRF and ICP.

If you have met the criteria for “possible case” and answered yes to at least one of the above indicators in Criteria 2, the home meets the criteria for “probable case”. These criteria do not confirm that the drywall causes corrosion. Identifying the origin of the drywall is considered a screening tool for suspect drywall, but confirmation requires analysis described in Criteria 3.

**Criteria 3:****Confirmatory Evidence of Drywall Associated Corrosion (Confirmed Case = 1 or more)**

1. Elemental sulfur (Orthorhombic sulfur, cyclooctasulfur, S<sub>8</sub>) content of gypsum core exceeding 10 mg/kg (ppm), indicating the gypsum in drywall samples from the home contains the source material that is believed to contribute to the reduced sulfur gasses emitted from corrosive drywall. Analytical methods commonly used for this include GC/ECD, GC/MS, or HPLC.
2. Laboratory analysis of suspect drywall headspace for reduced sulfur gas emissions (H<sub>2</sub>S, COS, CS<sub>2</sub>) indicating drywall samples from the home emit reduced sulfur gasses capable of causing copper corrosion. Analytical methods commonly used for this include GC/SCD. *Results that are indicative of corrosive drywall must be established by each laboratory based upon internal procedures, comparison to control samples, and validated methods.*
3. Qualitative analysis of suspect drywall for its ability to cause corrosion/blackening of copper under controlled conditions, indicating drywall samples from the home emit gasses capable of corroding copper. *Results that are indicative of corrosive drywall must be established by each laboratory based upon internal procedures, comparison to control samples, and validated methods.*

If you have met the criteria for “possible case”, ruled out other sources of hydrogen sulfide as significant contributors to copper corrosion in the home, and receive positive results on a sufficient number of samples from one or more of the above evaluations in Criteria 3, the home meets the criteria for a “confirmed case”. Some confounding factors that should be excluded as causes of observed corrosion are hydrogen sulfide from well water, sewer gas, or soil gas.

**Odors and Symptoms**

- Use of odors as an indicator of drywall associated corrosion is limited. Odors have not been reported in all homes exhibiting drywall associated corrosion.
- Occupant reported health symptoms have limited use in identifying homes with drywall associated corrosion. The symptoms reported by occupants are not unique or consistent across affected homes.
- Documenting the presence of odors and/or occupant symptoms may be important to public health agencies, but their relationship to the presence or absence of drywall associated corrosion in homes remains unclear.

## **Remediation**

Prior to embarking on efforts to remediate the home, one should perform sufficient evaluation to ensure the criteria for “confirmed case” are met and rule out confounding factors.

## **Insurance, Legal and Political Issues**

Due to the issue being associated with a “building defect,” it is unlikely homeowner insurance policies will provide coverage. Almost all commercial liability insurance carried by builders, drywall installers, importers and distributors, etc. will include a “pollution exclusion” that is likely to be interpreted by the courts as excluding coverage for this condition.

Numerous lawsuits have been filed in Florida and other states against the parties claimed to be responsible. Due to the general lack of insurance coverage, it seems unlikely there will be enough funds available from those being sued to abate all affected buildings, even if these lawsuits succeed.

Various politicians and consumer advocate groups have called for a “product recall” to require those responsible (manufacturers, importers, distributors, builders, etc.) to correct the problems. Again, it seems unlikely sufficient funds will be available from these parties to fully abate all affected buildings in the absence of insurance coverage.

## **Main Producers of Chinese Drywall**

Knauf Plasterboard Tianjin Co. Ltd., part of Knauf Gips (Knauf) is the primary company named as a producer of imported Chinese drywall. While other Chinese companies are suspected of producing defective drywall, Knauf's name comes up most consistently, as the company prints its name on its products.

From January to September 2006, 52 million pounds of Knauf drywall were unloaded in New Orleans, three-quarters of it from Knauf Tianjin, and at least 37 million pounds of Knauf drywall was shipped directly from China to Florida ports.

A home may have been built with drywall from several sources, American and imported. Drywall usually has a source printed on the back. Chinese drywall may be marked "Made in China", "China", "Knauf Tianjin", or have no marking at all.

## **Current Status of Chinese Drywall**

The most recent data, according to court filings:

- 550 million pounds of Chinese drywall was imported from 2004 to 2006, enough to construct 60,000 average-size homes.

- 60 percent of the drywall came through Florida ports.
- Port of Miami received the largest number of shipments, for a total of more than 100 million pounds. Port Everglades received 80 million pounds, while the Port of Tampa received 50 million pounds.

Discussions began in January 2009 between the U.S. Consumer Product Safety Commission, the U.S. Environmental Protection Agency (EPA) and Florida officials. In February 2009, U.S. Senator Bill Nelson of Florida sent a letter to the U.S. Consumer Product Safety Commission and the EPA, asking them to jointly investigate whether the Chinese drywall is toxic, and to determine the extent of potential damage to homes. The Consumer Product Safety Commission launched a formal investigation.

In March 2009, as concerns about the defective drywall grew, Senator Nelson of Florida and Senator Mary Landrieu of Louisiana jointly introduced a resolution and bill urging the Consumer Product Safety Commission to recall Chinese-made drywall and temporarily ban its import.

In May 2009, the U. S. House of Representatives passed an amendment to the Mortgage Reform and Predatory Lending Act, HR 1728, that would require the Department of Housing and Urban Development (HUD) to study the effects of tainted Chinese drywall on foreclosures and the availability of property insurance.

Finally, the Drywall Safety Act of 2012, was signed by the President on January 14, 2013. This Act H.R. 4212, being shorter than most is recited below:

## **H. R. 4212**

### **AN ACT**

To prevent the introduction into commerce of unsafe drywall, to ensure the manufacturer of drywall is readily identifiable, to ensure that problematic drywall removed from homes is not reused, and for other purposes.

#### **Section 1. Short title**

This Act may be cited as the Drywall Safety Act of 2012.

#### **Sec. 2. Sense of Congress**

It is the sense of Congress that—

(1) the Secretary of Commerce should insist that the Government of the People's Republic of China, which has ownership interests in the companies that manufactured and exported problematic drywall to the United States, facilitate a meeting between the companies and representatives of the United States Government on remedying homeowners that have problematic drywall in their homes; and

(2) the Secretary of Commerce should insist that the Government of the People's Republic of China direct the companies that manufactured and exported problematic drywall to submit to jurisdiction in United States Federal Courts and comply with any decisions issued by the Courts for homeowners with problematic drywall.

### **Sec. 3. Drywall labeling requirement**

(a) Labeling requirement—

Beginning 180 days after the date of the enactment of this Act, the gypsum board labeling provisions of standard ASTM C1264–11 of ASTM International, as in effect on the day before the date of the enactment of this Act, shall be treated as a rule promulgated by the Consumer Product Safety Commission under section 14(c) of the Consumer Product Safety Act (15 U.S.C. 2063(c)).

(b) Revision of standard—

If the gypsum board labeling provisions of the standard referred to in subsection (a) are revised on or after the date of the enactment of this Act, ASTM International shall notify the Commission of such revision no later than 60 days after final approval of the revision by ASTM International. The revised provisions shall be treated as a rule promulgated by the Commission under section 14(c) of such Act (15 U.S.C. 2063(c)), in lieu of the prior version, effective 180 days after the Commission is notified of the revision (or such later date as the Commission considers appropriate), unless within 90 days after receiving that notice the Commission determines that the revised provisions do not adequately identify gypsum board by manufacturer and month and year of manufacture, in which case the Commission shall continue to enforce the prior version.

### **Sec. 4. Sulfur content in drywall standard**

(a) Rule on sulfur content in drywall required—

Except as provided in subsection (c), not later than 2 years after the date of the enactment of this Act, the Consumer Product Safety Commission shall promulgate a final rule pertaining to drywall manufactured or imported for use in the United States that limits sulfur content to a level not associated with elevated rates of corrosion in the home.

(b) Rule making; consumer product safety standard—

A rule under subsection (a)—

- (1) shall be promulgated in accordance with section 553 of title 5, United States Code; and
- (2) shall be treated as a consumer product safety rule promulgated under section 9 of the Consumer Product Safety Act (15 U.S.C. 2058).

(c) Exception

(1) Voluntary standard

Subsection (a) shall not apply if the Commission determines that—

(A) a voluntary standard pertaining to drywall manufactured or imported for use in the United States limits sulfur content to a level not associated with elevated rates of corrosion in the home;

(B) such voluntary standard is or will be in effect not later than two years after the date of enactment of this Act; and

(C) such voluntary standard is developed by Subcommittee C11.01 on Specifications and Test Methods for Gypsum Products of ASTM International.

(2) Federal Register—

Any determination made under paragraph (1) shall be published in the Federal Register.

(d) Treatment of voluntary standard for purposes of enforcement—

If the Commission determines that a voluntary standard meets the conditions in subsection (c)(1), the sulfur content limit in such voluntary standard shall be treated as a consumer product safety rule promulgated under section 9 of the Consumer Product Safety Act (15 U.S.C. 2058) beginning on the date that is the later of—

(1) 180 days after publication of the Commission's determination under subsection (c); or

(2) the effective date contained in the voluntary standard.

(e) Revision of voluntary standard—

If the sulfur content limit of a voluntary standard that met the conditions of subsection (c)(1) is subsequently revised, the organization responsible for the standard shall notify the Commission no later than 60 days after final approval of the revision. The sulfur content limit of the revised voluntary standard shall become enforceable as a Commission rule promulgated under section 9 of the Consumer Product Safety Act (15 U.S.C. 2058), in lieu of the prior version, effective 180 days after the Commission is notified of the revision (or such later date as the Commission considers appropriate), unless within 90 days after receiving that notice the Commission determines that the sulfur content limit of the revised voluntary standard does not meet the requirements of subsection (c)(1)(A), in which case the Commission shall continue to enforce the prior version.

(f) Future rulemaking—

The Commission, at any time subsequent to publication of the consumer product safety rule required by subsection (a) or a determination under subsection (c), may initiate a rulemaking in accordance with section 553 of title 5, United States Code, to modify the sulfur content limit or to include any provision relating only to the composition or characteristics of drywall that the Commission determines is reasonably necessary to protect public health or safety. Any rule promulgated under this subsection shall be treated as a consumer product safety rule promulgated under section 9 of the Consumer Product Safety Act (15 U.S.C. 2058).

#### **Sec. 5. Revision of remediation guidance for drywall disposal required**

Not later than 120 days after the date of the enactment of this Act, the Consumer Product Safety Commission shall revise its guidance entitled Remediation Guidance for Homes with Corrosion from Problem Drywall to specify that problematic drywall removed from homes pursuant to the guidance should not be reused or used as a component in production of new drywall.

## **Module C Liability**

### **Insurance Coverage**

Insurance companies have been making their best arguments to deny any coverage liability. The first policy in question is the homeowner's policy. Insurers have argued that there are several exclusions that could provide them with relief from coverage. For example, losses caused by the following perils are typically excluded:

- Wear and tear, marring, deterioration
- Inherent vice, latent defect, mechanical breakdown
- Smog, rust, mold, wet or dry rot
- Release, discharge or dispersal of contaminants or pollutants
- Settling, cracking, shrinking, bulging or expansion of pavements, patios, foundations, walls floors, roofs or ceilings."

An article published entitled "*Solving the Chinese Puzzle of Contaminated Drywall: Owners and Builders Seek Redress for Defective Drywall Installed in Homes*" offered the following discussion of these exclusions.

*"Deterioration' is a gradual decline or reduction in a property's value resulting from a decline in physical condition. It can be caused by action of the elements or by ordinary wear and tear. A 'latent defect' is customarily one that cannot be discerned by a normal inspection of the property by its owner and must be identified by an expert's investigation. It could be argued that this type of exclusion is applicable to the defective drywall claims, since the material appears normal to the layperson but can be identified as defective by a consultant's investigation or by analysis of its composition. 'Inherent vice' is a condition in an insured property that has the potential to cause damage to portions of the property other than the part containing to portions of the property other than the part containing the inherent vice.*

*The Chinese drywall, it may be argued, exhibits this property since gases emitted from the drywall have been alleged to cause corrosion of metals, including the wiring, plumbing and air conditioning coils in homes where it has been installed. In some cases, the pollution exclusion in a homeowners policy may arguably apply to the release of harmful gases from the drywall that are damaging plumbing, wiring, heating and air conditioning systems, appliances, computers and electronic equipment. Even the odor may be regarded as a release of a pollutant or contaminant, although it is not clear that the incorporation of pollution exclusions in property damage policies was intended to apply to releases that are contained within the insured structure and involve non-industrial materials.*



*Counterarguments can be made that the pollution exclusion should apply only to releases of hazardous materials that impact the environment, but not to damage to the structure, building materials or furnishings within a structure.*

*Some homeowner's policies also contain exclusions for construction defects. This exclusion is included with the thought that an alternative course of action is available to the homeowner: an action for breach of warranty against the contractor and subcontractors that built the home. Even where this exclusion is not included in the policy, some courts have denied coverage for defective construction or materials claims, since damage to the drywall did not occur during the policy period – it was already defective when it was installed and is in the same condition when the problem is discovered. Other courts have concluded that there is no occurrence or event giving rise to the alleged loss where the defective material is unchanged from when it was installed. The damage to the plumbing, wiring, air conditioning, appliances and computers may be excluded as deterioration (e.g., gradual damage), or as rust or corrosion. There are, however, jurisdictions that regard the installation of the defective drywall as an 'occurrence' and consider the damage to be ongoing during the term of the policy even though the defective material itself may not be altered after its installation.*

***In summary, homeowner's policies are not likely to respond to the costs of tearing out and replacing the defective drywall. And although they might pay for the ensuing loss to the wiring, plumbing, air conditioning and appliances, there is no guarantee, however, as these losses may also be impacted by exclusions for mechanical breakdown."***

## **Who is Liable**

The question that everyone is asking, especially the owners of these contaminated properties, is "Who is liable for the damage". Here is a short list of potentially responsible parties:

1. The manufacturer of the contaminated drywall.
2. The supplier(s) who sold the contaminated drywall to the builder.
3. The builder who installed the contaminated drywall.
4. The developer who hires the builder that installed the contaminated drywall.
5. The previous owner of a resold home who may or may not have had knowledge of the contaminated drywall in the building.
6. The owner of a commercial property that leases out space that contains contaminated drywall.
7. The insurance companies of any of the above.

## Recent Court Rulings

There have been three definitive rulings by the court involving homeowners and the following guilty parties including the following cases:

1. Banner Supply Class Action Settlement
2. Audubon Insurance Company
3. *Taishan Gypsum Co. Ltd.*
4. Knauf Plasterboard Tianjin Company, Ltd.

