

Lessons Learned from Prior Reports on FEMA's 50 Percent Repair-or-Replace Rule Decisions





DHS OIG REPORT

Lessons Learned from Prior Reports on FEMA's 50 Percent Repair-or-Replace Rule Decisions

May 29, 2019

Why We Wrote This Report

During the recovery phase of declared disasters, the Federal Emergency Management Agency (FEMA) compares repair versus replacement costs to evaluate the feasibility of repairing damaged facilities. Using a "50 Percent Rule" FEMA determines whether a facility can be restored to perform the same functions as before the disaster.

In seven audits conducted from 2012 through 2016, we identified FEMA's past challenges with repair-or-replace decisions. This report provides lessons learned from these challenges as discussed in previous OIG reports.

What We Recommend

This report contains no recommendations.

For Further Information:

Contact our Office of Public Affairs at (202) 981-6000, or email us at DHS-OIG.OfficePublicAffairs@oig.dhs.gov

What We Found

FEMA can benefit from past lessons learned to improve its decisions when applying the 50 percent repair-or-replace rule for damaged facilities. According to 44 Code of Federal Regulations section 206.226(f), a facility is considered repairable when disaster damages do not exceed 50 percent of the cost of restoring the facility to its pre-disaster condition.

FEMA is assisting in the recovery from some of the most catastrophic disasters in U.S. history — Hurricanes Harvey, Irma, and Maria, and the October 2017 California wildfires. One of FEMA's major disaster recovery decisions is to determine whether to fund the repair or replacement of damaged facilities. Based on prior Office of Inspector General (OIG) work, we compiled 10 errors FEMA should avoid when making repair-or-replace decisions to ensure that grant funds are properly spent:

- Inaccurate/incomplete cost estimates
- Use of "conceptual estimates"
- Inclusion of "soft" costs
- Omission of building elevation costs
- Inclusion of whole-building upgrade costs
- Inclusion of emergency protection costs
- Lack of formal training for decision makers
- Insufficient independent review
- Insufficient supporting documentation
- Decisions made without thorough assessments

FEMA has taken several corrective actions in response to our prior reports. Together with the lessons learned, these actions may help minimize the risk that taxpayer dollars are wasted on ineligible replacement costs.

Management Comments

FEMA's comments are included in appendix A.



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Department of Homeland Security

Washington, DC 20528 / www.oig.dhs.gov

May 29, 2019

MEMORANDUM FOR: Jeffrey Byard
Associate Administrator
Office of Response and Recovery
Federal Emergency Management Agency

FROM:

for Sondra F. McCauley *Kristen Burnard*
Assistant Inspector General for Audits

SUBJECT: *Lessons Learned from Prior Reports on FEMA's
50 Percent Repair-or-Replace Rule Decisions*

Attached is our final special report, *Lessons Learned from Prior Reports on FEMA's 50 Percent Repair-or-Replace Rule Decisions*. This report comprises lessons learned from a series of Department of Homeland Security Office of Inspector General (OIG) audit reports that identified challenges the Federal Emergency Management Agency (FEMA) encountered in implementing the 50 percent repair-or-replace rule (50 Percent Rule). We considered technical comments and incorporated the formal comments provided by your office.

In this report, we are reemphasizing potential challenges with 50 Percent Rule decisions during the recovery phase of Hurricanes Harvey, Irma, and Maria, the October 2017 California wildfires, and any future disasters. The report contains no recommendations but highlights FEMA's need to ensure its staff follow revised policies and corrective measures to properly apply the 50 Percent Rule.

Consistent with our responsibility under the *Inspector General Act*, we will provide copies of this report to congressional committees with oversight and appropriation responsibility over the Department of Homeland Security. We will post the report on our website for public dissemination.

Please call me with any questions, or your staff may contact Katherine Trimble, Deputy Assistant Inspector General for Audits, at (202) 981-6000.



