Workshop Objectives

Ensuring the proper disposal of the millions of cubic yards of debris generated as a result of a hurricane is no easy task and requires a significant amount of planning between the public and private sectors. This workshop will review traditional and innovative disposal options for disaster-related debris in an effort to increase diversion from the waste stream, limit impacts on area landfills, and ensure disposal capacity for the future.

Curriculum for Program

Part 1 – Introduction and Purpose — 10 Minutes

Format: Interactive Lecture

- Introduction of instructors and participants

Part 2 – Series Midpoint Review — 15 Minutes

Format: Interactive Lecture

- Workshop 1: Getting Back to Basics
- Workshop 2: All Hands on Deck
- Workshop 3: Keeping It Between the Lines

Part 3 – Purpose and Overview — 10 Minutes

Format: Interactive Lecture and Large Group Discussion

- Ensuring proper disposal
- End-markets for disaster debris
- Disposing of special wastes

Part 4 – Ensuring Proper Disposal — 45 Minutes

Format: Interactive Lecture and Large Group Discussion

- Waste streams
- Estimating debris volume by event

Case Study: Mecklenburg County, North Carolina – Hurricane Hugo

- State and federal regulations

BREAK — 15 Minutes

Sponsored by: Crowder Gulf

Part 5 – End-Markets for Disaster Debris — 40 Minutes

Format: Interactive Lecture and Large Group Discussion

- Landfills
- Biomass facilities

- Mulching
- Incineration
- Land applications for ash

Guest Speaker: Living Earth Technology Company *(15 Minutes)*

- Recycling

Case Study: City of Houston, Texas – Hurricane Ike

- Financial impact

Part 6 – Disposing of Special Wastes 35 Minutes

Format: Interactive Lecture and Large Group Discussion

- Hazardous materials
- Regulated asbestos-containing material
- Construction and demolition

Guest Speaker: Waste Management *(15 Minutes)*

Part 7 – Questions/Next Steps 10 Minutes

Format: Interactive Lecture

- Resources and references
- Next workshops
- Questions

M. Wayne Floyd

East Carolina University
B.S. in Environmental Health

KEY EXPERTISE

- Debris Management
- Emergency Management and Response
- Debris Removal Operations
- Environmental Health
- Public *Assistance*

Mr. Floyd has over 25 years of hands-on experience in emergency management planning, disaster response and recovery and environmental health hazards associated with natural disasters. Most recently, Mr. Floyd has served as Program Manager for the Texas Department of Transportation (TxDOT) – Beaumont District currently conducting various debris missions throughout southeast Texas.

Previously, Mr. Floyd involved managing debris management operations for a number of jurisdictions in Florida in response to Hurricanes Charley and Frances. While under contract to NCDOT, Mr. Floyd served as an on-site construction manager responsible for coordinating the services of a staff of 27 public assistance (PA) profect officers in administering the Federal Emergency Management Agency (FEMA) PA Program. This involved working with NCDOT, the North Carolina Emergency Management Agency, FEMA and local governments in the development of 404 and 406 mitigation proposals. Mr. Floyd was responsible for obtaining data and developing the enviornmental aspects of the mitigation proposals and the damage survey reports. In addition, he provided oversight to management contracts.

In addition, Mr. Floyd worked as the State Deputy PA Officer for debris management while under contract with the Mississippi Emergency Management Agency (MEMA). He worked with FEMA, State PA Coordinators and Project Officers to develop validation guidelines for field operations and monitoring of debris removal operations throughout the State. Mr Floyd was responsible for the coordination between FEMA's Mission Assignment for Wet Debris/Sediment to the U.S. Coast Guard (USCG) and the Natural Resocurces Conservation Service (NRCS) Emergency Watershed Protection jurisdictional issues and funding opportunities available to local communities and state agencies. He facilitated the combined efforts of FEMA, USCG, the Mississippi Department of Marine Resources (MDMR), local counties and Fortune 100 private companies in the removal of a 15,000 cubic yard debris field deposited in a sensitive marine preserve.

WASTE MANAGEMENT OF TEXAS, INC. **CHARLES A. RIVETTE, P.E.**
Manager of Planning and Project Development

EDUCATION

University of Kentucky, Master of Science in Civil Engineering, 1981
University of Kentucky, Bachelor of Science in Civil Engineering, 1979

LICENSES AND AFFILIATIONS

Registered Professional Engineer: State of Texas, 1985
Board Member, TCEQ Municipal Solid Waste Advisory Committee (since 1997)
Member, National Society of Professional Engineers
Member, American Society of Civil Engineers
Former Company Representative, Geosynthetic Research Institute

CURRENT RESPONSIBILITIES

Mr. Rivette supports the planning, permitting, construction and operations of WM's 9 SE Texas landfills and two transfer stations. He has been directly involved in the debris management activities for Hurricanes Ike and Rita, and Tropical Storm Allison.

