

Comprehensive Plan for Disaster Clean-up and Debris Management

Louisiana Department of Environmental Quality

Revised March 2009

Purpose

The purpose of the Comprehensive Plan for Disaster Clean-up and Debris Management is to establish a framework to facilitate the proper management of debris generated by natural disasters within the state. The goal is to facilitate a reasonable, efficient and prompt recovery from such disasters and be protective of human health and the environment. The plan includes flexible and innovative approaches to address disaster-generated debris issues. It adheres to the Louisiana Department of Environmental Quality's (LDEQ) mission of protecting human health and the environment to the fullest extent possible under the circumstances. The plan allows LDEQ the flexibility to consider, approve or disapprove reasonable requests for authorizations, variances, and waivers as needed for rapid and environmentally sound waste management, recycling, and disposal. A primary objective of the plan is to conserve landfill capacity and to protect natural resources to the maximum extent practicable.

Pursuant to the laws of the state of Louisiana, the Secretary of the LDEQ is granted the authority to declare an emergency upon receipt of evidence of an incident that requires immediate action to prevent irreparable damage to the environment and serious threats to life or safety. Upon declaring that an emergency exists, the Secretary may issue such permits, variances or other orders as necessary to respond to the emergency, and such orders are effective immediately. With the declaration of an emergency, the Secretary issues an administrative order which provides specific measures authorized within the timeframe of the emergency. Those specific measures contained in the emergency order serve as relief for the duration of the order from the regulatory and proprietary requirements of the LDEQ. However, the measures do not provide relief from the requirements of other federal, state, and local agencies.

Thus, the regulatory flexibility to expeditiously manage disaster-generated debris in the manner set forth in this plan is authorized upon issuance of an Emergency Declaration and Administrative Order by the LDEQ Secretary. The Emergency Declaration and Administrative Order will require adherence to the "Comprehensive Plan for Disaster Clean-up and Debris Management," except where the Debris Management Plan may be in conflict with the provisions of the Order. In the event of conflict, the Order shall prevail.' Moreover, while this plan is consistent with state and federal law, it does not supersede any ordinance adopted by a local governing authority.

This Comprehensive Plan for Disaster Clean-up and Debris Management documents some of the lessons learned from prior disasters and extends beyond those lessons to formulate a plan that manages future disasters in a cohesive, organized and efficient manner, while ensuring protection of public health and the environment.

The LDEQ prepared a Hurricane Katrina Debris Management Plan which was released on September 28, 2005, and revised on October 14, 2005. Additionally during the 2006 Regular Session of the Louisiana Legislature, Senate Bill 583 (SB 583, Act 662) was enacted as LA R.S. 30:2413.1. LA R.S. 30:2413.1 directs the LDEQ to develop and implement a comprehensive debris management plan for certain debris generated by natural disasters. The bill states the goal of the comprehensive debris management plan is to "reuse and recycle material, including the removal of aluminum from debris, in an environmentally beneficial manner and to divert debris from disposal in landfills to the maximum extent practical and

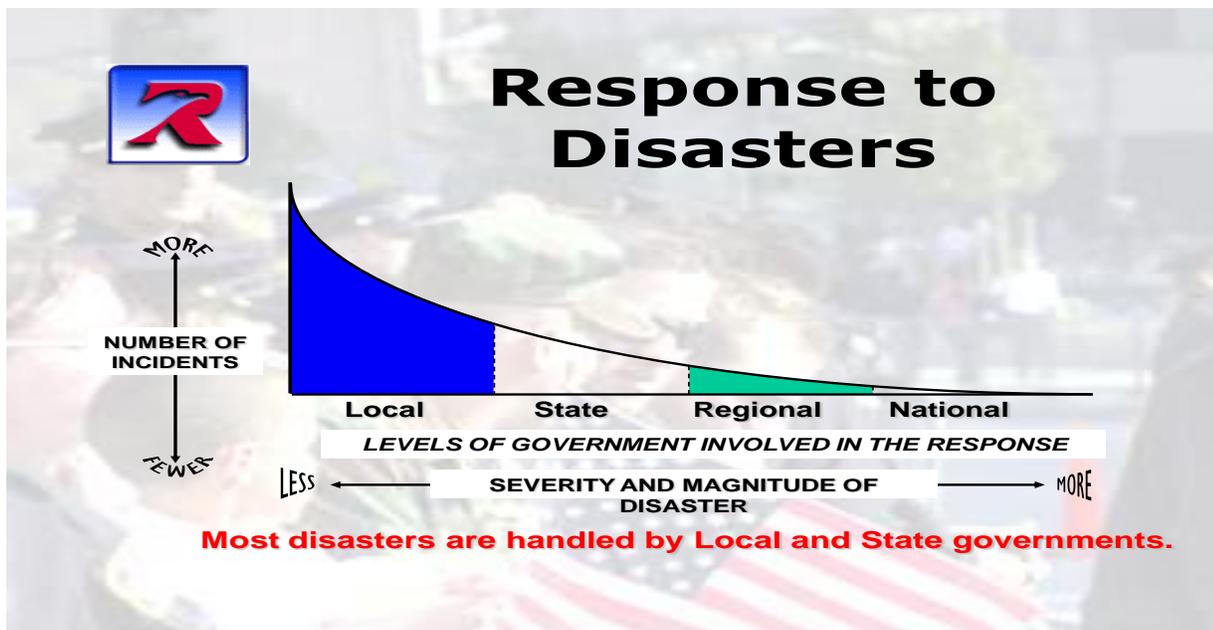
efficient which is protective of human health and the environment.” Among other things, SB 583 dictates the use of the following debris management practices, in order of priority, to the extent they are “appropriate, practical, efficient, timely and have available funding: recycling and composting; weight reduction; volume reduction; incineration or co-generation; and land disposal.” The plan is limited by and may not extend beyond the limitations imposed by the Secretary’s Emergency Declaration and Administrative Order.

This plan builds upon LDEQ’s existing plan and is intended to be a living document. As such, it will be amended, as necessary, to address specific challenges as they arise.

1.0 Background

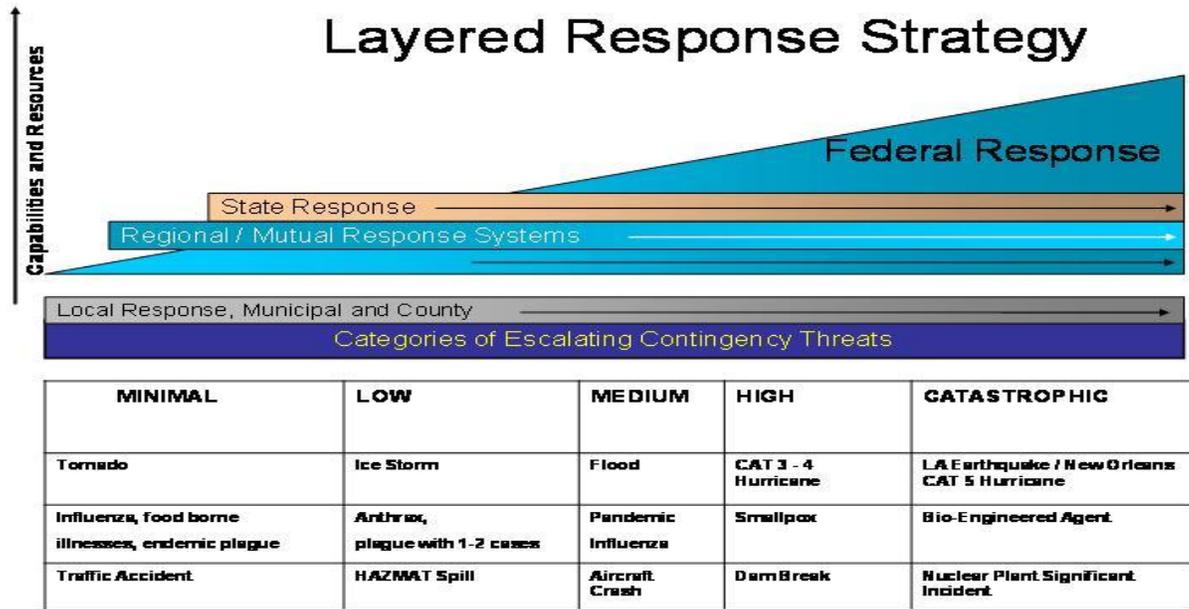
Local governments are the lead responders for incidents and most incidents are handled locally (fires). Some incidents (chemical transportations spills) escalate in complexity and are handled by a combination of state and local resources.

1.1 Response to Disasters



FEMA assistance is triggered by the Governor's Declaration of an Emergency and a request for federal assistance. The Governor's request is made to the FEMA Regional office in Denton, Texas. Representatives from the Governor's Office of Homeland and Emergency Preparedness (GOHSEP) and FEMA conduct a preliminary damage assessment (PDA) to estimate the extent of the disaster and its impact on individuals and public facilities. This information is included in the Governor's request to show that the disaster is of such severity and magnitude that effective response is beyond the capabilities of the State and the local governments and that Federal assistance is necessary. Local response to save lives and initiate recovery takes place immediately and automatically while the external responses are mobilizing.

Disasters of less severity and magnitude are triggered by the Governor's Declaration of an Emergency minus the request for federal assistance. Representatives from the Governor's Office of Homeland and Emergency Preparedness (GOHSEP) conduct a preliminary damage assessment (PDA) to estimate the extent of the disaster and its impact on individuals and public facilities. Local response to save lives and initiate recovery takes place immediately and automatically while the external responses are mobilizing.



1.2 DISASTER CATEGORIES

There are many types of disasters to contend with and we have categorized them as:

- NATURAL - Floods, Tornadoes, Hurricanes, Thunderstorms and Lightning, Winter Storms and Extreme Cold, Extreme Heat, Earthquakes, Volcanoes, Landslide and Debris Flows (Mudslide), Tsunamis, Wildfires
- INCIDENTS - Hazardous Materials Spill/Leak, Terrorism, Explosions, Aircraft Crashes, Chemical Emergencies, Nuclear Power Plant Incidents, Fires
- BIOLOGICAL – Flu and Food Poisoning Outbreaks, Pandemics, Bio-Engineered agent releases

1.3 Disaster Intensity

One method, the Conway Disaster Impact Scale, has proposed to classify disasters by intensity;

Impact 1: Disasters that involve 10 or more dead and/or US\$10 million or more in property damage, usually in a local area.