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Background

The Federal Emergency Management Agency (FEMA) is assisting in the recovery from Hurricanes Harvey, Irma, and Maria, and the October 2017 California wildfires. These events are some of the most catastrophic disasters in U.S. history. On August 25, 2017, Hurricane Harvey made landfall in the Gulf Coast portion of Texas as a Category 4 hurricane. Wind speeds of 130 mph and storm-related rainfall of about 40 to 60 inches caused widespread destruction and catastrophic flooding. Two weeks later, Hurricane Irma devastated the Caribbean region as a Category 5 hurricane, before making landfall in Florida as a Category 4 hurricane. Subsequently, Hurricane Maria hit Puerto Rico as a Category 4 hurricane, leaving 100 percent of the territory without power. More than a million people were displaced from their homes.

As FEMA responded to the three major hurricanes, the most destructive wildfires in California's history devastated California. In response to the hurricanes and wildfires, the President signed 12 major disaster declarations, providing assistance to affected communities within the designated areas.¹

One of the most important recovery decisions for FEMA following a declared disaster is whether to fund the repair or replacement of damaged buildings.²

According to 44 Code of Federal Regulations (CFR) section 206.226(f), a facility is considered repairable when disaster damages do not exceed 50 percent of the cost of restoring the facility to its pre-disaster condition. For this calculation, the repair estimate is the numerator and the replacement estimate is the denominator.

50 Percent Rule Calculation

<u>\$75,000</u>	Numerator
<u>\$100,000</u>	Denominator
Calculation = 75%	

For example, if the repair cost is estimated to be \$75,000 and the replacement cost is estimated to be \$100,000, the facility is eligible for replacement because

¹ There were 10 major disaster declarations associated with Hurricanes Harvey, Irma, and Maria (DR-4332, DR-4335, DR-4336, DR-4337, DR-4338, DR-4339, DR-4340, DR-4341, DR-4345, and DR-4346) and two associated with the California wildfires (DR-4344 and DR-4353).

² *FEMA's Progress in Clarifying its "50 Percent Rule" for the Public Assistance Grant Program*, OIG-14-123-D, August 2014.



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Department of Homeland Security

the estimated repair cost is 75 percent (\$75,000/\$100,000) of the estimated replacement cost. FEMA calls this calculation the “50 Percent Rule.”³

Further, it must be feasible to repair a facility so it can perform the same functions as immediately prior to the disaster. A grant fund applicant may elect to perform repairs to a facility, in lieu of replacement, if the work is in conformity with applicable standards. However, eligible costs are limited to the less expensive solution (repair or replacement).

Lessons Learned from Prior FEMA Challenges Applying the 50 Percent Rule

In 7 audits conducted from 2012 through 2016, we identified 10 improper decisions or miscalculations related to application of the 50 Percent Rule. These errors can serve as lessons learned for FEMA as it makes repair-or-replace decisions during recovery from Hurricanes Harvey, Irma, and Maria, and the October 2017 California wildfires. The lessons learned may also facilitate repair-or-replace decisions during future recovery operations.

Calculation of Inaccurate and Incomplete Cost Estimates

We identified a number of inaccurate and incomplete cost estimates in both the repair and replacement aspects of the calculation. For example, FEMA included: (1) repair estimates containing damaged elements that were not the result of the disaster, (2) repair cost estimates rather than actual costs for damaged elements that the applicant had already repaired, and (3) replacement estimates based on incorrect square footage of the replacement facility. Developing cost estimates for new buildings, sometimes with incomplete or missing design information, can be complex and time consuming. In addition, incomplete replacement cost estimates result in an understated denominator that increases the likelihood that the ratio will exceed 50 percent.

