OFFICE OF INSPECTOR GENERAL

Catalyst for Improving the Environment

Evaluation Report

EPA Provided Quality and Timely Information on Hurricane Katrina Hazardous Material Releases and Debris Management

Report No. 2006-P-00023

May 2, 2006

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Abbreviations

ATSDR	Agency for Toxic Substances and Disease Registry
EPA	Environmental Protection Agency
ESF	Emergency Support Function
FEMA	Federal Emergency Management Agency
LDEQ	Louisiana Department of Environmental Quality
MDEQ	Mississippi Department of Environmental Quality
NPL	National Priorities List
OIG	Office of Inspector General
PCIE	President's Council on Integrity and Efficiency
RCRA	Resource Conservation and Recovery Act
RECAP	Risk Evaluation/Corrective Action Program
UST	Underground Storage Tank

Cover photo: Damage from Hurricane Katrina. (Source: EPA)

U.S. Environmental Protection Agency
Office of Inspector General

2006-P-00023
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At a Glance

Catalyst for Improving the Environment

Why We Did This Review

This review was conducted in conjunction with the President's Council on Integrity and Efficiency as part of its examination of relief efforts provided by the Federal Government in the aftermath of Hurricanes Katrina and Rita. We conducted this review to assess the Environmental Protection Agency's (EPA's) response efforts related to oil spills, hazardous materials, Superfund sites, and debris and waste management.

Background

On August 29, 2005, Hurricane Katrina made landfall, leaving behind a trail of destruction in three States. In Louisiana and Mississippi, the storm created an estimated 86 million cubic yards of debris; caused the spill of more than 7 million gallons of oil; produced floodwaters that deposited hazardous substances in sediments; and passed over 18 Superfund National Priority List sites and more than 400 industrial facilities that store or manage hazardous materials.

For further information, contact our Office of Congressional and Public Liaison at (202) 566-2391.

To view the full report, click on the following link:
www.epa.gov/oig/reports/2006/20060502-2006-P-00023.pdf

EPA Provided Quality and Timely Information on Hurricane Katrina Hazardous Material Releases and Debris Management

What We Found

Following Hurricane Katrina, EPA was the Federal agency with lead responsibility to prevent, minimize, or mitigate threats to public health and the environment caused by hazardous materials and oil spills in inland zones. EPA responsibilities also included providing oversight and assistance in the management of hurricane-generated debris and waste.

EPA established quality and timely approaches for rapidly identifying, prioritizing, and assessing the nature, magnitude, and impact of hazardous material releases:

- EPA coordinated with State, local, and other Federal government agencies to assess potential environmental and human health impacts from Hurricane Katrina and provided quality and timely information for determining risks and impacts in EPA's areas of responsibility and oversight.
- On its own, or in partnership with State, local, or other Federal agencies, EPA provided information on chemicals present in sediment samples, and assessed results of damage or releases at all Superfund National Priority List sites in the path of the Hurricane, more than 400 industrial facilities, and approximately 850 Louisiana underground storage tanks.

Also, EPA is providing quality and timely oversight, assistance, and direct support in managing hurricane hazardous debris and waste throughout the affected areas:

- EPA distinguished between hazardous and non-hazardous debris and is ensuring consistency in segregation through its management of hazardous wastes and oversight assistance at various landfills and staging areas.
- EPA provided the public with information on how to properly dispose of household hazardous waste, and collected over 2.5 million hazardous waste containers in Louisiana.
- EPA provided information to the States, and the States and EPA have worked together to address challenges in Katrina recovery and cleanup efforts.

EPA responded to issues and questions we raised about response and cleanup progress. We make no recommendations.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

OFFICE OF
INSPECTOR GENERAL

May 2, 2006

MEMORANDUM

SUBJECT: EPA Provided Quality and Timely Information on Hurricane Katrina Hazardous Material Releases and Debris Management
Report No. 2006-P-00023

TO: Susan Bodine
Assistant Administrator, Office of Solid Waste and Emergency Response

James I. Palmer, Jr.
Regional Administrator, EPA Region 4

Richard E. Greene
Regional Administrator, EPA Region 6

This is our report on the subject evaluation conducted by the Office of Inspector General (OIG) of the U.S. Environmental Protection Agency (EPA). The evaluation did not identify any conditions requiring corrective actions and no recommendations are made. This report represents the opinion of the OIG and the findings in this report do not necessarily represent the final EPA position.

The Agency agreed with our observations and provided only technical comments to our draft report. These comments are included in Appendix F. Since our report made no recommendations, no further action is required. We appreciate the cooperative efforts of EPA, Mississippi, and Louisiana officials and staff as we carried out our work. If you or your staff have any questions regarding this report, please contact me at (202) 566-0847, or Carolyn Copper, at 202-566-0829.

Sincerely,

Bill A. Roderick
Acting Inspector General

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Purpose

The President's Council on Integrity and Efficiency (PCIE), a group of Federal audit and investigative organizations, is conducting multiple audits, evaluations, and investigations of the Federal Government's response to Hurricanes Katrina and Rita. This review was conducted in conjunction with the PCIE as part of its examination of relief efforts provided by the Federal Government in the aftermath of Hurricanes Katrina and Rita. As such, a copy of the report has been forwarded to the PCIE Homeland Security Working Group, which is coordinating Inspectors General reviews of this important subject.

As a member of the PCIE, the Environmental Protection Agency (EPA) Office of Inspector General (OIG) was tasked with evaluating several issues related to EPA's response. One of these evaluations was to assess EPA's Hurricane Katrina response efforts related to oil spills, hazardous materials, Superfund sites, and debris and waste management. Overall, we sought to determine whether EPA is providing quality and timely information relative to the safety of individuals and the environment, and whether the information is being used by the States and other regulatory agencies in their response efforts. To address this overall objective, we sought to answer the following questions:

- How is EPA determining the nature, magnitude, and impact of oil spills, fuel releases, sediment contamination, and other hazardous material or substance releases (including new releases and/or those from existing Superfund sites) on human health and the environment?

- How is EPA making distinctions between hazardous and non-hazardous hurricane debris and waste, and are these distinctions being made consistently across the Gulf Coast region?

Background

On August 29, 2005, Hurricane Katrina made landfall on the Gulf Coast, leaving behind a trail of mass destruction in parts of Louisiana, Mississippi, and Alabama. In Louisiana and Mississippi, the storm created an estimated 86 million cubic yards of debris; caused the spill of more than 7 million gallons of oil; produced floodwaters that deposited fuel oils, gasoline, bacteria, and metals in sediments; and passed over 18 Superfund National Priorities List (NPL) hazardous waste sites and more than 400 industrial facilities that store or manage hazardous materials. Due to flooding and hurricane storm surges, millions of hazardous products – such as bleach, cleaners, oil, fuels, pesticides, herbicides, paint, and batteries – were scattered into the environment. In Louisiana alone, the hurricane potentially impacted approximately 850 underground storage tank facilities and over 300,000 "white goods" (appliances, such as refrigerators and air conditioners, which may contain harmful substances such as Freon).

After EPA's initial focus and assistance with urgent rescue needs, EPA shifted its efforts to its responsibilities under the National Response Plan. The plan establishes a single, comprehensive framework for the management of domestic incidents, including hurricanes. It provides the structure and mechanisms for the coordination of Federal support to State, local, and tribal incident managers and for exercising direct Federal authorities and responsibilities. Based on the authorities and responsibilities under the National Response Plan, the Federal Emergency

Management Agency (FEMA) assigns specific missions to various Federal agencies through Emergency Support Functions (ESFs). Agencies may participate in a variety of ESFs, either as the lead or support agency. EPA is the lead Federal agency for ESF #10 – Oil and Hazardous Materials. ESF #10 responsibilities may include:

- Addressing threats from actual or potential releases including oil spills, sediment contamination, and hazardous substances.
- Managing household hazardous waste, and other material releases which may pose a threat to public health or the environment, such as electronics and white goods.
- Managing, overseeing, and assisting in the segregation of hazardous debris and waste.