Impact 2: Disasters that involve 100 or more dead and/or \$100 million or more in property damage, usually within a state or province.

Impact 3: Disasters that involve 1,000 or more dead and/or \$1 billion or more in property damage, usually within one nation.

Impact 4: Disasters that involve 10,000 or more dead and/or \$10 billion or more in property damage, usually within one continent.

Impact 5: Disasters that involve 100,000 or more dead and/or \$100 billion or more in property damage,

usually within a multi-continent global region.

Impact 6: Disasters that involve 1 million or more dead and/or \$1 trillion or more in property damage, affecting the entire world.

At first glance, this scale appears to be massive, yet when applied to Louisiana disasters, the following results were obtained:

Average 24 tornadoes per year. 3 dead.

2005 Hurricane Katrina hit the Louisiana/Mississippi coast. Flood topped levees in New Orleans. More than 1,000 dead. Damage \$200 billion.

2005 Hurricane Rita hit the Sabine Pass area causing heavy damage in Lake Charles and Vermillion Parish.

2002 Hurricane Isidore hit Mexico/Yucatan then moved across Gulf to Louisiana.

2002 Hurricane Lili hit Louisiana.

2001 ice storm. Major disaster in 6 parishes.

1995 floods in Southeast Louisiana and Mississippi. 7 dead. \$3 billion damage.

1936 Louisiana highest temp recorded at Plain Dealing, 114F.

1930 quake 4.2, Napoleonville.

1921 tornado, Gardner. 31 dead.

1919 Hurricane, Louisiana, Florida, and Texas. 750 dead.

1915 Hurricane, eastern Texas and Louisiana. 275 dead.

1909 Hurricane. 350 dead.

1908 tornado. 143 dead.

1908 tornado, Gilliam. 49 dead.

1906 Hurricane. Louisiana and Mississippi. 350 dead.

1899 Louisiana lowest temp recorded at Minden, -16F.

2.0 Disaster Management

Disaster debris management is typically the largest part of government expenditures for disasters relief and recovery. The success of a debris management program is dependent upon the commitment by the agencies involved to planning, implementing, and evaluating their plan effectively and efficiently. Proper planning by management and effective employee training provides a foundation for a quick and successful recovery. See: <http://www.ohsep.louisiana.gov/recovery/debrismgtsampleplan.htm>

The benefits of advance planning for disaster debris management include:

- Organized control of disaster debris management
- Reducing costs
- Increased speed and efficiency of clean-up
- Minimizing environmental and public health impacts
- Consistency with federal reimbursement requirements

There are several key themes that run through this guidance:

- Making reduction, composting, recycling and diversion from landfills a priority
- Pre-approval of debris sites and local activation of pre-approved sites
- Proceeding in a manner that facilitates federal reimbursement
- *More training in state and federal policies and procedures is need*

2.1 Debris Response Triggers

GOHSEP and FEMA use the results of the Preliminary Damage Assessment (PDA) to determine if the disaster situation is beyond the combined capabilities of the State and local resources and to verify the need for supplemental Federal assistance. Since all disaster do not necessarily require debris management, it is possible to apply Disaster Types with Disaster Intensity to trigger various levels of debris options. For example;

(NOTE: these are examples of how triggering might be applied and *may* not be used nor implied as being proposed for adoption by DEQ)

LOW INTENSITY

Trigger 1 - Impact 1 and local flooding or intense storms: Local debris site activation and vegetation debris reduction.

MEDIUM INTENSITY

Trigger 2 - Impact 2 and Cat. 1 Hurricanes or tornadoes: Consider construction and demolition (C&D) debris site collection

Trigger 3 - Impact 3 and Cat. 2-3 hurricanes: Consider air curtain destructors, and modify C&D definitions for flooded areas.

HIGH INTENSITY

Trigger 4 - Impact 4: consider additional debris sites, grinding C&D and implementing asbestos handling guidance modifications.

Trigger 5 - Impact 5: consider amended residence demolition guidance; consider additional C&D guidance.

CATASTROPHIC

Trigger 6 - Impact 6: consider vegetative debris options, consider additional disposal options.

(NOTE: these are examples of how triggering might be applied and *may* not be used nor implied as being proposed for adoption by DEQ)

2.2 Federal Funding Triggers

Recipients of FEMA funding will require state agencies and local governments to accept roles and responsibilities for Environmental and Historic Preservation (EHP) Compliance. Compliance is essential for proper and timely reimbursement and enduring the inevitable audit. These laws and executive orders are aimed at protecting water, air, coastal, wildlife, land, agricultural, historical and cultural resources, as well as minimizing potential adverse effects to children, low-income and minority populations.

FEMA funded activities that may trigger and EHP review:

- *Debris Removal*
- *Emergency Protective Measures*
- *Repair to Pre-Disaster Condition*
- *Modification, Expansion, & Mitigation*
- *New Construction & Ground Disturbance*

Detailed EHP information for state agencies and local government officials is provided in Appendix F.

3.0 Recycling and Beneficial Use

This plan is designed to encompass LDEQ's goal of reduction, conservation and management relative to debris management. The plan promotes the reduction of the debris stream utilizing chipping, grinding, recycling or other methodologies as directed in LA R.S. 30:2413.1. It promotes conservation and management by ensuring that adequate capacity exists for disposal and management of disaster-generated debris, including that generated by redevelopment and repopulation by businesses and residents. The plan also encompasses the legislative mandate in as directed in LA R.S. 30:2413.1 to reduce debris 50% by volume and 50% by weight prior to disposal in a landfill.

Local governments or state agencies should identify sites where recycling and beneficial use options may be utilized. Local governments or state agencies should maintain standby contracts to provide for the oversight, implementation and operation of recycling and beneficial use projects associated with disaster-generated debris activities. The standby contracts should include provisions to ensure that marketing outlets are available to receive and process the material resulting from the recycling and beneficial use activities. The recycling and beneficial use options provided below and later in this document will contribute to the plan's goals.

Bricks and concrete removed from homes during the demolition process may be recycled utilizing stone crushing equipment. Equipment utilized for this purpose shall be operated in accordance with manufacturers' instructions and any applicable LDEQ correspondence, authorization or guidance. *A copy of the manufacturers' instructions shall be maintained on site and made available to the regulatory agencies upon request.*

4.0 Debris Management Definitions

4.1 Construction and Demolition Debris –

Non-hazardous 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, remodeling, repair, renovation, or demolition project
- The incidental mixture of construction and demolition debris with asbestos-contaminated waste. (i.e., incidental asbestos-contaminated debris that cannot be extracted from the demolition debris)

4.2 Vegetative Debris – Vegetative debris consists of whole trees, tree stumps, tree branches, tree trunks, and other leafy material. **It does not include processed wood or other lumber used in construction.**

4.3 Debris Management Site – is a location that has been identified by the local government and evaluated and approved by LDEQ for the purposes of staging, reduction or final disposal of disaster-generated debris.

The activities conducted at these sites might include:

- Woodwaste Chipping and Grinding and/or Composting Woodwaste Burning Operations
- Construction and Demolition Debris Staging or Disposal
- Staging of Vessels and Vehicles
- Staging of Special Debris (Munitions and Ordnance, Household Hazardous Materials, Compressed Gas Tanks, Electronic Goods, White Goods and Tires)

4.4 Curbside Segregation of Debris - *is the sorting of debris by the resident into piles of discrete waste streams being collected as the result of a disaster.*

This is the most efficient and cost effective method. The debris piles must be placed on the right-of-way and kept away of obstruction, such as, mailboxes, fire hydrants, gas meters and telephone poles. Waste streams typically needing curbside separation in a disaster recovery effort are, vegetative debris, construction & demolition debris, electronics, household hazardous materials and regular garbage. This will vary according to the extent of the disaster and the capabilities and decision of local governments. Curbside segregation of debris should not be done by the collection crews.

4.5 De minimus contamination - De minimus contamination of the construction and demolition debris waste stream should be insignificant contamination of no ~~less~~-more than 10 to 15 %.

4.6 Eligible debris -Debris removal is the clearance, removal, and/or disposal of items such as trees, sand, gravel, building components, wreckage, vehicles, and personal property. For debris removal to be eligible, the work must be necessary to: eliminate an immediate threat to lives, public health and

safety; eliminate immediate threats of significant damage to improved public or private property; ensure the economic recovery of the affected community to the benefit of the community-at-large; and to mitigate the risk to life and property by removing substantially damaged structures and associated appurtenances as needed to convert property acquired through a FEMA hazard mitigation program to uses compatible with open space, recreation, or wetlands management practices.

4.6.1 Types of eligible debris:

1. Vegetative
2. Construction & Demolition
3. Hazardous Waste
4. Household Hazardous Waste
5. E-Waste
6. Soil, Mud, and Sand
7. White Goods
8. Vessels and Vehicles
9. Putrescent

4.6.2 Types if ineligible debris

1. Debris from a previous disaster
2. Debris related to construction
3. Fallen trees in a forest
4. Stump removal, unless authorized by FEMA
5. Private property debris, unless authorized by FEMA
6. Debris on public golf courses or cemeteries
7. Regular municipal garbage collection

5.0 Debris Management Sites

This document is designed to provide guidance to local governments and state agencies in planning, mobilizing, operating and deactivating disaster debris sites. It is important that agencies and local governments handling debris have a Debris Management Plan that complies with the debris management requirements of FEMA as published in FEMA's Debris Management Guide, FEMA-325. It is important that a local Debris Management Plans that identify key staff members and their responsibilities for managing and controlling debris clearing, removal and ultimate disposition operations. Agencies and local governments will need to determine appropriate sites for the following temporary activities: staging and transfer of construction and demolition (C&D) debris; staging of vehicles and vessels; staging of household hazardous waste; chipping, grinding and/or burning of vegetative debris; composting of vegetative debris; handling of munitions and ordnances; staging of white goods, electronic goods and other consumer items; and recycling and beneficial use activities.

