



## FEDERATION OF AMERICAN SCIENTISTS

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# Two & a Half Years Later: Surviving the FEMA Aftermath...

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FEMA's inability to meet emergency housing needs is a national scandal. Victims of the 2005 hurricanes have lived in cramped, unsafe housing for more than two years. On February 14th, 2008, the Center for Disease Control (CDC) [announced](#) that thousands of people on the Gulf Coast continue to live in FEMA-provided shelters that expose them to levels of formaldehyde that are up to 40 times more than maximum permitted levels.<sup>1</sup> One person has died and many others have been injured by this prolonged exposure. This danger has been [known for over a year](#), yet people continue to live in these hazardous conditions.

Unfortunately, this debacle is part of a much larger problem. The roots of this lie in FEMA's inability to manage procurements in a way that ensures high quality products at the lowest cost to the taxpayer. The current Gulf Coast fiasco is directly traceable to a process where FEMA purchased thousands of units worth hundreds of millions of taxpayer dollars using a one-page specification (see [HSFEHQ-05-Q-4000, "Request for Quotations," Sept 8, 2005](#)). This specification provided no guidance about its expectations for quality, and never specified requirements for indoor air quality, fire safety, safety in high winds, energy efficiency (for affordable energy bills), or countless other essential measures to ensure public safety and to minimize overall project costs. This created a situation that allowed manufacturers to use the cheapest, substandard materials available to construct inadequate homes for those in need.

Beyond the poor specifications, FEMA had no oversight into the quality control of the procured units. They did not have direct representation in factories to continually inspect the units, to inspect the process, and to audit the procurement process. Like the specification, this resulted in the provision of substandard housing that has since been proven as unsafe for occupancy.

Without drastic and fundamental changes to this plan, there is simply no guarantee that FEMA won't repeat the same confused and poorly planned process that has scarred the gulf coast for the past two years.

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<sup>1</sup> According to the CDC the average formaldehyde level of indoor air is 10-20 parts per billion (ppb) (<http://www.cdc.gov/od/oc/media/pressrel/2008/r080214b.htm>). The Agency for Toxic Substances and Disease Registry sets "minimal risk levels" for chronic exposures at 8 ppb (<http://www.atsdr.cdc.gov/mrls/index.html>). The average reading in the FEMA trailers was 77 ppb and highest reading in the FEMA trailers was 590 ppb (30-60 times the average indoor air levels and 74 times the "minimal risk level").

Thankfully, FEMA does not need to repeat these grievous mistakes in the future. A process can be put in place today that will ensure that future disaster victims are put in attractive, energy-efficient, and (most importantly) safe housing quickly and inexpensively. Additionally, provisions can be put in place so these temporary shelters can quickly be converted to permanent homes on permanent foundations, replacing FEMA's disposable travel trailer solution with a lasting contribution to the affordable housing stock post-disaster. This is a major step, as a region's affordable housing stock is often the last to be rebuilt after a disaster, and it houses the most diverse and vulnerable citizens.

This solution is realistic and possible, and has already been demonstrated. The state of Mississippi was successful in replacing 2,000 travel trailers, moving the victims of Hurricane Katrina and FEMA's negligence into safe housing under the [Alternative Housing Pilot Program](#). FEMA can learn from this model, and should immediately take the following four steps to replace travel trailers with adequate homes, and should implement these strategies to properly prepare for the next natural disaster. It is this investment in safety that will keep FEMA from repeating the same scandalous mistakes:

## **1. PLAN for HOMES**

FEMA should immediately prepare a full set of engineering drawings and specifications for a range of 5,00-1,000 square foot homes that will meet standards for mobile homes (24 CFR 3280, referred to as the HUD code) and common local building codes (the International Residential Code - the IRC) when put on permanent foundations. This "dual certification" allows for rapid deployment to any state under the federal HUD-code program, and long-term use as permanent housing under the state's modular programs. These designs should be relevant: designed for different climate zones, for durability, for long-term use, and designed to be used as homes, not recreational vehicles.

Most importantly, this work should be done by qualified professional engineers, not FEMA staff. FEMA staff does not have the expertise, liability, or effectiveness to implement alone. These engineers are licensed professionals, knowledgeable in the relevant codes, the industry, and the everyday process of correctly building and deploying homes. These engineers should certify that the designs meet all applicable requirements for safety – including indoor air quality, fire safety, and resistance to strong winds and earthquakes.

During an emergency the manufacturing facilities would be expected to be able to go into production in less than a week. This would require the designs be industry ready, tailored to industry production capabilities and practices.