PROFESSIONAL EXPERIENCE

Mr. Rivette has directed daily landfill operations as a District Manager, as well as provided support to WM's Government Affairs Program. Prior to joining Waste Management, Mr. Rivette worked for BFI for 12 years. He held positions as the Manager of Geotechnical Engineering, as Director for Landfill Permitting and Development, as Assistant Regional Landfill Manager and as Area Landfill Manager. As Area Landfill Manager he was responsible for the operations of 22 landfills in the states of Texas, Oklahoma, and Arkansas. He has managed the construction, or the operations, or directly assisted in the permitting, for more than 50 different landfills. He has also provided expert testimony in association with landfill permitting activities.

Prior to working directly for a waste industry operations company, Mr. Rivette worked over eight years as a civil engineer with an international geoscience consulting firm. In this capacity, he provided consulting engineering design services for a diverse range of projects including solid waste landfills, liquid waste containment facilities, tall buildings, liquid storage tanks, roadway design, and very large deepwater offshore structures. Mr. Rivette worked in all facets of the geoscience consulting industry, including project management, field and construction supervision, proposal and cost analysis, in situ tool development and use, laboratory operations, special product research, and forensic studies

Mr. Rivette has authored or co-authored several published technical articles, including "Design and Cost Impacts of Subtitle D Regulations on Private Landfill Owners" published in the September 1993 Geotechnical News, and, "the Use of Calcium Sulfate as an Alternate Road Base Material" which was chosen by the Texas Section of ASCE as a winner of the Hawley Award.

John Buri

Mr. Buri is a versatile emergency management, disaster mitigation, preparedness, response and recovery professional with eight years of dedicated consulting experience on behalf of cities, counties, regional planning councils and state governments. Mr. Buri has assisted with the management of debris monitoring programs following some of the nation's worst natural disasters including Hurricane's Dolly, Gustav and Ike 2008. He has been responsible for general operations oversight and advisor to department heads and elected officials regarding disaster debris management and financial issues. Mr. Buri also is extremely familiar with policies associated with specialized debris missions including private property ROE administration, waterways cleanup and beach remediation services.

Through his disaster recovery work, Mr. Buri has developed significant knowledge of federal, state and local regulations pertaining to solid waste management, hazardous waste management. Mr. Buri is well versed in regulations, policies and reimbursement processes for state and federal agencies including: Division of Emergency Management, Department of Transportation, Department of Environmental Quality, State Historical Preservation Office, FEMA, OSHA and FHWA. In addition, Mr. Buri has been recognized throughout the State of Texas as an expert on debris management issues, conducting speaking engagements at the Texas Hurricane Conference, the Texas Homeland Security Conference and the Solid Waste Association of North America annual conferences over the last three years.

Mr. Buri also sits on the Disaster Recovery Committee for the National Hurricane Conference and is a member of the Board of Directors for the Emergency Management Association of Texas.

Texas State University
Master of Public Administration

University of Texas at Austin
B.A. in Government

KEY EXPERTISE

- FEMA PA Program Management
- Procurement, contracts and negotiations
- Federal reimbursement/appeals support
- Disaster debris management plans
- Government affairs

Mark Rose

Mr. Mark Rose is President of the Living Earth Technology Company (LETCO) Group, LLC DBA and has been with the firm since 1995. He has over 32 years of experience in the soil, mulch and composting industry and is considered an expert in field of vegetative waste management.

In 2008, Mr. Rose was intimately involved in the City of Houston's debris management program following Hurricane Ike as a subject matter expert to city leadership. In addition, the LETCO Group, under his direction, was one of the primary markets for the reduced vegetative waste for the City's debris.

Mr. Rose is a member of the Texas Commission on Environmental Quality (TCEQ) Municipal Solid Waste and Resource Recovery Council and is president of the Compost Advisory Council of the State of Texas Alliance for Recycling.

KEY EXPERTISE

- Solid waste management
- Composting
- Public policy

Workshop 4

April 29, 2010

Guest Speakers:
Mark Rose & Chuck Rivette

Topic:
Best Practices to Properly Dispose of Disaster Debris

WORKSHOP AGENDA

- Ensuring Proper Disposal of Debris
- End-Markets for Disaster Debris
- Disposing of Special Wastes

9:00 a.m. – 12:00 p.m.
H-GAC Conference Room
3555 Timmons Lane Houston, TX 77027

Reducing Your Disaster Footprint: An In-Depth Discussion of Debris Disposal Methods

H-GAC

INTRODUCTION

Presentation Team

John Buri

- Supported debris management for every Beck Disaster Recovery, Inc. (BDR) disaster response since 2004
- Provides subject matter expertise in disaster planning, operations, and grant funding opportunities
- Served as program manager for the City of Houston following Hurricane Ike