The Department will pre-approve disaster debris sites. Sites that were approved by LDEQ for use in previous disasters are prime candidates for pre-approval. The designation of a location as an inactive "pre-approved" site will subject to an annual renewal by June 1. Upon the declaration of a disaster by the Governor, local governments and state agencies may "activate" a pre-approved site for its intended purpose and notify the LDEQ Regional Manager within 5 days. Regional Office staff will monitor the site and handle site "deactivation" requests once site use is not longer needed. A site may be closed as a pre-approved site upon request of the property owner, the local government that requested designation or the Department.

5.1 Finding the Right Location

When selecting a proposed debris management site, the local government should consider the following:

- What is the proposed use for this site?
- Is it easily accessible?
- Is it removed from obstructions such as power lines and pipelines?
- Is the site considered to be a wetland area, as defined by the U.S. Army Corps of Engineers?
- Is the general site topography conducive to the activity that will be conducted there?
- Are there nearby residences and/or businesses that will be inconvenienced or adversely affected by use of this site?
- Is the size sufficient for its intended use?
- Is the soil type suitable for its intended use?
- Is the site a previously authorized location that is being reactivated for use?
- Is the site located near water bodies such as rivers, lakes or streams and their proximity to occupied dwellings?
- What is its proximity to the impacted area?
- Does the site have historical preservation approval?

In addition to the criteria listed above, LDEQ will evaluate proposed burn sites based on their proximity to water bodies such as rivers, lakes or streams, and occupied dwellings.

5.2 **Site Approval**

In order for a location to be considered by the LDEQ as a debris management site, the local government must submit an Emergency Disaster Cleanup Site Request Form to LDEQ. The form is available on LDEQ's website at <http://www.deq.louisiana.gov/portal/tabid/259/Default.aspx> and a copy is attached as Appendix A. Authorizations may be issued prior to or following a site inspection by LDEQ personnel for staging areas to be used for temporary storage and chipping, grinding or burning of disaster-generated debris. Sites that have been identified by local government and evaluated and authorized by LDEQ for use in response to a hurricane disaster will be provided on LDEQ's website. If the site is approved, LDEQ will inform the local government and will document the approval, usually by letter. The letter will also contain any restrictions or operational conditions that must be adhered to relative to the site. Operational conditions will be outlined in an Interim Operational Plan.

5.3 **Site De-activation**

Each temporary debris management site with the exception of authorized vegetative debris sites where ash is land-applied, will eventually to the extent practicable, have disaster-related debris cleared and be restored to its previous condition and use. De-activation must be in accordance with approved LDEQ practices and/or the Interim Operational Plan. Sampling of soil and/or ash that is left at the site may be required by the LDEQ. The local governing authority will be required to take necessary steps to ensure that no environmental contamination is left on-site. De-activation should be accomplished within the time limits established by the LDEQ.

6.0 C&D Debris Management

LDEQ recognizes that decisions on the disposition of wastes and debris need to be made at the collection point. Use of best professional judgment will be necessary to determine the ultimate disposition of collected material. Contractors chosen by the local governing authority, or by state or federal agencies, should possess knowledge of applicable regulations and of any LDEQ Declarations of Emergency and Administrative Order in order to correctly route waste streams to appropriate sites and/or facilities.

6.1 C&D Debris Staging/Transfer

In the event that a considerable amount of the disaster-generated C&D debris to be staged at temporary sites and transported to permitted Type III facilities or to be placed into LDEQ authorized C&D debris disposal sites. Materials approved for receipt at these facilities include roof shingles, roofing materials, insulation, and wallboard, etc.

If approved, site operations will comply with an Interim Operational Plan provided by the LDEQ. It is the responsibility of the local government to provide this Interim Operational Plan to any entity that may be charged with operation of the site.

Arrangements should be made to segregate unsuitable materials such as household garbage, white goods, asbestos containing materials (ACMs), and household hazardous waste. These materials should be placed in containers and transported to facilities that are approved for their receipt. If more than de minimus amounts of these wastes are present, the waste should be handled in a manner consistent with the most stringent management technique necessary for the waste stream.

6.2 C&D Debris Disposal

To the maximum extent possible and practicable, C&D debris shall be disposed in permitted C&D Debris Landfills. However, due to the devastation caused by a natural disaster, it may be necessary to allow staging and/or disposal of C&D debris at sites that are deemed appropriate but are not permitted.

In extreme circumstances local governments may request establishment of temporary C&D disposal sites. Sufficient information must be provided to justify the request and that also demonstrates the site will operate under efficient, expeditious and environmentally safe operations. If approved, site operations must comply with the Interim Operational Plan provided by LDEQ.

7.0 Vegetative Debris Management

Every effort shall be made to consolidate material from fallen trees and other vegetative debris in an attempt to beneficially use as much of this material as possible. For example, local industries can utilize the wood material for fuel, should be encouraged to do so. Material may be chipped or otherwise reduced in volume to allow for composting or other beneficial reuse. Site operations must conform to the requirements of 30:2413.1 in that “the total green and woody debris intended for final disposal in a landfill, fifty percent shall be reduced by weight and fifty percent by volume prior to transport to a landfill” (for disposal). The law states that “reuse and recycle material and to divert debris from disposal in landfills to the maximum extent practical, efficient, and expeditious in a manner that is protective of human health and the environment. “

7.1 Coast Restoration Projects

The Department of Natural Resources has stated “The potential to use post-storm vegetative debris in coastal Louisiana for coastal restoration and protection purposes is very limited. Several demonstration projects have been attempted; however, they proved not to be economically and ecologically justifiable.” See Appendix E for the full text of the DNR statement.

PARAGRAPH IF WE ISSUE PERMITS

Permits issued to debris sites give the permittee (local governing authority and state agency) the authority to operate after the Governor of Louisiana has declared the affected area an emergency. The local governing authority and state agency will notify the Waste Permits Division at Office of Environmental Services, Waste Permits Division, Post Office Box 4313, Baton Rouge, Louisiana 70821-4313, of the intent to activate the site/permit for the duration of the declared disaster. All permit requirements shall be followed unless otherwise notified by the Department in writing

7.2 Vegetative Staging and Processing Debris Sites

Materials approved for receipt at vegetative debris staging and processing sites include vegetative debris such as yard waste, trees, limbs, stumps, branches and untreated or unpainted wood. Sites should be identified as staging/grinding/chipping/composting sites and/or burn sites. All debris sites must be operated in accordance with the LDEQ-provided Interim Operational Plan or other LDEQ correspondence or guidance. ***It is the responsibility of a local government authority and/or a state agency to provide the LDEQ plan, correspondence or guidance to any entity that may be charged with operation of the site.*** All equipment (grinders, chippers, air curtain burners) shall be operated in accordance with manufacturers’ instructions and any applicable LDEQ authorization. A copy of the manufacturers’ instructions shall be maintained on site and made available to the regulatory agencies upon request.

7.3 Vegetative Debris Staging

Some debris sites will only stage vegetative debris. These debris sites shall not conduct any form of processing of the vegetative debris. These debris sites shall only store the vegetative debris until, such time as it is to be hauled to a processing site for reduction. Maintaining staging piles of chipped or ground debris with a height of less than 6 feet and base width of less than 10 feet provides greater surface area for dissipation of heat and volatile gases, thereby minimizing the risks of spontaneous combustion. Staging sites must limit staging piles of chipped or ground debris temperature to 160 degrees or less in order to reduce the potential for spontaneous combustion by allowing accumulated heat and gases to escape. Sites only approved for staging must request and obtain written approval in order to chip, grind, compost or burn debris.

It is strongly recommended that local governments designate a drop-off vegetative debris site where residents may bring vegetative debris for aggregation and/or processing. It is also suggested that portion of this site be setup to accept other residentially materials, such as, electronics, appliances household hazardous materials, tires and compressed gas cylinders.

7.4 Vegetative Debris Grinding/Chipping/Composting

Grinding and chipping provides material for use in landscape mulch, compost preparation, coastal stabilization/restoration projects, and industrial boiler fuel.

In preparing compost and/or mulch piles, care should be taken to reduce the potential for spontaneous combustion. Placing ground organic debris into piles can result in rapid microbial decomposition that generates heat and volatile gases. Temperatures in large piles containing readily degradable debris can rise to greater than 160° F, increasing the chance of spontaneous combustion.

Spontaneous combustion is more likely in large, dense piles of debris under dry, windy conditions. Maintaining windrows with a height of less than 6 feet and base width of less than 10 feet provides greater surface area for dissipation of heat and volatile gases, thereby minimizing the risks of spontaneous combustion.

Turning piles when temperatures reach 160 degrees can also reduce the potential for spontaneous combustion by allowing accumulated heat and gases to escape. Turning piles when temperatures decline can restore microbial activity and composting temperatures. Optimal moisture should be maintained to reduce combustibility. As a rule, optimal moisture is obtained when squeezing a handful of material yields a drop or two of water. Shredded leafy debris will decompose more rapidly and retain more heat than wood chips. Sufficient wood chips or other bulky materials should be mixed with leafy material to ensure rapid diffusion of heat and gases during the early stages of decomposition.

Large piles or windrows should be located away from wooded areas, power lines and structures. They should be accessible to fire fighting equipment, if a fire were to occur.

7.5 Vegetative Debris Burn Sites

Vegetative debris burn sites consist of open burning and burning via the use of an air curtain destructor or pit burners. Proximity to roads and dwellings is of particular importance in the selection of sites for this activity.

LDEQ may approve open burning of vegetative debris on a case-by-case basis. As with all proposed debris management sites, **open burning locations must be approved by LDEQ in advance of their use.** Local governments may utilize open burning during the initial disaster response for a reasonable timeframe to allow for the reestablishment of critical arteries for transportation, emergency response and governmental operations. In addition, where continued burning is necessary, any burning shall utilize equipment to efficiently combust waste and reduce emissions if LDEQ or local governing authority deems the use of equipment necessary to protect public health and the environment. Local, state and federal partners associated with the vegetative debris burning operation will be advised of locations that have been approved for this purpose. All sites must be operated in accordance with the LDEQ-provided Interim Operational Plan or other LDEQ correspondence or guidance.