In addition to ESF #10, EPA also serves as a support agency under a variety of other ESFs, including ESF #3 – Public Works and Engineering – which addresses managing contaminated debris and waste. ESF functions supported by EPA are listed in Appendix A.

Various principal authorities guide the structure, development, and implementation of the National Response Plan that pertain to ESF functions supported by EPA:

- **Federal disaster legislation:** The Robert T. Stafford Disaster Relief and Emergency Assistance Act, Public Law 93-288, as amended (the Stafford Act) supports State and local governments and their citizens overwhelmed by disasters. This law establishes a process for requesting and obtaining a Presidential disaster declaration, defines the type and scope of assistance available, and sets conditions for obtaining assistance.

- **Other regulatory authorities:** EPA's other authorities to respond to environmental events remain in effect, such as those provided in the National Contingency Plan; Comprehensive Environmental Response, Compensation, and Liability Act; Resource Conservation and Recovery Act (RCRA); and Oil Pollution Act of 1990.

Scope and Methodology

This evaluation focused on the States impacted most by Hurricane Katrina – Mississippi and Louisiana – and did not include Alabama. To gain first-hand knowledge on Hurricane Katrina's impact in these two States, we visited portions of the affected areas in Louisiana and Mississippi. In Louisiana we visited the Metairie Incident Command Center, Old Gentilly Landfill, debris staging areas, and a household hazardous waste collection site. We also visited impacted areas in and around the New Orleans area, including the Lower Ninth Ward, St. Bernard Parish (Murphy Oil spill site), Agriculture Street Landfill Superfund site, and the area surrounding the 17th Street Canal levee break. In Mississippi we visited the Biloxi Incident Command Center, a Division A landfill and staging area, and other impacted areas along the Gulf Coast including the cities of Waveland and Biloxi.

To answer the first question, we identified sites or facilities that can be, or have been, associated with hazardous material substance releases, and collected and analyzed specific operational, management, and response-related information about them. The categories of sites or facilities we looked at for this question included:

- **Operational Facilities:** Operational facilities regulated by existing Federal, State, and local environmental programs. Operational facilities utilize, produce, and/or store chemicals and other hazardous substances, and thus have the potential to release hazardous substances into the environment. They include RCRA generators; RCRA transport, storage, and disposal facilities; Toxic Release Inventory filers; and Risk Management Plan filers.
- **Contaminated Hazardous Waste Sites:** Superfund NPL sites as identified by the Federal Superfund Program. Established pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act, the NPL is a list of abandoned or uncontrolled hazardous substance sites that are prioritized for long-term remediation.
- **Underground Storage Tanks (USTs):** USTs as identified by State and local programs.
- **Oil Spills:** Spills in navigable waters and land releases.
- **Sediments:** Non-point source contamination of New Orleans by flood water sediments. EPA conducted air, flood water, sediment, and soil sampling; this evaluation addresses only the sediment sampling activities.

To determine the quality and timeliness of EPA's efforts, we evaluated how EPA was determining the nature, magnitude, and impact of oil spills, sediment contamination, and other hazardous material or substance releases on human health and the environment. We evaluated whether the information associated with this was timely and presented to the public. In carrying this out, we interviewed officials from various EPA headquarters program offices, including the Office of Solid Waste and Emergency Response and its constituent offices: Office of Emergency Management, Office of Solid Waste, and Office of Underground Storage Tanks. We also interviewed program officials in EPA Region 4 (which covers Mississippi) and Region 6 (which covers Louisiana), as well as State officials from the Louisiana Department of Environmental Quality (LDEQ) and the Mississippi Department of Environmental Quality (MDEQ).

We performed field work from October 2005 through February 2006. We conducted our review in accordance with *Government Auditing Standards*, issued by the Comptroller General of the United States. Additional details on scope and methodology are in Appendix B.

EPA Provided Quality and Timely Information on the Nature, Magnitude, and Impact of Hazardous Material Releases

EPA Regions 4 and 6 established quality and timely approaches for rapidly identifying, prioritizing, and assessing the nature, magnitude, and impact of hazardous material releases. EPA coordinated with State, local, and other Federal Government agencies to assess potential environmental and human health impacts from Hurricane Katrina. Further, EPA provided the public, State and local officials, and other Federal decision makers with quality and timely information in EPA's areas of responsibility and oversight. This included conducting and distributing sampling results of floodwater sediments in New Orleans, and identifying and assessing Superfund NPL sites and major operational facilities. Details follow.

Sediment Contamination

EPA provided quality and timely information on sediment contamination to the States and other Federal decision makers for use in determining associated risk and impact assessment. As of February 2006, EPA, in coordination with LDEQ, took more than 800 sediment samples in the New Orleans area to determine the nature and type of contamination that may have impacted residential areas due to the migration of chemicals and other hazardous materials by floodwaters. While some samples exceeded LDEQ and EPA criteria, the majority of the chemicals detected were below levels of health concern. Sampling results were provided to FEMA and to State and Federal health agencies – including the Centers for Disease Control and Prevention, Agency for Toxic Substances and Disease Registry (ATSDR), and Louisiana Department of Health and Hospitals – for risk and impact assessment and public notification. EPA promptly posted summaries of sediment sampling activities, test results, and safety precautions recommended by public health agencies on public Web sites as they became available. Public service announcements were promptly issued regarding precautions related to the now receded floodwaters and the cleanup of sediments. EPA continues to post results to its Web site as they become available.

Region 6 is tasked under ESF #10 to conduct sampling and assessment of sediments in residential areas where floodwaters from Hurricane Katrina receded. EPA defines sediment as residuals deposited by receding flood waters that may include historical sediment from nearby water bodies, soil from yards, road and construction debris, and other material. The objective of the sampling is to determine the nature and type of contaminants that may have impacted residential areas due to migration of hazardous materials. Region 6 geared initial sampling toward characterizing the sediment to determine potential risks to first responders. On-going sampling and analysis is being conducted to address risk associated with long-term exposure. To help ensure reliable and quality sampling data, Region 6 developed an emergency response quality assurance sampling plan[1] that includes screening levels, quality assurance measures, and data validation requirements.

Within days of the floodwaters receding, EPA, in coordination with LDEQ, had drafted a quality assurance sampling plan and began collecting sediment samples. During the initial sampling period of September 10 – October 14, 2005, EPA and LDEQ collected sediment samples at more than 430 sites in the streets and public areas of Jefferson, Orleans, Plaquemines, and St. Bernard Parishes (all sampling sites as of December 11, 2005, are displayed in the map in Appendix C). EPA tested each of the samples for about 200 different pollutants, including volatile organic compounds, semi-volatile organic compounds, total metals, pesticides, and total petroleum hydrocarbons. EPA and LDEQ compared levels of chemicals with ATSDR Minimum Risk Levels to the appropriate Minimum Risk Levels to determine risk. For those chemicals with no Minimum Risk Level, ATSDR developed exposure models based on current available toxicity information to determine associated risk.

Based on sample results released during the period September 17-26, 2005, some samples contained a variety of chemicals, as expected in a highly populated urban area. However, the

[1] *Emergency Response Quality Assurance Sampling Plan for Hurricane Katrina Response Screening Level Sampling for Sediment in Areas Where Flood Water Receded, Southeast Louisiana*, September 2005.

majority of the chemicals were below levels of health concern. The most frequently detected chemicals included some metals; petroleum hydrocarbons; polycyclic aromatic hydrocarbons (PAHs); and, to a lesser degree, pesticides (e.g., chlordane, dieldrin, aldrin). Many of these chemicals are or were commonly used, and therefore are routinely present in the environment. To determine short-term risk associated with the detected chemicals, EPA worked closely with ATSDR to determine appropriate exposure scenarios. EPA and ATSDR concluded that exposure during response activities to the low levels detected should not cause adverse health impacts as long as proper protective equipment is worn (e.g., gloves and safety glasses).