### **Banner Supply Class Action Settlement**

On June 14, 2011, Banner Supply, its affiliates and insurers have agreed to settle *Chinese drywall claims* with thousands of Florida homeowners. According to a Reuters report, the \$55 million global settlement, which still has to be approved by the federal judge overseeing the Chinese drywall litigation in New Orleans, covers as many as 3,000 Florida homes that were built with Chinese drywall supplied by Banner.

On August 11, 2011, the Court issued the Preliminary Approval Order of the Amended Banner Class Settlement Agreement and Exhibits.

### **Description of the Litigation**

*On June 15, 2009, the Judicial Panel on Multidistrict Litigation created MDL 2047 in order to consolidate lawsuits brought in several federal district courts in the Gulf Coast and mid-Atlantic regions of the United States by property owners whose homes or other properties were damaged by Chinese Drywall. Plaintiffs sued the manufacturers of Chinese Drywall as well as homebuilders, developers, installers, realtors, brokers, suppliers, importers, exporters, and distributors that were involved with Chinese Drywall, and their insurers. Banner did not manufacture the defective drywall. Banner merely distributed it. Because Banner distributed defective Chinese Drywall, complaints were filed against Banner Supply Co., Banner Supply Co. Pompano, LLC, Banner Supply Co. Port St. Lucie, LLC, Banner Supply Co. Ft. Myers, LLC, Banner Supply Co. Tampa, LLC, Banner Supply International, LLC, and any other entity insured under the Banner Insurance Policies (collectively, "Banner"), and Banner's insurers, Chartis,<sup>1</sup> FCCI,<sup>2</sup> Hanover,<sup>3</sup> and Maryland Casualty<sup>4</sup> (collectively, the "Insurers"), as well as other defendants, including companies responsible for manufacturing Chinese Drywall. The Litigation seeks relief on behalf of a class of persons and entities with claims against all of these entities, including Banner and its Insurers, arising out of Chinese Drywall.*

*The complaints make claims based on strict liability; violations of the Florida Deceptive and Unfair Trade Practices Act (Fla. Stat. §501.203, et seq.), other state and federal consumer protection laws, and laws against unfair trade practices; negligence; private and public nuisance; tort; equity and medical monitoring; breach of contract; loss of use; loss of enjoyment; personal injury and related statutory violations; bodily injury; indemnity; contribution; breach of express or implied warranty; redhibition; negligence per se; violation of the Louisiana New Home Warranty Act (La. R.S. 9:3141, et seq.), the Louisiana Products Liability Act (La. R.S. 9:28000.51, et seq.) and the Louisiana Unfair Trade Practices and Consumer Protection Law (La. R.S. 51:1401, et seq.); negligent discharge of a corrosive substance; unjust enrichment; breach of implied warranty of fitness and merchantability (Fla. Stat. § 718.203); breach of implied warranty of habitability; negligent misrepresentation; building code violations (Fla. Stat. § 553.84); and relief by way of subrogation, contractual indemnity, common law indemnity, and/or contribution against Banner.*

*Banner and its Insurers deny any wrongdoing whatsoever, and specifically deny having committed any violation of any law, claiming that the manufacturers are ultimately responsible for selling Banner products that they certified were safe and fit for use when in fact the products were defective. Banner's Insurers also deny coverage and liability for Banner's conduct. Banner and its Insurers likewise deny the existence of any class except for purposes of this Settlement, assert certain affirmative defenses, and deny any liability to any member of the Conditional Settlement Class.*

*The Court has not certified a class in the Litigation, other than conditionally for settlement purposes (the "Conditional Settlement Class"), and has made no determination that any class could be certified if the Litigation is not settled hereby. The Court has not determined the merits of any claims or defenses in the Litigation. This Notice does not imply that there has been any finding of any violation of the law by Banner or its Insurers that recovery could be had in any amount.*

*Counsel for the Conditional Settlement Class ("Class Counsel") entered into the Settlement after weighing the substantial benefits that the members of the Conditional Settlement Class will receive as a result of the Settlement against the probabilities of success and failure in securing any recovery from Banner or its Insurers by means of further litigation and delay. Class Counsel consider it to be in the best interests of the Conditional Settlement Class that all of the above captioned actions and all other claims be settled in accordance with the terms of the Settlement as to Banner and its Insurers and believe that the proposed Settlement is fair, reasonable, and adequate for the Conditional Settlement Class. Although Banner and its Insurers deny all liability and the existence of any class (other than for settlement purposes) in the Litigation, Banner and*

*its Insurers consider it desirable to settle the Litigation on the terms proposed, to avoid further expense and inconvenience.*

### **Summary of the Proposed Settlement**

*The Settlement is subject to, and becomes effective only upon, final approval by the United States District Court for the Eastern District of Louisiana (the "Court"), the Honorable Eldon E. Fallon presiding. Set forth below is a summary of the principal terms and conditions of the Settlement. The complete Settlement is on file with the Court; posted in the Clerk's offices at the United States District Courthouse for the Eastern District of Louisiana, Florida courts, and the 34th Judicial District Court, Parish of St. Bernard; published on the District Court's Chinese Drywall MDL website at <http://www.laed.uscourts.gov/Drywall/Drywall.htm>, the CPSC website, and the Florida Department of Health website; and available for your inspection as described below.*

*The Settlement provides for the contribution by Banner's Insurers, following final approval by the Court, of Settlement Funds in the aggregate amount of \$53,081,572.30, representing all of the remaining insurance proceeds available to Banner, in full settlement of all claims of the Class Members against Banner or its Insurers arising from or otherwise related to Chinese Drywall purchased from, supplied, distributed, marketed, used, sold and/or delivered by Banner. For purposes of the Settlement, Chinese Drywall is defined as:*

*any and all drywall products purchased from, supplied, distributed, marketed, used, sold and/or delivered by Banner alleged to be defective and manufactured, in whole or in part, in China, or that include components manufactured, in whole or in part, in China, including, but not limited to, drywall manufactured by Knauf Gips KG; Knauf Plasterboard (Tianjin) Co., Ltd.; Knauf Plasterboard (Wuhu), Co., Ltd.; Gebrueder Knauf Verwaltungsgesellschaft, KG; Guangdong Knauf New Building Materials Products Co., Ltd.; Beijing New Building Materials Public Ltd. Co.; Taishan Gypsum Co., Ltd. f/k/a/ Shandong Taihe Dongxin Co., Ltd.; Taian Taishan Plasterboard Co., Ltd.; Pingyi Zhongxin Paper-Faced Plasterboard Co., Ltd. f/k/a Shandong Chenxiang Building Materials Co., Ltd.; Crescent City Gypsum, Inc.; and any other manufacturer of Chinese drywall.*

*In summary, Settlement Funds will be allocated to pay for and/or reimburse Class Members for the costs of remediating Affected Properties and other damages. The Court has appointed an Allocation Committee whose members include Attorneys Arnold Levin and Russ Herman as Co- Chairs, Hilarie Bass, Neal A. Sivyer, Dorothy H. Wimberly, Charlie Long, Vanessa Serrano, Ervin A. Gonzalez, Michael J. Ryan, and Bruce William Steckler. By no later than, 2011 [should be thirty days before close of opt*

out period], the Allocation Committee shall publish on the Court's website, <http://www.laed.uscourts.gov/Drywall/Drywall.htm>, their written recommendation as to: (i) a fair and equitable plan of allocation of the Settlement Funds; and (ii) the evidence that Class Members will need to provide as part of their Proof of Claim to submit a valid claim. Following approval of the Settlement, the Court will determine a fair and equitable Nov. 17, 5 allocation of Settlement Funds, after considering the recommendation of the Allocation Committee, and Class Members will have an opportunity to comment on or object thereto. Parties that have intervened in the Litigation will also have standing to comment on allocation and an opportunity to participate in the allocation process. If the Court finally approves the Settlement, Proof of Claim forms will be mailed to Class Members and parties that have intervened who have not opted out of the Class. All Class Members who receive in excess of the MMSEA dollar threshold in effect at the time the Settlement is Final must provide the Insurers with their full name, date of birth, social security number, and gender, as well as any other information necessary for the Insurers to comply with their reporting obligations under the Medicare, Medicaid & SCHIP Extension Act of 2007.

The Settlement provides that the Plaintiffs' Steering Committee ("PSC") appointed by the Court, Class Counsel (but not Co-Class Counsel), common benefit attorneys, and private counsel for Class Members may petition the Court for an award of attorneys' fees constituting, in the aggregate, no more than 32% of the Settlement Funds, plus reimbursement of reasonable expenses, including the costs of Notice. However, the petitioning attorneys are permitted to seek a fee of 10% from those entities who recover from the Settlement Funds and are not represented by the PSC, have private counsel, and have actively pursued this Litigation. Application to the Court will subsequently be made for the fees and costs incurred in the administration of the Settlement Funds. Co-Class Counsel may petition the Court for reimbursement of reasonable expenses and an award of attorneys' fees at an agreed hourly rate consistent with her normal hourly rate for duties performed as Co-Class Counsel in connection with this Settlement. The Court will determine the allocation of any fees awarded. Such costs, expenses, and attorneys' and administration fees as the Court may award shall be paid out of the Settlement Funds. Banner and its Insurers will not be responsible for any payments beyond their initial contribution to the Settlement Funds.

### **Simon Finger and Rebecca Finger vs. Audubon Insurance Co**

In late March 2009, a Louisiana court ruled that an insurer may not use several exclusions to deny homeowner claims resulting from tainted Chinese drywall. The New Orleans Parish Civil District Court ruled recently that Audubon Insurance Co.'s pollution exclusion in its homeowner's policy could not be used as an "affirmative defense" to deny coverage of a Chinese drywall claim. In his ruling, Judge Lloyd J. Medley wrote

that Audubon's gradual or sudden loss exclusion and its faulty, inadequate or defective planning exclusion also could not be used as defenses to deny coverage. The case, *Simon Finger and Rebecca Finger vs. Audubon Insurance Co.*, arose when the Fingers filed a July 2009 claim with Baton Rouge, La.-based Audubon, a subsidiary of American International Group Inc., under an all-risks policy. Audubon denied the claim last July, citing its pollution and contamination; gradual or sudden loss; and faulty, inadequate or defective exclusions as reasons for denial, according to court documents. In his ruling, Judge Medley said a policyholder with all-risk coverage "has a 'very light' burden and must show only damage" occurred. He added that the burden of proof is on the insurer to define what claims are denied, adding that "exclusions must be interpreted as narrowly as possible to provide maximum coverage for the insured."

The court said as a general rule, insurance policies should be interpreted to effect, not deny, coverage. During depositions, Audubon argued that the policy "speaks for itself."

In addition, the pollution exclusion "was never intended to apply to residential homeowners claims for damages caused by substandard building materials," the judge ruled. Faulty drywall that emitted various gases into the home "is not sufficient enough to qualify as a 'pollutant' under the pollution exclusion," he said.

As for the gradual or sudden loss exclusion, the judge said he followed previous Louisiana court rulings that found "the purpose of the policy is to secure an indemnity against accidents which may happen, not against events which must happen," thus affording coverage to the policyholder.

Audubon argued that the exclusion applied to corrosion, as it's been reported that sulfuric gases the drywall emits corrodes wiring and metals within the homes. Judge Medley said that the corrosion is a result of the drywall and not due to corrosion over time.

Judge Medley also ruled that the Chinese drywall is not defective as Audubon's exclusion interprets it, meaning that the policy's exclusion for faulty, inadequate or defective planning also does not apply.

Under the "plain language of the Audubon policy, the Chinese drywall 'defect' is not one that renders the drywall unable to perform the purpose of drywall," Judge Medley wrote in his opinion.

Currently, there are more than 2,000 complaints filed nationwide regarding the faulty drywall, including a multidistrict litigation trial taking place in New Orleans.

### ***Multidistrict Litigation – The Chinese-manufactured Drywall Products Liability Litigation***

Because of the commonality of facts in various cases throughout the U.S., this litigation was designated as multidistrict litigation pursuant to 28 U.S.C. § 1407. In response to a Transfer Order from the United States Judicial Panel on Multidistrict Litigation on June 15, 2009, all federal cases involving Chinese drywall (CDW) were transferred and consolidated for pretrial proceedings in the U.S. District Court, Eastern District of Louisiana. The Judge hearing these cases is Judge Eldon Fallon who has been on the federal bench since 1995 and has experience handling large multidistrict cases including a consolidated class action against the manufacturers of the drug Vioxx.

### ***Multidistrict Litigation - Germano, et al. v. Taishan Gypsum Co. Ltd., et al.***

The first case, ***Germano, et al. v. Taishan Gypsum Co. Ltd., et al., case no. 09-6687***, involves seven Virginia plaintiffs whose homes have drywall manufactured by China-based Taishan Gypsum Co. At issue is whether the homes must be gutted completely, as the plaintiffs argue, or whether proper ventilation will do. Taishan was served with court papers, but has not responded. Another Chinese drywall manufacturer, Knauf Plasterboard Tianjin, is providing its view on what the minimum fix should be.

The difference between Knauf's experts and the plaintiffs would be dramatic. Multiplied by tens of thousands of drywall cases, the amount of money at stake could be in the billions. National Underwriters, an insurance publication, recently said house repairs alone could cost \$8 billion to \$10 billion, depending on how rigorous the removal protocol is. The liability of insurance companies will be determined in future trials.

The decision in ***Germano, et al. v. Taishan Gypsum Co. Ltd., et al.***, written by United States District Judge Eldon Fallon was issued on April 8, 2010. It provided direction on remediation of the homes as well as a decision on damages due to each of the seven families.

The evidence supports the conclusion that the appropriate remediation for the Plaintiff-intervener homes includes the removal of all drywall, all electrical wiring, the entire HVAC system, and many other items such as appliances, carpet, cabinetry, trim work and flooring. The scope of this remediation is supported by both the scientific and practical evidence presented. The scientific evidence demonstrated that corrosion has damaged most components that contain copper or silver. The practical evidence demonstrated that selective removal of only CDW is not feasible or cost-effective in this case. The practical evidence further revealed that attempting to gently remove, store or clean or protect carpet, cabinetry or flooring is not feasible or cost-effective. The

practical evidence also indicates that items such as trim work and base boards will likely be ruined or extensively damaged when the drywall is removed.

The Court offered the following discussion of details of and justification for the scope of this remediation.