Air Curtain Pit Burners (Air Curtains or Pit Burners) should be operated in accordance with the manufacturers' instructions and with any applicable LDEQ permits or directives. *A copy of the manufacturers' instructions shall be maintained on site and made available to the regulatory agencies upon request.*

Ash from Vegetative Debris Burn Sites may be land applied on site or off site. **Off site application of ash will require specific, written prior approval by DEQ.** **Whenever possible, soil test data and analysis of the ash should be available to determine appropriate application rates.** Ash should not be applied during periods of high winds. Ash should not be applied within 25 feet of surface waters or ditches or drains on vegetated sites. These distances should be doubled on sites that are not vegetated, and the ash should be promptly incorporated into the soil. As an approved **alternative** to land application, ash from combustion of clean vegetative debris may be utilized as a blending or stabilization component, chemical activator, replacement component in masonry products or a component of pozzolanic concrete. Ash that cannot be land applied or used in an alternative manner shall be disposed at a permitted solid waste landfill.

Assistance in obtaining soil test data and waste analysis of ash may be available through parish offices of the LSU Cooperative Extension Service.

7.6 Vegetative Debris Disposal

To the extent possible and practicable, vegetative debris that cannot be beneficially used will be disposed of in permitted landfills. Of the total green and woody debris intended for final disposal in a landfill, it shall be reduced fifty percent by volume and fifty percent by weight prior to final disposal into a landfill. This debris may be used as compost, daily cover (with permission), ground cover or as fuel. It may not be disposed of in a landfill as the first option, but may be used as a component of the cover system for a landfill or a means for providing erosion control.

7.7 Weekly Debris Management Reports

In order for the Department to monitor the local government or state agency management of the vegetative debris waste stream and to ensure that the Legislative Mandate has been met *(vegetative debris shall be reduced fifty percent by volume and fifty percent by weight prior to final disposal into a landfill)*, all vegetative debris sites processing vegetative debris (grinding, chipping, burning, disposal debris sites) shall submit to the Department on a weekly basis, a Weekly Debris Management Report (WDMR) indicating how much vegetative debris is received, what method(s) of process is utilized (i.e. chipping, grinding, beneficial reuse, and/or burning), how much vegetative debris is processed, and the final fate of the waste stream (i.e. industrial boiler fuel, compost/mulch, a component of the cover system for a landfill, etc.). This report is required to be filled out by all active sites until all of the vegetative debris received has been finally processed. All WDMRs shall be submitted before the debris site can be closed. (Copies are in Appendix G)

All WDMRs shall be signed by an authorized person duly authorized by the local government or state agency responsible for the debris site. This signature is a certification under penalty of law that the document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations. It is the local government or state agencies responsibility that all WDMRs are filled out and submitted to the Department in a timely manner.

For Site De-activation, see page 13.

Notification of Final Closure

Once a closure assessment is conducted and all Weekly Debris Management Reports have been received and verified complete, a closure letter is signed by the Assistant Secretary indicating that the debris site is considered closed by the Department and shall not accept or process any additional debris.

7.8 Marsh Debris Management

7.8.1 Marsh Grass

Freshwater marsh grass debris can be an effective additive to composting hurricane wood waste ground or chipped piles. As marsh grass is almost completely water, it provides a natural moistening agent to composting, and at the same time, accelerating the natural process of decomposition.

According to Bill Carney, Ph.D., Coordinator of the L.S.U. Ag Center, Research and Extension, W.A. Callegari Environmental Center, utilization of this freshwater marsh grass in the composting process in a 2:1 ratio will result in the most effective management of this debris which is extremely difficult to burn,

conserve landfill space pursuant to our statutory mandate, and synergistically employ both debris streams for the public good in an environmentally sound manner. Increased salt content due to storm surge may affect its final use as a soil amendment after composting. There exist field test meters that can be used to determine salinity levels.

7.8.2 Retrievable Debris

Retrievable debris items that are in the wetland marsh area shall be retrieved in accordance with ESF-10 protocol¹ and transported to an authorized debris management area. Those items will then be either recycled and/or disposed in accordance with this plan

Retrievable debris items (e.g., vessels, containers, orphan drums, propane tanks, vessels, vegetative/woody matter, white goods, etc.) that are not in a marsh but are located in or near land or a water-body adjacent to a wetland marsh area shall be retrieved for transport to an authorized debris management site. Those items will then be either recycled and/or disposed in accordance with this plan.

Retrievable debris items should, if possible, be retrieved during the initial recovery operation, managed and transported to facilities that are approved for their receipt and management. These debris recovery and removal activities are not expected to result in appreciable habitat disturbance.

7.8.3 Irretrievable Debris

Irretrievable debris items that are located in the marsh, especially sensitive marsh areas, shall be managed in accordance with ESF-10 protocol. These debris management activities are expected to result in appreciable habitat disturbance and therefore, would require an expedited or emergency trustee consultation.

7.8.4 Marsh Burning

Care needs to be taken with marsh burning during disaster recovery operations. Due to the immense amounts of vegetative debris generated in most disasters, these fires can easily expand beyond anticipated burn areas. Marsh burning near active debris sites can pose risk to the site and site personnel. Burning is a practice utilized in marsh areas, especially in areas designated as a refuge. Refuge areas utilize marsh fires on a 2 to 3 year rotational schedule to manage the accumulation of marsh grass and other vegetative/woody debris. The refuges and other entities (i.e. private, parish, state, or federal) owning marsh areas that are non-oil contaminated areas may

¹ ESF-10 – Emergency Support Function #10 describes the lead coordination roles, the division and specification of responsibilities among federal agencies, and the national, regional, and onsite response organizations, personnel, and resources that may be used to support response actions. ESF #10 is applicable to all federal departments and agencies with responsibilities and assets to support state, local, and tribal response to actual or potential oil or hazardous materials incidents.

utilize this method to address the accumulations of marshy grass and debris generated as a result of a natural disaster. The utilization of a marsh fire to address the disaster-generated debris must be communicated to and coordinated with local, state and federal entities (i.e., parish government, property owners, Department of Natural Resources, Department of Wildlife and Fisheries, Department of Environmental Quality, Environmental Protection Agency, United States Coast Guard, United States Army Corps of Engineers, Parish/Local Fire Department) participating in the disaster response and management activities. The plans and procedures pertaining to marsh burning are to be evaluated and authorized by all entities involved in the effort. The plan must take into consideration the potential presence of hazardous, flammable, ignitable or reactive materials that could impact the marsh burning operation. This is needed so that the proper environmental and personal safety precautions will be set forth in the marsh burning plans and procedures.

7.8.5 Transportation in the Marsh

The specific methods of maneuvering transport vehicles (i.e. marsh buggies, pontoons, etc.) in the various areas of the marsh for the purposes of debris management and retrieval activities will need the concurrence of the Department of Natural Resources (Coastal Management), the Louisiana Department of Wildlife and Fisheries and other pertinent state level agencies. This coordination is also needed to address potential navigation hazards or obstructions posed by the presence of disaster-generated debris in the marsh areas.

8.0 Special Debris Management

8.1 Household Hazardous Materials (HHM)

Hazardous waste is waste that can catch fire, react, explode, is corrosive or toxic. Most HHM produced by residential consumers is in small quantities, so those wastes have been exempted from regulation as a hazardous waste by EPA and the State of Louisiana. To be defined as “household” waste and thus considered exempt from federal/state hazardous waste regulations, the waste must be generated by individuals on the premises of a residence for individuals (a household) *and* composed primarily of materials found in the wastes generated from homes. Wastes generated by commercial or industrial establishments that appear to be the same as household waste are not exempt from state/federal hazardous waste regulations.

The Department strongly recommends that sponsors of HHW collection programs manage the collected waste as a Subtitle C hazardous waste, that is, it shall be managed at a facility or site following the hazardous waste guidelines. Given the effort and expense put into a HHW collection program, it makes sense to ensure the greater level of personal safety and environmental protection that will result from the more stringent controls. Precautions must be taken at these sites to prevent the release of materials into the environment. Such precautions include, providing lined temporary storage areas for accumulation of the material, segregation of the various streams, using trained personnel, obtaining spill kits and providing personal protective equipment.

HHM staged at a permitted solid waste facility or approved Emergency Debris Management Site for scrapping/recycling shall be staged away from other solid wastes by category, appliances, CRTs, LPG, *etc.*

8.2 Appliances

Local governments should set up drop-off collection sites for citizens for large appliances (white goods). It is recommended that local governments contract with a metals/or scrap appliance dealers to come and collect white goods for recycling, as white good may not be landfilled. Mercury switches must be removed from appliances by the contractor. Mercury containing devices are easily handled. More detailed information on mercury devices in appliances is available from LDEQ’s web site at:
<http://www.deq.louisiana.gov/portal/tabid/287/Default.aspx>

8.3 Small Engines

Small engines may be sent to a scrap metal processor. Efforts should be made to be made to remove oil and fuel.

8.4 Electronic Goods

In order to contribute to increased recycling and to reduce the volume of waste disposed in landfills, electronic waste (electronic goods or e-goods) should be recovered. It is recommended that local governments contract with an electronics recycler or use the state recycling contractor to come and collect electronics for recycling and dismantling. A state contract is available for state agencies and local government agencies to utilize for the collection of electronics.

Cathode Ray Tubes (CRTs) shall be sent for reuse and/or recycled. See the LDEQ regulations at LAC 33:V: 4911, 4913, and 4915. (Conditional Exclusion for Used, Broken Cathode Ray Tubes Undergoing Recycling, Conditional Exclusion for Used, Intact Cathode Ray Tubes (CRTs) Exported for Recycling, Notification and Recordkeeping for Used, Intact Cathode Ray Tubes (CRTs) Exported for Reuse)

8.5 Compressed Gas Cylinders

Compressed gases present a unique hazard. Depending on the particular gas, there is a potential for simultaneous exposure to both mechanical and chemical hazards. Gases may be: flammable or combustible; explosive; corrosive; poisonous; inert; or, a combination of hazards. If the gas is flammable, flash points lower than room temperature compounded by high rates of diffusion present a danger of fire or explosion. Additional hazards of reactivity and toxicity of the gas, as well as asphyxiation, can be caused by high concentrations of even "harmless" gases such as nitrogen. Since the gases are contained in heavy, highly pressurized metal containers, the large amount of potential energy resulting from compression of the gas makes the cylinder a potential rocket or fragmentation bomb.