Use of “Conceptual” Estimates

In past audits, we identified mistakes resulting from FEMA’s inappropriate use of “conceptual” computer-generated models. These computer models quickly generate overall cost estimates by applying building dimensions, along with other general factors, to generic construction models. This estimation method

³ FEMA refers to the repair vs. replacement calculation set forth in 44 CFR 206.226(f) as the “50 Percent Rule.” FEMA implements the rule according to Disaster Assistance Policy 9524.4. FEMA’s current guidance on the rule is contained in the *Public Assistance Program and Policy Guide* (PAPPG), Version 3.1 (April 2018), which is effective for all emergencies and major disasters declared on or after August 23, 2017.



OFFICE OF INSPECTOR GENERAL

Department of Homeland Security

is based on generic building models that do not capture the unique characteristics of the damaged facility. Specifically, this estimation method cannot consider all required building codes and standards or the costs of any iconic architectural features common in government and university buildings. When replacement costs are understated, the repair-to-replacement ratio is inaccurately high, thus increasing the likelihood that the ratio will exceed 50 percent.

Inclusion of “Soft” Costs

FEMA’s 50 Percent Rule policy does not allow “soft” costs in the 50 Percent Rule calculation.⁴ “Soft” costs are costs other than direct construction costs, such as project management, architectural, and engineering costs, financing, legal fees, and other pre- or post-construction expenses. FEMA’s policy only allows inclusion of direct construction costs, or “hard” costs, in the numerator (repair) and denominator (replacement). Because 50 Percent Rule determinations can hinge on minor costs, even a 1 percent error can result in funding a new building rather than repairing the existing building.

Omission of Building Elevation in Replacement Estimates

According to FEMA’s 50 Percent Rule, the replacement estimate should include the cost of all work necessary to provide a new facility of the same size, design capacity, and function as the damaged facility in accordance with current codes and standards. Constructing a new building requires elevation, or some type of flood-proof option, to mitigate against future floods and to meet building codes.⁵ FEMA often excluded these costs from its estimated replacement costs due to limited familiarity with the proper application of the 50 Percent Rule and no formal training. Improperly excluding costs associated with code compliance from the estimated replacement cost (the denominator) increases the ratio, thus increasing the likelihood that the ratio will exceed 50 percent.

⁴ See Recovery Policy 9524.4 *Repair vs. Replacement of a Facility under 44 CFR §206.226(f) (The 50 Percent Rule) – Policy Clarification; and Cost Estimating and Review Requirements* (September 2015).

⁵ Although FEMA’s guidance does not allow inclusion of hazard mitigation costs in 50 Percent Rule calculations, eligible Public Assistance funding costs include the cost to comply with a local floodplain management ordinance that requires elevation or flood-proofing of a substantially damaged facility located in a Special Flood Hazard Area. While these costs are not included in the repair cost of the 50 Percent Rule calculation, they are included in the replacement cost of the calculation.



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Inclusion of Code-triggered, Whole-building Upgrades in Repair Estimates

FEMA's 50 Percent Rule policy does not allow inclusion of code-triggered, whole-building upgrades, such as building elevations, in the repair side of the calculation. However, our audits have shown that some FEMA officials have included these upgrades because they incorrectly interpreted the policy. This type of error can also include other whole-building enhancements such as seismic upgrades or enhanced fire protection systems. Improperly including whole-building repair amounts in the numerator increases the ratio, thus increasing the likelihood that the ratio will exceed 50 percent.

Inclusion of Emergency Protective Measures in Repair Estimates

FEMA's 50 Percent Rule policy does not allow the inclusion of Emergency Protective Measures in repair estimates.⁶ Yet, some FEMA officials included these costs in the repair cost estimates. The 50 Percent Rule calculation should only include those repairs associated with the damaged components (including non-emergency mold remediation) and the codes and standards that apply to repair of the damaged components. Improperly including Emergency Protective Measures costs in the numerator increases the ratio, thus increasing the likelihood that the ratio will exceed 50 percent.