Wayne Floyd

- Serves as BDR's program manager for the Texas Department of Transportation debris projects
- Over 25 years of experience coordinating with local, state, and federal agencies in emergency management

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TODAY'S AGENDA

- ✓ **SERIES MIDPOINT REVIEW**
- PURPOSE AND OVERVIEW
- ENSURING PROPER DISPOSAL
- END-MARKETS FOR DISASTER DEBRIS
- DISPOSING OF SPECIAL WASTES
- QUESTIONS/NEXT STEPS

SERIES MIDPOINT REVIEW

- Workshop #1: Getting Back to Basics
  - Review of previous events
  - Ideas for debris management planning
  - Review of H-GAC resources
- Participant feedback
- Outstanding questions

SERIES MIDPOINT REVIEW

- Workshop #2: All Hands on Deck
  - Triggers for state/federal mission assignments
  - Federal agencies
  - State agencies
- Participant feedback
- Outstanding questions

SERIES MIDPOINT REVIEW

- Workshop #3: Keeping It Between the Lines
  - Federal agencies – FEMA, OIG, EPA, USFWS, USACE
  - State agencies – TCEQ, THC, GLO, TDEM
  - Local jurisdictions
- Participant feedback
- Outstanding questions

TODAY'S AGENDA

- ✓ SERIES MIDPOINT REVIEW
- ✓ **PURPOSE AND OVERVIEW**
- ENSURING PROPER DISPOSAL
- END-MARKETS FOR DISASTER DEBRIS
- DISPOSING OF SPECIAL WASTES
- QUESTIONS/NEXT STEPS

PURPOSE AND OVERVIEW

- Provide information on proper disposal of disaster-generated debris
- Estimate potential debris volume
- Discuss required documentation for disposal
- Identify viable recycling programs
- Discuss end-markets
- Identify roles and responsibilities for final disposal
- Review state and federal regulations

TODAY'S AGENDA

- ✓ SERIES MIDPOINT REVIEW
- ✓ PURPOSE AND OVERVIEW
- ✓ **ENSURING PROPER DISPOSAL**
- END-MARKETS FOR DISASTER DEBRIS
- DISPOSING OF SPECIAL WASTES
- QUESTIONS/NEXT STEPS

ENSURING PROPER DISPOSAL

- Planning considerations
  - Landfill space
  - Recycling options
  - Labor resources
  - Equipment
  - Storage locations
  - Long-term impacts on landfill space

ENSURING PROPER DISPOSAL

- Waste streams
  - Vegetative
  - Construction and demolition (C&D)
  - Hazardous materials/toxic
  - Household hazardous waste
  - White goods
  - Putrescible waste
  - Vehicles and vessels
  - Electronic

ENSURING PROPER DISPOSAL

Volume

- Debris volume by event
  - Wind
  - Surge/flooding
  - Seismic
  - Man-made

ENSURING PROPER DISPOSAL

Volume

Location	Disaster	Impact/Debris Quantities
Los Angeles, California	Northridge earthquake	7,000,000 cubic yards (CY) 25,000 dwellings uninhabitable 7,000 buildings severely damaged
Escambia County, Florida	Hurricane Ivan	6,000,000 CY vegetative debris 1,000,000 CY C&D debris
New York, New York	World Trade Center	1,460,000 tons (~5,000,000 CY)
San Francisco, California	Loma Prieta earthquake	414 single family homes destroyed 18,000 single family homes damaged
Greene County, Missouri	2006 ice storm	1,250,000 CY vegetative
Mingo and Logan Counties, West Virginia	2004 floods	8,000 tons (~12,000 CY)
Sarasota County, Florida	Tropical Storm Gabrielle	150,000 CY vegetative debris

ENSURING PROPER DISPOSAL

Volume

- Debris volume by estimation
  - USACE Hurricane Debris Estimating Model considers the following factors:
    - Number of households
    - Storm category
    - Vegetation characteristic of the area
    - Storm precipitation characteristic
- FEMA 325 provides values for each of the above factors

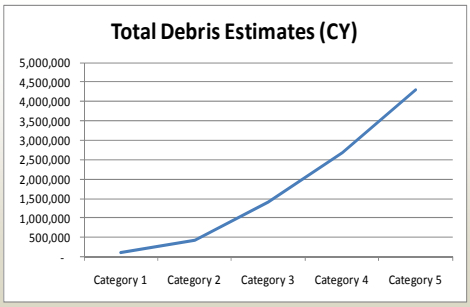
ENSURING PROPER DISPOSAL

Volume

- USACE Hurricane Debris Estimating Model
  - As the category of storm increases, the potential for debris grows exponentially.
  - The purpose of the model is to estimate potential debris volume for planning purposes.
  - Evaluate debris management site and landfill to determine capacity requirements.
  - Variables should be anticipated following an actual event.