Following the initial sampling period, EPA began addressing risks associated with long-term exposure. EPA and LDEQ compared results of samples collected after September 25, 2005, to LDEQ's *Risk Evaluation/Corrective Action Program (RECAP) Management Option 1 Soil Standards*. LDEQ's non-industrial RECAP Soil Standards are intended to be protective of long-term (i.e., 30-year) exposures to children and adults in a residential setting. Although the levels in some samples exceed RECAP standards, they fall within a risk range of 1 in 1,000,000 to 1 in 10,000 risk of an individual developing cancer over a lifetime, from exposure to those concentrations, which EPA has found acceptable in other contexts.

Subsequent sampling conducted through February 2006 continues to detect many of the same chemicals as noted in the previous sampling events, but the majority of chemicals detected are below levels of concern. Approximately 40 locations, found within 17 of 26 New Orleans area zip codes, continue to detect some values at levels exceeding RECAP standards. These locations have been identified for further sediment/soil evaluation and possible re-sampling. EPA officials said that should an area be found to pose an unacceptable risk after confirmatory sampling, they will work with the State of Louisiana to determine appropriate next steps.

Superfund Sites

EPA promptly identified, prioritized, and assessed all Superfund NPL sites in the affected areas of Louisiana and Mississippi (see Figure 1). EPA generally provided quality and timely information on the assessment process to the States, local agencies, and general public. EPA promptly posted assessment results, along with supporting validated analytical data, on the Agency's public Web site. Overall, EPA concluded that there were no impacts from Hurricane Katrina for 15 of the 18 sites in the affected areas.

Under ESF #10, EPA is the lead Federal agency responsible for addressing actual or potential releases of hazardous materials, including those from NPL sites. EPA identified 18 NPL sites in the affected areas through its Superfund

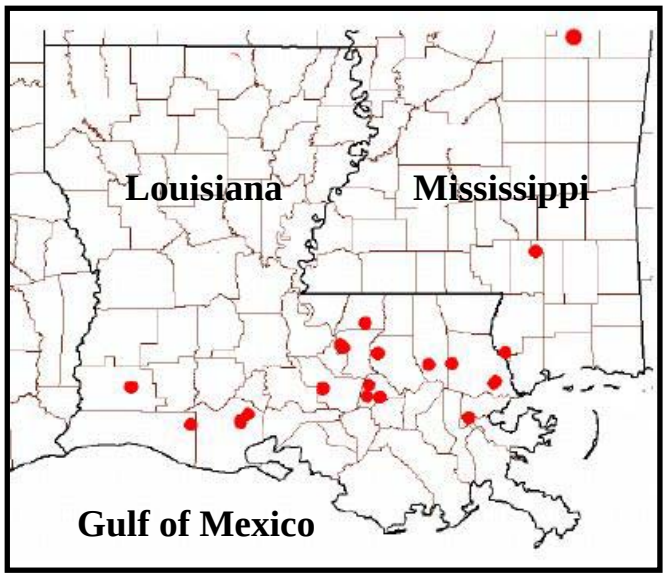

Figure 1- NPL sites in Louisiana and Mississippi. (Source: Congressional Research Service Report *Cleanup After Hurricane Katrina: Environmental Considerations*, October 13, 2005. Text added by EPA OIG)

database (15 in Louisiana and 3 in Mississippi). EPA prioritized these sites based on proximity to the hurricane's path, and assessed them with assistance from the States. The assessment process generally included an initial damage assessment (e.g., contact with State and/or responsible parties, and/or visual inspections), followed by further evaluation, including site inspection and sampling. Although the approaches varied somewhat, both Regions utilized approved sampling plans and performed data validation to ensure data quality.

In Louisiana, Region 6, with assistance from the State, conducted initial NPL site assessments during September 2-9, 2005. EPA and LDEQ conducted further evaluation and sample activities (sediments, surface water, and groundwater) from September 13 through October 14, 2005, in accordance with site-specific operations and maintenance monitoring plans.[2] EPA's conclusions regarding the potential impact of the hurricane on the sites were based on comparisons of post-hurricane data to past sample data collected during routine monitoring activities. Region 6 received, evaluated, and promptly posted validated analytical data results on the Agency's public Web site.

In Mississippi, MDEQ conducted initial NPL site assessments during September 7-8, 2005. EPA Region 4 conducted further evaluation and sampling activities from September 15 through October 14, 2005. Sampling activities were conducted in accordance with Region 4's *Quality Assurance Project Plan, Post-Katrina Site Evaluations, Southern and Coastal Alabama and Mississippi, October 2005*, which was developed according to EPA guidance for Quality Assurance Project Plans. EPA's conclusions regarding potential impact of the hurricane on the sites were based on comparison of post-hurricane data to existing soils and sediment cleanup values defined for the site, or past sample data. In addition, the results were compared to *EPA Region 9 Preliminary Remediation Goals*[3] and the Office of Water's *2004 National Recommended Water Quality Criteria*[4] to determine whether site conditions might represent previously unrecognized risks to human health and the environment. Region 4 received, evaluated, and promptly posted validated analytical data results to the Agency's public Web site.

Based on the post-hurricane evaluations of Superfund sites, EPA concluded that the hurricane did not impact 15 of the 18 sites. The remaining three sites are in Louisiana. Two of these sites – Delatte Metals and PAB Oil – showed higher concentrations of metals in groundwater samples than from pre-hurricane samples. EPA said it will continue to monitor groundwater at these sites as part of the routine operations and maintenance. Initial results for the third site – Agriculture Street Landfill in Orleans Parish – confirmed that the remedy implemented at the site was not impacted by the hurricane, but completion of the final evaluation is pending further sampling of sediments deposited by flooding in the area that exceeded LDEQ RECAP criteria.

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[2] Seven of the 15 NPL sites are Final NPL sites and are in the construction completion–operations and maintenance phase with monitoring plans. The remaining sites are deleted NPL sites, which had been removed from the NPL after EPA determined no further response is required to protect human health and the environment.

[3] *EPA Region 9 Preliminary Remediation Goals* are risk-based concentrations based on long-term (i.e., 30-year) exposures to children and adults in a residential setting. The goals are intended to assist risk assessors and others in initial screening-level evaluations of environmental measurements.

[4] This is a compilation of surface water quality criteria for the protection of aquatic life and human health for approximately 150 pollutants.

Operational Facilities

EPA, in coordination with the States, quickly identified, prioritized, and assessed the major operational facilities in the path of Hurricane Katrina. Examples of major operational facilities in the Gulf Coast area include chemical manufacturing facilities and oil refineries.

Operational facilities utilize, produce, and/or store chemicals, pesticides, and other hazardous material or substances, and thus have the increased potential to release hazardous materials or substances into the environment. The identification and assessment of such facilities after a natural disaster is important to ensure no significant releases of these materials occurred, and to contain or remediate any such releases. Both Louisiana and Mississippi used data from the Risk Management Plan program and the Toxic Release Inventory as major sources for identifying operational facilities to be assessed after Hurricane Katrina. EPA identified 224 Toxic Release Inventory and 233 Risk Management Plan facilities in affected areas of Louisiana, and 26 Toxic Release Inventory and 50 Risk Management Plan facilities in affected areas of Mississippi. In addition to these facilities, EPA and the States used other information sources, such as regulated hazardous waste handlers, to ensure major potential sources of chemical releases were rapidly assessed.

