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Disaster Debris Removal After Hurricane Katrina: Status and Associated Issues

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Summary

Hurricane Katrina produced unprecedented destruction, resulting in disaster debris from vegetation and man-made structures. Before Katrina, the event that left behind the greatest recorded amount of disaster-related debris in the United States was Hurricane Andrew in 1992, which generated 43 million cubic yards (CY) of debris in Florida's Metro-Dade County. Disaster debris generated as a result of Hurricane Katrina may be over 100 million CY.

Before the Gulf Coast region can rebuild, particularly in the New Orleans metropolitan area, much debris generated by the storm must be removed and properly managed (i.e., landfilled, recycled, or burned). The types of debris generated include vegetative debris (e.g., trees, limbs, shrubs), municipal solid waste (e.g., common household garbage and personal belongings), construction and demolition debris (in some instances, entire residential structures and all their contents), vehicles (e.g., cars, trucks, and boats), food waste (technically termed "putrescibles"), white goods (e.g., refrigerators, freezers, air conditioners), and household hazardous waste (e.g., cleaning agents, pesticides, pool chemicals). Each type of waste may contain or be contaminated with certain toxic or hazardous constituents. In the short term, removal of debris is necessary to facilitate the recovery of the region. In the long term, the methods in which these wastes are to be managed require proper consideration to ensure that their management (e.g., landfilling) would not pose a future threat to human health or the environment.

This report provides the background and information necessary to understand why, if cleanup is to continue, additional funding of debris removal activities will likely be needed for months to come, as well as factors that make debris removal a costly, complex, and lengthy operation. (The "debris removal" process may involve several activities, such as waste separation, hauling, landfill disposal, burning, and recycling.) To illustrate these points, this report provides an overview of the types and amounts of debris generated, the governmental agency requirements and responsibilities regarding the debris removal process, and the complicating factors unique to Hurricane Katrina. Such factors include the slow pace of residents to return to hard-hit areas of New Orleans, the difficulty in separating hazardous debris from non-hazardous debris, and issues associated with demolishing private structures and structures that may contain asbestos. Another issue of concern involves sending construction and demolition (C&D) debris to landfills located in communities affected by the storm. This could become an issue of concern to Congress if agencies participating in the cleanup become liable under provisions of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), also known as Superfund; this could be possible because the definition of C&D debris was expanded after the storm to include potentially contaminated material.

Debris removal operations associated with the hurricane are essentially complete in Alabama and are nearing completion in Mississippi. Therefore, this report focuses primarily on issues associated with continuing debris removal activities in Louisiana. This report will be updated.

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Disaster Debris Removal After Hurricane Katrina: Status and Associated Issues

A variety of factors will influence the time it will take and the money it will cost for the recovery and reconstruction of the Gulf Coast region destroyed by Hurricane Katrina. One significant factor in that recovery is the speed with which the debris from vegetation and man-made structures damaged or destroyed by the storm can be removed from the area.

Management of debris is a concern after any major disaster. Destruction in the wake of Hurricane Katrina, and compounded soon after by the effects of Hurricane Rita, created disaster-related debris greater than any amount previously recorded in the United States. The volume of waste generated is unique because of the large area over which the storm caused damage and the nature and scope of the damage. Regions of Alabama, Mississippi, and Louisiana, covering 90,000 square miles, were declared a “major disaster” by the President. Although debris was generated over the entire disaster area, the most significant property damage was concentrated within a 100-mile radius of where the storm made landfall on the Gulf Coast. Within this area, damage due to high winds, flooding from high rain fall, and storm surge resulted in significant devastation. In the New Orleans metropolitan area, flooding, largely resulting from breached levees and flood walls, left much of the area under water.¹

This report discusses issues associated with debris removal operations after a disaster on the scale of Katrina. In particular, it discusses why debris removal is an ongoing concern months after the hurricane, and why it is likely to be a concern for many months to come, as well as factors that make debris removal such a costly, complex operation. To illustrate these points, this report provides an overview of the types and amounts of debris generated, the governmental agency requirements and responsibilities regarding the debris removal process, and complicating factors unique to Hurricane Katrina. There are two primary areas of interest for Congress with regard to debris removal. The first involves the continued need, if cleanup is to continue, for funding to support debris removal operations, particularly as the demolition of private structures begins. The second involves the future potential for federal, state, and local agencies to become liable under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA),²

¹ See CRS Report RL33141, *Hurricane Katrina: Social-Demographic Characteristics of Impacted Areas*, by Thomas Gabe, Gene Falk, Maggie McCarty, and Virginia W. Mason; see the section “Hurricane Katrina — Estimates of Population Affected in Impacted Areas.”

² CERCLA is the principal federal statute addressing the cleanup of hazardous substances that pose threats to public health, welfare, and the environment. Under CERCLA, in (continued...)

popularly known as Superfund, as a result of their current disposal practices (see “Factors Complicating Debris Removal” below).

Debris removal operations associated with the hurricane in Alabama are essentially complete. In Mississippi, debris removal operations are nearing completion. Therefore, this report focuses primarily on issues associated with continuing debris removal activities in Louisiana. For additional information about cleanup operations in response to Hurricane Katrina, see CRS Report RL33115, *Cleanup After Hurricane Katrina: Environmental Considerations*, by Robert Esworthy et al.

Background

Hurricane Katrina made landfall on the Gulf Coast on August 29, 2005. It left in its wake destruction unprecedented in the United States. Damage done to the region was from two different but related sources — the hurricane itself (resulting in flooding from storm surge and rainfall, and damage from high winds from the hurricane itself and from tornadoes spawned by the storm) and the flooding of the New Orleans metropolitan area from breaches in several levees. Storm surge and related coastal flooding destroyed vegetation and man-made structures along the coast of Alabama, Mississippi, and Louisiana. In Louisiana, up to 80% of New Orleans and large areas of Plaquemines and St. Bernard Parishes were flooded — to depths of almost 20 feet in the hardest-hit areas.