ENSURING PROPER DISPOSAL

Volume



ENSURING PROPER DISPOSAL

Volume

ENSURING PROPER DISPOSAL

Volume

- Volume does not return to pre-storm levels
  - Volusia County, Florida following Hurricanes Charley, Francis, Ivan, and Jeanne:
    - Initial surge of vegetative debris immediately following the event
    - High levels remained for six months
    - Debris from demolitions expected to continue for another two years following the storms

ENSURING PROPER DISPOSAL

Case Study

Mecklenburg County, North Carolina – Hurricane Hugo

- An estimated decade's worth of vegetative debris was generated in three hours
- Only available landfill had less than 2.5 years of capacity remaining
- Burning was not an option due to air quality conditions
- Storm generated approximately 400,000 tons (1.6 million CY) of vegetative debris

ENSURING PROPER DISPOSAL

Case Study

Mecklenburg County, North Carolina – Hurricane Hugo (continued)

- County staged and reduced debris without using limited landfill space
- Media helped implement "Take-a-Ton" mulch give-away campaign
- Contractors hauled and sold mulch to local paper mills as boiler fuel

For more information on this study, visit the following Web site:

http://www.epa.gov/osw/conserve/rrr/imr/cdm/pubs/disaster.htm#examples

ENSURING PROPER DISPOSAL

Regulations

- State Regulations – TCEQ Regulatory Guidance
  - Traditional Municipal Solid Waste Disposal: A Guide for Local Governments
    - http://www.tceq.state.tx.us/comm_exec/forms_pubs/pubs/rg/rg-469.html/at_download/file

ENSURING PROPER DISPOSAL

Regulations

- State Regulations – Burning
  - Check local ordinances or other regulations about outdoor burning.
  - If a county has a burn ban in place, the TCEQ will not approve any exception to the rule.
  - For additional information concerning outdoor burning in Texas, consult the TCEQ's Outdoor Burning in Texas (RG-049).

ENSURING PROPER DISPOSAL

Regulations

- State Regulations – Burning
  - Burning of electrical insulation, treated lumber, plastics, non-wooden construction or demolition materials, heavy oils, asphaltic materials, potentially explosive materials, chemical wastes, or items that contain natural or synthetic rubber (for example, tires) is **strictly prohibited**.

ENSURING PROPER DISPOSAL

Regulations

- Federal Regulations
  - Hazardous waste – Resource Conservation and Recovery Act
  - Open burning – Section 110 under the Clean Air Act
  - Asbestos-containing material – 40 CFR 61.145(c)(10), NESHAP and OSHA regulations

ENSURING PROPER DISPOSAL

Regulations

- Federal Regulations – Final Disposal
  - Permitting
  - Bonded
  - Time conditions

TODAY'S AGENDA

- ✓ SERIES MIDPOINT REVIEW
- ✓ PURPOSE AND OVERVIEW
- ✓ ENSURING PROPER DISPOSAL
- ✓ **END-MARKETS FOR DISASTER DEBRIS**
- DISPOSING OF SPECIAL WASTES
- QUESTIONS/NEXT STEPS

END-MARKETS FOR DISASTER DEBRIS

- Landfills
- Biomass facilities
- Mulching and recycling facilities
- Paper mills
- Land applications of ash

END-MARKETS FOR DISASTER DEBRIS — Landfills

- Avoid landfilling reduced material
- Cost can be reasonable even if material is long-hauled
- FEMA pilot program may allow locals to keep money from recyclers
- Identify end-markets early to avoid flooded market
- Conduct due diligence for final disposal

END-MARKETS FOR DISASTER DEBRIS — Biomass Facilities

- Industrial
  - Paper mills
  - Fuel additive in boilers
- Agricultural
  - Soil amendment
- Compost facilities
  - Do not allow residents to pick up compost directly from debris management site

END-MARKETS FOR DISASTER DEBRIS — Mulching

- Chipping
  - Most expensive reduction method
  - 4:1 or 75 percent reduction
  - Grinding
  - Tub grinder
  - Belt grinder
  - Chipper
  - Wood chips must be of acceptable size

END-MARKETS FOR DISASTER DEBRIS — Mulching

- Limit contamination of material
- Mulch piles may be fire hazard if stored for extended periods of time
  - Only 15-20 feet high
  - Moved to final disposal facility quickly
- Several markets for wood chips
  - Landfill daily cover
  - Paper mill/industrial fuel
  - Soil amendment for agriculture

END-MARKETS FOR DISASTER DEBRIS — Incineration

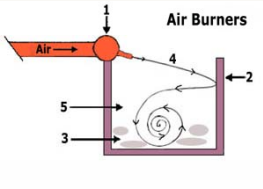
- Air curtain incinerators
  - More costly than open-burning
  - Referred to as “trench burning” or “pit burning”
  - Burns very hot (1,000º C) and reduces smoke
  - Not ideal in sandy/rocky soils or low-water table
  - Ash needs to be cleaned out periodically