### **1. All Drywall in the Plaintiff-intervener Homes needs to be Removed & Replaced**

As indicated above, the Chinese drywall in the Plaintiff-interveners' homes emits a foul odor, irritates the human body, and emits sulfur gases which corrode copper and silver, metals of which most electronic and mechanical objects are made, thus reducing these objects life span and posing a fire risk and making the homes hard, if not impossible, to live in. Accordingly, all Chinese drywall must be removed from the Plaintiff-interveners' homes. There seems to be little or no dispute on this issue. There is dispute, however, over the scope of remediation where the home contains both Chinese drywall and non-Chinese drywall. The issue is whether all drywall should be removed or only the problematic drywall in this case. The overwhelming evidence reveals that in such mixed structures it is necessary to remove all the drywall, both Chinese and other, for the following reasons.

*a. Drywall sales and delivery records, where available, lack the reliability and precision necessary to locate all of the Chinese drywall in a mixed drywall home.*

During the construction phase of the Interveners' homes, available sales records from Venture Supply, Inc., showed that between 45 and 212 sheets of CDW were delivered to each of these homes. In some, but not all cases, additional "stacking" records were provided, indicating the number of domestic boards as opposed to CDW which were placed on a given Plaintiff-interveners' floor. In the home with the second least number of boards (45 boards in the Michaux home according to these Venture records), Chinese drywall was found to be scattered among all three floors of the home. In another Intervener family's home (Baldwin), the stacking records indicated 77 sheets were placed only on the first floor of the home. The second floor air conditioning zone of the Baldwin home, which is fed by air wholly from this floor, has suffered copper sulfide corrosion from gases released by CDW. The second floor of the house also has light switches which have suffered silver sulfide corrosion from gases released by CDW. The experts retained by Knauf documented second floor switches and outlets that had suffered visible copper sulfide corrosion. In a home with identical "stacking" records, testing has demonstrated that CDW has been scattered among domestic board on the second floor of a home that was supposed to be, according to the records, CDW free. Accordingly, the Court finds that these records were not sufficiently reliable to conclude that the second floor of the home did not contain CDW.



*b. The Knauf proposed method, or combination of methods, for selective drywall identification do not rise above the level of experimental, and lack the scientific reliability necessary to conduct a board-by-board removal system at the present time.*

Experts retained by Knauf suggested that using a combination of screening tools (including XRF and the subjective color coding of wires) eliminated the need to remove all drywall in a home with mixed sources of drywall. For the reasons set forth in the Court's Order of February 18, 2010, granting a Daubert motion in part, the Court finds that handheld XRF is unreliable for the purpose of identifying CDW on a board-by-board basis. The Court similarly finds that the observation of corrosion on electrical and mechanical systems in homes informs the determination of whether the home, as a whole, suffers from corrosive attack associated with CDW as reflected in the screening definitions for Florida Department of Health (FDOH) and the Consumer Product Safety Commission (CPSC). Despite the utility of these methods for home characterization, they lack the precision and accuracy necessary to conduct individual board identification as evidenced by the decision by Florida and the CPSC to eliminate this method from any confirmatory testing. PSC expert Dean Rutila explained six reasons why observation of corrosion on a wire is not a reliable tool to be used for the purpose of selective identification and removal of CDW. The six reasons are: (1) CPSC and FDOH have determined that it is a screening tool, not a tool for CDW board by board identification; (2) no governmental or peer-reviewed endorsement exists for board by board identification; (3) it is an incorrect assumption that effects of corrosive CDW are only very localized-these gases actually disburse throughout the house; (4) there are no available receptacles next to many boards in house, e.g., "scarce" in ceilings; (5) it is impractical to determine where one drywall board stops and next one starts; and (6) there is no guarantee that all CDW contamination can be removed or certify the same to code officials. Defendant Knauf provided expert reports extensively reporting on the visible corrosion of wires as well as findings from their field use of XRF. The Court finds that this method, like the handheld XRF gun, also produced "false negatives," e.g., concluding that ceilings and rooms within homes were CDW-free, when subsequent testing of the homes demonstrates CDW labels and follow-up laboratory testing confirmed that the board was Chinese and was releasing corrosive gases. The intervener homes have suffered corrosive attack and, in order to make the plaintiff whole, any system that lacks the ability to definitely identify the offensive drywall is unacceptable and rejected by this Court. The regulatory and scientific record demonstrates that removing all drywall from a mixed drywall home is the only method that ensures this goal is obtained.

*c. Removal of all drywall in a mixed home is efficient and cost effective.*

Large Florida homebuilders with extensive experience in CDW remediation have determined that removal of all drywall in affected homes is efficient and cost-effective, and that attempted selective identification and removal of CDW is neither efficient nor cost-effective.

The Court finds that removal of all drywall from a CDW home has been demonstrated repeatedly to be an efficient method of repair. In testimony from homebuilders in Florida, coupled with photographic and video graphic evidence, the Court finds that a home can be stripped of all drywall in a matter of hours. For complete drywall removal, the removal process does not call for highly-skilled workers and removes drywall from the home rapidly and efficiently. In contrast, for attempted selective drywall removal, assuming that boards could be accurately identified (which the Court rejects), CDW would have to be "surgically excised" from a mixed CDW home, followed by the installation of new board in its place. The record shows this is neither practical nor cost-efficient. The Court finds that selective removal of drywall, with the corresponding need to patch the borders between old and new board, is time-consuming and requires a highly-skilled drywall installer to attempt to conceal the patch. Beazer Homes projected that to do this type of patchwork would require a four-to five-fold increase in cost per square foot, which estimate matched the estimate for such patch work provided by the experts retained by the plaintiff. The Court also finds that walls with certain types of finish applied are extremely difficult to repair as it is not possible to "feather" the finish. Repairs of this sort will not restore the home to its original condition.

*d. It is not practical or economical to detect, selectively remove, and replace individual boards of Chinese drywall.*

Impacted homes were frequently built with a mixture of Chinese drywall and domestic drywall. The 4' x 12' Chinese drywall boards manufactured by Taishan were cut to fit a myriad of locations around these homes, resulting in sections of boards divided and installed as needed to fit the specific room. The Court received evidence of a typical home drywall installation that included a closet with many small pieces of drywall segments and a ceiling with 11 segments of drywall. In rooms with ceilings greater than 8 feet in height, drywall installers frequently install a narrow band of drywall to make up the distance between two horizontal boards (8") and the ceiling. As a large drywall board is cut to fit a given area, the remaining portion of the board is set aside for use in an area of the home that requires a similarly sized board. In this way, a single board will frequently be cut into segments that are within a room, a floor, and a home. Once installed, the finishing process for drywall, which includes taping and multiple layers of drywall finish followed by sanding and painting, renders the demarcation between drywall segments almost impossible and certainly impractical to detect. Additionally,

many of the drywall boards are placed behind kitchen cabinets, bathroom vanities, appliances, mechanical equipment, and other objects that further conceal their location.

## **2. All Electrical Wires in the Plaintiff-intervener Homes need to be replaced**

### *a. Scientific Reasons*

The electrical systems of the seven homes include copper low voltage wires which carry current to smoke detectors, fire alarms, and thermostats, among other devices. The homes also have copper high voltage electrical wires which carry current between electrical components such as circuit breakers, receptacles, and switches. Corrosive gases emitted from Chinese drywall cause significant damage to copper high and low voltage wires as a result of the buildup of thick films or corrosion product. CDW also causes pitting to occur on wires as was demonstrated by the Sandia National Laboratories. Pits in the wires from the Plaintiff-interveners' homes ranged from 10 microns to 29 microns in depth. It is highly probable that there exist in the Plaintiff-interveners' homes corroded wires with a distribution of pit sizes, some of which would be larger than the deepest pit measured by CDW investigators. This further confirms the corrosion is due to the exposure to Chinese drywall. In failure analysis, where the concern is the "weakest link" because the goal is to prevent failures and protect against life safety issues connected to failures (i.e., corrosion increases resistance which increase heat and generates a fire risk), one must focus on the most vulnerable components. For example, in failure analysis of a copper tube, it is important not only to look at average thickness of the copper material to determine if a leak is possible, but more importantly to look at the weakest link in the tube. Thus, the maximum corrosion thickness and the maximum pit depth are important considerations in failure analysis.

Wires from homes without CDW, namely the control homes, did not show the severe corrosion thicknesses associated with predicted failure, did not show thick copper sulfide deposits, and did not show severe pitting found on the wires from CDW homes. The insulation jackets on electrical wires do not adequately protect them from corrosive attack. Reactive sulfur gases permeate the sheathing and corrode wires from the inside out. This penetration of wire insulation has been demonstrated in both "lamp cord" wires and under the jackets of Rome high voltage wire on the grounding wire which lacks its own insulation. The corrosive attack from CDW occurs even on insulated wires within the walls of the home. See P1.1981 (switch box from Beazer home). This was demonstrated on the marked wire attached to a light switch box taken from one of the Beazer homes. The corrosive attack also occurs on lamp cords which are in the center of a room away from drywall sources. The corrosive environments in these homes will result in premature failures of the electrical system according to the expert analysis of both the plaintiff experts and at least one Knauf expert. It is not feasible to clean the

wires of corrosion product to render them free of risk of future failure. To do this, one would have to remove the wire, remove the insulation on the wire, clean the wire, and reinstall the wire insulation. Such a process is not only time consuming but needs special equipment and expertise. The Rome insulation utilized in Plaintiffs' homes was type NM which is not sufficient for corrosive environments. Engineering standards require the replacement of wires which have been exposed to this environment. Building codes are drafted for life safety purposes and generally set a minimum level of safety. A building code is usually prescriptive and not discretionary. Corrosion on active residential wiring is a violation of the national safety code as well as the safety and building codes of the various states. The "corrosive residue" on, and "deterioration by corrosion" to, the wires are violations of electrical codes promulgated by Virginia.

*b. Economic & Practical Reasons*

It is practical to remove the wiring while all the drywall is out of the home because of the ease of access to the cavities where the wiring is located. The replacement of the electrical wires, requires access to wall and ceiling cavities currently covered by drywall. The Court was presented evidence that the network of wires in the home, including low and high voltage, phone, cable, and other system wires, is extremely complex and dispersed throughout the ceilings and walls. Electrical wires are stapled in place within the wall cavities pursuant to applicable building codes. These wires cannot be removed without gaining access to the wall cavity. The evidence also demonstrates that replacement of all wiring is warranted because of practical cost considerations. The Court finds that it both economical and practical to remove all the wiring while the drywall is gone, rather than removing only some of the wiring at this time and then risk later have to tear down the drywall again in the case that additional wiring exposed to the sulfur gases is harmed or fails. Additionally, the low-voltage wiring supporting life and safety devices such as fire alarms and smoke detectors should be removed and replaced because of the low cost of replacement when compared with the high risk of injury or death if these devices are not functioning properly.

**3. All Copper Pipes in the Plaintiff-intervener Homes need to be replaced**

*a. Scientific Reasons*

Copper pipes are utilized to carry water and copper plumbing components form integral parts of the plumbing system, including risers (attached fixtures to delivery lines), shower control devices, pressure regulators, and a variety of other applications. The corrosive gases responsible for destroying copper in wiring have also damaged the plumbing and mechanical copper components. This corrosion caused pitting which leaves corrosion product in the wall of the pipe. From a scientific standpoint, under

normal operating conditions, humidity and microscopic moisture on these pipes (or other copper surfaces such as coils or wire) will create the conditions for the deepening of these pits by the reactivation of the corrosion inside the pit, regardless of whether or not the defective drywall is removed. The evidence supports the conclusion that copper pipes with significant corrosion and pits cannot be adequately "cleaned."

*b. Economic & Practical Reasons*

The plumbing systems in homes are impossible to remove or replace in walls and ceilings when drywall is present. Thus it is practical to remove the plumbing while all the drywall is out of the home because of the ease of access to the cavities where the plumbing is located. Also from a practical standpoint, builders have rejected the prospect of "cleaning" the corrosion off of copper components, finding it is more cost-effective and less time-consuming to simply remove and replace them.

#### **4. The HVAC Units in the Plaintiff-intervener Homes need to be replaced**

*a. Scientific Reasons*

Heating, ventilating, and air-conditioning ("HVAC") units contain both copper and silver components, all of which are corroded by the sulfur gases emitted by Chinese drywall. KPT experts agree that the HVAC systems in the seven (7) Plaintiff homes have been badly corroded by CDW. For example, the air handlers of the HVAC systems of the Plaintiff-intervener homes are corroding in multiple areas including the coils, circuit board, and contactor switch. The copper coils of HVAC systems are similarly failing because of the sulfur gas emitted from CDW. The coils are part of the air handler in the HVAC system. The sulfur gas from CDW causes a heavy black corrosion on HVAC coils. The sulfur gas from CDW causes copper sulfide corrosion on HVAC coils. The copper sulfide corrosion causes pitting in the HVAC coils. The copper sulfide corrosion in the pits of the HVAC coils will continue even after the CDW is removed and replaced. The corrosion caused by CDW causes the copper to develop a spongiform texture. The corrosion caused by CDW has resulted in multiple failures of HVAC coils in Plaintiffs' homes. By contrast the HVAC coils from control homes do not demonstrate corrosive attacks. The HVAC coils from control homes have no copper sulfide corrosion. Additionally, the corrosion caused by CDW in the Virginia homes attacks the brazes that connect copper pipes. The circuit boards of the air handler are also corroding. Corrosion on circuit boards increases resistance which leads to premature failure. The contactor switches of the air handler are also corroding. Corrosion on contactor switches increases resistance which leads to failure. Due to the corrosion in multiple areas of the air handler units in these homes, the entire unit must be replaced. The air handler units of other national builders such as Beazer and Lennar exhibit similar problems and are

being replaced. The refrigerant that causes cooling in an HVAC system is circulated through a copper pipe called a "line set." The line set pipe connects the interior air handling units to the outside compressor units. The line set pipes run through the interior walls from the air handler unit until it exits the house to connect to the air compressor. The line sets in these homes have a heavy black corrosion caused by CDW sulfur gasses. When the temperature of any copper pipe, such as the line set, in a house drops below the "dew point," moisture will form and make the pipe particularly susceptible to the CDW sulfur gases. Cross-sections of the line set pipe in these homes demonstrate deep pitting caused by CDW sulfur gasses. The line set pipes of other national builders such as Beazer and Lennar exhibit similar problems and are being replaced. The heavy corrosion to the line set pipes requires replacement.