Lack of Formal Training for Decision Makers

At the time of these prior audits, neither FEMA headquarters nor the FEMA Regions had established mandatory training on the 50 Percent Rule for FEMA officials responsible for making repair or replacement decisions. Some errors resulted from staff who are responsible for cost estimations, but do not understand the 50 Percent Rule and cost-estimating standards.

Lack of Sufficient Independent Review

FEMA had not established an independent review process to confirm the validity of 50 Percent Rule calculations and decisions. FEMA officials may have been able to identify some of these errors if they required review of calculations by qualified regional office staff. While FEMA officials reviewed projects for a variety of factors, FEMA did not require a specific review of 50 Percent Rule decisions.

⁶ As explained in the PAPPG, Emergency Work is work that must be done immediately to save lives, protect improved property, protect public health and safety, or avert or lessen the threat of a major disaster.



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Department of Homeland Security

Use of Insufficient Supporting Documentation

Federal regulations require agencies to maintain proper documentation to support decisions.⁷ In some instances, we could not find proper documentation supporting the assumptions, rationales, and facts FEMA used to arrive at its 50 Percent Rule decisions. Previously, FEMA officials said that while FEMA has a variety of documentation requirements, none specifically address the documents FEMA needs to support 50 Percent Rule decisions. Insufficient documentation makes it difficult to review decisions and can compromise FEMA's ability to support decisions adequately if appealed by the grant applicant.

Lack of Adequate Assessments prior to Authorizing Funding

In the wake of a disaster, FEMA officials need to make funding decisions quickly because recovery work cannot move forward until FEMA decides whether to fund the repair or replacement of damaged facilities. Although quick decisions are critical, it is more important for FEMA to authorize the spending of disaster resources accurately. For large and complex facilities, this determination can take months and may require use of outside experts. Because of the significant amount of funding associated with these decisions, FEMA officials should not rush their funding decisions.

FEMA's Corrective Measures

The challenges we reported in FEMA's 50 Percent Rule calculations were both costly and indicative of significant need for improvement. Five of seven prior audits on FEMA's repair-or-replace challenges resulted in more than \$100 million in questioned costs. We summarized these costs in our August 2014 report, *FEMA's Progress in Clarifying its "50 Percent Rule" for the Public Assistance Grant Program* (OIG-14-123-D). See appendix B. We also provided four recommendations to help FEMA improve the accuracy of its future 50 Percent Rule calculations and repair versus replacement decisions. In response to our report, FEMA has implemented corrective actions, including revised policies and other measures to improve repair versus replacement decisions.

Specifically, in September 2015, FEMA issued a memo titled, *Repair vs. Replacement of a Facility under 44 CFR §206.226(f) (The 50 Percent Rule)*, to clarify the identically titled Recovery Policy 9524.4. FEMA also included the updated language in its *Public Assistance Program and Policy Guide* (PAPPG),

⁷ 36 CFR 1222.12 (c); 36 CFR.1222.22 (e).



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Department of Homeland Security

first published in January 2016. The PAPPG is a comprehensive, consolidated program and policy document that receives periodic updates.⁸ Specifically, it incorporates and supersedes language from previously issued Public Assistance Program publications, the 9500 Series documents, and other policy and guidance documents. For example, the guide includes the Repair vs. Replacement section of FEMA's Recovery Policy 9524.4, *Repair vs. Replacement of a Facility under 44 CFR §206.226(f) (The 50 Percent Rule)*.

FEMA's updated policy of the 50 Percent Rule, contained in the PAPPG, addresses the issues we identified in previous reports. The updated guidance specifies which costs may and may not be included in both repair and replacement cost estimates. The guidance also details a review process by a licensed engineer or architect with cost estimation expertise or a certified cost estimator. Further, to ensure the accuracy of the repair and replacement cost estimates, FEMA added a second level of review by the United States Army Corps of Engineers for all replacement requests with an estimated Federal share of at least \$5 million. Finally, the updated guidance allows applicants who lack the resources to develop their own cost estimates adequately to request technical assistance from FEMA.

