DEBRIS MANAGEMENT
LESSONS LEARNED
I. Introduction
II. Potential Debris Waste Streams
III. Multi-Agency Planning & Coordination
IV. Waste Segregation
V. Debris Disposal Management
VI. Sample Contracts
Debris Waste Streams Hurricanes Katrina and Rita

August 29, 2005

September 23, 2005
Hurricane Destruction
Massive Quantities of Debris
Massive Quantities of Debris
Fallen Structures and Damaged Autos
Debris and Autos
Widespread Flooding
Widespread Flooding
Widespread Flooding
Residual Solid Deposits to 4 Feet Thick
Residual Solids from Levee Breaks
Debris from Levee Break
Residual Solids from Floodwaters
Multi-Agency Planning & Coordination

FEMA

- U.S. OSHA
- ORLEANS PARISH
- USACE
- State and Local Agencies
- U.S. EPA
- LDEQ
Inter-Agency Development of Work Plans

- Environmental & Waste Segregation Plan
- Labor Management Plan
- Residual Solids Removal Plan
- White Goods Management Plan
- Electronic Waste Management Plan
- Small Motorized Equipment Management Plan
- HHW Management Plan
- ACM Management Plan
- Home Decommissioning Plan
- Demolition Plan
Waste Segregation Program

Primary Objectives:

- Removal of ineligible wastes from C&D.
- Conserve Type I & II MSW landfill space.
- Minimize the potential for C&D landfills from becoming future superfund sites.
- Protection of the Workers and population through an aggressive H&S Program.
WASTE SEGREGATION PROCESS FLOW

FLOOD-IMPACTED PROPERTY / STRUCTURE

- VEGETATIVE DEBRIS
- HOUSEHOLD HAZARDOUS WASTE (HHW)
  - VOLUME REDUCTION VIA CHIPPING/GROUNDING
  - TRANSPORT TO GENTILLY LF FOR USE AS COVER
  - TRANSPORT TO EPA PROCESSING CENTER
  - FREON/PUTRID WASTE REMOVAL
  - SANITARY LF FOR DISPOSAL
  - CROWDER STAGING AREA
  - SEGREGATE AND BAG
  - GENTILLY LF

- WHITE GOODS
  - MUNICIPAL SOLID WASTE* (MSW)
    - ELECTRONIC WASTES (E-WASTE)
    - ASBESTOS CONTAINING MATERIAL (ACM)
    - CONSTRUCTION & DEMOLITION DEBRIS (C&D)

- DISPOSAL

*NON-RECOVERABLE MUNICIPAL SOLID WASTE INCLUDE TIRES AND MOTORIZED DEVICES. THESE ITEMS ARE SEGREGATED, BUT NOT CURRENTLY PICKED UP.
What are Ineligible Wastes?

- Household Hazardous Waste (HHW)
- Asbestos Containing Materials (ACM)
- Appliances (White Goods)
- Electronic Wastes (eWastes)
- Gas-powered Small Motorized Equipment (SME)
- Municipal Solid Wastes (MSW)
- Tires
- Munitions & Guns
- Automobiles / Boats
HOUSEHOLD HAZARDOUS WASTES (HHW)

- Cleaning products
- Automotive products
- Lawn and garden products
- Flammable products
- Indoor pesticides
- Workshop/painting supplies
- Mercury containing bulbs, ballasts, and switches.
HHW Segregation Crew

At peak operations, EE&G HHW crews exceeded 1200 staff daily
Removal of HHW from Curbside Debris
HHW Staged Curbside Awaiting Pickup
HHW Pickup.
EPA HHW Collection Facility
Asbestos Containing Material (ACM)

New Orleans is an “Asbestos City”

Construction of most homes occurred during peak years of ACM use in building materials.
ACM was blown off of some structures during the Hurricanes
ACM Commingled with C&D
Flagged Debris Pile Containing ACM
ACM Removal from Curbside Debris Pile
The bags containing ACM are sealed with duct tape
ACM Bags Loaded into Box Trucks
ACM Bags Offloaded at Designated Landfill

12/08/2005
Electronic Wastes
(E-Wastes)
E-Wastes Commingled with Curbside C&D
Curbside Ewaste
E-Wastes Loaded for Hauling to Processing Area
E-Waste Processing Area
E-Wastes are placed on pallets after being further segregated into item types (PCs, TVs, etc.)
Some E-Wastes are wrapped on the pallets prior to shipping to the recycler.
Some E-Wastes are loaded into boxes for shipping to the recycler
White Goods
Curbside White Goods.  
Most Contain Putrid Waste
Offloading of White Goods at Processing Area

12/08/2005
Removal of Putrid Wastes
“Americas Dirtiest Job!”
Staging of “Cleaned” Refrigerators
Removal of Refrigerant
White Goods Crushed and Baled for Recycling