Figure 2- A chemical manufacturing facility in Mississippi after the hurricane. (Source: EPA)

Initial assessments began shortly after the hurricane made landfall, starting with telephone calls and e-mails to operational facilities that had been identified prior to impact. Within a few weeks, EPA had conducted aerial and ground assessments and had utilized facility self assessments to determine the magnitude of potential hazardous material and substance releases, and to prioritize those operational facilities needing additional assessment. Prioritization of facilities was based on a combination of facility size, hardest hit areas, proximity to people and sensitive environmental areas, facility contact non-response, local regulatory expertise, and calls into the National Response Center.

Underground Storage Tanks

Louisiana and Mississippi, under applicable program delegations (RCRA Subtitle I), identified, prioritized, and performed initial damage assessments to USTs in affected areas. EPA provided assistance requested by the States. The States identified hurricane-affected USTs and prioritized them for initial assessment primarily based on accessibility. The States generally limited initial assessments to visual site inspections, which looked for signs of damage.

An UST consists of a tank and any underground piping connected to the tank that has at least 10 percent of its combined volume underground. USTs are used to store petroleum products or other hazardous substances and are operated for gasoline sales to the public or individuals. The greatest potential hazard from a leaking UST is that the contents can seep into the soil and contaminate groundwater. A leaking UST also has the potential for fire and explosion.

In Louisiana, EPA assisted LDEQ in conducting initial damage assessments at 848 facilities within the affected New Orleans area, including the parishes that sustained the greatest storm-related damage: Jefferson, Orleans, Plaquemines, St. Bernard, St. Tammany, and Washington. By November 15, 2005, initial assessments were completed in Louisiana.

In Mississippi, MDEQ performed its assessments without EPA assistance, and identified 355 facilities in Hancock, Harrison, and Jackson counties. Initial assessments are on-going, with 110 completed to date. Mississippi assessment activities have been complicated by massive debris piles that must be cleared to access affected UST facilities.

Figure 3 - Storm-damaged UST in Mississippi. (Source: MDEQ)

Figure 4 - Twisted UST vent lines in a debris pile. (Source: MDEQ)

Oil Spills

In the aftermath of Hurricane Katrina, EPA, the U.S. Coast Guard, and LDEQ worked together with local industries to assess, manage, and mitigate environmental damage resulting from oil spills in affected areas of Louisiana. There have been at least five major oil spills reported, each involving over 100,000 gallons, and one spill impacted a residential neighborhood. EPA is providing oversight of the residential cleanup as well as conducting independent sampling analysis. Sampling results from the residential cleanup indicate that short- and long-term exposures to sediments in the oil spill areas do not pose a public health hazard. Sampling results, activities performed, and recommendations for short-term protectiveness in the residential area are posted on EPA's public Web site as the information becomes available.

Under the National Response Plan, the U.S. Coast Guard is the lead agency for ESF #10 responses in coastal zones, while EPA is the lead agency for inland zones. For incidents affecting both zones, EPA serves as the lead agency. ESF #10 responsibilities include appropriate response and recovery actions to prepare for, prevent, minimize, or mitigate a threat to public health, welfare, or the environment caused by actual or potential oil and hazardous

materials incidents. Response and recovery actions include efforts to detect, identify, contain, clean up, or dispose of released oil and hazardous materials.

Since most of the hurricane-related oil spills occurred at facilities in the coastal zones near the Mississippi River south of the New Orleans area, the U.S. Coast Guard served as the primary agency for response and recovery actions. As shown in Table 1, EPA identified at least five major oil spills, with the total spill volume approaching 7.5 million gallons (about two-thirds as much oil spilled from the Exxon Valdez tanker in 1989).

Table 1 - Louisiana Oil Spills

Facility Name	Location	Gallons
Bass Enterprises	Cox Bay, Plaquemines Parish	3,780,000
Chevron Empire Terminal	Buras, Plaquemines Parish	1,428,000
Shell Oil	Pilottown, Plaquemines Parish	1,066,800
Murphy Oil	Meraux, St. Bernard Parish	1,050,000
Shell Pipeline Oil LP	Nairn, Plaquemines Parish	138,600
TOTAL		**7,463,400**

Additionally, the U.S. Coast Guard estimated that approximately 134 spills of less than 100,000 gallons also occurred.

Murphy Oil, ranking fourth in spill volume, could be considered the most significant of the spills, due to it being adjacent to a residential neighborhood. Over 1 million gallons of oil were released when an above ground storage tank was dislodged, lifted, and damaged by floodwaters (see Figure 5). The release impacted over 1,800 homes in more than a 1-mile radius, as well as in surrounding canals and Murphy's tank farm containment area.

The U.S. Coast Guard, with support from EPA, conducted initial response and assessment efforts at the Murphy Oil spill site. Subsequently, the Coast Guard and EPA split lead responsibilities for oversight of Murphy's cleanup activities at the site. The Coast Guard agreed to provide oversight of the removal of free oil in the canals, tank farm containment area, neighborhood streets, and storm drains. EPA agreed to provide oversight of cleanup in residential areas accessible to the public (e.g., parks, school yards, roads, highway median strips, and sidewalks).

Figure 5 - Murphy Oil and adjacent residential area. (Source: EPA)

EPA, working closely with LDEQ, is also overseeing ongoing sampling activities of residential and other properties, and is performing independent analysis of samples taken by Murphy Oil under EPA oversight. As of March 13, 2006, EPA had collected 745 quality assurance/quality control split samples from 7,200 interior and exterior sediment samples gathered at 4,252 addresses by Murphy Oil. The results of EPA's sampling activities show that the primary contaminants detected include arsenic, PAHs, and diesel and oil range organic chemicals.

EPA provided its sample results to ATSDR for evaluation and notification to the public. ATSDR concluded that short- and long-term exposures to sediments in the oil spill area below LDEQ RECAP standards do not pose a public health hazard. However, ATSDR recommended that returning residents should avoid direct contact with the oil contaminated sediments, as they may cause skin irritation. Sample results, activities performed, and recommendations for short-term protectiveness are posted on EPA's public Web site[5] as the information becomes available.

EPA Provided Quality and Timely Information and Actions Regarding Management of Hazardous and Non-Hazardous Debris and Waste

EPA established an effective hazardous and non-hazardous debris and waste management approach which facilitated quality and timely information dissemination and hazardous debris management activity. EPA distinguished between hazardous and non-hazardous debris and waste and is ensuring consistency in segregation through its management of hazardous wastes and oversight assistance at non-hazardous landfills and staging areas. EPA's partnership with States and other regulatory agencies contributed to the effective management of hazardous debris and the safeguarding of individuals and the environment from risks arising from the improper removal and disposal of hazardous debris and waste. Specifically, EPA's debris management activities include:

Figure 6 - Debris field resulting from storm surge through a residential neighborhood in Waveland, Mississippi. (Source: EPA OIG)

- Direct oversight of hazardous waste management.
- Management of household hazardous waste collection.
- Management of electronics collection.
- Management of white goods, including removal and recycling of Freon.
- Oversight of the segregation of hazardous and non-hazardous waste and debris.
- Guidance to State and local governments in managing non-hazardous solid waste.

[5] EPA's Public Web site for Murphy Oil Spill - http://www.epa.gov/katrina/testresults/murphy/index.html

Hazardous Debris Management

EPA has provided quality and timely oversight, assistance, and guidance to ensure consistency in the management of hazardous hurricane debris and waste throughout the affected areas in Louisiana and Mississippi. EPA has directly managed hazardous waste, including household hazardous waste; electronics; and white goods. EPA quickly established a plan to address the segregation, collection, and disposal of hazardous waste. EPA's hazardous waste and debris collections used established collection and drop-off sites as well as neighborhood sweeps. EPA collaborated to organize household hazardous waste and electronic waste collection campaigns in individual parishes in Louisiana and counties in Mississippi, distributing over 2 million flyers in Louisiana alone, and using other media to advertise these events. An example of a household hazardous waste collection flyer is in Appendix D. EPA also promptly provided advisories, and public service announcements and public outreach materials in multiple languages, to inform the community of potential hazards and debris disposal options. In addition to general public collections, EPA is collecting segregated hazardous debris and waste directly from non-hazardous debris landfills and staging areas. EPA is also conducting marsh and wetland reconnaissance to retrieve hazardous debris and alleviate potential environmental threats.