END-MARKETS FOR DISASTER DEBRIS — Incineration

- Air curtain incinerators (continued)
  - In-ground or above ground
  - Speed of blower impacts amount of smoke
  - Construction of pit and berms
  - Should be managed 24 hours a day
  - Spot checks of material to ensure clean debris
  - Additional blower can increase production

END-MARKETS FOR DISASTER DEBRIS — Incineration

- Air curtain incinerators (continued)
  - Use backhoe to dig trench
  - Above ground
    - Import soil
    - Fire-box
  - Dimensions
    - 8-12' Wide
    - 12-20' Depth
    - Length of blower



END-MARKETS FOR DISASTER DEBRIS — Land Applications for Ash

- Ash
  - Agricultural benefits when added to soil
    - Replaces lime
  - Over 25 landfills in the region for use as daily cover
  - Numerous farms and ranches in region

Guest Speaker

Living Earth Technology Company

END-MARKETS FOR DISASTER DEBRIS — Recycling

- Metals
  - Market for ferrous metals is well established
  - Current market price for scrap metal is $90 to $100 per ton

END-MARKETS FOR DISASTER DEBRIS — Case Study

City of Houston, Texas – Hurricane Ike

- 3.9 million CY of vegetative debris
  - 12 debris management sites
  - 19 recycling facilities
  - 264,857 tons diverted from the waste stream
  - Erosion control at 5 landfills
  - Boiler fuel at 2 paper mills
- 1.5 million cubic yards of C&D
  - 6 final disposal sites

END-MARKETS FOR DISASTER DEBRIS — Financial Impact

- Reduce Costs
  - Pre-positioned contracts for hauling/disposal
  - Volume reduction efforts (burning, grinding, chipping, etc.)
  - Diversion of remaining debris (agricultural, industrial fuel, landfill erosion, daily cover, etc.)
- Revenue Sources
  - Sale of diverted material (metal, wood, etc.)

END-MARKETS FOR DISASTER DEBRIS

Financial Impact

- Reserve Funds
  - Restricted reserve for storm debris
  - Solid waste user fees (preferred)
    - Add to revenue requirement to be recovered through the base fee
- Special assessment
- General fund

END-MARKETS FOR DISASTER DEBRIS

- Search for industrial/manufacturing firms that may accept wood chips
  - www.RecycleTexasOnline.org
  - www.CleanTexas.org – search by material, location or business type
- EPA tool to search for end-users by area
  - http://www2.ergweb.com/bdrtool/login.asp

TODAY'S AGENDA

- ✓ SERIES MIDPOINT REVIEW
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- ✓ ENSURING PROPER DISPOSAL
- ✓ END-MARKETS FOR DISASTER DEBRIS
- ✓ **DISPOSING OF SPECIAL WASTES**
- QUESTIONS/NEXT STEPS

DISPOSAL OF SPECIAL WASTES

Hazardous Material

- Flooding and Hazardous Waste
  - Flooding may cause hazardous and non-hazardous materials to be mixed.
  - Separation can be difficult or impossible under time constraints.
  - Mixed debris may end up being disposed of in a landfill not intended for mixed debris.

DISPOSAL OF SPECIAL WASTES

Regulated Asbestos Containing-Material

- Regulated Asbestos-Containing Material
  - Concern during demolition programs
  - Often in homes built before the late 1970s
  - Must be tested before initiating demolition
  - Must be disposed of in a classified landfill
  - EPA air quality monitoring
  - Plastic sheath wrapping for transportation
  - Certified asbestos supervisor on-site

DISPOSAL OF SPECIAL WASTES

Construction and Demolition

DISPOSAL OF SPECIAL WASTES

Construction and Demolition

- Mauling
  - Heavy equipment crushes material
  - 4:3 ratio or 25 percent reduction
- C&D Grinding
  - 4:2 ratio or 50 percent reduction
  - Specialized tub grinders
  - May be difficult to acquire

DISPOSAL OF SPECIAL WASTES

Construction and Demolition

- Must weigh benefits of reduction vs. direct haul
- Reduction rates lower than vegetative
  - C&D already a dense material
- Equipment breakdown can be problematic

Guest Speaker

Waste Management

TODAY'S AGENDA

- ✓ SERIES MIDPOINT REVIEW
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- ✓ END-MARKETS FOR DISASTER DEBRIS
- ✓ DISPOSING OF SPECIAL WASTES
- ✓ **QUESTIONS/NEXT STEPS**

QUESTIONS/NEXT STEPS

- Resources and References
  - EPA publication: Planning for Natural Disaster Debris
    - http://www.epa.gov/wastes/conserve/rrr/imr/cdm/pubs/pndd.pdf
  - CRS Report for Congress Managing Disaster Debris Overview of Regulatory Requirements, Agency Roles, and Selected Challenges
    - http://www.policyarchive.org/handle/10207/bitstreams/18988.pdf