#### *b. Economic & Practical Reasons*

The "line-sets" described above are installed in a home in one continuous piece from outside compressor to the air handler unit. For upstairs air handler units, these lines frequently run through interior walls and ceilings. These lines are installed first, and wiring, insulation, and other equipment are installed over them, rendering them impossible to access for removal and replacement without first removing all drywall. Replacement of the line set pipes requires removal of all drywall in those areas of the walls where the pipe runs. Accordingly, it makes sense to replace these items since they are suffering from corrosion and are most easily removed and replaced while the drywall is gone. The outside compressors may need to be replaced in these homes, and should be evaluated on a case-by-case basis. The outside compressors demonstrate excessive wear from excessive operation. The excessive operation of the compressor is caused by attempting to circulate coolant through a failed and corroded coil in the air handling unit. The outside compressor may also need to be replaced to match the connections on new air handling units, and should be evaluated on a case-by-case basis. The connections between the air handler and compressor have been altered due to changes in refrigerant regulations. The duct work that runs from and to the air handling unit must be replaced. Particulate matter from the CDW is in the ductwork. The duct work cannot be adequately cleaned. The contractors for these homes could not obtain quotes to even attempt cleaning of the ductwork. Even if attempts could be made at cleaning the ductwork, the cost of cleaning would be greater than simply replacing the ductwork. Other national builders like Beazer and Lennar are replacing the duct work.

### **5. Selective Electrical Devices & Appliances in the Plaintiff-intervener Homes Need to be replaced**

#### *a. Scientific Reasons*

Silver is a very conductive metal and is used in the electronic contacts in practically every device that carries electrical current. For example, silver is present in circuit breakers, light switches, thermostats, computers, televisions, and generally "anything that has a button." It is a preferred metal because it has good resistance to corrosion attacks from most sources. However, like copper, its Achilles' heel is sulfur. Silver is readily corroded by sulfur. When it is exposed to sulfur, silver sulfides are produced. When a sulfide corrosion product exists, it dramatically increases resistance of electrical current through the connection. This increased resistance can cause either complete failure or excessive heating of the connection when energized. Complete failure and/or excessive heat of a switch can lead to fires or other life safety problems, depending on the intended function of the switch. For example, a malfunctioning safety cut-off switch in a clothes dryer might cause a fire. Corrosion can also lead to premature failure of the electrical device or appliance. The lifespan of devices with silver corrosion has been seriously diminished. The silver corrosion found on the Plaintiffs' devices indicates that they were in a "Level III" or "Level IV" corrosive environment as measured on an objective corrosion scale. Level IV is the worst. In a Level III environment, equipment failure rates increase by a factor of 100. The lifespan of devices with silver corrosion can be decreased to a tenth or a quarter of its normal lifespan. Most of the appliances and electronics located in the representative homes need to be replaced due to corrosion on metallic contact surfaces and on other metallic components. As discussed above, the corrosion has damaged the copper wiring in the appliances and electronics. The corrosion also has damaged the silver contacts in the appliances and electronics. Refrigerators are particularly susceptible to damage from the sulfur gasses due to the cool copper lines and compressor which circulate refrigerant. They are also particularly susceptible to damage from the sulfur gasses due to the high air flow caused by the compressor fan. Electronic systems in the Plaintiff-interveners' homes have failed. Electronic systems in the Plaintiff-interveners' homes are damaged by the corrosion. Electronic systems in the Plaintiff-interveners' homes are likely to fail before their normal and expected periods of use end. Examples of damaged or failed electronic systems include televisions, computers, and any other item with a circuit board.

#### *b. Economic & Practical Reasons*

Replacement of electronic devices and appliances damaged by sulfur gases emitted by Chinese drywall makes sense under practical cost considerations. It is more cost effective to replace items such as smoke detectors, than to remove them from the home, transport them to and store them in a facility, and transport them back to the home.

### **6. Whether Flooring needs to be replaced**

*a. Carpet must be replaced*

The carpet in the houses cannot be adequately protected during the remediation process. Attempting to remove and store the carpet during the remediation is not cost-effective. The evidence indicates that it would be cheaper to replace the carpet than attempt storage and reinstallation.

*b. Hardwood or Vinyl Flooring Must be replaced*

The hardwood or vinyl flooring poses a challenge in some circumstances and in some climates. The unconditioned air during the remediation process can damage hardwood floors. Dust generated during the remediation process will intrude into the cracks and crevices of the flooring and may require resanding and refinishing the floors. In the representative cases, the evidence supports the conclusion that the hardwood or vinyl flooring must be replaced as part of the remediation.

*c. Tile Flooring May Need to be Replaced*

The evidence shows that tile flooring may be properly protected during the remediation process, and if this can be done, the Court finds that it does not need to be removed and replaced. In the case if the tile flooring is damaged, then it should be removed and replaced. Additionally, tile that is affixed to the drywall will be ruined during the drywall removal and should be replaced.

**7. Items Which Must be Removed With the Drywall May Need to be Replaced**

*a. Cabinets Must be Replaced*

The cabinets in the houses must be removed to gain access to the drywall. The testimony reveals that it would not be cost-effective to attempt to gently remove the cabinets and store them in a climate-controlled storage unit. It is more cost-effective to replace the cabinets than attempt removal and storage.

*b. Countertops Must be Replaced*

The countertops must be removed during the remediation to gain access to the drywall. The contractors providing estimates for the Virginia homes indicate from experience that the countertops will chip or break during removal. Beazer testified that the countertops in Florida homes being remediated broke during removal. Because of these factors, the countertops should be replaced as part of the remediation.

*c. Trim, Crown Molding and Baseboards Must be Replaced*



Trim, crown molding and baseboards are placed on top of the drywall. They will have to be removed to get to the defective drywall. In most instances it is less costly to replace these items than to take additional time to gently remove, store and put back the original materials. This is the case with the representative homes. Accordingly, the Court finds that these items should be replaced.

*d. Bathroom Fixtures Must be Replaced*

Sinks, toilets and shower enclosures generally must be removed when the drywall is removed because they are installed on top of drywall or to enable the remediation workers to move freely. It is more cost-effective to replace these items than to gently remove, safely transport and store, and reinstall at a later date. Thus these items should be removed and replaced.

**8. Insulation Must be Replaced**

The insulation cannot be adequately protected during the remediation process. The insulation will be damaged during the removal of the drywall. It will also be contaminated with drywall dust produced during the removal of the drywall. The drywall dust cannot be properly cleaned or removed from the insulation. It is more cost-effective to replace the insulation.

**9. The Plaintiff-intervener Homes Will Need to be Cleaned With a HEPA Vacuum, Wet-wiped or Power-washed, & Allowed to Air-out After Remediation**

In order to eliminate the tremendous amount of dust produced from removal of the drywall, and to eliminate the offensive odor of the Chinese drywall, Plaintiff-interveners' homes will need to be cleaned and aired-out after remediation is complete. A HEPA vacuum should be used to remove the fine drywall dust and other particles. Additionally, the homes should be wet wiped or power washed to eradicate any remaining particles. Finally, the houses will need to air out for between fifteen (15) and thirty (30) days. The cleaning and airing-out is necessary to insure that all sulfur odors are gone.

**10. After Remediation, an Independent, Qualified Engineering Company Should Certify that the Homes are Safe for Occupation**

Following the deconstructing phase of the remediation process, the houses will need to be inspected by an independent and qualified engineering company. This is important for insurance, resale potential, and peace of mind for the present occupants. The independent and qualified engineering company should provide a letter or report

indicating that the remediation has been correctly performed. The company should also provide a letter or report indicating that the homes are safe to be reoccupied.

### **11. The Scope of Work is Consistent With Chinese Drywall Remediation by National Homebuilders**

The necessary remediation proposed by the plaintiff is essentially the same in all material respects as the scope of remediation being utilized by national builders Beazer Homes and Lennar Homes. National builders Beazer and Lennar have also independently assessed the need for their remediation through scientific evidence, practical cost considerations, and hands-on experience with the problem. Although in theory, a thorough cleaning or selective replacement of contaminated drywall may be an option, in practice however, the evidence however does not support the feasibility of such an option. The alternative remedies to a complete remediation that have been tried or suggested, such as selective identification and removal of Chinese Drywall, "cleaning" corroded wires, switches, and contact points, leaving corroded wires and switches in place, clipping the exposed ends of the corroded wires and splicing wires, or making new junction boxes, will not make the plaintiff whole, will not be adequate from a scientific or practical standpoint, and will not provide safety and marketability to the homeowner. The impractical and time-consuming prospect of clipping, stripping and/or cleaning separate wires in a switch or junction box is demonstrated by reference to the sample switch box removed by Beazer's Jerry Smith from one of the Beazer homes. The only economically feasible option, at least at the present time, is to totally gut the structure, take it down to the studs and remove and replace all wiring.

### **12. The Court's Scope of Remediation as Compared to the NAHB & CPSC Remediation Protocols**

After the hearing in the *Germano* matter, the National Association of Home Builders (NAHB) and the Consumer Product Safety Commission (CPSC), each released their own remediation protocols. In its protocol, the NAHB recommends taking out all drywall in a home unless the Chinese drywall is in a contained area. It also recommends taking out all plumbing, low-voltage wiring, and carpet. Further, the NAHB recommends the use of HEPA-filter vacuums to suck up dust, airing out homes over a period of time, and paying for temporary living expenses for displaced families. These recommendations are consistent with the Court's own findings. However, in contrast to the Court, the NAHB recommends removing only the damaged ends of high-voltage wiring, but advises builders who are concerned about meeting building codes or being cost-effective to take all wiring out. It also provides that tile floors, cabinets, and doors do not need to be replaced. However, in the judicial hearing held to date, the Court was convinced that these items should be replaced as well.

The CPSC remediation protocol is largely consistent with the Court's protocol. Both call for the replacement of all possible problem drywall, all fire safety alarm devices, all electrical components and wiring, and all gas service piping and fire suppression sprinkler systems. *Interim Remediation Guidance for Homes with Corrosion from Problem Drywall*, Consumer Product Safety Commission & Department of Housing and Urban Development, April 2, 2010. However, if a portion of drywall can be reasonably identified as non-problematic drywall, the CPSC allows for leaving that drywall in place. The evidence reviewed by this Court indicates that the better and more realistic approach dictates the removal of all drywall in those homes in which there is a substantial mixture. This is necessary in order to remove and replace wires, pipes, and insulation, and to adequately clean the home. Furthermore, the evidence indicates that it is virtually impossible to detect with reasonable accuracy which is and which is not Chinese drywall.

### **13. The Plaintiff-Intervener Families will be Out of Their Homes for 4-6 Months During Remediation**

The evidence indicates that with regard to the representative homes, the remediation process will require the removal and demolition of most interior building components in the homes. Accordingly, the families will need to move out of their homes during the remediation. The contractors providing independent estimates to perform the remediation estimate that the process will take four (4) to six (6) months to complete. The families are entitled to alternate living expenses during the remediation process.

### **The costs of repairing Virginia CDW homes is on average \$86/square foot**

The cost per square foot to repair includes the following:

1. Demolition and disposal of all damaged and affected building components in the homes.
2. Replacement of all drywall.
3. Replacement of the entire HVAC assembly.
4. Replacement of all electrical wiring and devices such as receptacles and switches.
5. Replacement of items that are damaged during the removal of the drywall, i.e., trim and baseboards.
6. Replacement of items that are less expensive to replace than store, i.e., carpet.

However, the cost per square foot to repair does not include the replacement of the exterior shell of the house, including windows, exterior doors, structural members, exterior siding, roof trusses, the roof, concrete, and nails. The average cost to repair complies with RS Mean's data. RS Means is a publication which compiles data on a national basis for cost to repair and replace building components.

### Damages Awarded in Virginia CDW Homes

The table below shows cost and damage data for each of the seven homes involved in the initial MDL case. The Other Damage cost includes compensable damages such as personal property losses, post inspection cost, temporary living cost, and economic losses, as well as loss of use and enjoyment damages. The loss of use and enjoyment damage amount is \$100,000 for each home except Home No. 2, which was \$30,000. With the exception of Home No. 2, the remediation involves nearly a total gut and replace approach. Home No. 2 had only 8 sheets of Chinese drywall in a one room addition in the basement and consequently required only isolated remediation and impact. The purchase dates for these homes ranged from July 14, 2006 to June 4, 2009.

No.	Location	Type	Size (SF)	Purchase Price	Remediation Cost	Other Damage	TOTAL
1	Williamsburg, VA	Single Family	2957	\$376,719	\$257,730	\$ 83,969	\$441,699
2	Williamsburg, VA	Single Family	4800	\$475,000	\$ 14,957	\$ 74,720	\$ 89,677
3	Williamsburg, VA	Single Family	3245	\$369,500	\$249,140	\$158,766	\$407,906
4	Williamsburg, VA	Single Family	3079	\$383,200	\$232,491	\$249,122	\$481,613
5	Newport News, VA	Townhouse	2115	\$197,110	\$194,720	\$157,020	\$351,740
6	Newport News, VA	Townhouse	2367	\$267,500	\$198,142	\$157,466	\$355,608
7	Virginia Beach, VA	Duplex	3055	\$795,000	\$312,755	\$168,131	\$480,886
				<b>\$2,864,029</b>	<b>\$1,459,935</b>	<b>\$1,149,194</b>	<b>\$2,609,129</b>

Below is summary of damage for all of the homes quantifying the types of damage awarded:

No. of Homes	7	4 single family, 2 townhomes, 1 duplex
Size (SF)	21,618 SF	
Purchase Date	7/2006-6/2009	
Purchase Price	\$ 2,864,029	
Appraised Value	\$ 2,752,500	2010 Appraisal
Diminution Value	\$ 622,750	Amount home is devalued after remediation is complete
Remediation Cost	\$ 1,459,935	
Personal Property	\$ 34,109	
Post Inspection Cost	\$ 105,191	
Economic Loss	\$ 212,535	Includes financing cost and burden
Alternate Living Cost	\$ 167,359	
Loss of use	\$ 630,000	
Grand Total	\$ 2,609,129	

An average cost per SF analysis using the 6 homes with full remediation is shown below:

Size (SF)	16,818 SF	\$/SF	% of Purchase
Purchase Price	\$ 2,389,029	\$ 142.05	
Remediation Cost	\$ 1,444,978	\$ 85.92	60%
Personal Property	\$ 28,545	\$ 1.70	1%
Post Inspection Cost	\$ 91,992	\$ 5.47	4%
Economic Loss	\$ 196,390	\$ 11.68	8%
Alternate Living Cost	\$ 157,547	\$ 9.37	7%
Loss of use	\$ 600,000	\$ 35.68	25%
Grand Total	\$ 2,519,452	\$ 149.81	105%

The analysis above shows that the remediation (\$85.92) and inspection cost (\$5.47) totals \$91.39/SF which is 64% of the recent purchase price. The grand total of all damages awarded is \$140.82/SF which is greater than the recent purchase price by 5%.