Amount and Types of Debris

The scope of Katrina’s destruction is unique, due in part to the vast geographic area over which it caused damage. Before Katrina, the disaster that generated the greatest recorded amount of debris in the United States was Hurricane Andrew in 1992. That storm created debris over a 500-square-mile area and generated 43 million cubic yards (CY) of debris in Florida’s Metro-Dade County.³ By comparison, Hurricane Katrina created disaster debris across a 90,000-square-mile disaster area. To date, disaster debris totals are estimated at —

- 2 million CY in Alabama,
- 43 million CY in Mississippi (with 1.7 million CY remaining), and
- 50 million CY in Louisiana (with about 10 million CY remaining; this total does not include an unknown amount of demolition debris that will be generated once the demolition of private properties begins).

² (...continued)

general, waste generators, transporters who select the disposal site, and disposal facility owners and operators are liable for response costs and for damage to natural resources.

³ By comparison, the disaster debris generated after the September 11, 2001, terrorist attacks on New York City was approximately 1.4 million tons (2.8 million CY).

Hurricane Katrina is also unique because of the type of waste generated. Generally, “disaster debris” includes waste materials created as the result of a man-made or natural disaster, such as an earthquake, flood, hurricane, or terrorist attack. Debris created from flooding is often quite different from debris created from an earthquake or storm. Disaster debris from Hurricane Katrina involves two types of waste — waste generated immediately during and after the storm (e.g., from high winds and flooding related to rainfall and coastal storm surge) and extensive flooding related to the levee failure in New Orleans (resulting in deep flood waters that left some areas submerged for weeks).

The primary types of disaster debris being removed in the wake of Hurricane Katrina fall into the following categories:

- Municipal solid waste — general household trash and personal belongings.
- Construction and demolition (C&D) debris — building materials (which may include asbestos-containing materials), drywall, lumber, carpet, furniture, mattresses, plumbing.
- Vegetative debris — trees, branches, shrubs, and logs.
- Household hazardous waste — oil, pesticides, paints, cleaning agents.
- White goods — refrigerators, freezers, washers, dryers, stoves, water heaters, dishwashers, air conditioners.
- Electronic waste — computers, televisions, printers, stereos, DVD players, telephones.

The unique nature of debris generated as a result of the New Orleans flooding is illustrated in **Table 1**, which lists specific types of waste identified by the Louisiana Department of Environmental Quality (LDEQ), EPA, and the Corps that have been generated in Louisiana. (For more detail regarding the types of disaster debris being removed in the wake of Hurricane Katrina and some of the issues or concerns associated with its removal, see **Table 2** in the **Appendix**. Also, selected issues associated with debris removal are discussed in more detail in the “Factors Complicating Debris Removal” section, below.)

Table 1: Debris Amounts Collected in Louisiana for Individual Types of Waste

Type of Waste	Amount ^a	Comments
Curbside debris	40,940,440 CY	These amounts reflect the total waste picked up curbside and from private properties in the New Orleans area and include all categories of waste being picked up by the U.S. Army Corp of Engineers and local governments (see the discussion of governmental agency roles, below); it does not include waste that is to be generated as a result of future demolition activities and rebuilding efforts.
White goods	821,366 units	This total also includes white goods generated as a result of Hurricane Rita.
Freon removal	322,900 units	Freon is removed from freezers, refrigerators, and air conditioners and sent to local vendors for recycling.
Electronic goods	566,321 units	Electronic goods can usually be recycled, but such waste generated in the New Orleans area is likely damaged beyond repair by flood waters.
Waste containers	3,562,744 containers	Louisiana DEQ identifies “waste containers” as drums, propane tanks, large and small containers, and vehicle fuel tanks; these containers may also be counted under curbside debris totals.
Hazardous waste	15,391,058 lbs.	This total represents waste collected at HHW drop-off points or through curbside collection and removal; some waste in this category may also be counted under the “Curbside debris” totals, above.
Non-hazardous waste	3,519,528 lbs.	See comment for “Hazardous waste.”

Source: Table prepared by the Congressional Research Service (CRS) based on a review of data from LDEQ, available at [<http://www.deq.louisiana.gov/portal/Default.aspx?tabid=2402>], as of June 16, 2006.

- a. Debris removal amounts change constantly. The Louisiana Department of Environmental Quality (LDEQ) updates debris removal totals, generally, on a weekly basis. Amounts listed here were updated on June 16, 2006.

In addition to debris totals reported by LDEQ (listed in **Table 1**), the Corps reported that it removed 36 million pounds of rotten meat and other food from several large commercial cold storage facilities from the New Orleans area. Also, LDEQ has not reported a definitive estimate of the number of cars, trucks, and boats that were destroyed and abandoned in the region, but the numbers are estimated in the tens or possibly hundreds of thousands.

Governmental Roles in Debris Removal

Much of the federal agency response to debris removal after Hurricane Katrina has been in accordance with provisions of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (The Stafford Act, 42 U.S.C. §§ 5121-5206) and the National Response Plan.⁴ The Stafford Act authorizes the President to issue a “major disaster” or “emergency” declaration in response to catastrophes that overwhelm state and local governments. After Hurricane Katrina, the President declared a major disaster in certain areas of Alabama, Mississippi, and Louisiana. This declaration authorized all federal agencies, as necessary, to provide assistance to respond to the disaster, including the “demolition of unsafe structures which endanger the public” (§ 5170b) and debris removal activities (§ 5173).⁵

The National Response Plan (NRP) was developed by the Department of Homeland Security (DHS) to structure the way responders work together and to provide supporting mechanisms for disasters so serious that the Secretary of DHS declares them to be “Incidents of National Significance.”⁶ The NRP applies to situations where the resources of state and local authorities are overwhelmed and have requested federal assistance. Various federal statutory authorities and policies provide the basis for federal actions and activities in the context of domestic incident management under the NRP. The NRP does not confer new authorities upon the Secretary of DHS or any other federal official. Rather, the NRP establishes the coordinating structures, processes, and protocols required to integrate the specific statutory and policy authorities of various federal departments and agencies. As with the Stafford Act, the President has designated DHS as the implementing agency for the NRP.