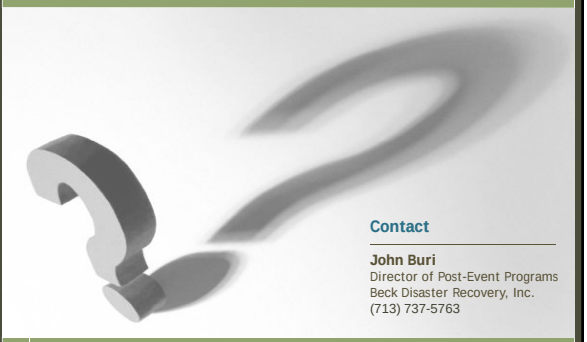
QUESTIONS/NEXT STEPS

- Workshop #5 – Sticker Shock: The Financial Realities of Debris Operations
  - Documentation guidelines
  - Federal funding sources
  - Activities that can jeopardize funding
  - Funding timeline
  - Cost-saving opportunities and strategies

QUESTIONS/NEXT STEPS

- Workshop #6 – What if…: Planning for Special Debris Operations
  - Household hazardous waste
  - Open fields
  - Hazardous trees
  - Wet debris
  - Private property
  - Time and materials operations
  - Vessels and vehicles
  - Animal carcasses

THANK YOU



Contact

John Buri
Director of Post-Event Programs
Beck Disaster Recovery, Inc.
(713) 737-5763

Recycling, Reuse and Reduction Success Stories

Of course, every community hopes it never has to use its disaster debris management plan, but when a disaster does hit, prepared communities can recover more quickly than other communities. Below are disaster debris case studies from an earthquake, a flood, and three hurricanes. These case studies include examples of situations in which planning paid off, as well as circumstances in which the lack of planning slowed recovery.

Los Angeles, California — The Northridge Earthquake

The city of Los Angeles relied heavily on recycling to manage debris from its January 1994 earthquake. In response to the earthquake, city staff negotiated with FEMA to designate recycling as the preferred method of debris management. The city developed contracts with existing businesses to recycle clean source-separated materials and worked with more than nine businesses to develop processing capacity for mixed debris. By midsummer, the city was able to recycle about 50 percent of the earthquake debris collected each week. By July 1995, the city was recycling over 86 percent of the debris collected, totaling over 1 1/2 million tons.

Collection and Recycling

The city of Los Angeles did not have a plan for debris management prior to the earthquake but quickly developed debris management procedures after the disaster. The day after the earthquake struck, the city instituted a curbside debris collection program, which did not include recycling. C&D debris under normal conditions makes up 10 to 15 percent of the Los Angeles waste stream. Prior to the 1994 earthquake, one local company processed 150 tons of C&D waste per day. After the earthquake, the city picked up as much as 10,000 tons of C&D waste per day. City officials updated an existing list of licensed, insured debris removal contractors and asked them to attend an orientation and to sign hastily drafted contracts for debris removal.

At first, contracts for debris removal were only two pages long and contracted for one week of work. These early contracts allowed the city to begin removing debris quickly, yet did not include recycling or other requirements such as subcontracting parameters. Contracts ultimately grew to 22 pages. The city assigned each contractor a grid of streets to clear. City inspectors (pulled from other assignments) monitored contractors and kept records to determine whether debris in each area was collected within seven days of being set out. When contractors expended their total contract amounts, city officials placed them at the bottom of the list of approved contractors and called them again when their turns came.

After two months of negotiation, FEMA allowed the city to include recycling as a debris removal method. This decision was based primarily on the city's local policy supporting recycling and a recycling pilot that documented a potential 82 percent recycling rate. Contractors began separate collections of wood, metal, dirt, concrete and asphalt, and red clay brick. The city required the contractors to send any debris that could not be separated to facilities that recycled at least 80 percent of the mixed debris.

Most of the materials collected were recyclable. Recyclers crushed concrete and asphalt (mixed with up to 15 percent dirt) and sold it for use as sub-base in roads. They reused dirt as landfill cover and soil

amendment. They ground and screened wood, selling fine pieces by the cubic yard for landscaping and coarse pieces for cogeneration fuel or compost. Recycling facilities either ground up brick for use on baseball infields or chipped it for use in landscaping. Scrap metal dealers recycled metal waste.

By December 1995, four facilities were capable of recycling mixed debris. Two of them used an automated process that screened out fine debris and sent the remainder along a conveyor belt where workers removed and separated wood, brick, metal, and trash by hand. A vibrating screen removed any dirt left in the remaining stream. At the end of the process, only clean concrete and asphalt were left.