**Multidistrict Litigation – Hernandez vs. Knauf Gips KG, et. al.**

A federal judge has awarded more than \$164,000 to a family whose home was ruined by Chinese-made drywall. The April 27, 2010 ruling by U.S. District Judge Eldon Fallon comes less than a month after he awarded \$2.6 million to seven Virginia families. Fallon's earlier decision was the first for a batch of federal lawsuits over drywall-tainted homes. Fallon presided over a trial without a jury for the case brought by the Hernandez family of Mandeville, Louisiana. He ruled all drywall must be removed and the home needs to be gutted. He also agreed that electrical wiring, plumbing components, the heating and air conditioning system as well as appliances must be replaced. Manufacturer Knauf Plasterboard Tianjin Co. argued the family's home can be repaired for less than \$59,000

In Hernandez, the defendant participated and defended the case from start to finish. This is an interesting point to note, in that the previous case did not involve a participating defendant from the manufacturer. In fact, the defendant, Knauf agreed that there is no dispute that the following must be completely removed and replaced:

- All drywall whether Chinese or domestic,
- all insulation,
- flexible duct work,
- switches and receptacles,
- molding
- countertops

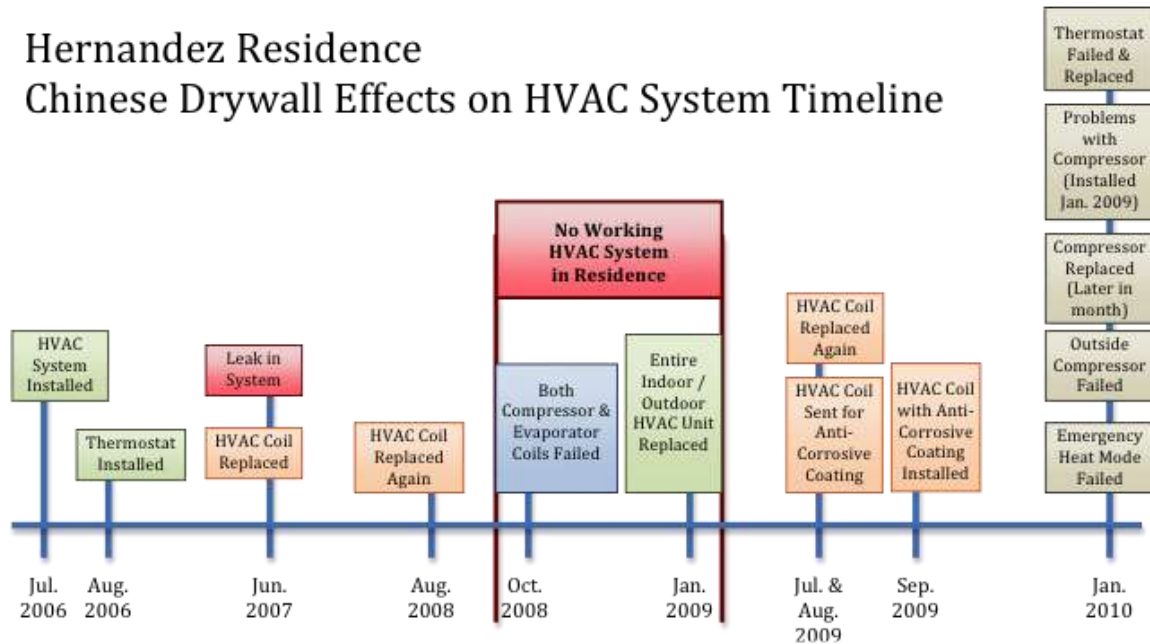
However, the parties were unable to reach an agreement as to the proper remediation for the electrical, plumbing, and HVAC systems, and other items which are involved in the removal of drywall or contain silver and copper components. Thus the Court ordered the following in an attempt to address these matters.

- 1 The entire electrical system must be removed & replaced including high voltage and low voltage wires. This conclusion is based on the following evidence:
  - a) visual evidence
  - b) scientific testing & standards,
  - c) insulation on wires does not prevent corrosion
  - d) the corroded wires cannot be sufficiently "cleaned" of the corrosion
  - e) the corroded wires violate applicable building codes
- 2 All lighting fixtures that contain copper wiring or silver contacts must be removed and replaced.
- 3 All copper & silver plumbing components must be removed & replaced.

- 4 The entire HVAC system must be removed & replaced. The HVAC coil has been replaced six times and four temporary window units damaged in less than four years. (See progression of HVAC damage in the chart below).

## Hernandez Residence

### Chinese Drywall Effects on HVAC System Timeline



- 5 Appliances & consumer electronics damaged by Chinese drywall must be removed & replaced. Recorded damage and failure of appliances included the following items within the home:
- Refrigerator failed in less than one year after moving in.
  - Microwave malfunctioned after one year.
  - Food-frying appliance in the kitchen had blue sparks shooting out of the outlet.
  - VCR
  - 2 TVs
  - Toaster
  - Smoke detector
- 6 Everything in front of the drywall must be removed and replaced based on the following rationale:
- As a practical matter, everything in front of the drywall in the Hernandez home, such as cabinets, trim, fixtures and bathroom porcelain, needs to be removed prior to removal of the drywall.
  - Removal of these items can damage even those items deemed worth salvaging. It is not worth the cost to attempt to remove, store, and replace

these items, when it is likely they will be damaged and when one considers the relatively low cost of these items. Knauf's own proposed remediation protocol calls for the replacement of items damaged during remediation. Accordingly, these items must also be replaced.

- 7 Flooring may need to be replaced based on the following:
  - a) The wood floors in the Hernandez home may need to be removed and replaced if they are damaged during the remediation process. This is consistent with Knauf's proposed remediation protocol. However, the Court finds that with the proper care, the wood floors can be sufficiently protected.
  - b) Both parties' remediation protocols call for the removal and replacement of carpet, thus the Court requires all carpet in the Plaintiffs' home to be removed and replaced.
  - c) Tile floors can be sufficiently protected during remediation and thus do not require removal and replacement.
  
- 8 Critical non-electronic personal property damaged by the Chinese drywall must be replaced such as the following items:
  - a) Clothing
  - b) Rugs
  - c) Mattresses
  - d) Door knobs
  - e) Strike plates
  - f) Silver picture frame
  
- 9 After remediation, comprehensive cleaning of the home is necessary based on the following:
  - a) Drywall remediation will create substantial dust no matter how controlled the removal process.
  - b) Complete removal of the dust requires regular vacuuming, followed by vacuuming with a HEPA filter, and finally a pressure washing or wipe-down of all surfaces with a damp cloth.
  - c) After drywall removal and cleaning, Plaintiffs' home should be aired-out for up to 30 days to allow all odors and gases to be eliminated while the studs of the home are exposed.
  - d) Knauf's proposed cleaning protocol is largely the same as the Plaintiffs'.
  
- 10 An independent, environmental consultant must certify the remediation is complete & successful.



Regarding the cost of remediation, the court concluded the following costs by category:

1. Demolition	\$10,000.00
2. Appliances	\$4,560.05
3. Cabinetry	\$10,960.48
4. Drywall	\$11,000.00
5. Insulation	\$2,383.92
6. Painting	\$10,000.00
7. Electrical	\$15,192.00
8. Doors	\$2,385.00
9. Cleaning	\$5,218.09
10. Carpet	\$1,000.00
11. HVAC	\$10,452.74
12. Plumbing	\$12,373.80
13. Mirrors	\$273.30
14. Countertops	\$1,137.81
15. Fireplace	\$120.00
16. Trim work	\$4,000.00
17. Hardware	\$1,417.11
18. Storage	\$300
19. Temporary costs during repairs	\$775
20. Environmental inspection, approval, and certification	\$10,000.00
Subtotal	\$113,549.30
Overhead (10%)	\$11,354.93
Profit (10%)	\$11,354.93
Subtotal Remediation Cost	\$136,259.16
Permits (0.5%)	\$681.30
Total Remediation Cost	\$136,940.46

In addition to the cost of remediation, the court considered the following additional costs:

Personal property	\$5357.33
Recurring alternate living expenses	\$9507.24
Non-recurring alternate living expenses	\$9562.00
Pretrial repair costs	\$2,682.29
Post trial repair costs	\$1,500.00

Property tax reduction	(\$1,499.68)
Total additional costs	\$27,109.18

In conclusion, the court awarded damages in the amount of \$164,049.64, plus reasonable attorneys' fees, the costs of these proceedings, and legal interest from judicial demand until paid.

### Chinese manufactured Drywall Products Liability Litigation

In addition to individual litigation, the US District Court, Eastern District of Louisiana has established a settlement program to allow for registration of any and all claims. The registration period opened on May 27, 2013 and closed on October 25, 2013.

#### Claim Registration

The Settlement Administrator engaged in several outreach efforts during the course of the registration period to alert potential claimants to the necessity of registering in order to file claims, to notify claimants of deadline extensions, and to alert claimants with incomplete registration forms that they needed to complete the registration process prior to the registration deadline. A total of 9,946 claimants registered a total of 20,651 properties. Collectively, these claimants indicated that they would file a total of 26,414 claims. This number is based solely on non-binding information solicited as part of the registration process, and does not reflect the total number of claims actually filed.

There are more registered properties than registered claimants because many claimants registered multiple properties. Table 1 shows the number of registered properties and claimants.

<b>Table 1. Chinese Drywall Settlement Program Registered Affected Properties (As of 8/11/14)</b>				
<b>Row</b>	<b>Category</b>	<b>Registered Claimants</b>	<b>Registered Properties</b>	<b>Registered Claims</b>
1.	Represented	8,636 (200 Firms)	18,724	24,018
2.	Pro Se	1,310	1,927	2,396
3.	<b>Total</b>	<b>9,946</b>	<b>20,651</b>	<b>26,414</b>

#### Claims Submission

To date, there have been 22,389 claims submitted to the Chinese Drywall Settlement Program. Table 2 provides a detailed breakdown of the claims filing status by claim type.

<b>Table 2. Chinese Drywall Settlement Program Claim Summary Report (As of 8/11/14)</b>		
<b>Row</b>	<b>Claim Type</b>	<b>Submitted Claims</b>
1.	Bodily Injury	870
2.	Foreclosure or Short Sale	913
3.	Global, Banner, InEx Repair and Relocation Expenses	12,599
4.	Knauf Remediation	1,369
5.	Lost Rent, Use, or Sales	1,830
6.	Miscellaneous	3,996
7.	Pre-Remediation Alternative Living Expenses	755
8.	Tenant Loss	57
9.	<b>Total</b>	<b>22,389</b>

### Claims Review

To date, the Settlement Administrator has reviewed 18,851 claims and issued 20,070 Notices to Claimants. The Settlement Administrator has completed initial review of Knauf Remediation, Global, Banner and InEx Repair and Relocation Expenses, Pre-Remediation Alternative Living Expenses, Tenant Loss and Lost Rent, Use, and Sales claims. Table 3 summarizes the Settlement Administrator's claim review progress to date.

<b>Row</b>	<b>Claim Type</b>	<b>Submitted Claims</b>	<b>Reviewed Claims</b>	<b>Reviews Since 6/13/14 Status Report</b>	<b>Notices Issued</b>
1.	Bodily Injury	870	870	0	2,157
2.	Foreclosure or Short Sale	913	684	611	610
3.	Global, Banner, InEx Repair and Relocation Expenses	12,599	12,599	0	12,321
4.	Knauf Remediation	1,369	1,369	0	2,124
5.	Lost Rent, Use, or Sales	1,830	1,830	242	1,758
6.	Miscellaneous	3,996	687	0	47
7.	Pre-Remediation Alternative Living Expenses	755	755	1	1,053
8.	Tenant Loss	57	57	0	0
9.	<b>Total</b>	<b>22,389</b>	<b>18,851</b>	<b>854</b>	<b>20,070</b>

#### Notification of Claim Review Results

The Settlement Administrator is utilizing an online Notification system that allows claimants to view Notices related to their claims online and respond using online forms. Claimants with a new Notice receive an email communication notifying the claimant that a new Notice is available, along with a link to the Chinese Drywall Settlement Program Portal. The 12 notification email sent to law firms also contains a detailed list of the claimants for whom the Settlement Administrator posted a new Notice. Claimants and law firms can view and if necessary, respond to Notices online. All Notices issued by the Settlement Administrator will be stored in the Claimant's file and will be accessible at any time. Table 13 summarizes the Notices issued to date.

<b>Table 13. Settlement Administrator Notice Summary (As of 8/11/14)</b>						
<b>Row</b>	<b>Claim Type</b>	<b>Incompleteness Notices</b>	<b>Follow-Up Incompleteness Notices</b>	<b>Denial Notices</b>	<b>Eligibility Notices</b>	<b>Total Notices Issued</b>
1.	Bodily Injury	825	706	626	N/A	2,157
2.	Foreclosure or Short Sale	610	0	0	N/A	610
3.	Global, Banner, InEx Repair and Relocation	2,948	1,329	1,530	6,514	12,321
4.	Knauf Remediation	519	468	1,137	N/A	2,124
5.	Lost Rent, Use or Sales	1,104	399	255	N/A	1,758
6.	Miscellaneous	0	0	47	N/A	47
7.	Pre-Remediation Alternative Living Expenses	512	292	249	N/A	1,053
8.	<b>Total</b>	<b>6,518</b>	<b>3,194</b>	<b>3,844</b>	<b>6,514</b>	<b>20,070</b>

## **Module D The Impacts and Effects of Chinese Drywall**

### **EPA Test Results**

In the spring of 2009, the EPA published results of tests it conducted comparing Chinese-made drywall to American-made drywall. According to the agency, Chinese-manufactured drywall contained elevated levels of strontium sulfide, as well as several organic compounds associated with the production of acrylic paint that were not present in samples of U.S.-made drywall. Consumers from more than 10 States and the District of Columbia have reported concerns related to drywall imported from China that is in their houses. The Consumer Product Safety Commission (CPSC) is the lead federal agency for this issue. The U.S. Environmental Protection Agency (EPA) is working with CPSC and the Centers for Disease Control and Prevention-Agency for Toxic Substances and Disease Registry (CDC-ATSDR), in coordination with State and local authorities, to investigate this matter. To gather more information about Chinese drywall, CDCATSDR requested that EPA conduct an elemental analysis of Chinese drywall and compare it with drywall manufactured in the United States.

With CDC-ATSDR's concurrence, two wallboard samples from Florida houses known to have been manufactured in China were selected by the Florida Department of Health (FDOH) for analysis. Additionally, four samples of U.S.- manufactured drywall were purchased by EPA from local stores in Edison, New Jersey and included in the analysis. The results of the analysis are noted below. It is important to note that the analysis included a very small sample size, and the results of this testing may not be representative of all drywall products. The analysis was conducted to identify the elemental material contained in the drywall samples and is not itself intended to establish a definitive link between the drywall and the conditions being observed in houses.