Under the NRP, DHS identifies and groups the capabilities of federal departments and agencies into 15 Emergency Support Functions (ESFs) to provide the planning, support, resources, program implementation, and emergency services that are most likely to be needed during Incidents of National Significance. ESFs that include debris removal missions are ESF #3, “Public Works and Engineering” (for which the U.S. Army Corps of Engineers [the Corps] is the coordinating agency),

⁴ This report provides information necessary to understand individual agency roles specific to the debris removal and management process. For more information on provisions of the Stafford Act and the National Response Plan, see CRS Report RL33053, *Federal Stafford Act Disaster Assistance: Presidential Declarations, Eligible Activities, and Funding*, and CRS Report RL32803, *The National Preparedness System: Issues in the 109th Congress*, by Keith Bea.

⁵ The Stafford Act and implementing regulations use the term “debris removal” in a broad sense to encompass the entire process of removing, handling, recycling, and disposing of debris (44 C.F.R. 206.224). Similarly, in this report, the term “debris removal” is used broadly. Where necessary, actions such as disposal or recycling will be referred to specifically.

⁶ In accordance with provisions of the NRP, all presidentially declared disasters and emergencies under the Stafford Act are considered Incidents of National Significance (see “Section II. Planning Assumptions and Consideration” of the NRP, available at [http://www.dhs.gov/dhspublic/interapp/editorial/editorial_0566.xml], as of June 16, 2006).

and ESF #10, “Oil and Hazardous Materials Response” (for which the U.S. Environmental Protection Agency [EPA] is the coordinating agency). Not all ESFs are necessarily activated by the declaration of an Incident of National Significance. After Katrina, ESFs 3 and 10 were activated, in turn activating certain response functions of the Corps and EPA.

The primary roles of DHS’s Federal Emergency Management Agency (FEMA), the Corps, EPA, and state and local governments with regard to debris removal activities are summarized in **Table 3** in the **Appendix**. **Table 3** focuses primarily on these agencies’ roles under the Stafford Act and other authorities and as outlined under the NRP (e.g., EPA responsibilities under ESF #10 may include requirements applicable to the management of solid and hazardous waste under provisions of the Resource Conservation and Recovery Act [RCRA, 42 U.S.C. § 6901 et seq.]). It does not summarize all potential debris removal activities that may be required of all federal, state, or local agencies under all federal, state, or local laws or regulations.

Funding Debris Removal Activities

Congress appropriates money for activities authorized by the Stafford Act to the Disaster Relief Fund (DRF). The Stafford Act authorizes debris removal by federal agencies from publicly owned properties (e.g., roads and public buildings). The most commonly used method for state and local governments to acquire assistance for debris removal is through the FEMA Public Assistance (PA) program. FEMA can either reimburse local governments for the cost of debris removal, or the local government can request direct federal assistance from FEMA, which then tasks the Corps to complete the debris removal process.

The 109th Congress enacted two FY2005 emergency supplemental appropriations bills (P.L. 109-61 and P.L. 109-62) that appropriated \$62.3 billion for immediate relief and response needs. On June 15, 2006, President Bush signed the Emergency Supplemental Appropriations Act for Defense, the Global War on Terror, and Hurricane Recovery, 2006 (H.R. 4939), which appropriated \$6 billion to FEMA for disaster relief expenses. (See CRS Report RS22239, *Emergency Supplemental Appropriations for Hurricane Katrina Relief*, by Keith Bea.) Of the money appropriated to date, it is difficult to determine exactly how much has been or will be spent on debris removal operations. As of April 5, 2006, hurricane recovery funds for each agency’s mission assignment were approximately \$4 billion to the Corps and \$322 million to EPA.⁷ As of June 7, 2006, FEMA’s Public Assistance obligations for debris removal in the New Orleans metropolitan area were \$403.6 million.⁸

⁷ The President’s Council on Integrity and Efficiency, *Oversight of Gulf Coast Hurricane Recovery, A Semiannual Report to Congress*, Apr. 30, 2006, p. 48.

⁸ Federal Emergency Management Agency, “Weekly Disaster Relief Fund (DRF) Report, Congressional Weekly Report,” June 7, 2006, p. 84, available online at [http://appropriations.house.gov/_files/HurricaneKatrinaLink.htm], as of June 16, 2006.

The disaster declarations for Louisiana and Mississippi, and subsequent amendments,⁹ specify that FEMA will reimburse designated local governments 100% of the cost of debris removal on public and private property, in counties that are eligible for assistance, until June 30, 2006. After that, federal assistance for debris removal will be 90%. Pursuant to the initial disaster declaration for Alabama, the 100% cost reimbursement applied to debris removal operations in designated counties until October 27, 2005. Funding for any work after that reverted to the standard 75% federal and 25% nonfederal cost-share arrangement for debris removal and emergency protective measures.

FEMA typically reimburses localities for removing storm-related debris only from public rights-of-way. The agency agreed to pay the cost of debris removal from private property, including commercial property, from a number of selected Katrina-affected counties and parishes in Alabama, Louisiana, and Mississippi. However, this was done after affected state and local governments alerted FEMA that widespread debris on private property created a health and safety risk and identified the areas that required debris removal.

State Debris Plans and Emergency Declarations

Both Mississippi and Louisiana are removing their disaster debris in accordance with specific disaster debris management plans and emergency declarations (as outlined in **Table 3** in the **Appendix**, below). A debris management plan serves as guidance to anyone involved in debris removal operations.¹⁰ Those plans delineate the types of disaster debris that will be handled under the specified emergency conditions and the existing laws that apply to the handling and disposal of different types of waste (i.e., hazardous waste, non-hazardous waste, asbestos-containing materials). The plans also specify requirements regarding the selection of debris storage and staging sites and waste handling methods (e.g., chipping/grinding, burning, or landfilling) for certain types of waste.