Hazardous debris management varies slightly across the affected States due to the differing nature of the hurricane's impact. For example, the storm surge in Mississippi complicates the segregation of hazardous from non-hazardous debris because the surge caused explosive-like destruction and debris became intermingled. On the other hand, because Louisiana was mostly impacted by floodwaters that have receded, debris is generally recognizable for proper segregation purposes. EPA's collection efforts in Louisiana have included an emphasis on segregation at pickup, which includes segregating at the residential level. Instructions to Louisiana residents (where they have returned) on how to segregate their waste are illustrated in Appendix E.

Figure 7 - Segregation of household hazardous waste at an EPA collection site. (Source: EPA OIG)

Examples of EPA's management of hazardous debris, segregated into the categories of hazardous waste, electronics, and white goods, are:

- ***Hazardous Waste*:** EPA managed hazardous waste in Louisiana and Mississippi by establishing multiple collection sites in each State. These sites receive hazardous waste and segregate the waste for disposal as hazardous waste or recycling, according to the type of waste. In addition, both Louisiana and Mississippi, in collaboration with EPA, advertised and held household hazardous waste collection events. Waste that includes leftover household products that contain corrosive, toxic, ignitable, or reactive ingredients is

considered to be household hazardous waste. Examples are batteries, paint, pool supplies, lawn and automotive products, and other household chemicals such as bleach and carpet cleaners. Improper disposal of these wastes can pose risks to human health and the environment.

As shown in Figure 8, EPA collected over 2.5 million hazardous waste units since September 2005. These units include household hazardous waste from collections and segregation efforts, and also include other types of hazardous waste such as drums, cylinders, and larger containers.

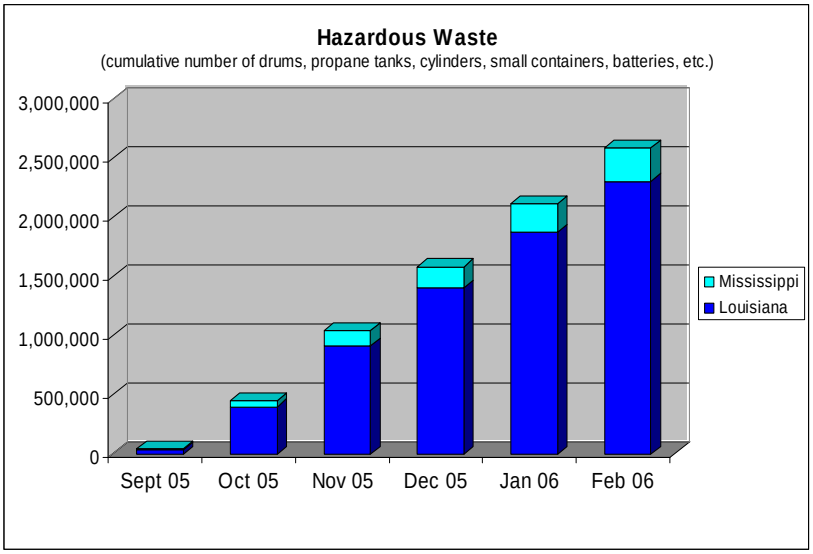


Figure 8 - EPA hazardous waste collection volume.
(Source: EPA OIG analysis of data from EPA Situation Reports)

- ***Electronic Waste*:** Electronic devices contain varying amounts of lead and other heavy metals considered hazardous to human health, and proper disposal (including recycling) needs to be considered. Common examples of electronic waste are televisions, radios, stereos, cameras, VCRs, computers, and microwave ovens. Over 300,000 electronics devices have been collected in Louisiana through electronics recycling contracts. During the course of our review, we suggested that EPA provide consistent information to the impacted public on potential hazards in electronic goods, particularly for those that cannot be recycled or collected and those that may remain in damaged homes. We also suggested that EPA better inform the public about the means of disposal throughout the affected parishes. EPA implemented these suggestions and they have been reflected in subsequent collection campaigns.

Figure 9 - Electronic waste at curbside.
(Source: EPA OIG)

- ***White Goods*:** White goods are appliances, such as refrigerators and air conditioners, that may contain hazardous substances such as Freon, compressor oil, and mercury switches. Up to 1 million white goods may require processing in Louisiana. EPA has been collecting

white goods to minimize the amount of hazardous substances that may accompany debris into landfills. As indicated in Figure 11, in Louisiana EPA has processed over 300,000 white goods and removed Freon from over 280,000. In contrast to Louisiana, where white goods remain largely intact, white goods in Mississippi are more difficult to segregate and manage due to the destructive nature of the storm surge, which typically damaged and intermingled white goods with other debris.

Figure 10 – EPA contractors removing contents and recycling Freon from refrigerators at Old Gentilly landfill in Louisiana. (Source: EPA OIG)

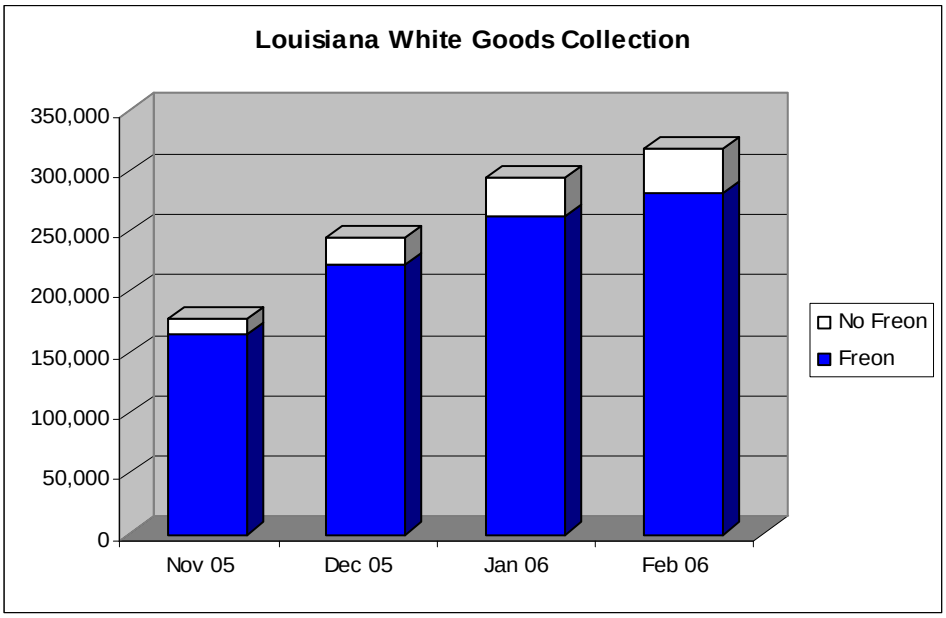


Figure 11 –White goods collection volume.
(Source: OIG analysis of EPA Situation Reports)

Non-Hazardous Debris Management

EPA has provided quality and timely oversight, assistance, and guidance to ensure consistency in the management of non-hazardous hurricane debris and waste throughout the affected areas in Louisiana and Mississippi. EPA is ensuring consistency in the distinction of debris and waste provided to States and local agencies. This is being accomplished through EPA's oversight in the segregation of hazardous debris from non-hazardous debris at landfill and staging areas.