Propane is a flammable gas that is sometimes generically referred to as LP-Gas or, LPG. It is recommended that local governments contract with a local LPG dealer to handle the inspection, pickup, recycling and redistribution of functional LPG and other flammable gas containers. It is recommended that local governments contract with a local compressed gas dealer to handle the inspection, pickup, recycling and redistribution of functional compressed gas containers.

There should be no deliberate release of any compressed gas container, including oxygen and nitrogen tanks, by personnel as a part of the debris collection efforts. De-pressurized gas containers may still contain explosive gas mixtures. A close working relationship should be established with scrap metal processing facilities dealing with containers destined for scrap metal reclamation.

8.6 Fluorescent lamps

Fluorescent lamps are a Universal Waste and may be recycled using the state contract for fluorescent lamps. See: <https://ecat.doa.louisiana.gov/ecat/external/externalContractDetail.sdo?docId=407269>.

8.7 Pesticides

Residentially generated pesticides should be handled as solid waste. The Department of Agriculture and Forestry, Waste Pesticide Program at (225) 925-6914 be contacted for pesticide questions or problems.

8.8 Munitions and Ordnance

Munitions or ordnance associated with the aftermath of a disaster that remain unexploded either by malfunction, design, or any other cause, should be handled by a law enforcement trained technician in chemical or conventional munitions or explosives handling, transportation, render-safe procedures, or destruction techniques.

8.9 Tires

Tires collected through hurricane debris collection activities and deposited at parish collection centers will be ineligible for payment of the Waste Tire Management Fund (WTMF) subsidy and are to be treated as debris under FEMA funded debris removal programs. Eligibility of tires for the subsidy shall be governed by the most current version of DEQ's Amended Declaration of Emergency and Administrative Order. For more help please contact Tony Case or Kerri Meyers at DEQ Financial Services, Phone: (225) 219-3863, Fax: (225) 219-3868.

8.10 Used Oil

Used motor oil, transmission fluid and generator oils may be recycled by contacting a registered used oil transporter.

8.11 Latex Paint

Latex paint, if not recycled, may be hardened by adding an absorbent, such as cat litter or a commercial hardener and then sent to a municipal landfill.

8.12 Other Hazardous Wastes

Hazardous wastes, such as old gasoline, oil based paints, chemicals and solvents should be handled using a qualified hazardous waste contractor who is sending the materials to a permitted hazards waste facility or reclaimer.

8.13 Monitoring

Demolition teams, debris collectors, local governments, approved Emergency Debris Management Site operators and landfill operators should remain vigilant for the proper handling of Household Hazardous Materials.

8.14 Recordkeeping

Processors should keep a record of the amount of materials recovered and transported for recycling. Some products already require recordkeeping, e.g. used oil, and duplicate recordkeeping is not required, but a week summary report by category is expected. (form to be provided)

9 Final Disposal Options

This plan is designed to ensure that disaster-generated debris that requires disposal is managed and disposed in a manner that is protective of public health and the environment. Disaster-generated debris requiring disposal shall be managed and disposed at sites that have either been permitted or authorized by the LDEQ.

Uncontaminated wood debris generated from construction intended for final disposal must be segregated and reduced in volume and weight prior to transport to a landfill.

Disaster-generated debris contaminated with oil (i.e. crude oil, petroleum refined product) shall be disposed in a Type I Solid Waste Landfill, except that oil contaminated marsh grass may be approved by the Department with local governments approval for burning on a case by case basis as . Disaster-generated debris that is visibly covered with oil is considered to be oil contaminated debris.

The burning of disaster-generated debris contaminated with or containing hazardous waste is prohibited.

Creosote treated telephone poles, railroad crossties or treated wood chips must be disposed in a Type I Solid Waste Facility.

Construction and demolition debris that is mixed with other disaster-generated debris need not be segregated from other solid waste prior to disposal in a permitted solid waste landfill. Non-recyclables and residuals generated from segregation of disaster-generated debris shall also be disposed of in a Type II or III landfill.

Putrescible waste (e.g. rotting food that has been removed unsalvageable refrigerators and freezers) shall be disposed of in a Type II landfill.

The disposal of excessive accumulations of small animal carcasses shall be in accordance with the Louisiana Department of Health and Hospitals sanitary code. The disposal of large animal carcasses (e.g. horses, cows) shall be in accordance with the instructions from the Louisiana Department of Agriculture.

Hazardous waste generated as a result of the disaster event must be separated from other disaster-generated waste and disposed of at a permitted commercial hazardous waste disposal facility. Recyclables and hazardous waste must be segregated for beneficial environmental use prior to transport to a landfill. While household wastes are classified as solid wastes that are not hazardous wastes, it is imperative that the household waste collected during this event be managed not only in an environmentally sound manner but also in accordance with the appropriate LDEQ rules and regulations governing the storage and processing of this type of waste.

10.0 Formosan Termite Control (Larry LeJune of DAF is going to provide an update) -no change

Landfills are an ideal environment for these subterranean termites, especially in humid Louisiana. For this reason, restrictions are in place from the Louisiana Department of Agriculture and Forestry designating where in Louisiana potential Formosan termite contaminated debris might be disposed. Landfill operators, contractors and waste generators should consult with the Department of Agriculture and Forestry regarding proper disposal of Formosan termite debris. Contact Mr. Bobby Simoneaux at (225) 925-3763 or Hbobby_s@daf.state.la.us

Appendix A

Emergency Disaster Site Forms

Request for Temporary Storm Debris Staging Areas Letter

CERTIFIED MAIL RETURN RECEIPT

Name
Company
Address

RE: Request for Temporary Storm Debris Staging Areas
Parish (or DOTD)AI#
Gustav AI#

Dear :

Due to the widespread damage caused by Hurricane Gustav, the Louisiana Department of Environmental Quality (LDEQ), Office of Environmental Services, Waste Permits Division issues this approval to <Parish or DOTD> to operate temporary storm debris staging areas for construction/demolition(C&D) debris, white goods, and woodwaste. Interim approval for this(these) site(s) was granted on <date>. Vegetative debris, woodwaste, household furnishings, electronic wastes, household hazardous wastes and white goods shall be separated from C&D waste. The use of staging areas is approved based upon the attached criteria. This approval applies to the following site(s) as indicated:

Site Name	Site AI#	Activity	Latitude	Longitude
1.				
2.				

This approval will allow for more efficient and expeditious management of the high volumes of vegetative storm debris resulting from Hurricane Gustav and is valid for sixty days (60) from the date of this letter or until the Declaration of Emergency and Administrative Order issued August 31, 2008 and subsequent amendments and extensions terminate, whichever is longer. However, the LDEQ reserves the right to reduce, rescind or extend the timeframe of this temporary approval.

Please be aware that this letter does not authorize processing and disposal of any kind. A separate request for purposes other than the activity authorized in this letter must be submitted to and approved by the LDEQ . Additionally, a copy of this letter must be maintained at the operation site at all times.

It is imperative that the debris collected as a result of this emergency event be managed not only in an environmentally sound manner, but also in accordance with the appropriate LDEQ rules and regulations governing the storage and processing of this type of waste. The applicant (Parish or DOTD) requesting the debris site(s) as well as the site operator(s), are responsible for compliance with the appropriate LDEQ rules and regulations. Failure to comply with these rules and regulations may result in a formal referral to the Enforcement Division and the possible issuance of civil orders and/or assessment of civil penalties.

If you have any questions concerning this matter, please contact Robert Thomas at (225)219-3056 .

Sincerely,

Cheryl Sonnier Nolan

Assistant Secretary

C: Regional Office
Toni Evans
Betty Brousseau
Daniel Lambert
Facility

Attachment

Temporary Staging Area Operations Criteria

1. Access to the site must be controlled to prevent unauthorized dumping and scavenging;
2. The site must have spotters to correctly identify and segregate waste types for appropriate management;
3. All other applicable requirements contained in the Emergency Declaration must be followed;
4. The site is limited to managing debris indicated in the Department's letter of approval.
5. Vehicles used to transport trees, tree limbs, construction materials, or metals shall contain such waste without allowing materials to fall or blow off the vehicle, in accordance with Louisiana environmental regulations (see LAC 33:VII.505.A.2).
6. Unless otherwise approved by the Department in response to a written request from you, the site must cease operation, and all Hurricane Gustav-generated debris must be removed from the site within sixty (60) days upon expiration of this letter, the Emergency Declaration or subsequent amendments or extensions, whichever is longer;
7. Debris piles shall be managed in accordance with the Comprehensive Plan for Disaster Clean-up and Debris Management;
8. Upon completion of this activity, the site must be closed in accordance with the Comprehensive Plan for Disaster Clean-up and Debris Management and as directed by LDEQ;
9. No vegetative debris from a staging site shall be transported for final disposal at a landfill without being processed at an LDEQ-authorized processing site to meet the statutory mandated reductions.

LDEQ Contact: Robert Thomas (225)219-3056 robert.thomas@la.gov
Request for Temporary Storm Debris Chipping and Grinding Letter

CERTIFIED MAIL RETURN RECEIPT

Name
Company

Address

RE: Request for Temporary Storm Debris Chipping and Grinding
Parish <DOTD>AI#
Gustav AI#

Dear :

Due to the widespread damage caused by Hurricane Gustav, the Louisiana Department of Environmental Quality (LDEQ), Office of Environmental Services, Waste Permits Division issues this approval to <Parish or DOTD> to operate temporary storm debris (vegetative debris) chipping/grinding areas. Interim approval for this site was granted on <date>. This approval applies to the following site(s) as indicated:

Site Name	Site AI#	Activity	Latitude	Longitude
1.				
2.				

This approval will allow for more efficient and expeditious management of the high volumes of storm debris resulting from Hurricane Gustav and is valid for sixty days (60) from the date of this letter or until the Declaration of Emergency and Administrative Order issued August 31, 2008 and subsequent amendments and extensions terminate, whichever is longer. However, the LDEQ reserves the right to reduce, rescind or extend the timeframe of this temporary approval.