### **EPA Results**

1. Sulfur was detected at 83 parts per million (ppm) and 119 ppm in the Chinese drywall samples. Sulfur was not detected in the four US-manufactured drywall samples.
2. Strontium was detected at 2,570 ppm and 2,670 ppm in the Chinese drywall samples. Strontium was detected in the US-manufactured drywall at 244 ppm to 1,130 ppm. Total acid soluble sulfides were not detected in any samples.
3. Iron concentrations of 1,390 ppm and 1,630 ppm were detected in the Chinese drywall samples and in the range of 841 ppm to 3,210 ppm for the US

manufactured drywall samples. Additional drywall samples will be tested to determine whether the iron is present as oxide, sulfide or sulfate.

EPA's analysis showed the presence of two organic compounds in the Chinese drywall that are associated with acrylic paints: propanoic acid, 2-methyl-, 2,2-dimethyl-1- (2-hydroxy-1-methylethyl) propyl ester at estimated concentrations of 58 ppm and 92 ppm, and propanoic acid, 2-methyl-, 3-hydroxy-2,4,4-trimethylpentyl ester at estimated concentrations of 50 ppm and 84 ppm. These compounds were not detected in the US-manufactured drywall.

EPA will continue to work with its federal and state partners to respond to this issue. EPA also is working with a multi-agency and state technical group to develop an indoor sampling protocol for use by CPSC and states to conduct indoor air testing in houses suspected of containing Chinese drywall. The group's goal is to complete the protocol by June 30, 2009. EPA expects that results from the indoor sampling will be evaluated by CDC-ATSDR for possible health implications.

## Impact on Building Systems

The coils below on the left unit appears to be dirty with debris and or a black ashy substance on the copper tubing. Coils with no damage on the right exhibit clean copper.



The pictures below show normal copper tubing (left) and corroded copper tubing (right)



### Damage to Electrical System

Chinese drywall corrodes electrical wiring. Check the electrical receptacles in your walls to see if the wires are blackened. Pull off the electrical plate and look inside.

The pictures below show some potential locations of electrical corrosion from Chinese drywall.



Corrosion can be a real electrical problem if not addressed.



### Damage to Refrigeration lines





### **Corrosion to Plumbing fixtures**

The plumbing fixtures below have been damaged from off gassing of Chinese drywall



### **Impact on Adjacent Materials in Building System**

These are all areas where the gassing smell can be absorbed.

1. Insulation
2. Appliances
3. Carpet and padding
4. Counter tops/cabinetry
5. Wood trim
6. Plumbing fixtures
7. Electricals fixtures/wiring/breaker systems
8. HVAC blower/coil unit, grilles, and duct work.

All of these areas have the potential for damage from gassing from the Chinese drywall products.

## **Impact on the Contents**

Jewelry: There have been reports of jewelry and silver tarnishing from the off gassing process. Furniture: There are reports of a sulfur smell so strong that it retains that smell in furniture as well as draperies. This has rendered some homes uninhabitable from these issues.

## **Off Gassing From Chinese Drywall**

Laboratory tests of samples for volatile chemicals have identified emissions of the sulfurous gases carbon disulfide, carbonyl sulfide, and hydrogen sulfide. These are the gasses that are being admitted from the Chinese Drywall. This gassing process appears to be enhanced with the rise of humidity.

According to Dr. Patricia Williams, a University of New Orleans toxicologist, there is no question - highly toxic compounds have been found in Chinese drywall and prolonged exposure to these compounds can cause serious problems. Strontium sulfide may be dangerous to developing children; it affects bone growth. Chronic exposure to these gases may affect the central nervous system (including visual and sensory changes), cardiovascular system, eyes, kidneys, liver and skin. Infants, children, the elderly and infirm (particularly those with heart and lung disease and diabetes) may have an increased vulnerability to these gases and the particulates that are released from the drywall. The particulates from Chinese drywall may invade and adhere to other building materials in the home's structure and personal objects within the home. Translation - cross-contamination is a real concern and should be factored into any remediation protocol.

## **Effect on Occupants**

Health risks (short and long-term) may remain an open question, but homeowners exposed to Chinese drywall have been reporting similar physical ailments and symptoms including acne, asthma attacks, bloody noses, congestion, coughing, dizziness, ear infections, eye irritation, fatigue, gastrointestinal problems, hair loss, headaches, hives, irritated eyes, joint and muscle pain, nausea, nosebleeds, phlegm, rashes, runny nose, shortness of breath, sneezing, sinus problems, sore throat, tightness of the chest, trouble breathing and urinary tract infections after being exposed to Chinese drywall.

Unfortunately, many of these are common symptoms which can be caused by a number of factors and to date, there is no scientific proof that Chinese drywall is the culprit. The

key is homeowners who did not have these symptoms or did not have the same severity prior to moving into contaminated home. Many see vast improvement after leaving their home - unfortunately, the symptoms reoccur when they return home. Certain people appear to be more prone to symptoms, including children, the elderly and those with compromised immune systems.

Officially, the U.S. Department of Health and Human Services, Agency for Toxic Substances and Disease Registry issued a Health Consultation entitled "POSSIBLE HEALTH IMPLICATIONS FROM EXPOSURE TO SULFUR GASES EMITTED FROM CHINESE-MANUFACTURED DRYWALL", on May 2, 2014.

The conclusions from this response to health risk questions related to Chinese Drywall are as follows:

People who were exposed to hydrogen sulfide and other sulfur compounds emitted by some drywall manufactured in China may have experienced adverse health effects or a reduced quality of life. The available data cannot be used to determine if people are still being exposed to levels that could cause health effects or adversely affect quality of life.

1. For the drywall samples manufactured in China between 2005 and 2006

- Based on the limited number of drywall samples tested, exposures to the estimated levels of hydrogen sulfide and sulfur dioxide from drywall samples manufactured in China between 2005 and 2006 were a public health concern. Short-term exposures might result in effects seen in both clinical and human epidemiologic studies. These include exacerbation of pre-existing respiratory conditions, eye and nasal irritation, headache, changes in vision, and weakness. Although less certain, longer term exposures may have increased the risk of damage to nasal tissue. Exposure to the estimated contaminant concentrations could diminish a resident's quality of life by triggering irritant (eye, nose, and throat) and physical (respiratory, gastrointestinal) symptoms, leading to negative mood states, and altering daily activities.
- The estimated contaminant concentrations increased with increasing temperature and humidity.
- Given the more than 90% reduction in hydrogen sulfide emission rates between the 2009 and 2010 laboratory testing, estimated contaminant concentrations from drywall samples were likely higher closer to their 2005-2006 date of manufacture.
- Estimated contaminant concentrations from the drywall samples tested are consistent with levels resulting in the severe metal corrosion observed in homes.

2. For the drywall samples manufactured in China in 2009

- Based on the limited number of drywall samples tested, long-term exposures to the estimated levels of hydrogen sulfide from drywall samples manufactured in China in 2009 may have posed a public health concern for sensitive people (e.g., those with asthma).

3. For the drywall samples manufactured in China in 2005, 2006 and 2009

- Current contaminant levels cannot be estimated with the data available for the drywall samples manufactured in China in 2005, 2006, and 2009. Therefore, the potential hazard, if any, from current exposures cannot be assessed based on the 2009-2010 laboratory data.

4. For the drywall samples manufactured in North America in 2009

- Based on the limited number of drywall samples tested, exposures to the estimated contaminant levels from drywall samples manufactured in North America in 2009 were below levels of public health concern. It should be noted that these samples were not identified by CPSC as problem drywall.

NOTE: Because of the small number of drywall samples tested, these conclusions do not represent the range of all possible sulfur compound concentrations and should not be generalized to all drywall manufactured during the period of concern.

**Recommendations**

1. ATSDR recommends that people with health symptoms or health effects they feel are associated with living in a home with problem drywall provide this ATSDR health consultation report to their health care provider.
2. ATSDR recommends that residents in homes with drywall that meet the CPSC problem drywall case definition follow the CPSC/U.S. Department of Housing and Urban Development (HUD) remediation guidance. This guidance is available at: <http://www.cpsc.gov/en/safety-education/safety-education-centers/drywall-information-center/>.

## **OSHA Guidelines-Effects on Workers**

The OSHA guidelines for acceptable levels of hydrogen sulfide in the workplace may provide useful guidance as the nation deals with the problem of hydrogen sulfide in homes built with Chinese drywall. OSHA reports that levels as low as 5 ppm can cause eye irritation that levels above 50 ppm can cause respiratory problems and that extreme levels in the 1000 – 2000 ppm range can cause breathing to stop completely. It is important to remember that these guidelines refer to hydrogen sulfate in the workplace and not in residences where there is the potential for more long term exposure.

## **Module E Chinese Drywall Protocols**

### **THRESHOLD INSPECTION PROGRAM (TIP) Established by US District Court – Eastern District of Louisiana in Pretrial Order No. 13A**

The following is a summary of the inspection protocol developed by the US District Court for the Multidistrict Litigation.

#### **E. Data To Be Obtained In The Threshold Inspection.**

##### **1. Identification of damage potentially caused by drywall.**

- a. Apparent odors — Observations and documentation by notations of any apparent odors.
  - i. Presence of sulfur-like odor in the premises, as documented by the Inspector at the inspection and/or by report of the premises' occupant(s) to the Inspector.
  - ii. Presence of any strong odor (e.g., air freshener) that could be serving to mask wallboard odor or act as another odor source should be noted on the TIP form.
- b. HVAC system(s) — by removal of service panel and visual inspection of the heat exchange coil in each Air Handler Unit. Note on the TIP form:
  - 1) Assess condition of copper U-bends of the coil,
  - 2) Assess condition of straight copper tubing around the coil,
  - 3) Assess condition of electrical system by removal of service panel and visual inspection of the electro-mechanical portion of the Air Handler Unit.
- c. Circuit breaker panels — by removal of service cover and visual inspection of circuit breaker panels.
- d. Appliances — by removal of cover or grating over compressor area of refrigerator(s) or other similar refrigerated appliances and visual inspection of the copper tubing on/around the compressor and the heat exchange coil.
- e. Plumbing fixtures — by visual inspection of all exposed plumbing connections (e.g., kitchen sinks, dishwasher connections, bathroom fixtures, hot water heater).
- f. Light fixtures — by visual inspections of chrome-finish or metallic light fixtures.
- g. Other fixtures and metallic hardware — by visual inspections of other fixtures and metallic hardware.
- h. Electrical Receptacles — by visual inspection of one switch per room around the home.
  - i. Exposed ground wires [Note: if ground conductors are insulated with only a stripped end, this should be documented and mapped on a floor plan.]
  - ii. Stripped ends of current-carrying conductors and the screws or terminals where they are connected.

## 2. Means of Drywall Identification.

### a. Agreement:

- By reference to documents that the parties can agree establish the identity of the manufacturer of Chinese manufactured drywall.
- If the identity of the drywall manufacturer(s) is not in dispute because the parties have agreed as provided in this paragraph, the inspection shall go forward but will be limited to physical inspection aimed at documenting the approximate amount of the subject drywall in the home and the apparent effects of the drywall in the premises as provided herein; and obtaining at least one sample from each distinctly identified piece of drywall in the home.

### b. Sampling:

- i. A total of thirty (30) randomly selected drywall sheets will be examined during this inspection.
- ii. Markings on drywall will be documented by notation on the TIP form and digital imaging of drywall installed on interior walls and/or ceilings, i.e., walls or ceilings that can be accessed using the optical scope methodology described herein and/or observed directly (e.g., attic examination).
- iii. Full sheets of drywall will be examined. It is not permitted to examine locations such as closets or other confined spaces where partial sheets are predominantly used.
- iv. In addition to the random sampling, two (2) wall sections that are located in the most inspected area of the home may also be sampled.

## 3. Determination of sampling locations.

### a. Selecting Walls and Ceilings to Be Sampled.

- Using the floor plan for the property, the inspector shall randomly inspect at least 7 (seven) interior walls that are greater than 8 feet in length and reasonably accessible so as to allow for the inspection of 28 different drywall sheets.
- For each hole that is made in the randomly selected walls, the inspector should examine four (4) drywall sheets, an upper and lower sheet for the cut wall and opposite wall.
- A minimum of two (2) drywall sheets from ceilings must also be inspected. The ceiling sheets should be selected randomly and based on ease of access.

- b. Based on observation, the inspector should identify at least two (2) sections of walls (a lower and upper section in a wall) that appear to be the most impacted. To the extent those sections have been previously identified by the random selection process above, they will be inspected accordingly. If they have not been selected, then 4" diameter samples/holes shall be taken of these sections with the objective of capturing product identification marks contained on the drywall sheets.

## 4. Drywall Inspection Procedures.

A borescope inspection should then be conducted up and down the wall cavity for the randomly selected walls and drywall sheets. Photos of the board end tape and any markings, (including video of the markings, for completeness if necessary), should be preserved, if and when a drywall marking is located.

Once the sample has been taken, it is to be stored in a double zip lock bag and properly labeled with the locator mark on the inner bag, and all other identifiers (i.e. address, date, sample #) on the outer bag.

- a. Where to drill the 4" holes on the randomly selected interior walls — Starting at the left side of the selected wall, measure approximately forty (40") inches from the left side and sixty (60") inches from the floor to allow for access to the upper and lower sheets on both the cut and opposite walls. Use discretion for locating the 4" diameter inspection/sample hole in a less obtrusive location when possible. Mark this location with sticker.
- b. If no identifiable marks are observed — go to the next selected wall/ceiling.
- c. If an identifiable mark is found, and it is the 1st distinct marking — cut three 4" samples, 2" apart capturing as much of the lettering/markings on the drywall as possible. Label and mark the sample by address, date, and sample #.
- d. After sampling is concluded — clean up debris, and plug the holes made during the inspection with nylon or other plastic caps using clear silicone bathroom / kitchen caulk. Photograph exemplary repaired sites.
- e. Ceilings locations on upper most floor with attic access — Enter the attic space and remove insulation in order to uncover drywall markings. Inspect all sheets that are easily accessible. A minimum of 2 ceiling sheets must be inspected to provide a total of 30 sheets for inspection. Document by notation and photograph. If the ceiling drywall sheets are not accessible through the attic, then additional interior wall holes should be drilled so that at least thirty (30) full drywall sheets can be inspected.

##### **5. Details on the collection of 4" drywall samples.**

- a. Inspectors should review their notes and photos, and identify drywall sheets with distinct manufacturers, brands, or markings.

Inspectors should collect three 4" discs, 2" apart, gathering as much of the character markings as possible from each sheet identifying a distinct manufacturer, brand, or marking, as well as sheets that are unmarked and / or unidentifiable.