FEMA officials stated they hired staff in the Public Assistance Division to support their Consolidated Resource Centers⁹ and cost estimator positions. Additionally, FEMA officials said they created standardized qualifications related to comprehending the 50 Percent Rule.

FEMA officials also stated they are "currently undertaking additional initiatives to enhance the accuracy and consistent application of the 50 Percent Rule." These initiatives "include the use of a third-party independent expert panel for cost estimates and the development of technical guidance to assist Public Assistance staff in implementing the 50 Percent Rule."¹⁰ According to FEMA, the technical guidance will address topics such as the "level of design detail

⁸ Version 1.0 - January 2016 (effective for all emergencies and major disasters declared between January 1, 2016, and March 31, 2017, superseded by Version 2.0); Version 2.0 - April 2017 (effective for all emergencies and major disasters declared between April 1, 2017, and August 22, 2017, superseded by Version 3.0); Version 3.0 - January 2018 (effective for all emergencies and major disasters declared on or after August 23, 2017, superseded by Version 3.1); Version 3.1 - April 2018 (effective for all emergencies and major disasters declared on or after August 23, 2017).

⁹ Consolidated Resource Centers are centralized locations where subject matter experts process grant applications from multiple disasters.

¹⁰ FEMA advised that the third-party independent expert panel would: 1) develop and document the cost estimation validation process; 2) validate cost estimates and estimating methodologies FEMA provides for review; and 3) establish a continuous improvement feedback loop.



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Department of Homeland Security

required for a 50 Percent Rule calculation [and] further definition of inclusions and exclusions in repair and replacement cost estimates.” The guidance will also provide “clarification of what elements constitute a building component (e.g., walkways and contents), and address scenarios such as hidden damages and demolished facilities.”

Conclusion

During the recovery phases of Hurricanes Harvey, Irma, and Maria, and the October 2017 California wildfires, FEMA experienced increased demands to respond to multiple major disasters simultaneously. FEMA officials must make funding decisions quickly because uncertainty about the level of funding required to repair or replace a damaged facility can lengthen recovery timelines. However, FEMA must also ensure its staff apply the 50 Percent Rule properly to avoid calculation errors and improper use of Federal funds. FEMA has taken several corrective actions to improve facility replace-or-repair decisions in response to our prior reports. Together with the lessons learned we identified, these actions may help minimize the risk that taxpayer dollars will be wasted on ineligible replacement costs.

Objective, Scope, and Methodology

Department of Homeland Security Office of Inspector General was established by the *Homeland Security Act of 2002* (Public Law 107-296) by amendment to the *Inspector General Act of 1978*.

The objective of this report was to apprise FEMA leadership of potential challenges in the application of the 50 Percent Rule for decisions on repairing or replacing facilities, arising during the recovery phases of disasters such as Hurricanes Harvey, Irma, and Maria, and the October 2017 California wildfires, and any future disasters. This report comprises lessons learned from our previous audit reports about the 50 Percent Rule. To accomplish our objective, we compiled and summarized reportable issues concerning 50 Percent Rule decisions from reports issued in fiscal years 2012 through 2016; analyzed the related findings and recommendations in those reports; and identified and quantified types of calculation errors and challenges for 50 Percent Rule decisions. We also identified FEMA’s corrective actions in response to our prior reports.

This report was prepared under the *Inspector General Act of 1978*, as amended — specifically, Section 2(2) — “to provide leadership and coordination and recommend policies for activities designed to promote economy, efficiency, and effectiveness in the administration,” prevention, and detection of fraud and



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Department of Homeland Security

abuse in FEMA's programs and operations. The work performed in this review does not constitute an audit in accordance with generally accepted government auditing standards.

The Office of Audits major contributors to this report are: Paige Hamrick, Director; J. Eric Barnett, Audit Manager; David B. Fox, Audit Manager; Patti Smith, Auditor-in-Charge (retired); Newton Hagos, Auditor; Roger Thoet, Independent Reference Reviewer; and Kelly Herberger and Deborah Mouton-Miller, Communications Analysts.