Please be aware that this letter does not authorize the onsite disposal of any kind. A separate request for purposes other than the activity which is approved in this letter must be submitted to and approved by the LDEQ. Additionally, a copy of this letter must be maintained at the operation site at all times.

It is imperative that the debris collected as a result of this emergency event be managed not only in an environmentally sound manner, but also in accordance with the appropriate LDEQ rules and regulations governing the storage and processing of this type of waste. The applicant/Parish<DOTD> requesting the debris site(s) as well as the site operator(s)/contractor, are responsible for compliance with the

appropriate LDEQ rules and regulations. Failure to comply with these rules and regulations may result in a formal referral to the Enforcement Division and the possible issuance of civil orders and/or assessment of civil penalties.

If you have any questions concerning this matter, please contact Robert Thomas (225)219-3056.

Sincerely,

Cheryl Sonnier Nolan
Assistant Secretary

C: Regional Office
Toni Evans
Betty Brousseau
Daniel Lambert
Facility

Attachment

Temporary Chipping and Grinding Operation Criteria

1. Access to the site must be controlled to prevent unauthorized dumping and scavenging;
2. The site must have spotters to correctly identify and segregate waste types for appropriate management;
3. All other applicable requirements contained in the Emergency Declaration must be followed;
4. The site is limited to managing debris indicated in the Department's letter of approval;
5. Unless otherwise approved by the Department in response to a written request from you, the site must cease operation, and all Hurricane Gustav-generated debris must be removed from the site within sixty days (60) days upon the expiration of this letter, the Emergency Declaration or the subsequent amendments or extensions whichever is longer;
6. Debris piles, including chips, shredded material shall be managed in accordance with the Comprehensive Plan for Disaster Clean-up and Debris Management;
7. Vehicles used to transport trees, tree limbs, construction materials, or metals shall contain such waste without allowing materials to fall or blow off the vehicle, in accordance with Louisiana environmental regulations (see LAC 33:VII.505.A.2).
8. Upon completion of this activity, the site must be cleared in accordance with the Comprehensive Plan for Disaster Clean-up and Debris Management and as directed by LDEQ;
9. Keep records of approximate volumes of vegetative debris chipped or ground and submit the information on the attached **Weekly Debris Management Report** to the LDEQ, Office of Environmental Services, Waste Permits Division on each **Sunday, starting _____, 200_**. The report should include Agency Interest # for this location.

LDEQ Contact: Robert Thomas

(225)219-3056

robert.thomas@la.gov

Temporary Burning Operation Letter

CERTIFIED MAIL RETURN RECEIPT

Mr.
Parish Council <DOTD>
Address

RE: Request for Approval
Burning Storm Debris
Parish Council < DOTD>
Agency Interest #

Dear Mr. :

Due to the widespread damage caused by Hurricane Gustav, the Louisiana Department of Environmental Quality (LDEQ), Office of Environmental Services, Waste Permits Division issues this approval to <Parish or DOTD> to burn vegetative storm debris. Interim approval for this (these) site(s) was granted on <date>. This approval applies to the following site(s) as indicated:

Site Name	Site AI #	Latitude	Longitude
-----------	-----------	----------	-----------

This approval will allow for more efficient and expeditious management of the high volumes of vegetative storm debris resulting from Hurricane Gustav and is valid for sixty days (60) from the date of this letter or until the Declaration of Emergency and Administrative Order issued August 31, 2008 and subsequent amendments and extensions terminate, whichever is longer. However, the LDEQ reserves the right to reduce, rescind or extend the timeframe of this approval.

Please be advised that this exception to burn does not authorize the creation of a public nuisance as identified in LAC 33:III.1109.D and does not excuse the person responsible from the consequences of or the damages or injuries resulting from the burning. A separate request for the use of a site for purposes other than that which is approved by this letter must be submitted to and approved by the LDEQ. Additionally, a copy of this letter must be maintained at the operation site at all times.

It is imperative that the vegetative debris collected as a result of this emergency event be managed not only in an environmentally sound manner, but also in accordance with the appropriate LDEQ rules and regulations governing the storage and processing of this type of waste. The applicant/Parish <or DOTD> requesting the debris site(s) as well as the site operator(s)/ contractor, are responsible for compliance with the appropriate LDEQ rules and regulations. Failure to comply with these rules and regulations may result in a formal referral to the Enforcement Division and the possible issuance of civil orders and/or assessment of civil penalties.

If you have questions regarding this matter, please contact Robert Thomas at (225) 219-3056.

Sincerely,

Cheryl Sonnier Nolan
Assistant Secretary

C: Regional Office
Toni Evans
Betty Brousseau
Daniel Lambert
Facility

Attachment

Temporary Burning Operation Criteria

LDEQ authorizes the burning of Hurricane Gustav-generated vegetative debris such as leaves, limbs, trees, etc., if the following criteria are met:

1. The burning is conducted only between the hours of 8:00 a.m. and 5:00 p.m. Piles of combustible material should be of such size to allow complete reduction in this time interval;
2. Fire-fighting personnel will be advised of the burning events;
3. The vegetative debris is at least one thousand (1,000) feet (305 meters) from any inhabited dwelling;
4. The burning is controlled so that the emission of smoke, suspended particulate matter, or uncombined water or any air contaminants or combination thereof, does not cross a public road and create a traffic hazard by impairment of visibility;
5. Care is taken to minimize the amount of dirt on the material that is being burned;
6. Heavy oils, asphaltic materials, items containing natural or synthetic rubber, or any materials other than plant growth which produce unreasonable amounts of smoke may not be burned; nor may these substances be used to start a fire;
7. Prevailing winds at the time of the burning must be away from any city, town or airport, the ambient air of which may be affected by smoke from the burning;
8. If an air curtain destructor was identified in your request, it must be used in accordance with the manufacturer's specifications;
9. Unless otherwise approved by the Department in response to a written request from you, the site must cease operation and all Hurricane Gustav-generated debris must be removed from the site within sixty (60) days upon expiration of this letter, the Emergency Declaration or the subsequent amendments or extensions whichever is longer;

10. Vehicles used to transport trees, tree limbs, construction materials, or metals shall contain such waste without allowing materials to fall or blow off the vehicle, in accordance with Louisiana environmental regulations (see LAC 33:VII.505.A.2).
11. Upon completion of this activity, the site must be closed in accordance with the Comprehensive Plan for Disaster Clean-up and Debris Management and as directed by LDEQ;
12. Debris piles, including chips, shredded material shall be managed in accordance with the Comprehensive Plan for Disaster Clean-up and Debris Management;
13. Keep records of approximate volumes of vegetative matter burned and submit the information on the attached **Weekly Debris Management Report** to the LDEQ, Office of Environmental Services, Waste Permits Division each **Sunday, starting September 21, 2008**. The report should include Agency Interest # for this location.

LDEQ Contact: Robert Thomas (225)219-3056 robert.thomas@la.gov

Instructions for Completing the Weekly Debris Management Report*

The State of Louisiana Comprehensive Plan for Disaster Clean Up and Debris Management mandates that vegetative debris intended for final disposal in a landfill shall be reduced fifty percent by volume and fifty percent by weight prior to transport to the landfill. (See La. R.S. 30:2413.1)

In an effort to encourage recycling, the beneficial use of vegetative debris, and the efficient management of debris generated by Hurricane Gustav, the Department of Environmental Quality (LDEQ) will require all debris management sites to submit a Weekly Debris Management Report. These weekly reports will indicate the volume and weight of debris received, processed, recycled, and finally disposed in a landfill.

Volumes and weights can be determined using the following methods:

1. **Debris Weight** is preferably measured by using a scale. If no scale is available, determine the debris weight using the following volume to weight conversion factor:

$$\text{Cubic yards of debris} \div 6 = \text{tons of debris}$$

Do not use the conversion factor of "6" if a scale or other approved method is utilized to determine the weight. Please use the same method to determine the weight of received, processed, and disposed debris.

2. **Truck Capacity** = length x width x height of the truck bed

3. **Net Truck Volume** = Truck Capacity x % full (for a full truck load assume 1)

Other approved FEMA methods may be used. Please document on the form which method is used.

4. **Volume of Vegetative Debris Received** = Sum of all Net Truck Volumes

5. **Volume of Vegetative Debris Processed (i.e. chipped, burned, etc.)** is the quantity of the vegetative debris **received** that was sent for processing.

6. **Volume of Vegetative Debris Recycled (used as fuel, etc.)** is the quantity of the vegetative debris **received** that was sent for a beneficial use.

7. **Volume of Vegetative Debris sent to a Landfill for Final Disposal** is the quantity of the vegetative debris **received** that was sent to a landfill for final disposal.

*Please note that the Weekly Debris Management Report shall be submitted to the LDEQ no later than each Sunday beginning Sunday, September 21, 2008. The report must be true, accurate, and complete. Failure to properly complete the report could subject the responsible party to civil and/or criminal penalties. Furthermore, failure to submit an accurate report timely could subject the responsible party to enforcement action by the LDEQ.

Appendix B

Asbestos

Licenses Required by the Louisiana State Licensing Board for Contractors (LSLBC):

Contractors performing asbestos abatement must be licensed by the Louisiana State Licensing Board for Contractors. Licensing for asbestos abatement is established under the Commercial license with a specialty in Asbestos. Additional information can be found at <http://www.lslbc.louisiana.gov/index.asp> or by calling (225) 765-2301.

A licensing requirement is that one Supervisor/Contractor acting as the responsible individual for the company must be accredited with LDEQ. Following approval from the Louisiana State Licensing Board for Contractors, all abatement workers/supervisors performing work in Louisiana are required to be accredited by LDEQ. The LDEQ Asbestos Accreditation Form (AAC-1) can be found at <http://www.deq.louisiana.gov/portal/Portals/0/permits/AsbestosandLead/AAC-1%20Asb%20App%20Form%2020106.doc>. Note that there is a fee for emergency processing (3 days or less).

Asbestos Accreditations and Notifications Required by LDEQ:

The Louisiana Air Quality regulations, Chapters 27 and 51, Section 5151, contain the requirements for Asbestos Demolition and Renovation abatement activities and accreditation for Workers, Supervisor/Contractors (including air monitoring personnel), Inspectors, Management Planners, and Project Designers. These regulations may be found at <http://www.deq.louisiana.gov/portal/Portals/0/planning/regs/title33/33v03.doc>.