City officials also ensured that debris would be recycled by providing training and incentives to haulers. For example, city officials required haulers to develop a recycling plan that included scouting for recyclables and dedicating trucks to a given type of waste, so that debris separated at the curb did not become mixed in the truck. The city also created a contract performance incentive that placed source-separated recycling higher than mixed recycling. With these efforts, the city expanded its C&D recycling capacity by a minimum of 10,300 tons per day. Immediately after the earthquake, all debris was disposed of in three landfills. Just over a year later, the city had added 18 recycling facilities and one landfill. This expansion helped to meet a long-term goal to increase recycling of routine C&D waste.

By the end of the program, the city had recycled almost 56 percent of all materials collected since the day of the earthquake for less than the cost of disposal. The city demonstrated that when sufficient recycling facility capacity exists, a recycling rate of over 86 percent can be achieved. This total would have been much higher, in fact, had the city implemented recycling in the beginning of the recovery effort. To prepare for the possibility of future disasters, Los Angeles has issued an RFP for a contingency contract for various waste management activities, including the use of sites in the event of a natural disaster.

Communication

Soon after the earthquake, officials placed news stories and advertisements to inform the public that they could leave debris for pickup on the street in a pile as wide as a parked car. At first, the city allowed residents to leave mixed debris at the curb. Later, city officials asked residents to separate the following materials: concrete and asphalt (these could be mixed), dirt, red clay brick, wood, and all other material. Residents had been accustomed to the relaxed requirements that allowed them to set out mixed debris, however, so crews of specially hired city workers distributed doorhangers requesting residents to separate their debris. Where residents still did not separate debris into its recyclable components, work crews preceded the debris haulers and separated the debris. When residents placed yard trimmings or other non-earthquake-related debris on the curb, workers left doorhangers explaining why these materials had not been picked up and giving directions on how to dispose of the materials. In the first eight months after the earthquake, debris haulers collected 122,000 truck loads of debris.

The city relied on both residents and city staff to determine which locations needed debris pickups. A telephone bank, staffed by English-, Spanish-, and Korean-speaking operators, fielded requests for pickups from residents. Staff entered the address of each caller into a geographic information system database and regularly produced maps showing areas needing pickups. At the same time, city inspectors supervising the debris management work reported streets where debris had accumulated.

Outside Assistance

Los Angeles was largely self-sufficient in managing its earthquake debris. If the quantity of debris had been greater, the city would have asked for assistance from USACE (through FEMA), the state of California, and other states. Other agencies provided some assistance. The California Office of Emergency Services provided a liaison to FEMA and issued emergency regulations expanding permit hours for solid waste facilities.

FEMA funded the debris recycling program, including paying recycling facility tipping fees, as well as the costs associated with hiring data entry staff and contracting with a consultant to manage recycling efforts. For the period of May 14, 1995, through July 15, 1995, the average tipping fee to use the recycling facilities was $21.55 per ton versus $24.92 per ton for disposal facilities, resulting in an average savings of $3.37 per ton. In addition, recycling saved the city transportation costs since recycling facilities were closer to the devastated areas and many had shorter lines. California's Integrated Waste Management Board helped Los Angeles obtain this funding by writing a letter to FEMA stating that recycling was state policy. Los Angeles, like every community in California, has been required to submit a plan for source reduction, recycling, and composting under the state's Integrated Waste Management and Litter Reduction Act. FEMA determined that since Los Angeles had a recycling policy prior to the earthquake, the city did not need to demonstrate that recycling would save money in order to obtain FEMA funding.

Lincoln County, Missouri — The Midwest Floods

The Midwest floods in the summer of 1993 inundated 75 towns and more than 20 million acres of land in nine states. The flood damaged or destroyed an estimated 50,000 homes and ruined household belongings in thousands of other homes that were flooded. One rural county that borders the Mississippi River, Lincoln County, Missouri, developed a successful debris management program with a significant recycling component.

Collection and Recycling

Lincoln County initiated separate debris cleanup programs for three types of debris:

- Mud and sand deposited on roads
  Crews cleared mud and sand from roads and moved it into roadside drainage ditches. Later the ditches were cleared of the dirt and sand to restore drainage. Crews delivered the dirt to farmers, who used it for topsoil.
- Household debris
  Soon after the flood waters began receding, county officials placed containers for household flood debris at one site in each of the county's four towns along the river. The county contracted with a private waste management firm to haul approximately 700 containers of debris, ranging in capacity from 40 to 90 tons, to a landfill.

Initially, staff operated the collection sites 10 hours per day. Officials soon increased operating time to 24 hours per day because residents dropped off more debris at night than during the day. County residents brought household flood debris to the collection sites and left it on the ground. The county used a hi-lift, a tractor with a bucket on the front, to lift heavy items into large containers. Site staff were responsible for

sorting materials for recycling, as well as separating out hazardous waste. The waste management contractor provided guidance on the types of hazardous waste sorters were likely to encounter. Staff separated about 25 percent of the debris, including appliances, wood, shingles, insulation, tires, materials containing asbestos, and household hazardous waste. Scrap dealers picked up the appliances; individuals salvaged wood. Missouri's recycling policy prohibiting landfilling of compostable materials (leaves and yard waste) was temporarily lifted after the flood.