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Appendix A
FEMA's Response to Draft Report


U.S. Department of Homeland Security
Washington, DC 20472



FEMA

March 8, 2019

MEMORANDUM FOR: John V. Kelly
Senior Official Performing the Duties
of the Inspector General

FROM: Joel Doolin 
Associate Administrator
Office of Policy and Program Analysis

SUBJECT: Management Response to OIG Draft Report: "Lessons
Learned from Prior Reports on FEMA's 50 Percent Repair-
or-Replace Rule Decisions"
(Project No. OIG-18-028-AUD-FEMA)

Thank you for the opportunity to review and comment on this draft report. The Federal Emergency Management Agency (FEMA) appreciates the work of the Office of Inspector General (OIG) in planning and conducting its review and issuing this report.

FEMA is pleased that the OIG has compiled lessons learned from its previous audit reports concerning the Public Assistance (PA) Program's 50 Percent Rule and shared this information with FEMA leadership, congress, and the public. FEMA also notes the OIG's positive recognition of the improvements that FEMA has already made to more consistently and accurately apply the repair versus replacement (50 Percent Rule) calculation. For example, as the draft report highlights, FEMA has updated the 50 Percent Rule policy to address prior concerns by adding second level reviews by the United States Army Corps of Engineers for projects with a federal cost-share over \$5 million.

In addition, FEMA has and will continue to implement policy, training, and process improvements to further promote the consistent and accurate implementation of the 50 Percent Rule. FEMA will continue to proactively seek opportunities to make further clarifications to ensure the 50 Percent Rule calculation to ensure it is easy to understand by both FEMA staff and applicants.

Finally, FEMA has consolidated operations so that all staff that conduct 50 Percent Rule calculations work in teams at each of FEMA's three Consolidated Resource Centers. As a result of this consolidation, FEMA has established a contingent of staff with expertise focused on making these determinations. This greatly increases FEMA's ability to apply internal controls, reduce calculation mistakes, improve consistency, and ensure appropriate



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Appendix A, cont'd.

documentation for making determinations, thus significantly improving its delivery of the PA Program. FEMA remains committed to begin a good steward of taxpayer monies, especially as concerns the application of repair versus replacement decisions, and continuing to support our citizens and first responders to ensure that as a nation we work together to build, sustain, and improve our capability to prepare for, protect against, respond to, recover from, and mitigate all hazards.

We noted that the draft report did not contain any recommendations. Technical comments were previously provided under separate cover. We look forward to OIG's continued disaster-related response and recovery work and any formal recommendations once that work is completed.

Again, thank you for the opportunity to review and comment on this draft report. Please feel free to contact me if you have any questions. We look forward to working with you in the future.



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Appendix B
Summary of Questioned Costs Related to the 50 Percent
Repair-or-Replace Rule (FYs 2012–2016)

Report Short Title	Report Number	State	Costs Questioned
University of Iowa	DD-12-17	IA	\$ 83,745,594
Paso Robles Joint Unified School District	DS-12-03	CA	12,958,864
Ochsner Clinic	DD-12-15	LA	2,197,550
Martinsville High School	DD-13-04	IL	1,136,581
Alaska Department of Natural Resources	DS-13-06	AK	398,186
City of Cedar Rapids ¹¹	OIG-14-145-D	IA	-
West School Buildings ¹²	OIG-16-132-D	TX	-
Total Questioned Costs			\$100,436,775

Source: See DHS OIG reports under the “Reports” tab at <http://www.oig.dhs.gov/>

¹¹ Although we did not question the costs, we identified unnecessary costs of \$12,103,979 to taxpayers because of improper replacement decisions for four facilities.

¹² The 50 Percent Rule miscalculation did not result in an incorrect replacement decision; therefore, we did not question the costs.



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Appendix C
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