Under ESF #3-Public Works and Engineering, the U.S. Army Corps of Engineers is the lead Federal agency[6] for the management of non-hazardous debris, with support from EPA and other agencies. Debris management activities under ESF #3 include managing, monitoring, and/or providing technical advice in the clearance, removal, and disposal of contaminated and uncontaminated debris from public property.

Uncontaminated debris includes:

- Vegetative debris (trees, bushes, and shrubs, etc.)
- Municipal Solid Waste (typical household and commercial garbage)
- Construction and demolition debris (resulting from damaged buildings and structures)

In November 2005, a fire occurred at a staging area for non-hazardous debris at a construction and demolition debris landfill operated by St. Bernard Parish. The fire resulted from the commingling of a hazardous substance with other non-hazardous debris and waste. EPA's Region 6 Response Group provided oversight, equipment operators, and fire suppression operations at the site until the ignition source was located, removed from the debris, and prepared for appropriate disposal. Simultaneously, EPA took action to prevent a similar-type fire from occurring at the household hazardous waste collection site in another section of the landfill. These actions included: spot checking all loads coming into the landfill, additional monitoring of contractor technicians, and installing large signs at entrances to the parish notifying residents to separate household hazardous waste at the curb. To ensure that appropriate controls and oversight are in place at the St. Bernard Parish landfill staging areas, we suggested that EPA work closely with FEMA, LDEQ, and the parish to ensure that the landfill has implemented controls, and to verify that appropriate controls are in place at all landfills in Louisiana accepting hurricane debris and waste. EPA placed representatives at the St. Bernard landfill to monitor incoming waste streams and perform random inspections on trucks entering the site. For other Louisiana parishes, EPA and LDEQ agreed to institute more frequent unannounced observation of operations and to document the results on a regular basis.

[6] While U.S. Army Corps of Engineers is the lead for debris management, some local agencies (e.g., parishes, counties) have elected to perform their own debris management activities with FEMA oversight and reimbursement assistance.

Appendix A

National Response Plan
Emergency Support Functions Supported by EPA

EPA and other Federal agencies work within the National Response Plan framework to ensure that work needed to help recover from disasters, such as hurricanes, is carried out. Specific missions are assigned through Emergency Support Functions (ESFs). EPA supports ESFs as shown below.

ESF	EPA's role may include:
ESF #3 – Public Works and Engineering	Infrastructure protection activities for drinking water and wastewater facilities; assistance in determining suitability of drinking water sources; location of disposal sites for debris clearance activities; and assessments, technical assistance, and monitoring for contaminated debris management
ESF #4 – Firefighting	Technical assistance for fires involving hazardous materials and also assistance in identifying uncontaminated water sources for firefighting.
ESF #5 – Emergency Management	Support to the Joint Field Office and provision of staff liaisons and technical experts. Joint Field Office is a temporary Federal facility established locally to provide a central point to coordinate resources in support of State, local, and tribal authority.
ESF #8 – Public Health and Medical	Technical assistance and environmental information for health/medical aspects of hazardous materials situations, technical assistance regarding drinking water supplies, and assistance identifying water supplies for critical care facilities.
ESF #10 – Oil and Hazardous Materials Response	Detection, identification, containment, cleanup, or disposal of released oil or hazardous materials; removal of drums, barrels, tanks, or other bulk containers that contain oil or hazardous materials; collection of household hazardous waste; permitting and monitoring of debris disposal; monitoring and protection of water quality; sampling and monitoring of air quality; and protection of natural resources.
ESF #11 – Agriculture and Natural Resources	Technical assistance for biological and chemical agents regarding environmental monitoring, contaminated crops/animals, and food/product decontamination.
ESF #12 – Energy	Response to State/local requests for fuel waivers to address fuel shortages.
ESF #13 – Public Safety and Security	Assistance through specialized evidence response teams who can work in a contaminated environment, investigation of criminal violations of environmental statutes, and forensic analysis of industrial chemicals.
ESF #14 – Long-Term Community Recovery	Technical assistance for planning for contaminated debris management and environmental remediation.
ESF #15 – External Affairs	Appropriate support as required.

Appendix B

Details on Scope and Methodology

To determine the quality of EPA's information on the identification of operational facilities, we identified facilities from various EPA data systems and compared them to the facilities identified and assessed by Regions 4 and 6. The data systems are provided in Table 2.

Table 2- Federal databases used to analyze the identification of operational facilities

System	Contains information on:
Toxic Release Inventory	Businesses that manufacture, process, or otherwise use above the threshold level of a listed chemical. Includes pounds of chemicals released to air, water, and land.
Risk Management Plans	Businesses that use specified flammable and toxic substances. Includes hazard assessments with a worst-case scenario, prevention programs, and emergency response programs.
Biennial Reports on hazardous waste	Quantitative hazardous waste generation and disposal volumes from large generators and treatment, storage, and disposal facilities.
Inventory Update Rule	Manufacturing volumes from large chemical manufacturers.
Section Seven Tracking System	Production volumes of pesticides reported by pesticide manufacturers.
National Response Center discharges reported	Oil spills or chemical releases.

To determine the quality and timeliness of EPA's information on Superfund NPL sites, we examined EPA's Superfund database (Comprehensive Environmental Response, Compensation, and Liability Information System, or CERCLIS) to identify sites in the affected areas of Mississippi and Louisiana. We then compared the OIG listing of sites to those sites identified for assessment by Regions 4 and 6. We reviewed Region 4's quality assurance plan[7] and sample results, as well as information provided to the public on the EPA's Web site. We reviewed the associated timeframes for these items in relationship to the Hurricane to determine the timeliness of EPA's efforts.

Our evaluation of EPA's information on oil spills was limited to the residential cleanup for the Murphy Oil spill. We identified major and medium oil spills, and the identification of the lead Federal agency (Coast Guard or EPA) through EPA Region 6 Situation Reports[8] and the Coast Guard's Web site. In addition, we identified and reviewed EPA's lead oversight activities at the Murphy Oil spill, including information on EPA's Web site. We also reviewed the ATSDR health consultant reports on the Murphy Oil spill to identify impacts or potential impacts on human health and the environment. We did not evaluate how the Coast Guard determined the

[7] Region 4's *Quality Assurance Project Plan, Post-Katrina Site Evaluations, Southern and Coastal Alabama and Mississippi, October 2005*-sampling plan that includes sampling/data quality objectives, investigation management plan, sampling design and rationale, quality assurance requirements, and investigation results.
[8] Situation Reports are internal briefing documents used by the Regions to document and track operational activities.

nature, magnitude, and impact from oil spills on human health and the environment as presented in our first question.

The States, and not EPA, are responsible under their delegated programs for the identification and assessment of USTs. We therefore did not evaluate the quality and timeliness of information provided. Our work in this area was limited to the review of UST guidance and regulations for the purpose of gaining an understanding of USTs and EPA's and the States' authorities under the program. In addition, we obtained information on the number of USTs in the affected areas and the status of the States' initial damage assessments. This information was obtained directly from the Regions, the States, and/or Situation Reports.

To determine the quality and timeliness of EPA's information on sediment contamination in New Orleans, we reviewed Region 6's emergency response quality assurance sampling plan for sediments, as well as EPA's Science Advisory Board[9] comments on the proposed plan. In addition, we reviewed sediment sampling information provided in the Region 6 Situation Reports and information provided for the public via EPA and LDEQ Web sites. We reviewed the associated timeframes for these items in relationship to the Hurricane to determine the timeliness of EPA's efforts.