The inspector need only collect a single sample from any sheet found to identify a specific, distinct manufacturer, brand, or marking, from each household, unless the marking or brand is written or printed in some different way from other sheets identifying such manufacturer. The fact that two markings share a similar word or ink shall not imply that they are from the same manufacturer.

The locations of the samples should be marked on the floor plan.

- b. Using a permanent marker, write the sample ID on the outside of the plastic bag. Ensure that the marker will not smudge or fade if exposed to moisture.

- c. The sample ID is composed of the address ID, sample date, and sample location following the pattern AAAAA-MMDDYYYYLL.
- d. Photograph the sample inside the container with the sample ID visible. Record the photo number on the Phase II Field Form.
- e. At the end of the inspection, gather all of the samples for shipment. Count the number of samples that the field form indicates should have been collected and ensure that this number matches the samples to be shipped.
- f. Securely pack the samples in an appropriate shipping container. Complete one chain of custody form for each address. Ship the samples to a location determined and maintained by Crawford & Company using a copy of the Chain of Custody (COC) form.

## **F. Record Keeping.**

1. Each inspection team will be provided with a batch of addresses to inspect. Each batch will be assigned a batch ID. This ID will be marked on the field forms and will provide a means of tracking task and data completeness throughout the process. On the blank field form, fill in the appropriate information to document the inspection process and any required samples. Ensure that the form is filled out completely, leaving no sections blank.
2. At the end of each day of inspection, inspection teams will bulk-upload the photos, scanned copies of the field forms, and Chains of Custody to the data repository.

## **G. Previously Conducted Inspections.**

If a Plaintiff / Defendant has hired an Inspector who has carried out an inspection of a particular premises prior to the date of this Order that the Plaintiff / Defendant believes meets the standards set forth, such Plaintiff's / Defendant's Inspector may complete the Threshold Inspection Program form, attach the relevant documentation of the previously conducted inspection, and submit the completed Threshold Inspection Program form to Liaison Counsel.

Liaison Counsel will forward the forms and supporting documentation to the Plaintiffs Steering Committee ("PSC") and Defense Steering Committee ("DSC"), which will review the Threshold Inspection Program form to determine if the previously conducted inspection and Threshold Inspection Program form is adequate for Pretrial Order #13 purposes. If not, a Threshold Inspection pursuant to Pretrial Order #13 will be required.

## **H. Certified Laboratory.**

PSC and DSC will agree on the selection of one or more Certified Laboratories to store all samples taken during the Threshold Inspection Program. Inspectors will provide all samples, with chain of custody forms, to one of the Certified Laboratories.



Any destructive sampling of drywall must be accomplished in a manner that leaves a sufficient amount of the drywall sample for further testing, unless the PSC and DSC agree with the suggested sampling and results are provided to all Parties. The laboratory analytical methods to be used for the samples will be determined by the Plaintiffs Steering Committee and Defense Steering Committee in cooperation with the Certified Laboratories, and order of the Court.

### **The Florida Professional Coalition for Chinese (reactive) Drywall Protocol**

The objective of this protocol is to inform repair contractors, occupants, and workers of the requirements for the safe removal and disposal of Chinese Drywall, the associated odors and damaged materials while protecting the health and well being of workers and occupants.

#### **Inspection and Evaluation**

The Goal of repair is to remove not only the reactive drywall but also the building materials damaged by its presence and the odor it generates, with the results being as though the reactive drywall had never been present.

Laboratory tests can characterize the drywall after samples are removed.

The use of a series of visual indicators along with the presence of the characteristic odor is currently the most predictive method to conclude reactive drywall is present.

The initial evaluation to determine if a home contains reactive (Chinese drywall) can be done by the home owner without the need for chemical testing, if they can be objective in their observations. The state of Florida Department of Health published a self assessment guide. [www.doh.state.fl.us](http://www.doh.state.fl.us)

#### **Building a team to fix the problem**

The following list are the team members that are recommended in this protocol.

1. A certified indoor Environmentalist
2. A licensed mechanical engineer
3. A medical doctor to evaluate the occupants
4. A licensed general contractor

The repair process is not completed until the homeowners are back in their home.

#### **How to Know if Your GC is Prepared to Deal with Chinese Drywall**

Make sure the GC has the following:

1. Safety plan for workers and subcontractors with a personal protective equipment program, basic worker safety, a lock out-tag out program and a confined space plan.
2. System for logging who is on the project while the owner's possessions are on site.
3. System for controlling access to the owner's possessions while they are in storage.
4. Appropriate temporary air conditioning, dehumidification and air filtration equipment to maintain good working conditions.

### **Respiratory Safety and Health**

OSHA 29 CFR 1910.134 regulates the requirements for respiratory safety and the use of respirators. The contractor should be familiar with these requirements and should provide the appropriate respiratory program. This includes knowing what contaminants workers will be exposed to.

Every worker should be wearing a half or full face piece with an organic vapor/acid gas filter as well as a HEPA filter.

### **Micro Cleaning Personal Items**

Personal items that have been exposed to Chinese drywall need to be removed from the home prior to the home being remediated. Items that are porous such as fabrics, linens, clothing, leather, and upholstered furniture should be clean by either standard washing or by dry cleaning or micro clean prior to being brought into storage. This includes a manual wipe down or HEPA type vacuum.

### **Creation of Three Work Areas**

1. One zone is for micro cleaning where the items will not be re-contaminated.
2. The second zone is for Worker Movement in and out of this zone should be minimized
3. And the third zone is Post micro cleaning and Tagging for storage.

### **Protection of Remaining Interior Finishes**

1. Protect all flooring to remain, tile, marble, and possibly wood.
2. Tubs can be left in place if covered and protected.

3. Shower floors and walls that are to remain should be protected to avoid damages to the surface.
4. Stair railings and decorative work that are not in contact with the drywall should be protected from damage.

Carpet is absorbent to odors; carpet should be removed and if appropriate, taken to a warehouse to be aired and stored. In most cases carpet should be replaced once the economic cost of the carpet is weighed against the cost of protecting it or removing, airing and reinstalling it.

### **Remove and Dispose of the Following Material**

1. Electrical outlets & switches
2. Electrical panels
3. Electrical power wire
4. High hat internal lighting components
5. Alarm system panel
6. Alarm system wiring
7. Pool/spa system panel
8. Pool/spa system wiring
9. Intercom device wiring
10. Security alarm cameras
11. Central vacuum wiring
12. Internal audio speaker wire
13. Cable/wiring jacks
14. Telephone wiring/jacks/cordless device
15. Exhaust fans
16. Air handler units (AHU)
17. Fiber glass duct/flexible metal duct

## 18. Wall and ceiling insulation

### **Remove the following items and evaluate whether they can be re-used**

1. Plumbing fixtures
2. Light fixtures
3. Appliances
4. Countertops
5. Cabinets
6. Mirrors and medicine cabinets
7. Kitchen exhaust hood
8. Metal duct externally insulated
9. AC condenser unit
10. Water heater
11. Garage opener
12. Vapor barriers and radiant type barriers
13. Television/computers and their components

### **Removal and Inspect Procedure**

1. Identify any components or appliances that are to be saved
2. Remove and discard all carpet, padding & tack strip
3. Protect flooring and any other items that are to remain in place, such as stair railing.
4. Turn off water and electrical and make provisions for temporary power and water to be utilized during demolition and re-construction.
5. Remove all appliances if they haven't already been removed, including water, heaters, dishwashers, and other built-ins. (If any components are to be saved, follow cleaning and storage procedures.)
6. Evacuate refrigerant lines, remove AHU and seal off all copper lines remaining.
7. Every electrical device should be inspected. Document conditions.
8. Mechanical, electrical and plumbing fixture should be removed. (If any components are to be saved, follow cleaning and storage procedures. Document conditions.)

9. Remove all air conditioning supply and return grilles, thermostats and controls.
10. Remove all doors and door frames. (If any components are to be saved follow cleaning and storage procedures.)
11. Remove all wood trim, baseboards, casing crown molding, mirrors and medicine cabinets.
12. Drywall should be removed under observation of the Environmental Consultant, allowing sampling team to remove samples and / or document which drywall boards are found to be Chinese (reactive) drywall as they are removed.
13. Remove all drywall except behind tile if cementitious backer board was installed. Use HEPA-filtered air filtration devices (AFD's) to minimize airborne particulate and its settling.
14. Remove all ceiling and wall fibrous batt insulation.
15. Using a Shop-Vac with high efficiency filters, gross vacuum spaces as they are completed with drywall removal, not less than once daily. Once all materials are removed, vacuum spaces thoroughly, including all piping, wiring, electrical boxes, and horizontal surfaces with the Shop-Vac.
16. At this point, the Environmental Consultant should collect additional samples from the building materials of the home that remains.
17. Inspect all structural plates and straps to determine if any replacement is necessary. Document Conditions.
18. Demo all electrical panels and components.
19. Demo appropriate HVAC components. Document conditions.
20. All copper pipes should be exposed if possible for inspections.
21. Remove all copper piping including a/c line. Document conditions.
22. Remove all drywall screws from framing, furring and trusses.
23. Remove all fiberglass duct work, possibly all a/c ducts.
24. All affected electrical wiring should be removed. Document conditions.
25. Remove all low voltage wiring. Document conditions.
26. Perform Final Deconstruction Cleaning.
27. Replace or repair all framing damaged by drywall removal.
28. Keep all de-construction zones clean daily and at all times.
29. Continue Airing Out and Humidity Control procedure until completed.
30. Perform Micro-Cleaning.
31. Cleaning Evaluation by the assessment team/Owner/Owner's Representative/CIE/IH.
32. A full video documentation of the residence should be done prior to any reconstruction.
33. After successful inspection by the Environmental Consultant, reconstruction of the residence may begin.

## Disposal of Debris

The Florida Department of Environmental Protection has issued Memorandum SWM-19.17 which is intended to give guidance on the disposal of Chinese (reactive) drywall, but is not intended to be construed as a rule or law. The Memorandum indicates that Chinese drywall is not considered hazardous waste and its disposal is allowed at C&D debris disposal facilities. However, since it is known that the calcium sulfate contained in gypsum board (drywall) creates hydrogen sulfide gas collection and control, the Dept. recommends that C&D sites as well as Class III landfills, develop plans to manage the disposal of large quantities of Chinese or other imported drywall as well as domestic made drywall in one of two ways.

1. Segregate or refuse to accept dedicated loads or large quantities of drywall and instead redirect them to class I landfills.
2. Accept the dedicated loads or large quantities of drywall, but apply at least six inches initial cover soil over the drywall preferably the same day, but at least weekly.

# **Module F Guidelines for Chinese Drywall** **Inspection and Removal**

## **Chinese Drywall Inspection Guidance**

### **SUMMARY OF IDENTIFICATION GUIDANCE FOR HOMES WITH CORROSION FROM PROBLEM DRYWALL AS OF MARCH 18, 2011**

In its continuing effort to provide accurate and helpful information, the Federal Interagency Task Force<sup>1</sup> believes that it is appropriate to update Revision 1 to the Interim Guidance—Identification of Homes with Corrosion from Problem Drywall, August 27, 2010,<sup>2</sup> to reflect additional information uncovered by the Task Force concerning the installation dates of problem drywall imported from China. Specifically, the CPSC has found a number of homes where problem drywall previously imported from China was not installed in homes until calendar year 2009. Previously, the CPSC believed that all such problem drywall installations were completed by the end of calendar year 2008. In this updated Identification Guidance for Homes with Corrosion from Problem Drywall as of March 18, 2011, the years of installation are adjusted accordingly, to include calendar year 2009.

There are no other substantive changes in this updated Identification Guidance for Homes with Corrosion from Problem Drywall as of March 18, 2011.

#### **Identification Guidance for Homes with Corrosion from Problem Drywall as of March 18, 2011 by the U.S. Consumer Product Safety Commission and the U.S. Department of Housing and Urban Development**

#### **Executive Summary**

The identification guidance was first revised on August 27, 2010, to effect a change in the understanding of the usefulness of strontium as a marker to confirm the presence of problem drywall. The August 2010 revision relied upon the draft report prepared by the CPSC's contractor, Environmental Health and Engineering (EH&E), on Identification of Problematic Drywall: Source Markers and Detection Methods, May 28, 2010, available at [www.DrywallResponse.gov](http://www.DrywallResponse.gov). The identification guidance is being updated further to reflect additional information uncovered by the Task Force concerning the installation dates of problem drywall imported from China. Specifically, the CPSC has found a number of homes where problem drywall from China was installed in homes during 2009.<sup>4</sup> Previously, the CPSC believed that all such problem drywall installations were completed by the end of calendar year 2008. In this updated Identification Guidance for Homes with Corrosion from Problem Drywall as of March 18, 2011, the years of installation are adjusted accordingly, to include calendar year 2009. This guidance

continues to represent what the Federal Interagency Task Force on Problem Drywall believes is the best approach based upon the information available today. This identification guidance is based primarily on the presence of metal corrosion in homes, as well as other indicators of problem drywall. This version supersedes prior versions of this Guidance. Additional work will continue to validate these methods, and the identification guidance will be modified as necessary.

## **Introduction**

This updated identification guidance represents what the Federal Interagency Task Force on Problem Drywall believes is the best approach based upon the information available today. We recognize that important additional guidance is still needed to clarify qualifications for inspectors and test laboratories and to describe methods for making the measurements in the criteria defined in this report. This identification guidance is being released in recognition of the immediate need for homeowners to have this information. Consumers should exercise caution in contracting for testing and should be diligent in confirming the references, qualifications, and background of individuals and firms that offer such testing. Scientific investigations have moved as quickly as possible to understand the complex problems presented by Chinese drywall. The scientific work completed by the Federal Interagency Task Force, to date, has been essential to building the foundation for decision-making by homeowners and local, state, and federal authorities. The investigation continues on several fronts to expand our understanding of this issue—but the Task Force believes that current information is sufficient to revise the guidance on how to identify homes with problems associated with this drywall.

Findings have shown a strong association between the presence of problem drywall and metal corrosion in homes. The results of investigations reported by the Federal Interagency Task Force provide criteria and indicators for identifying those homes. The Task Force updated the identification guidance based upon these findings.

This updated identification guidance is based primarily on the presence of metal corrosion in homes, as well as other indicators of problem drywall. It is possible to misclassify homes because of other possible sources of metal corrosion, such as volatile sulfur compounds from sewer gas, well water, and outdoor contaminants that may enter the home independent of the presence of problem drywall in the home. Homes may also be misclassified as having no drywall problem due to the absence of characteristics found to be typical in the limited testing to date. Given these limitations, additional work will continue to validate these methods, and the identification guidance will be modified as necessary.