The debris management plans provide an outline of existing applicable law. They also include changes to existing law or regulatory requirements as specified in emergency declarations issued by the respective Departments of Environmental Quality (DEQ).¹¹ Both states' emergency declarations, among other provisions,

⁹ See 71 *Fed. Reg.* 2261, FEMA Notice: "Louisiana; Amendment No. 10 to Notice of a Major Disaster Declaration," Jan. 13, 2006 and 71 *Fed. Reg.* 13861, FEMA Notice: "Mississippi; Amendment No. 13 to Notice of a Major Disaster Declaration," Mar. 17, 2006.

¹⁰ Louisiana DEQ, "Hurricane Katrina Debris Management Plan," available at [<http://www.deq.louisiana.gov/portal/Default.aspx?tabid=2245>]; and Mississippi DEQ, "Hurricane Katrina Disaster Debris Management Response," and amendments, available at [http://www.deq.state.ms.us/MDEQ.nsf/page/Main_HurricaneKatrinaDisasterRecovery?OpenDocument], as of June 16, 2006.

¹¹ Louisiana DEQ, "Declaration of Emergency and Administrative Order," and amendments available at [<http://www.deq.louisiana.gov/portal/Default.aspx?tabid=2245>]; Mississippi DEQ, Emergency Order 5062 05, Sept. 13, 2005, available at [http://www.deq.state.ms.us/MDEQ.nsf/page/Main_HurricaneKatrinaDisasterRecovery?OpenDocument], as of June 16,

specify existing and emergency requirements applicable to the management of solid waste, hazardous waste, and asbestos-containing materials. They also expand existing law or regulatory requirements to accommodate debris management issues unique to Hurricane Katrina. For example, the Louisiana DEQ emergency declaration expanded the definition of C&D waste to allow for the disposal of certain demolition wastes that would not otherwise be allowed in a C&D landfill (see the “Factors Complicating Debris Removal” section, below). Louisiana is operating under the provisions of its fifth amended emergency declaration. On May 31, 2006, provisions of the fifth amended declaration were extended 30 days.

On April 14, 2006, the Mississippi DEQ (MDEQ) issued a revision to its emergency authorizations for the management of building and structural debris and vegetative debris. In that revision, MDEQ declared that emergency need for additional storage and staging sites in response to storm management of Katrina wastes no longer exists for most counties and cities. MDEQ further directed local governments to begin preparing to close their storage and staging sites and begin transporting the remaining wastes directly to authorized disposal sites.

Factors Complicating Debris Removal

Debris removal after a disaster presents challenges unique to that disaster. Often, the debris removal process takes months or even years to finish. The slow pace of debris removal, particularly in flooded regions of the New Orleans area, has drawn attention from area stakeholders, as well as some Members of Congress. The type and breadth of destruction associated with Hurricane Katrina has resulted in various factors that complicate, and hence prolong, debris removal operations. Some of the prominent issues are discussed below.

Difficulty Separating Waste and the Slow Return of Residents

After most disasters, landfill space is usually limited, so communities try to divert as much waste from landfill disposal as possible through such means as reuse and recycling, burning, and composting. For example, vegetative debris can be chipped, composted, or burned; metals can be recycled; C&D waste can be partially recycled; household hazardous wastes can be separated and disposed of in specially designed landfills or incinerated; and refrigerators/freezers are emptied of spoiled foods and reused or recycled.

The separation of waste is also necessary to comply with existing federal and state laws regarding waste management.¹² For example, those requirements specify

¹¹ (...continued)
2006.

¹² States are required to regulate the management of solid and hazardous waste in accordance with provisions of the Resource Conservation and Recovery Act (RCRA). Solid waste is defined broadly under the law as “any garbage, refuse ... and other discarded (continued...)”

criteria under which solid, hazardous, C&D, and asbestos-containing wastes must be managed. Each category of disaster debris is required to be managed in a way that will limit the threat that such waste may pose to humans or the environment. To ensure that disaster debris is managed appropriately, the Corps is segregating and managing disaster debris as follows:

- White goods — collected separately, drained of freon, and recycled.
- Metals — collected and recycled.
- Vegetative debris — collected, and often ground, for re-use or burned; when mixed or contaminated with other wastes, burning is not an option.
- Electronic wastes — collected separately and recycled, to the degree possible.
- Household hazardous waste — collected separately and disposed of in specially designed landfills.
- C&D waste with asbestos-containing material (ACM) — separated and disposed into asbestos-permitted landfills.
- Tires — collected and recycled.

Although the Corps has requested that residents separate wastes, much of the disaster debris from flooded regions of the New Orleans area has been mixed to the point that separation is either very difficult or essentially impossible.¹³ Removing debris from each private property is time-consuming and labor-intensive. A crew must first segregate the waste, then waste that can be removed using equipment (e.g., a front loader) is loaded into trucks. Remaining waste must be removed by hand by a right-of-entry crew (i.e., a crew that has received permission from the property owner to enter the site).

For most disasters, residents evacuate an area for the duration of the event and return soon after — able to participate in the waste removal process. After Katrina, the destruction was so great that returning to many communities was impossible. This was the case particularly in the flooded areas of Orleans, Plaquemines, and St. Bernard Parishes. Although exact numbers are difficult to determine, it is estimated that 25% to 75% of the residents in those Parishes may have returned.¹⁴

In addition to facilitating more efficient pick-up by placing waste curbside, returning residents may expedite the removal process by separating the various types

¹² (...continued)

material” (42 U.S.C. § 6903). Hazardous waste, a subset of solid waste, is defined as a solid waste that is either specifically listed in the regulations (40 C.F.R. §§ 261.31-261.33) or meets specific criteria that make it toxic, ignitable (i.e., burns readily), corrosive, or reactive (e.g., explosive) (40 C.F.R. § 261.3).

¹³ For more information about the individual types of waste and issues associated with their removal, see **Table 2** in the **Appendix**, below.