These important steps were taken by the Mississippi Alternative Housing Program and the professionals involved, and that project should serve as a prototype to build from. The lessons learned from this program should be used to optimize the units for cost, performance, and livability.

## **2. BID for the BEST**

When a natural disaster occurs, FEMA must be able to act immediately, and should not have to negotiate housing procurement in a panic. With this in mind, a competitive bid process for each of FEMA's designs must be done to allow for the fastest response possible when the necessary time comes. This bid process should occur annually. This will ensure the relevance and accuracy of quotes for each disaster, allowing FEMA and the vendors to get the best pricing and units possible.

In addition to procuring units through annual competitive bidding, bids should only be accepted on a plant by plant basis, rather than from companies or dealers. Each manufacturer's bid should clearly outline plans for quality assurance. In the past, FEMA purchased from dealers – not manufacturers – and ended up paying higher than necessary prices for low quality units. By only accepting bids from the manufacturers performing the work, manufacturers can be held directly accountable for the quality of their end product, rather than allowing companies to run units in plants that have not been inspected to the quality control standards in the proposed bids.

FEMA must also require in each quality assurance plan that a representative from the engineering professional of record continually ensure that all units are produced to specification, that any substitutions or changes are properly approved, and that continually inspected to meet all applicable codes. The engineer of record becomes the "third party", rather than an employee of the manufacturing firm or FEMA staff. This outside accountability separates the oversight of quality assurance from the manufacturer, whose best interest is in moving units through his production line quickly. This will help insure the unit meets the design specification, and will properly balance the ultimate responsibility for the unit's design and construction.

Again, the work should build on the designs already prepared by Mississippi Alternative Housing Program and the professionals involved, taking lessons learned and optimizing the units for cost, performance, and livability. That way, FEMA has price points to evaluate whether the bids and the designs are competitive and relevant.

## **3. PROTOTYPE for SUCCESS**

FEMA should not only seek bids from 15-20 manufacturing facilities (capable of producing 15-20,000 units in 4 to 6 months), but the selected vendors should prototype the units and be production ready in the event of an emergency. Each of the winning bidders should be paid to produce at least three units to demonstrate that all vendors can meet and exceed all performance requirements. The first unit can serve as a test, where quality control and quality assurance can identify problem areas to correct. The second unit will serve as an opportunity to fix these mistakes and solidify the construction process, and the third unit will be kept at the manufacturing plant as a reference standard. This should be done at each manufacturing location, and all vendors

should be present so an understanding of effectiveness, expectations, and standards of quality is established well before an emergency.

#### **4. PROTECTING the homeowner through direct QUALITY ASSURANCE**

FEMA must hire the engineer of record, not in-house staff, to be continually responsible for working with each manufacturer during construction to ensure production quality. This is primarily accomplished through a series of Quality Assurance protocols. The engineer would need to be qualified HUD-inspector and an IRC home inspector to ensure that the units comply with HUD-codes and the IRC. The engineer should also have testing laboratory accreditation to ensure that all materials used comply with specifications (i.e. have the ability to review, test, and approve materials).

The engineer would be responsible for approving the manufacturing methods of each unit, ensuring quality control procedures are implemented, and must have the authority to stop production if the manufacturer fails to meet, or deviates from set performance expectations. The engineer must also have the responsibility to approve any changes, modifications, and substitutions requested in case of supply or labor shortages. For example, the major source of formaldehyde in current FEMA trailers comes from the over use of materials with formaldehyde that should be regulated to [CFR3280.308](#) (HUD's formaldehyde standard for wood panel products). The engineer of record must have the authority to substitute alternative materials in situations such as this.

Like the bidding process, it is important that these measures are addressed annually. It is necessary that this engineer learn from the past production and events every year to re-evaluate the design and propose new standards and methods to implement next year.

A similar process worked well in Mississippi by which the state designed, specified, bid, prototyped, put into production, inspected, and deployed 2,000 units to date. Using this method, FEMA would be able to react quickly to emergency needs for housing while getting the best possible price for a high quality product each year.

These steps are much needed to fix what has become a dangerous problem and national embarrassment. America cannot accept superficial changes or substitutions to FEMA's current approach when fundamental revisions to a flawed process are necessary. Thankfully, these crucial changes are simple and realistic.

Disaster victims face enough challenges. They shouldn't have to worry that their government is exposing them to additional hazards in the housing it provides. With proper planning and good management, the current Gulf Coast fiasco need never be repeated.