## Identification Method

The identification process will require two steps: (1) an initial or threshold inspection to find visual signs of metal corrosion and evidence of drywall installation in the relevant time period, and (2) the identification of corroborating evidence or characteristics.

### Step 1: Threshold Inspection

A visual inspection will seek to identify blackening of copper electrical wiring and/or air conditioning evaporator coils (or documentation of replacement of evaporator coils due to blackened corrosion causing failure), and the installation of new drywall (for new construction or renovations) between 2001 and 2009. Meeting both criteria for this step is a prerequisite to further consideration.

### Rationale

A visual observation of corroded air conditioning evaporator coils and/or electrical wiring by trained inspectors is believed to be a prerequisite for consideration of a home as having problem drywall. The Florida Department of Health has long included such corrosion as part of its definition of problem drywall homes. It is appropriate to limit the dates of installation to the relevant time period because this corresponds to the majority of complaints received by the U.S. Consumer Product Safety Commission (CPSC). In addition, older homes with earlier dates of installation could exhibit corrosion due to different sources acting over longer periods of time.

A CPSC contractor completed a detailed study of 51 homes in Alabama, Florida, Louisiana, Mississippi, and Virginia. The report was issued on November 23, 2009, and is available on [www.drywallresponse.gov](http://www.drywallresponse.gov). This investigation included inspections of each home for the presence and extent of corrosion. Copper and silver metal test strips, called "coupons," were placed in each home for two weeks to test the corrosive environment. The copper and silver coupons showed significantly higher rates of corrosion in homes where complaints had been registered than in the control homes. The dominant types of corrosion on the coupons were copper sulfide and silver sulfide, respectively, as determined by additional laboratory tests. Copper sulfide and silver sulfide appear as a black coating on copper or silver metal. Visual inspection and evaluation of electrical (ground) wire corrosion also revealed statistically significant greater corrosion in complaint homes compared to the control homes.

### Step 2: Corroborating Evidence

Because it is possible that corrosion of metal in homes can occur for other reasons, it is important to obtain additional corroborating evidence of problem drywall. Homes with the characteristic metal corrosion problems must also have at least two of these

corroborating conditions if the new drywall was installed between 2005 and 2009. For installations between 2001 and 2004, at least four of the following conditions must be met:

- (a) Elemental sulfur levels in samples of drywall core found in the home exceeding 10 ppm;
- (b) Corrosive conditions in the home, demonstrated by the formation of copper sulfide on copper coupons (test strips of metal) placed in the home for a period of two weeks to 30 days or confirmation of the presence of sulfur in the blackening of the grounding wires and/or air conditioning coils;
- (c) Confirmed markings of Chinese origin for drywall in the home;
- (d) Elevated levels of hydrogen sulfide, carbonyl sulfide, and/or carbon disulfide emitted from samples of drywall from the home when placed in test chambers using ASTM Standard Test Method D5504-08 or similar chamber or headspace testing; and/or
- (e) Corrosion of copper metal to form copper sulfide when copper is placed in test chambers with drywall samples taken from the home.

Collecting this corroborating evidence, in some cases, will require professional assessors and/or testing by analytical laboratories.

### **Rationale**

The Federal Interagency Task Force's study of the elemental and chemical composition of drywall samples shows higher concentrations of elemental sulfur and strontium in certain Chinese drywall than in non-Chinese drywall. Although, the 51-home study (41 homes with reported problems and 10 control homes) also found a correlation between elevated strontium levels and problem homes, additional testing conducted on a wide range of drywall samples found that the use of strontium as a marker resulted in false-positives where some non-problem drywall samples (based on chamber testing) were found to contain elevated strontium levels. The Task Force does not believe strontium has a causative role, and in light of the possibility for false-positives, we no longer consider elevated strontium levels to be valid corroborating evidence for problem drywall. However, in many cases, screening for strontium can be an effective tool in identifying what boards may warrant additional testing for elemental sulfur. The additional testing in the contractor's draft report<sup>19</sup> found that elemental sulfur (also known as orthorhombic sulfur) was highly correlated with problem drywall. Thus, the presence of elevated levels of elemental sulfur is believed to be corroborating evidence for homes with problem drywall.

The 51-home study and the preliminary corrosion reports also found that the type of corrosion present on copper coupons, copper electrical wire, and air conditioning evaporator coils was copper sulfide. Thus, the confirmation of copper sulfide or sulfur in the corrosion of the copper (and similarly silver sulfide or sulfur in the corrosion on silver coupons) is believed to be a corroborating marker.

Chinese drywall installed in the identified period has been associated with the types of corrosion problems reported. This does not imply that all Chinese drywall, or that only Chinese drywall, is associated with these problems, but that among homes with the characteristic corrosion, Chinese drywall is a corroborating marker. It is not absolutely necessary for the markings to be found because, in some cases, Chinese drywall does not have markings that identify the nation of origin of the drywall.

Additionally, the EH&E report on source markers (May 28, 2010), together with the Lawrence Berkeley National Laboratory Chamber Study Report (October 2010), indicate that higher emission factors for reactive sulfur gases, including hydrogen sulfide, show a connection between certain Chinese drywall and corrosion in homes. In addition, the patterns of reactive sulfur compounds emitted from drywall samples show a clear distinction between certain Chinese drywall samples manufactured in 2005/2006, and other Chinese and non-Chinese drywall samples. Also, the 51-home study reported an association between hydrogen sulfide levels in homes and corrosion in those homes. Thus, it is believed that one of the possible corroborating tests that could be considered is emissions testing from suspect drywall from homes. Another similar corroborative test could be determining whether corrosion of copper metal to form copper sulfide occurs when copper is placed in test chambers at elevated humidity with drywall from the home. Chamber tests may be costly and time consuming options.

### **Continuing Development of this Guidance**

We will incorporate future findings, as appropriate, to improve upon this guidance. More information on problem drywall is available at the federal Drywall Information Center website, [www.drywallresponse.gov](http://www.drywallresponse.gov).

# Chinese Drywall Removal Guidance

## Remediation Guidance

for Homes with Corrosion from Problem Drywall as of September 15, 2011

by the U.S. Consumer Product Safety Commission

and the U.S. Department of Housing and Urban Development

### Introduction

This Remediation Guidance summarizes what the U.S. Consumer Product Safety Commission (CPSC) and the U.S. Department of Housing and Urban Development (HUD) believe is an effective approach to address potential health and safety issues for the remediation of houses affected by problem drywall, given the information now available. Initial studies found a strong association between the presence of problem drywall and corrosion of metal in homes. Based upon those findings, the CPSC and HUD have developed this Guidance, which focuses on the replacement of problem drywall and building components for which drywall-induced corrosion might cause a health or safety problem. This version supersedes prior versions of the Guidance.

The CPSC and HUD recognize that many homeowners want to begin the process of repairing their homes. This revised Guidance is designed to be a conservative, commonsense approach to assist homeowners in making some of the challenging decisions they face remediating their homes. Should additional scientific information become available, which suggests that less extensive or less costly remediation methods would work, the CPSC and HUD will consider the evidence, and we will update our protocol, as appropriate.

### Remediation Guidance

This Remediation Guidance for homes with problem drywall calls for the replacement of all:

1. possible problem drywall;
2. smoke alarms and carbon monoxide alarms;
3. electrical distribution components (including receptacles, switches, and circuit breakers, but not necessarily wiring); and
4. fusible-type fire sprinkler heads.

All testing and remediation work should be conducted in compliance with applicable building codes, occupational safety and health standards, and environmental regulations. Gas service piping should be inspected and pressure-tested to ensure that the materials comply with the relevant building code(s), in accordance with the International Fuel Gas Code and National Fire Protection Association (NFPA) Standard

## 54, National Fuel Gas Code.

### Discussion

This Remediation Guidance addresses the emission of corrosive sulfur gases by problem drywall and the safety systems in the homes possibly affected by a corrosive environment by: (1) eliminating the source of the corrosion—the problem drywall, and (2) replacing certain building components for safety systems for which drywall-induced corrosion may affect performance, such as smoke and carbon monoxide alarms, electrical components, and fusible-type fire sprinkler heads, in addition to inspecting and testing gas service piping and glass bulb fire sprinkler heads.

As a threshold matter, before remediation, care should be taken to determine whether the home contains problem drywall. CPSC staff and HUD staff issued guidance<sup>4</sup> to assist in the identification of problem drywall.

Where a home has been identified as having problem drywall, the scientific and practical challenges of finding individual problem sheets of drywall remain. Until such challenges are overcome, this Remediation Guidance calls for the general replacement of all drywall in an identified home. If some of the drywall in a home can be identified reasonably not to be problem drywall—because it is known to have been installed prior to the relevant time period (*i.e.*, before 2001)—and if there are no other corroborating conditions (as provided in the CPSC and HUD guidance on identification), which indicates that the drywall is problem drywall, then one option would be to leave that drywall in place.

This Guidance includes replacement of the home safety systems at greatest risk of being affected by drywall-induced corrosion that may affect their performance: smoke alarms and carbon monoxide alarms; electrical components (but not necessarily the wiring); and fusible-type fire sprinkler heads. In addition, glass bulb fire sprinkler heads should be tested or replaced in accordance to NFPA Standard 25, and gas distribution piping should be inspected and pressure-tested, in accordance with NFPA Standard 54.

CPSC staff's assessment of the effect of problem drywall-related corrosion on electrical distribution components, gas service piping, fire sprinkler heads, and smoke alarms has not revealed any safety-related failures.

Corrosion of exposed electrical contact surfaces was observed on electrical devices harvested from affected homes, as well as on new devices subjected to an accelerated corrosion regimen at Sandia National Laboratories to simulate 40 years of exposure. However, although no significant degradation of the electrical connections to the devices was noted, extensive corrosion was present and replacement of receptacles, switches, ground-fault circuit interrupters, and circuit breakers is recommended, out of an abundance of caution.

CPSC staff's assessment of the effect of problem drywall-related corrosion on electrical distribution wiring indicated that exposed copper wires were corroded.<sup>4</sup> However, the corrosion was superficial, and it did not reduce the overall cross-section of copper significantly. Thus, the corrosion did not decrease the wire's ability to carry its rated current. Removal or cleaning of the exposed ends of the wiring to reveal a clean/uncorroded surface is recommended. Removal/replacement of cable runs is not necessary, unless the remaining cable has been damaged during drywall removal. However, all repairs must comply with local codes, and final approval of the installation is at the discretion of the authority having jurisdiction.

The corrosion seen on gas service piping materials was found to be superficial and uniform without pin holing. No meaningful loss of thickness was observed, and there was no evidence that the ability to carry gas and hold pressure was compromised. Out of an abundance of caution, and considering the wide variety of environmental conditions that might exist in different homes, this guidance recommends inspecting and pressure-testing gas service piping according to all applicable standards. Any changes to gas service piping should be done in strict accordance with all codes and standards.

A small but significant difference in performance for certain types of fusible-type sprinkler heads was found after accelerated corrosion although these sprinklers continued to meet the appropriate performance standards. This Guidance recommends the replacement of all fusible-type sprinkler heads and either testing or replacement of glass bulb sprinkler heads out of an abundance of caution, based on the finding of a small difference in performance for certain sprinkler heads after accelerated corrosion, as well as recognition of the National Fire Protection Association (NFPA) Standard 25, requiring either testing or replacement of sprinkler heads in corrosive environments (which may be present prior to remediation) every 5 years.

In the case of smoke alarms, there were small but significant changes to performance in some cases, although the alarms continued to meet applicable safety standards. The CPSC recommends replacement of smoke alarms every 10 years and carbon monoxide alarms after their limited lifespan, typically every 5–7 years. Therefore, as part of this Remediation Guidance, it is recommended that all smoke alarms and carbon monoxide alarms be replaced.

Staffs of the CPSC and HUD are aware that some remediation efforts have included the replacement of electrical wiring, water service plumbing, HVAC (heating, ventilation and air conditioning) evaporator coils, furnishings, and carpeting. Homeowners may seek to replace such items, but their replacement is not included in this Guidance because of the absence of a direct connection to safety.

Staffs of the CPSC and HUD continue to recognize that other remediation approaches ultimately could prove more cost-effective and/or less invasive; however, this Guidance is believed to be a conservative, commonsense approach and represents all applicable CPSC staff studies on corrosion effects from problem drywall.

Homeowners should recognize that homes can suffer from corrosion unrelated to drywall, and that such other corrosion problems may not be resolved by addressing the drywall.

*Other Building Materials and Contents:*

Underlying the CPSC staff and HUD staff's recommendations is the view that removal of the source material (*i.e.*, the problem drywall), will eliminate the cause of the corrosive environment. Staffs of CPSC and HUD do not have a scientific basis to believe that emissions from the problem drywall require replacement of non-problem drywall, wood studs, flooring, cabinetry, or other household components and fixtures that may have been exposed to the drywall emissions.

Staffs of the CPSC and HUD understand, however, that certain other building materials and contents could be affected or require replacement in the course of the practical construction or engineering steps required to undertake the remediation described in this Guidance. Staffs of the CPSC and HUD do not offer any view on the replacement of other affected metals, home electronics, or personal property.

*Drywall Dust Clean-Up:*

During the remediation, it is important to ensure that the home is cleaned to remove any visible drywall dust and debris that was created during the demolition, including material that is on and around framing material, prior to commencing reconstruction.

Staffs of the CPSC and HUD are aware that some parties who are remediating homes with problem drywall use HEPA (high efficiency particulate air) vacuums and wipe surfaces to remove drywall dust, and ventilate the home for a period between removal and replacement of drywall to insure that all reactive sulfur gases have dissipated. We do not have a scientific basis for recommending such steps, but homeowners may consider these options as they seek to make an informed decision in their particular situation.

*Additional Issues:*

Staffs of the CPSC and HUD are aware that some parties offer remediation approaches other than the replacement of problem drywall and affected metal components. We do not have a scientific basis to provide an opinion of such approaches.

Consumers should exercise caution in contracting for testing and remediation and should be diligent in confirming the references, qualifications, and backgrounds of individuals and firms that offer such services. Consumers should request that individuals and firms that offer remediation strategies that differ significantly from this Guidance explain those strategies to the consumer's satisfaction before the consumer's purchase of those services or products.

## **Conclusion**

Scientific investigations to understand the complex problems presented by the issue of problem drywall are wrapping up. The scientific work completed by the Federal Interagency Task Force has been essential to building the foundation for decision making by homeowners and local, state, and federal authorities. The results of the Task Force studies conducted to date are sufficient to provide this Remediation Guidance for homes with corrosion from problem drywall.



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