¹⁴ See monthly population estimates by the Louisiana Department of Health and Hospitals Bureau of Primary Care and Rural Health, posted on the Greater New Orleans Community Data Center website at [<http://www.gnocdc.org/>]. Percentages cited here are for the estimates posted as of April 2006.

of waste themselves. For example, they may empty refrigerators of spoiled food (which may also eliminate the need to dispose of refrigerators or freezers); separate household hazardous waste before it leaks or otherwise contaminates other debris; remove rain-soaked debris before it becomes moldy or contaminated with other waste; deal with downed trees, branches, or other vegetative waste; or assist with the demolition of their homes.

However, even in areas where residents have returned, the separation of wastes can be problematic. Returning residents have been reminded not to commingle household garbage, such as food waste, with demolition debris, such as shingles. According to Waste Management, Inc. (the company that has contracted to remove household garbage, as opposed to Corps-managed debris, in certain areas of the city), this has been a problem in some areas — resulting in waste piles that they are not allowed to remove.¹⁵

The low percentage of returning residents is evident in the high number of trips that debris removal operators have had to make through some communities. According to the Corps, after a disaster, it typically takes debris collectors two to three passes through a neighborhood before the disaster debris is removed. After Hurricane Katrina, more than 20 passes have been made in some neighborhoods, and debris collection is still not complete.

C&D Waste Disposal and Community Concerns

One factor that concerns various stakeholders is the use of local landfills to dispose of certain hurricane-related waste. In particular, issues associated with the use of the Gentilly Landfill and the Chef Menteur Landfill have drawn significant attention. There are a variety of issues associated with each landfill, but one issue common to both is the concern among some stakeholders that C&D waste commingled with contaminated waste is being accepted at landfills that are not designed to accept such wastes.

As stated previously, RCRA governs the disposal of solid and hazardous wastes. Municipal solid waste landfills that collect household garbage are predominantly regulated by state and local governments. EPA has, however, established minimum criteria that these landfills must meet. States are then authorized to implement their own criteria that are at least as stringent as the federal requirements. Louisiana is authorized to implement its own waste management programs under RCRA. An element of that program is the authorization to issue permits to construct and operate municipal solid waste landfills.

Under federal law, C&D waste is classified neither as hazardous waste nor as municipal solid waste. Therefore, C&D landfills are not subject to federal design and operational criteria (i.e., C&D landfills are not required under federal law to have protective liners that a municipal solid waste landfill, which is expected to receive a certain amount of hazardous waste from households, would have). The disposal

¹⁵ Bruce Egger, *The Times-Picayune*, "Officials raise stink over trash; Slow pickup is 'crisis,' councilwoman says," May 4, 2006.

of C&D waste as a waste category is primarily a state-regulated issue. Louisiana regulations define C&D waste as

nonhazardous waste generally considered not water-soluble, including but not limited to metal, concrete, brick, asphalt, roofing materials (shingles, sheet rock, plaster), or lumber from a construction or demolition project, but excluding asbestos-contaminated waste, white goods, furniture, trash, or treated lumber. The admixture of construction and demolition debris with more than five percent by volume of paper associated with such debris or any other type of solid waste (excluding woodwaste or yard trash) will cause it to be classified as other than construction/demolition debris.¹⁶

The LDEQ “Declaration of Emergency and Administrative Order” specifies criteria applicable to C&D waste disposal and expands the definition to include —

- furniture, carpet, and painted or stained lumber contained in the demolished buildings;
- the incidental admixture of construction and demolition debris with asbestos contaminated waste (i.e., incidental asbestos-contaminated debris that cannot be extracted from the demolition debris); and
- yard waste and other vegetative matter.

Both the Gentilly and Chef Menteur landfills were authorized by LDEQ to accept C&D waste in accordance with provisions of the emergency declaration.¹⁷ Further, LDEQ released decisional documents that delineate the justification for the use of Gentilly Landfill and the Chef Menteur Landfill for the disposal of hurricane-related waste.¹⁸ Among other reasons, LDEQ cites the need for these landfills because of their close proximity to areas that received heavy damage, thus expediting the debris removal process and minimizing the cost (compared to hauling the waste to landfills farther away). LDEQ also argues that the waste being sent there will be of a relatively benign nature and will pose a minimal risk to the environment.

Opponents to the use of the landfills to accept Katrina-related C&D debris argue that the proximity to the most heavily damaged areas of the New Orleans area is, in fact, a drawback to their location — they argue that the sites are close to neighborhoods attempting to recover from the storm. Also, they question how “benign” the waste truly is. For example, they argue that under the expanded definition of C&D debris, the landfills can accept waste that is potentially more harmful. Also, they fear that with thousands of homes being torn down, trash haulers

¹⁶ *Louisiana Code* Title 33, Part VII § 115.

¹⁷ The Gentilly Landfill was operating as a C&D landfill before Hurricane Katrina. The Chef Menteur Landfill received an emergency permit to operate after the storm.

¹⁸ See LDEQ’s “Justification for Utilization of Chef Menteur C&D Disposal Facility for the Disposal of Hurricane-Generated Debris,” available at [<http://www.deq.louisiana.gov/apps/pubNotice/pdf/Chefmonteurdecisionenglish5-12-06.pdf>]; and the “Revocation of Order Authorizing Commencement of Operation & Authorization for Utilization of Gentilly Landfill for Disposal of Hurricane Generated Construction and Demolition Debris,” available at [<http://www.deq.louisiana.gov/portal/Default.aspx?tabid=2403>], as of June 16, 2006.

will have a difficult time sorting out the hazardous debris from the harmless, and that material more noxious than that allowed under the emergency declaration will wind up at landfills that are not designed to protect the environment from potentially hazardous wastes.¹⁹

In November 2005, EPA provided FEMA with a technical analysis and recommendation for use of the Gentilly Landfill. In particular, EPA was responding to “Questions from federal elected officials and others [regarding] the issue of potential Superfund liability of federal agencies engaged in hurricane response for future cleanup of the landfill.”²⁰ The memorandum discusses, among other points, the background of the site, the permitting process, and the on-site process of inspecting and separating waste. EPA concluded that there is no a way to protect against future Superfund liability absolutely, particularly liability for a landfill. However, EPA recommended that current operations take steps to continue good operating practices and to document their activities, such as by posting signs clearly identifying categories of acceptable waste, distributing leaflets to debris haulers clearly identifying categories of acceptable waste, documenting current operating safeguards, and publishing written procedures for segregating waste streams prior to loading debris removal trucks, so that only non-hazardous materials are loaded into trucks bound for the non-hazardous waste landfill.