All personnel working as Asbestos Workers, Supervisor/Contractors (including air monitoring personnel), Inspectors, Management Planners, or Project Designers must be accredited by LDEQ. Initial and subsequent Asbestos Hazard Emergency Response Act (AHERA) training by an EPA recognized training provider or a training provider recognized by a state program authorized by

EPA is required for accreditation. A picture I.D. card and the appropriate fee(s) are also required. The LDEQ Asbestos Accreditation Application form can be found at

<http://www.deq.louisiana.gov/portal/Portals/0/permits/AsbestosandLead/AAC-1%20Asb%20App%20Form%2020106.doc>.

Also, a list of Louisiana recognized training providers can be found at <http://www.deq.louisiana.gov/portal/Portals/0/permits/AsbestosandLead/Current%20Asb%20Course%20Schedule%206706.pdf>.

The LDEQ is capable of expediting the accreditation process for the disaster affected areas, including disaster related abatement, and is able to provide almost immediate accreditation by letter, if necessary. Follow up certificates are then generated as soon as possible for all approved applicants. During the review process, if an applicant does not submit the necessary credentials, additional paperwork will be requested. If the requested paperwork is not submitted, the accreditation for that person will be halted.

The LDEQ Asbestos Notification form for Demolition or Renovation can be found at <http://www.deq.louisiana.gov/portal/Portals/0/permits/AsbestosandLead/AAC-2%20Asb%20Not%20Form%20022106.doc>

Complying with the LESHAP Asbestos Regulations:

The purpose of this portion of this document is to provide guidance for compliance with the standards for the demolition and renovation activity pursuant to the Louisiana Emission Standard for Hazardous Air Pollutants (LESHAP) for asbestos (LAC 33:III.Chapter 51.Subchapter M). Subchapter M has been deemed to be at least as stringent as the federal regulation and the LDEQ has received delegation of the National Emissions Standard for Hazardous Air Pollutants program from the US EPA. The LDEQ has used EPA guidance to provide similar guidance in the wake of Hurricanes Katrina and Rita in the determination of compliance with Chapter 51 (and through delegation, the NESHAP). In the aftermath of Hurricanes Katrina and Rita, LDEQ also received “No Action Assurance” letters from EPA that provided targeted flexibility regarding compliance with NESHAP regulations. LDEQ will initiate contact with EPA for similar regulatory flexibility should the nature or magnitude of the disaster warrant,

General Guidelines for Demolition and Related Activities:

Best Management Practices – Conduct all asbestos demolition, LDEQ approved grinding of non-regulated asbestos containing material, transportation, and disposal activities using best management practices and engineering controls to control emissions. These include, but are not limited to, wetting structures/materials before, during and after demolition or grinding, controlled

collapse of walls, and taking all reasonable steps to avoid running over asbestos containing material with heavy equipment.

Site Security – For all demolition, grinding and disposal sites handling asbestos containing material, establish and implement procedures to restrict public access.

Air Monitoring – Conduct air monitoring for the presence of asbestos fibers at enhanced construction and demolition debris landfills and LDEQ approved grinding facilities.

Structures Demolished by the Disasters and Debris on the Ground:

If a house or structure has been effectively demolished by the disaster, collection, treatment and disposal of the debris is not covered by LAC 33:III.5151.F. Additionally, this debris is not subject to the asbestos LESHAP, in accordance with EPA guidance.^{2P}

Structures That Remain Standing After The Disaster:

1. Demolition or renovation of any facility, as defined in LAC 33:III.5151, is required to comply with LESHAP regulations.
2. Demolition/renovation conducted by homeowner or homeowner's contractor. Renovation or demolition by the individual homeowner of residential buildings with four or fewer dwelling units is not covered by the asbestos LESHAPP³. The resultant debris is not subject to the asbestos LESHAP.
3. Demolition of residential structures conducted as a result of a government order.

The EPA has indicated that multiple residential buildings of four units or less, being demolished as a result of the disaster in accordance with a government order, are considered an "installation" as defined in the asbestos LESHAPP^{4, 5, 6P}. Assuming the demolition of multiple residential buildings

² Letter dated November 9, 2005, EPA (Coleman) to US Army Corps of Engineers (Smithers), which states: "If a building or other structure was totally destroyed by a hurricane, then the National Emission Standard for Asbestos, 40 C.F.R. Part 61, Subpart M (Asbestos NESHAP) does not apply to any subsequent activities. For such destroyed structures, you may immediately begin removal and proper disposal of the resulting debris."

³ NESHAP Clarification of Intent, Federal Register, July 28, 1995, Volume 60, Number 145, pages 38725-38726 which states: "EPA believes that individual small residential buildings that are demolished or renovated are not covered by the asbestos NESHAP. This is true whether the demolition or renovation is performed by agents of the owner of the property or whether the demolition or renovation is performed by agents of the municipality. EPA believes that the residential building exemption applies equally to an individual small residential building regardless of whether municipality is the "owner or operator" for the purposes of demolition or renovation."

⁴ NESHAP Clarification of Intent, Federal Register, July 28, 1995, Volume 60, Number 145, pages 38725-38726 which states: "However, EPA believes that the residential building exemption does not apply where multiple (more than one) small residential buildings on the same site are demolished or renovated by the same owner or operator as part of the same project or where a single residential building is demolished or renovated as part of a larger project that includes demolition or renovation of non-residential buildings." The notice further states: "EPA does not believe the residential building exemption was designed to exempt larger demolitions or renovations on a particular site, even where smaller residential buildings are involved."

with four dwelling units or less by a single entity are covered by the asbestos LESHAP, the department will consider compliance with this guidance as compliance with the asbestos LESHAP. It will be the responsibility of the local government or its contractors to determine the boundaries of the installation site. EPA's guidance with respect to "site" states that the site should be a "relatively compact area", but "the local government should use common sense when applying this guide."⁷ P EPA also states that "EPA believes that if a demolition project involves the demolition of several contiguous city blocks, the entire area could be considered a site."⁸P

Notification of demolition and wetting requirements apply in all instances of demolition using the AAC-2 form. The AAC-2 form may be located on the LDEQ's Asbestos and Lead web page at <http://www.deq.louisiana.gov/portal/Default.aspx?tabid=2251>

A. Facilities that are structurally unsound or uninhabitable

It is the responsibility of local governments and their contractors to determine which houses should be demolished because they are unsound or otherwise uninhabitable, and to prepare a list of the houses to be demolished. These residences may be demolished in accordance with more streamlined demolition requirements provided by EPA.

Since no inspections are performed, the entire waste stream must be disposed of in a permitted Type I or II landfill or other LDEQ approved landfill that meets federal NESHAP disposal standards (such as an enhanced C & D landfill which are required to have additional controls to meet or exceed the federal standards under NESHAP (see 40 CFR § 61.154).).

B. Structurally Sound Homes

For the installations consisting of sound residential structures, the LESHAP/NESHAP requires a thorough inspection of such residential structures by an asbestos inspector accredited by the LDEQ. The "LDEQ Inspection Protocol for "thorough inspections," is considered compliant with LESHAP, and can be found at <http://www.deq.louisiana.gov/portal/Default.aspx?tabid=2251>.

C. Thorough Asbestos Inspections

⁵ EPA has also issued subsequent Applicability Determinations which support this position. See Determination Detail, Control #A960033, dated 11/01/1995 and Control #A970008, dated 09/04/1997.

⁶ Letter dated November 9, 2005, EPA (Coleman) to US Army Corps of Engineers (Smithers), which states: "Please note that demolition and disposal of "partially-damaged" or "standing-but-unsafe-to enter" structures are subject to Asbestos NESHAP requirements."

⁷ NESHAP Clarification of Intent, Federal Register, July 28, 1995, Volume 60, Number 145, pages 38725-38726.

⁸ Ibid.

Thorough asbestos inspections must be conducted by asbestos inspectors accredited by LDEQ. The LDEQ Inspection Protocol for “thorough inspections”, which is considered compliant with LESHAP, must be followed when conducting a “thorough inspection” for the purposes of compliance with LESHAP.

Disposal of Waste Streams Resulting From Inspections and Demolition Activities

In order to address debris disposal needs as a result of recovery efforts after Hurricanes Katrina and Rita, LDEQ established criteria for Enhanced C& D Landfills. These enhanced landfills meet federal NESHAP disposal standards. Facilities meeting these requirements and approved by the LDEQ were utilized to effectively dispose of storm related debris. Should the nature or magnitude of the disaster warrant, LDEQ will reactivate the Enhanced C&D Landfill procedures to maximize debris disposal options.

Debris from residences that are being treated as structurally unsound and in danger of imminent collapse must be disposed of in LDEQ permitted Type I or II landfills authorized to accept asbestos or other LDEQ approved landfills that meet federal NESHAP disposal standards (such as an enhanced C & D landfill).

- Non-regulated Category I and II ACM (Non-RACM) may be disposed of at designated areas within permitted Type III landfills that are LDEQ approved for Non-regulated Category I and II disposition.
- RACM that has been removed from residences for which a thorough inspection has been conducted must be disposed of in permitted Type I or II landfills authorized to accept asbestos.
- C&D debris waste may be disposed of at LDEQ approved construction and demolition debris waste sites.

Handling of Debris and Waste Materials from Demolition Activity

The following applies to demolition activities conducted on residential structures that are considered part of an installation:

1. For installations where residences are being thoroughly inspected prior to demolition and RACM is identified, or where residences are being treated as structurally unsound and in danger of imminent collapse, appropriate procedures for asbestos emission control provided by LAC 33:III.5151.F.3 shall be employed. The wet method (fogging/misting) should be used prior to demolition, during demolition and during loading of the material. Mist the houses, including asbestos-containing roofing shingles and siding, remove, segregate and transport in an appropriate manner to a permitted asbestos Type I or II landfill, enhanced C&D debris landfill or regular C&D debris landfill as appropriate. The removal and segregation of material suspected to contain asbestos, including asbestos containing roofing and siding, is recommended.