12/08/2005
WASTE SEGREGATION STATISTICS
SUMMARY (as of 9/30/06)

- 1,115,977 HHW Items.
- 1,711,150 Bags of ACM
- 433,216 eWaste Items
- 589,628 White Goods
- 43,389 Small Motorized Equipment
White Goods Processing

Units

E-Waste Collection

Items

Debris Disposal Management

- Operations
- Debris Management
- Waste Disposal
- Solid Waste and Land Use Planning
Temporary Debris Staging & Reduction

Orleans Parish – Sector 1

Pontchartrain (25 Acres) – Vegetation / C&D

Crowder Road (17 Acres) – Vegetation / E-Debris
Temporary Debris Staging & Reduction

Debris Types:
- Vegetative debris
- C&D
- White Goods
- Automobiles / Boats
- Residual Solids
- Oil-Coated Debris
- Household Hazardous Waste
- Electronic Debris
- Asbestos
- Munitions
- Carcasses, etc.
Recycling White Goods

Gentilly Landfill – Orleans Parish

Orleans Parish & Vicinity

Bella Road – Western Parishes
Reduction

- Chipping/Grinding
  - Vegetation
  - C&D pilot tests
- Incineration
  - Vegetation
  - C&D pilot tests
  - Open burning
  - Air curtain
  - Potential emissions
  - Fire control
  - Incomplete combustion
Reduction

- **Landfill Types & Locations**
  - Hazardous Waste (Subtitle C)
  - Municipal Solid Waste (Subtitle D)
  - Construction & Demolition Debris (C&D)
  - Asbestos debris
  - Non-permitted storage/disposal sites

- **Landfill Management**
  - Infrastructure
  - Waste flow
  - Cover / compaction
  - Safety

- **Permitted vs. Authorized**
Southeast Louisiana Disposal Facilities
Example Sites

- C&D
- Vegetation
- Residual Solids
- Asbestos
# Hurricane Katrina & Rita Debris Management

<table>
<thead>
<tr>
<th>Issue</th>
<th>Southeast Louisiana</th>
<th>Southwest Louisiana</th>
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</thead>
<tbody>
<tr>
<td>Debris Volume</td>
<td>Extremely high, estimates vary from 10M yds to &gt; 100M yds</td>
<td>Accessible debris likely less than 2M yd</td>
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<tr>
<td>Debris Distribution/Access</td>
<td>High volume in place debris, infrastructure obstacles</td>
<td>Remote areas, scattered debris – largely inaccessible</td>
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<tr>
<td>Debris Reduction</td>
<td>Limited vegetative grinding &amp; isolated incineration</td>
<td>Open burn for vegetative only</td>
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<tr>
<td>Landfill Proximity</td>
<td>Nearby C&amp;D. Subtitle C further.</td>
<td>Lack of permitted facilities. Approved sites – stage, dispose</td>
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<tr>
<td>Landfill Capacity</td>
<td>&gt; 40M Yds Permitted C&amp;D &amp; Type I/II MSW.</td>
<td>Vermilion limited. No Cameron capacity. Jeff Davis &gt; 20M Yds</td>
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<tr>
<td>White Goods, HHW, E-Debris</td>
<td>Massive operation, ongoing, Gentilly, Crowder, HHW sites.</td>
<td>Small operations - &lt; 3 weeks white goods</td>
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<tr>
<td>Special Waste</td>
<td>High volume oil-coated debris, residual solids, etc.</td>
<td>Sparse occurrence of special waste</td>
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</table>
Proactive Solid Waste Planning

- **Land Use for Operations**
  - Potential operational areas
  - H&S concepts
  - Guidelines for waste transportation
  - Infrastructure for haulers (Food, Fuel, Water, Sewer)

- **Communications**
  - Phone (cellular, land lines, satellite)
  - Internet

- **Debris Management**
  - Temporary storage facilities
  - Recycling programs
  - Reduction strategies
  - Disposal facilities
  - Beneficial reuse of closed landfills, where feasible

- **Regulatory Considerations**
  - Conceptual waivers
  - Conceptual emergency operations
  - Streamlined permitting guidelines
  - Limitations regarding regional solid waste facilities
Pre-landfall and Post Landfall Debris Modeling

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<thead>
<tr>
<th>County</th>
<th>Quantity (cy)</th>
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<tr>
<td>Berkeley</td>
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<tr>
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<td>13,207</td>
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Output:
South Carolina
35,964,493 cubic yards
Welcome

The U.S. Army Corps of Engineers emergency management mission is to fully prepare for and effectively respond to natural and national emergencies. To successfully prepare for and respond to emergencies, the Corps relies upon our internal and external Emergency Management “Communities of Practice” partners. The Emergency Response Portal is a tool for sharing information and communicating with this community.

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