To date, no similar technical analysis regarding Superfund liability has been conducted for the Chef Menteur Landfill. However, a representative of the Louisiana Field Office of the U.S. Fish and Wildlife Service (the Service) submitted comments to the Corps presenting the Service’s concerns regarding the operation of the landfill and the types of waste being accepting there.²¹ Specifically, the Service expressed concern that the operation of the Chef Menteur Landfill will pose a threat to the adjacent Bayou Sauvage National Wildlife Refuge. The comments state that

[The Service]... is primarily concerned about the potential secondary and indirect effects of siting and operating construction/demolition debris (C&D) landfill at [the Chef Menteur Landfill] location... Given the scope and nature of the flooding events and the age of many of the buildings to be demolished and deposited in the proposed landfill, we believe that the delivery of materials containing numerous environmental contaminants, such as lead-based paint, asbestos,

¹⁹ Gordon Russell, *The Times-Picayune*, “Chef Menteur landfill testing called a farce, Critics say debris proposal ‘would be a useless waste of time,’” May 26, 2006.

²⁰ Memorandum from George Pavlou, Senior Federal Official, New Orleans Field Office, to John Connolly, Infrastructure Branch Chief, “Potential Federal CERCLA Liability for use of the Gentilly Landfill for debris operations from Hurricane Katrina, FEMA-1603-DR-LA, ESF#10 Task Order,” November 11, 2005, available online at [<http://www.deq.louisiana.gov/portal/Default.aspx?tabid=2403>], as of June 16, 2006.

²¹ May 19, 2006, letter from Russell C. Watson, Supervisor, Louisiana Field Office of the U.S. Fish and Wildlife Service, to Colonel Richard P. Wagenaar, District Commander, U.S. Army Corps of Engineers. This letter is not available to the public online, but was provided to CRS by *The Times-Picayune* after the publication of its June 6, 2006, article referring to the letter (“Federal agency enters debate over landfill, Wildlife Service official calls for liner, limits at Chef Menteur site,” available online at [<http://www.nola.com/frontpage/t-p/index.ssf?/base/news-5/1149574327298360.xml>], as of June 16, 2006).

creosote, arsenic-based wood treatment chemicals, various petroleum products, and a variety of pesticides and household cleaning chemicals would be unavoidable. Placement of such materials in an unlined landfill, particularly within coastal wetlands, could potentially result in leaching and resultant persistent contamination of ground water, surface water and adjacent wetland habitats.

Further, the letter describes hydrological pathways that contaminated leachate from the landfill could travel to reach the Refuge. It requests that a liner be installed at the landfill or that restrictions be applied to waste being hauled there. To date, neither the Corps nor LDEQ has formally responded to the Service's comments.

Opponents of the use of the landfills filed suit to halt waste shipments to each landfill. The first, related to Gentilly, resulted in a settlement agreement between the plaintiff (the Louisiana Environmental Action Network, LEAN) and LDEQ that limits C&D shipments to 19,000 CY per day at the site.²² In the second suit, related to Chef Menteur, the judge rejected the plaintiff's (LEAN's) motion for a temporary restraining order that would have shut down a New Orleans area landfill.²³ In mid-May 2006, as a result of vocal opposition from area residents, New Orleans Mayor Ray Nagin temporarily halted waste shipments to the Chef Menteur landfill until testing could determine the toxicity of C&D waste being sent there. The landfill has since reopened as the interested parties debate how testing will be done.

LDEQ cites the settlement agreement limiting debris intake at the Gentilly Landfill, in part, for its decision to use the Chef Menteur site.²⁴ The available landfill capacity at the 100-acre Chef Menteur site is 7.2 million CY of debris.²⁵ It is estimated by some that a landfill that size, filled to capacity, will result in a debris pile that is 80 feet above surrounding landscape elevations.²⁶

Demolition of Private Properties

DHS estimates that hundreds of thousands of homes were damaged to some degree by the storm and subsequent flooding.²⁷ The degree to which cleanup and, possibly, rebuilding may occur depends on the extent to which and when some of those damaged structures will be demolished and removed.

²² Documents related to the suit, including the administrative order and settlement agreement, are available online at [<http://www.deq.louisiana.gov/portal/Default.aspx?tabid=2403>], as of June 16, 2006.

²³ The judge's ruling is available online at [<http://www.deq.louisiana.gov/portal/tabid/2245/Default.aspx>], as of June 16, 2006.

²⁴ See LDEQ's "Justification for Utilization of Chef Menteur C&D Disposal Facility for the Disposal of Hurricane-Generated Debris," pp. 2-3.

²⁵ *Ibid*, p. 8.

²⁶ Russell Watson letter to the Corps (footnote 18).

²⁷ See the DHS, Office of the Federal Coordinator for Gulf Coast Rebuilding, "Current Housing Unit Damage Estimates Report," Feb. 12, 2006 (revised April 12, 2006), available at [<http://www.gnocdc.org/>], as of June 16, 2006.

FEMA or the Corps cannot decide to demolish homes or remove the debris from private property. That determination must be made by the homeowner and involves a multi-step process involving property decommissioning and condemnation. That process includes inspecting the structure, evaluating the presence of hazardous substances and materials; testing for asbestos-containing materials; removing and segregating regulated and hazardous substances and materials; and transporting and disposing of hazardous waste streams.