2. Each structure should be knocked down in a controlled manner to minimize excess breakage of asbestos containing material. Debris should be wetted during demolition, interim staging, and loading activities.
3. It may not be necessary that Category I asbestos containing material (vinyl tile, mastic, etc.) be removed and segregated from the construction and debris waste if it does not have a high probability of becoming friable. If this material does not become friable by the forces expected to act on the material in the course of demolition, it may be disposed at a designated area in an approved C&D disposal site. Regarding Category I asbestos containing material, follow the LDEQ Inspection Protocol for “thorough inspections.”
4. Removal of RACM from Inside Sound Structures. For structurally sound structures, shut windows and doors. If they cannot be shut, install critical barriers (e.g. polyethylene sheeting). However, sufficient wetting is required to manage emissions during removal.
 - a. Negative air is not required;
 - b. The wet method must be employed to remove the regulated ACM;
 - c. Regulated ACM waste must be bagged and labeled;
 - d. Bulk material left behind must be visually inspected and cleaned appropriately;
 - e. No air monitoring clearance is necessary;
 - f. Walls, ceilings, floors, etc. must be encapsulated to ensure ACM fibers are not being released during demolition and loading;
 - g. Follow demolition procedures as noted in this plan, and use OSHA worker protection guidelines.

Appendix C

Vehicles and Vessels

Local governments need to propose an aggregation point for the temporary storage of abandoned vessels and vehicles. These sites should be secure, fenced and lighted. LDEQ shall evaluate and, if appropriate, authorize the aggregation site. The Office of State Purchasing will negotiate contracts related to the recovery and recycling of abandoned vehicles. The Louisiana Department of Transportation and Development will be the project manager for the vehicle recovery and recycling project associated with the disaster response.

Vehicles and vessels brought to the storage areas should be inventoried by license plate, make, model, color and vehicle identification number. They shall be staged and site tagged for easy retrieval. Scrap vehicles should be dismantled and properly recycled. The following materials must be recovered: gasoline and diesel fuel, refrigerants, lubricating oils, mercury ABS switches, mercury convenience switches, lead acid batteries, brake and transmission fluid, antifreeze and tires. Propane tanks and large appliances in recreational vehicles should be removed.

Vessels deemed for scrap should be crushed to reduce volume for easier handling and management, shredded and properly recycled when possible. The following materials must be recovered: gasoline and diesel fuel, refrigerants, lubricating oils, mercury bilge switches, propane tanks, large appliances, lead acid batteries, transmission fluid and electronics such as radar sets, radios, GPS units, and depth finders.

APPENDIX D

Training Recommendations

<http://training.fema.gov/>

FEMA Independent Study Program (Isp)

IS-5.A - An Introduction to Hazardous Materials

IS-100.a - Introduction to Incident Command System, I-100

IS-100.PWa - Introduction to the Incident Command System, I-100, for Public Works Personnel

IS-200.a - ICS for Single Resources and Initial Action Incidents

IS-253 - Coordinating Environmental and Historic Preservation Compliance

IS-632 - Introduction to Debris Operations in FEMA's Public Assistance Program

FEMA Emergency Management Institute Campus or Regional Courses

E905 IEMC: Hurricane: Preparedness and Response

E906 IEMC: Hurricane: Recovery and Mitigation

E915 IEMC: Homeland Security Preparedness and Response

E920 IEMC: Hazardous Materials: Preparedness and Response

E202 Debris Management

E210 Recovery from Disaster: The Local Government Role

Appendix E

DRN Coastal Restoration Letter

Appendix F

Environmental and Historic Review

Federal environmental and historic preservation laws and Executive Orders provide the basis and direction for the implementation of federal environmental and historic preservation review requirements for FEMA-funded projects. Failure to comply with these laws could result in project delays and denial of funding. FEMA through the Environmental and Historic Preservation Program engages in a review process to ensure that FEMA funded activities comply with these laws

Historic Preservation

Section 106 of National Historic Preservation Act of 1966, as amended, requires Federal agencies to enter a 4-step review process to consider the effects of its actions on historic properties. As a Federal agency, FEMA must "take into account" the effects of our actions, or undertakings on historic properties and "afford the Advisory Council on Historic Preservation a reasonable opportunity to comment on [FEMA] actions.

What is an Undertaking? Any project, activity or program funded in whole or in part with Federal money or under the direct or indirect jurisdiction of a Federal agency." If private, local or State money constitute the major funding source of the project and one federal dollar is involved, the project is federalized for the purposes of Section 106.

The historic preservation review process mandated by Section 106 is outlined in regulations issued by the Council. Revised regulations, "Protection of Historic Properties" (36 CFR Part 800), became effective August 5, 2004. The Section 106 4-Step Process:

Step 1: Initiate the Process

Step 2: Identify and Evaluate Historic Properties

Step 3: Assess Adverse Effects

Step 4: Resolve Adverse Effects

National Environmental Policy Act (NEPA)

NEPA establishes a national policy for the protection and maintenance of the environment by providing a process which all federal agencies must follow. Under the act each federal agency, including FEMA, must write their own NEPA compliance regulations to fit their particular programs. NEPA directs federal agencies to thoroughly assess the environmental consequences of "major federal actions significantly affecting the environment." Before FEMA can fund or implement an action that may effect the environment, agency decision-makers must study the potential impacts that the proposed action and alternatives will have on the human and natural environment, and make that information available to the public.

Because different actions may not have similar, significant effects on the environment, there are differing levels of review under NEPA:

- *Statutory Exclusions*
- *Categorical Exclusions*
- *Environmental Assessment*
- *Environmental Impact Statement*

FEMA also follows:

Executive Order on Floodplains Management (E.O. 11988)

Clean Air Act (CAA)

Resource Conservation and Recovery Act (RCRA)

Clean Water Act (CWA)/ Rivers and Harbors Act (RHA)

Coastal Zone Management Act (CZMA)

Coastal Barriers Resources Act (CBRA)

Wild and Scenic Rivers Act (WSR)

Endangered Species Act (ESA)

Fish and Wildlife Coordination Act (FWCA)

Wetlands Executive Order (E.O. 11990)

Environmental Justice Executive Order (E.O. 12898)

Local debris management officials are strongly recommended to take the FEMA online course S-253 Coordinating Environmental and Historic Preservation Compliance, S-253. This interactive computer-based course provides an overview of FEMA's environmental and historic preservation compliance responsibilities and is an independent study alternative to the 4-day E/L253 course held at the Emergency Management Institute or in the regional offices.

<http://www.training.fema.gov/EMIWeb/IS/is253.asp>

The State Historical Preservation Office (SHPO) has provided us with the following form to post on our website:

[*Emergency Disposal Site Consultation Form*](#)

<http://www.deq.louisiana.gov/portal/LinkClick.aspx?fileticket=Z3NXIj7q1zU%3d&tabid=2889>

In order to facilitate FEMA reimbursement for debris sites, this form must be filled out and either faxed or emailed to the following:

Louisiana Division of Archaeology

Attn: Section 106 Consultation

Fax: 225-342-4480

email: archaeology@crt.state.la.us

If there are any questions, please contact SHPO at 225-342-8170, or by fax/email as listed above.

Appendix G

Weekly Debris Management Report (WDMR)

Appendix H

Estimating Disaster Debris

Forecasting Debris Quantities

The formula for estimating debris quantity is: $Q=H(C)(V)(B)(S)$

H (Households)=Population/3 (3 persons per household)

C (Category of Event)=Factor (See table below)

V (Vegetation Multiplier)= Factor (See table below)

B (Commercial Density Multiplier)= Factor (See table below)

S (Precipitation Multiplier)= Factor (See table below)

Category Value of "C" Factor

50 yr Flood 2 CY

100 yr Flood 8 CY

Cat 1 Hurricane Force Winds 2 CY

Cat 2 Hurricane Force Winds 8 CY

Cat 3 Hurricane Force Winds 26 CY

Cat 4 Hurricane Force Winds 50 CY

Cat 5 Hurricane Force Winds 80 CY

Vegetative Cover Value of "V" Multiplier

Light 1.1

Medium 1.3

Heavy 1.5

Commercial Density Value of "B" Multiplier

Light 1.0

Medium 1.2

Heavy 1.3

Precipitation Value of "S" Multiplier

None to Light 1.0

Medium to Heavy 1.3

Once the amount of debris has been estimated, the Parish will require temporary storage sites the size of which can be determined by taking the following factors into consideration:

1. The debris pile shall be stacked to a height of no more than 10 feet.
2. 60% usage of the land area will be devoted to roads, safety buffers, burn pits, household hazardous waste, etc.,
3. 10 foot stack height = 3.33 yards
4. 1 acre = 4,840 square yards (sy)
5. Total volume per acre = 4,840 sy/ac x 3.33y = 16,133 cy/ac.

Using the above assumptions, the estimate of total debris from any Earthquake or Major Flood will be within 30% plus or minus of the actual amount of debris accumulated.

This plan has estimated that under the worst scenario, e. g., is a Category 5 event, heavy vegetation cover, heavy commercial density, and heavy precipitation, the amount of acres needed for a temporary landfill is 3,352 acres. The calculation (**assuming a population of 500,000**) is as follows:

$$Q = H(C)(V)(B)(S)$$

$$Q = 166,667 \times 80 \times 1.5 \times 1.3 \times 1.3$$

$$Q = 33,800,068 \text{ cy of debris.}$$

$$33,800,068 \text{ (cy of debris) / } 16,133 \text{ (cy/ac)} = 2,095 \text{ acres of debris.}$$

$$2,095 \text{ acres} \times 1.66 \text{ (60\% more area needed for roads, etc.)} = 3,352 \text{ acres.}$$

Note: To help visualize what 33,800,068 cy of debris looks like, picture a building occupying 1 acre. 1,000,000 cubic yards of debris would create a stack 62' high on one acre.

That building would be 2,046 feet high or approximately 200 stories high.

For more information see:

<http://www.ohsep.louisiana.gov/recovery/debrismgtsampleplan.htm>

The US Army Corps of Engineers has models for estimating debris volumes, hurricane wind impacts, roof damage and housing needs and the demand for ice and water at:
<https://eportal.usace.army.mil/sites/ENGLink/DisasterImpactModels/default.aspx>