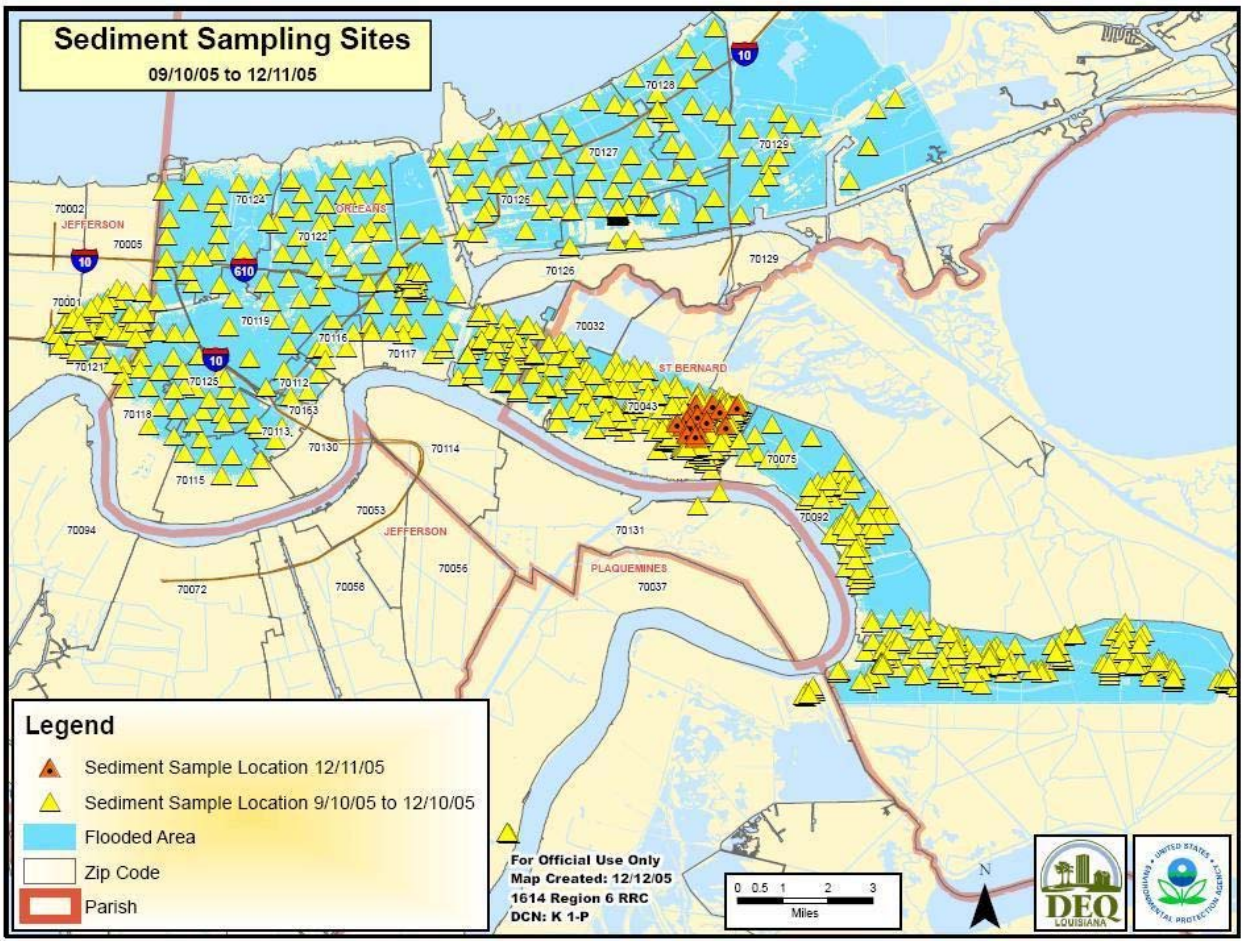
Our general approach for answering our second question, regarding management of hazardous and non-hazardous debris and waste, was to identify relevant activities in the affected States and the underlying information needed to manage this debris and waste. We collected and analyzed operational and response-related information about how these activities were performed or how information was obtained. The activities and information reviewed pertained to waste characterization and segregation, landfill capacity, staging and burning facilities, tracking of debris and waste, waivers, and FEMA and U.S. Army Corp of Engineers debris management.

To determine whether EPA was providing timely and quality information and actions regarding distinctions between hazardous and non-hazardous hurricane debris and waste and whether the distinctions were being made consistently, we conducted interviews with various EPA headquarters program officials, Region 4 and 6 program officials, and State officials. We researched EPA and State Web sites to obtain information, guidance, and authorities that generally pertained to debris management. This information included the National Response Plan, Situation Reports, State and Federal regulations, FEMA Mission Assignments, emergency orders and State guidance documents, Recycling Electronics and Asset Disposition documents, public notices/flyers, State landfill lists, maps, and news articles. We reviewed the associated timeframes for these items in relationship to the Hurricane to determine the timeliness of EPA's efforts. To enhance our understanding of the complexity of the segregation of debris and waste in the affected areas, we visited selected landfills and staging areas in Mississippi and Louisiana to see if these distinctions were being implemented and how the various types of hazardous and non-hazardous waste were segregated and managed. We did not conduct interviews with FEMA or the U.S. Army Corps of Engineers regarding their activities related to the management of hazardous and/or non-hazardous debris.

[9] Congress established the EPA Science Advisory Board in 1978 and gave it a broad mandate to advise the Agency on technical matters, advising the Agency on emergency and other short-notice programs.

Appendix C

Sediment Sampling Sites in Flooded Areas of New Orleans



Mississippi Household Waste Collection Flyer

HOUSEHOLD HAZARDOUS WASTE COLLECTION DAY

MDEQ

Items Accepted

Aerosols, All Purpose Cleaners, Ammonia, Anti-Freeze, Automobile Cleaners, Batteries, Brake Fluid, Charcoal Lighter Fluid, Chlorine Bleach, Detergents, Disinfectants, Drain Opener, Furniture Polish, Gasoline, Glass Cleaner, Herbicides, Insecticides, Mothballs, Motor Oil, Oven Cleaner, Paint, Paint Thinner, Pesticides, Pool Chemicals, Rodent Poisons, Rubber Cement, Rug & Upholstery Cleaner, Scouring Powder, Silver Polish, Snail & Slug Killers, Toilet Bowl Cleaner, Transmission Fluid, Tub & Tile Cleaner, Turpentine, Varnish, Water Seal, Wood Finish, Cooking Oil

We CANNOT accept:

- Animal Manure/carcasses
- Human Waste or other biological waste (anything blood related or bodily fluids)
- Home TVs, tubing or dialysis equipment
- Sharps/Needles
- Spoiled food/mold damaged items

Put Toxic Waste In Its Place

Household Hazardous Waste is…

Unused or leftover portions of products containing toxic chemicals and any product which is labeled **CAUTION, POISONOUS, TOXIC, FLAMMABLE or CORROSIVE.**

A Safe Substitute is…

A safe alternative to a toxic product. Fact sheets are available to help you reduce the use of toxics and minimize health risks.

Legal Transportation is…

Leaving products in the original containers and making sure that the containers are sealed so that they will not leak. Transport containers in the trunk or in the back of the vehicle away from passengers.

DO NOT TRANSPORT OVER 5 GALLONS OR 50 POUNDS AT ONE TIME.