Local governments have limited capabilities to oversee the complicated documentation requirements that must be completed before a private structure can be demolished. Further, demolition decisions are controversial and have social and political implications. It has been speculated by some that many residents will not choose to allow their homes to be demolished, but may instead opt to repair or rehabilitate their damaged homes.

The number of private structures ultimately demolished will likely have the greatest impact on the time it takes to complete debris removal operations. Many questions must be answered before the extent of the demolition will be known. For example, the plan for rebuilding New Orleans is still largely unknown. That plan may specify areas in which rebuilding will not be allowed or where rebuilding may be required to be elevated.

Asbestos in Buildings Being Demolished

The presence of asbestos-containing materials in damaged residential structures, and the need to segregate that material before demolition and disposal, will add to the time it takes to demolish individual structures. Both federal and state laws specify criteria that must be met when demolishing a structure with asbestos-containing materials.²⁸ Further, Mississippi and Louisiana have each published their own protocols for complying with state asbestos requirements, as they apply to the destruction and cleanup after Hurricane Katrina.²⁹ EPA is working closely with each state and is providing debris management guidance to ensure minimization of exposures while expediting cleanup. For example, EPA has advised states to make

²⁸ The Clean Air Act (§112) establishes national emissions standards for hazardous air pollutants (NESHAP), including asbestos. Individual states, in coordination with EPA, must manage ACM in compliance with the asbestos NESHAP, with regard to asbestos removal and disposal during building destruction and renovation (40 C.F.R. §§ 61.140-61.160).

²⁹ See Mississippi DEQ's "Policy for Handling Demolitions of Structures to Address Potential Asbestos," Jan. 3, 2006, available at [http://www.deq.state.ms.us/MDEQ.nsf/page/Main_HurricaneKatrinaDisasterRecovery?OpenDocument]; Louisiana DEQ's "LDEQ Protocol to Comply with the LESHAP Regulations," Mar. 16, 2006, available at [<http://www.deq.louisiana.gov/portal/Default.aspx?tabid=2251>]; and the Feb. 24, 2006, letter from Granta Nakayama, EPA Assistant Administrator, Office of Enforcement and Compliance, to Mike McDaniel, Secretary, LDEQ, specifying EPA's agreement with LDEQ regarding asbestos issues in hurricane-affected areas, available at [<http://www.deq.louisiana.gov/portal/tabid/2223/Default.aspx>], as of June 16, 2006.

efforts to segregate asbestos and certain other types of waste for proper disposal in landfills prior to burning the debris.³⁰

Not knowing how many structures will have asbestos, it is difficult to estimate how much time may be added to the demolition process (and subsequent debris removal process). However, it is a factor that has been identified by the Corps as one that limits their ability to remove debris.³¹

Conclusion

To date, there have been no congressional hearings devoted specifically to issues related to debris removal operations. However, the topic has been discussed broadly as an element of overall response activities. For example, there have been broad discussions on the scope of the damage and volume of debris created by the storm and the role of federal agencies in the cleanup response.³² There have also been hearings to discuss issues associated with the federal government's contracting policies, practices, preparations, and response to Hurricane Katrina, of which debris removal contracts are a part.³³

The need for funding for debris removal operations will continue as demolition activities begin in earnest in the New Orleans metropolitan area. It is difficult to estimate how long demolition will take, but it may last six months to a year. After that, the rebuilding itself will also generate a significant amount of construction debris. This is likely to continue for several years.

³⁰ EPA, Hurricane Katrina Response, Frequent questions, "Asbestos," available at [<http://www.epa.gov/katrina/faqs.htm>], as of June 16, 2006.

³¹ The Corps, "Louisiana and City of New Orleans-Debris Removal and Demolition Mission," provided to CRS on Mar. 16, 2006, and identified as materials used for presentation to DHS, Feb. 14, 2006.

³² See the House Committee on Transportation and Infrastructure, Subcommittee on Economic Development, Public Buildings, and Emergency Management, hearing "Recovering after Katrina: Ensuring that FEMA is up to the task," Oct. 6, 2005, background and witness testimony available online at [<http://www.house.gov/transportation/pbed/10-06-05/10-06-05memo.html#WITNESSES>], as of June 16, 2006.

³³ See House Committee on Government Reform hearing "Sifting Through Katrina's Legal Debris, Contracting in the Eye of the Storm," May 4, 2006, background and witness testimony available online at [<http://reform.house.gov/GovReform/Hearings/EventSingle.aspx?EventID=42668>]], as of June 16, 2006.

Appendix

Table 2: Types of Disaster Debris and Selected Issues/Concerns with Removal

Waste Type	Examples	Selected Issues/Concerns with Removal
Municipal solid waste (MSW)	Personal belongings and general household trash	Commonly, MSW is non-hazardous waste that is sent to landfills permitted to accept such waste. After being submerged in flood waters, such waste may have become contaminated with hazardous constituents that are essentially impossible to separate or remove. In areas subject to flooding or storm surge, MSW may include the entire contents of homes in that area.
Putrescibles	Rotten or spoiled fruits, vegetables, seafood, or meats	Putrescibles are considered MSW, but must be removed as soon as possible to avoid odor problems, environmental contamination, and rodent infestation. When mixed with other MSW, as in flood conditions, they may contaminate surrounding debris. Millions of pounds of food waste were generated in the New Orleans area.
White goods	Refrigerators, freezers, air conditioners, washers, dryers, stoves, water heaters, and dishwashers	After Hurricane Katrina, white goods such as refrigerators and freezers contained rotten food that had to be removed before the appliances could be recycled or otherwise disposed of. White goods containing freon (e.g., refrigerators, freezers, and air conditioners) have to be properly drained of freon before recycling or disposal.
Household hazardous waste (HHW)	Oil, pesticides, paints, cleaning agents	Where practical, it is usually preferable to collect HHW separately from municipal waste to avoid sending large quantities to landfills that are not intended to accept hazardous waste. However, in extensively flooded areas of New Orleans, particularly where residents have not returned, containers may have leaked and contaminated the surrounding debris. Homeowners have been asked to separate HHW that has not leaked or spilled from other disaster debris. However, in areas where homeowners have not returned, HHW may become mixed with demolition waste.

Waste Type	Examples	Selected Issues/Concerns with Removal
Construction and demolition (C&D) debris	Asphalt, drywall, plaster, brick, metal, concrete, roofing materials, and untreated lumber	C&D waste is generally considered a relatively benign type of waste. Such waste is generally disposed of at specially designated C&D landfills but must have toxic materials removed beforehand. Under normal conditions, separating toxic materials from C&D waste is not a problem (other than adding to the time it takes to demolish a structure). However, C&D waste generated in flooded areas of New Orleans may be mixed with or be contaminated with toxic substances such lead, asbestos, arsenic (in certain treated wood), petroleum products, household hazardous waste, putrescibles, or mold. Destruction may be so extensive that the separation of toxics is essentially impossible.
Vegetative debris	Trees, branches, shrubs, and logs	Chipping and mulching vegetative waste for reuse or composting are preferred methods of managing vegetative waste. However, when it is generated in significant amounts, burning may be the primary viable management option.
Automobile-related materials	Cars and trucks, fuel, motor oil, batteries, and tires	Tens of thousands of cars, trucks, and boats were abandoned in the New Orleans area. Waste from those vehicles include metals that can be recycled. Typically, auto-related wastes such as motor oil, gasoline, whole tires, and batteries are prohibited from MSW landfills or are recycled.
Electronic waste	Computers, televisions, printers, stereos, DVD players, telephones	Electronic waste can typically be reused or recycled. However, this is not feasible if the products have become contaminated with sewage or flood waters. Such waste may include various hazardous components, such as lead and mercury.

Source: Table prepared by the Congressional Research Service (CRS) based on a review of Mississippi and Louisiana Departments of Environmental Quality disaster management plans.

Table 3: Summary of Selected Governmental Roles in Post-Katrina Debris Removal Activities

Agency	Role/Responsibility Under the Stafford Act/National Response Plan	Comments
FEMA	Provide assistance to respond to the disaster, including funding debris removal and the “demolition of unsafe structures which endanger the public”; provide funding from the Disaster Relief Fund to agencies with various Emergency Support Functions (ESF) specified in the National Response Plan (NRP); FEMA receives requests for assistance from state representatives, and “mission assigns” the Corps to perform specific tasks that are deemed eligible.	Debris removal missions under ESF#3, Public Works and Engineering, and ESF #10, Oil and Hazardous Materials Response, involve an interagency and inter-governmental team that includes, among many, the following agencies: FEMA, the Corps, EPA (including regional offices), the states of Louisiana and Mississippi, local Parishes and counties, and the American Red Cross.
The Corps	<p>The Corps acts as the coordinator for ESF #3. The Corps’ mission includes right of way clearance, curbside pickup, private property debris removal (PPDR), and property demolition. Included within its ESF #3 mission is providing personnel for the Corps’ debris removal team, obtaining a contractor to execute the mission, and coordinating landfill and burn site and the final disposal of debris.</p> <p>The management of <i>contaminated</i> debris is coordinated with EPA under ESF #10.</p>	Debris removal may be entirely the mission of the Corps under its authority, or it may be done by the local government and reimbursed by FEMA (under the Stafford Act’s Public Assistance [PA] program). In Louisiana, the Corps has the ESF #3 mission in 21 parishes, while 19 other parishes are conducting debris removal on their own through the FEMA PA program. In Mississippi, the Corps has the ESF #3 mission in 15 counties, and 75 other counties are conducting debris removal on their own through the FEMA PA program.

Agency	Role/Responsibility Under the Stafford Act/National Response Plan	Comments
EPA	<p>Under ESF #3, EPA assists local agencies in locating disposal sites for debris clearance activities and assists with contaminated debris management activities by coordinating and/or providing resources, assessments, data, expertise, technical assistance, monitoring, and other appropriate support.</p> <p>EPA is the lead federal agency under ESF #10. Under the mission, FEMA funds EPA’s retrieval and disposal of orphan tanks and drums and the collection of household hazardous waste; the collection of liquid and semi-liquid waste has also been tasked to ESF #10.</p>	<p>EPA has worked with other federal agencies (particularly the Corps), state agencies, and local governments to facilitate the collection, segregation, and management of household hazardous waste. EPA has provided guidance on identifying and disposing of electrical equipment that may contain PCBs and on the handling and disposal of debris containing asbestos. EPA has also provided the affected states with guidance on burning debris.</p>
State and local government	<p>The states help coordinate local governmental requests for federal assistance and work with FEMA to define the mission. The Corps coordinates with state representatives regarding operational issues.</p> <p>Local agencies are responsible for providing Rights-of-Entry permits to allow the Corps or its contractors to enter private property for debris removal activities (within the Corps’ authority); establishing criteria and procedures for classifying different types of debris; selecting disposal methods and approving disposal operations; condemning properties; providing demolition plans, and designating the appropriate type of landfill.</p> <p>Each state is conducting debris removal operations in accordance with declarations of emergency issued by its respective Department of Environmental Quality (DEQ) and in accordance with specific debris management plans issued after the storm.</p>	<p>The Louisiana and Mississippi Departments of Environmental Quality (LDEQ and MDEQ, respectively) are the environmental regulatory arms of the state government. Each state is authorized to implement its own solid and hazardous waste management program, including siting and permitting debris disposal sites.</p> <p>State or local governments may choose to accept the debris removal mission and apply for reimbursement from FEMA (see the Comments section regarding the Corps, above).</p>

Source: Table prepared by CRS based on a review of selected provisions of the Stafford Act, ESFs #3 and #10 of the National Response Plan, and debris management plans issued by the Louisiana and Mississippi Departments of Environmental Quality.