Proper Disposal is…

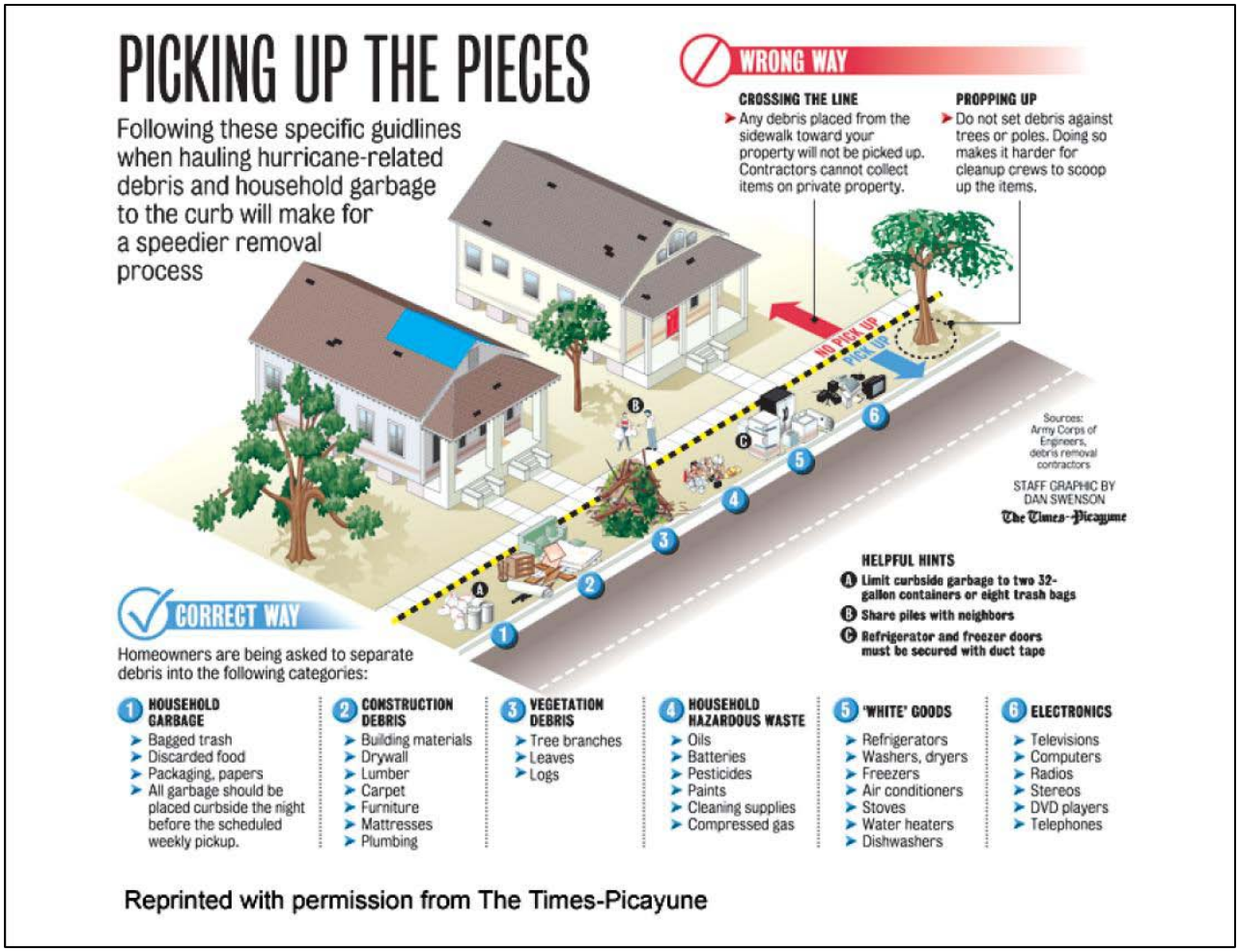
EXTREMELY IMPORTANT. It is dangerous to discard hazardous household materials in the trash or down the drain. Instead, use up the product as intended, or take the unused portions to the scheduled event.

HOUSEHOLD HAZARDOUS WASTE COLLECTION DAY

Please turn over to find a location near you . . .

Appendix E

Curbside Waste Segregation Instructions



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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

APR 26 2006

OFFICE OF
SOLID WASTE AND
EMERGENCY RESPONSE

MEMORANDUM

SUBJECT: Draft Evaluation Report:
EPA Provided Quality and Timely Information on Hurricane Katrina Hazardous Releases and Debris Management
Assignment No. 2005-001751

FROM: Susan Parker Bodine
Assistant Administrator

TO: Bill A. Roderick
Acting Inspector General

Thank you for the opportunity to review the draft report on the subject evaluation conducted by the Environmental Protection Agency's (EPA) Office of Inspector General (OIG). EPA's response to Hurricane Katrina has been a major undertaking, involving staff from across the country and at Headquarters. As you note in the draft report, EPA has worked with the Federal Emergency Management Agency (FEMA) and other Federal, State and local agencies, providing support under various Emergency Support Functions (ESF) in the National Response Plan. The response to Hurricane Katrina was also an opportunity for EPA to implement its National Approach to Response, including the use of the Incident Command System and support to Regions 4 and 6 by professional responders and volunteers from several other Regions.

This response includes the Regions' comments as well.

I acknowledge and agree with OIG's positive assessment of: (1) EPA's quality and timely approaches for rapidly identifying, prioritizing, and assessing the nature, magnitude and impact of hazardous material releases; and (2) EPA's provision of quality and timely information for determining risks and impacts. We provided information to the public on our Website as well as in printed flyers distributed in the area affected by Katrina.

I also acknowledge with appreciation that OIG provided suggestions to EPA concerning better informing the public about the means of disposal of electronic waste (page 12) and concerning controls at the St. Bernard Parish landfill staging areas (page 14).

Replying to your request in your April 7, 2006, memorandum that I address the factual accuracy of the draft report, I offer the following comments:

1. On page 2 the report references the "Oil Pollution Control Act of 1990." I believe that "Control" is not part of the name of that legislation.

2. On page 5, paragraph 3 concerning "should an area be found to pose an unacceptable risk," it would be more accurate to say that we will work with the State of Louisiana to "determine appropriate next steps."

3. On page 8 the report states: "Under the National Response Plan, the U.S. Coast Guard is the lead agency for ESF #10 responses in coastal zones, while EPA is the lead agency for inland zones." You might want to modify the first sentence in the "At a Glance" page to indicate that EPA's leadership is in the inland zones.

4. On page 10, first paragraph: the first sentence states that "EPA . . . is performing independent sampling activities . . ." in the residential area. This is not accurate. We suggest: "EPA . . . is performing independent analysis of samples taken by Murphy Oil with EPA oversight."

5. On page 10, second paragraph: the second sentence should be corrected for accuracy with the addition of the phrase as follows: "ATSDR concluded that short- and long-term exposures to sediments in the oil spill area *below LDEQ RECAP standards* do not pose a public health hazard."

6. On page 10, the last bullet on the page: We give guidance for solid waste, but our oversight is limited to the segregation of hazardous and non-hazardous waste.

7. On page 13, last paragraph: please refer to the above comment. We suggest deleting "and assistance in non-hazardous debris management, particularly." The last sentence would then read, "This is being accomplished through EPA's oversight in the segregation of hazardous debris from non-hazardous debris at landfill and staging areas."

8. The report discusses sediment sampling, but does not mention that we also sampled flood water (474 samples) and soil (645 samples). We are also doing extensive and continuous air sampling, with results being reported on EPA's Katrina web site. If you want to use the most current numbers for sediment, as of April there are 1410 samples in the database.

Should you have questions, please call Deborah Dietrich, Director of the Office of Emergency Management, at 202-564 8600.

cc: Richard Greene, Regional Administrator, Region 6
Jimmy Palmer, Regional Administrator, Region 4

Appendix G

Distribution

EPA Headquarters

Office of the Administrator
Assistant Administrator, Office of Solid Waste and Emergency Response
Agency Followup Official (the CFO)
Agency Followup Coordinator
Audit Followup Coordinator, Office of Solid Waste and Emergency Response
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Associate Administrator for Public Affairs
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EPA Region 4

Regional Administrator
Deputy Regional Administrator
Regional Audit Followup Coordinator

EPA Region 6

Regional Administrator
Deputy Regional Administrator
Regional Audit Followup Coordinator