Substantial household hazardous waste accumulated at the collection sites. If sorters were unsure whether particular materials were hazardous (e.g., shingles and insulation), they set them aside as special debris. The waste hauler then determined whether these materials should be taken to a hazardous or nonhazardous waste landfill. The hauler placed leaking hazardous waste containers into sealed containers. No hazardous materials leaked onto the ground, so no soil remediation was needed at the collection sites.

- Building demolition debris

Approximately 300 houses in Lincoln County sustained damage amounting to more than 50 percent of the value of the house. Most of these homeowners chose to sell their properties to the county in a buyout and demolition program. FEMA and the state Community Development Block Grant program, which is connected with a Department of Housing and Urban Development program, funded the program.

Once the county purchased the houses slated for demolition, county crews worked to remove and separate salvageable or nonburnable items from the homes. Crews removed vinyl siding, windows, asphalt shingles, insulation, cabinets, appliances, furniture, electrical cables, piping, rafters, studs, and decks. The demolition contractor then had the option to sell or give away as much of these materials as possible before disposing of what remained. The contractor then could easily demolish the shell of each house, which consisted almost entirely of wood.

An air curtain burner combusted the demolition debris and unsalvaged items from the houses. Other debris was landfilled.

Communication

A mass mailing of over 1,000 letters was sent to residents in the Lincoln County floodplain. Information also was distributed through a local newspaper. The county's communication strategy differed for each of the three types of debris generated.

Through phone calls and advertisements in local newspapers, the county found farmers interested in taking the soil debris piled by the roadside. County crews removing soil from ditches delivered some of the soil to their farms.

The county publicized the household debris collection program through public meetings, newspapers, and radio, but ultimately word of mouth was the most effective communication mechanism. Signs on the road identified each collection site. The county informed residents 30 days prior to the closing of the collection sites.

A series of public meetings was held throughout the county to inform residents of the home buyout program. County staff responsible for assessing flood damage to houses met daily for breakfast from 6 to 7 a.m. at a centrally located restaurant in the flood area and welcomed homeowners to meet with them

and learn about the buyout program. The county also notified residents of the program with posters at the same restaurant and at a resort community at the northern end of the flood area. As of July 1995, Lincoln County had completed over 250 buyouts, had demolished and recycled over 200 homes, and was expecting to purchase and remove an additional 150 homes from the flood plain.

Outside Assistance

The Boonslick Regional Planning Commission, a local government group, recruited staff for the collection sites and the pre-demolition salvage crews. U.S. Department of Labor funds paid for these services through the Jobs Training Partnership Act program.

Metro-Dade County, Florida — Hurricane Andrew

Hurricane Andrew, which struck the Florida coast on August 24, 1992, left an estimated 6 million tons of debris in Metro-Dade County (Greater Miami). This included downed trees and debris from 150,000 houses that were severely damaged or completely destroyed. Because of the extent of the destruction, Miami received help in collecting hurricane debris from USACE through FEMA.

Since the hurricane, to streamline the administration of hauling contracts in the event of future disasters, Metro-Dade County has issued an RFP for a contingency contract for various waste management activities. The RFP calls for two types of bids: one bid for a disposal site plus waste hauling services and one bid for a disposal site without waste hauling services.

Collection and Recycling

Metro-Dade County instituted a hurricane plan prior to the disaster and followed the plan's emergency debris collection guidelines. In accordance with the plan, the county initially focused on both collection of garbage, because garbage can pose the greatest health risk, and clearing of the county's highways.

In the three weeks after the hurricane, the amount of garbage set out by residents was double the pre-disaster amount as people in houses without electricity cleaned out spoiled food from refrigerators and freezers. County garbage collection crews worked seven days a week, 18 hours per day to collect garbage and clear debris from the streets.

A small number of county solid waste management employees initially could not report to work because they needed to make emergency repairs to their homes, obtain food for their families, or provide care to children or elderly dependents. In these cases, other county employees offered assistance, thereby reducing the amount of time county employees were unable to perform their waste management duties.

Initially, the hurricane debris consisted mostly of downed trees. As citizens began their cleanup efforts, more household debris was collected (e.g., rain-damaged furniture). And as repairs began, the debris contained more C&D wastes (e.g., drywall and roofing tiles).

The county asked residents to bring wood and yard waste, appliances, and metal to any of the county's 18 existing trash and recycling drop-off centers. Wood and yard waste was chipped for mulch. Scrap dealers took appliances and metal. County officials asked residents to place other hurricane debris at the curb and to separate non-burnable waste from burnable waste.

Soon the trash and recycling centers were overwhelmed with debris. The county then opened neighborhood staging areas in parks and similar locations where residents could bring their wood waste. Approximately 500,000 tons of wood waste from the hurricane were mulched and distributed to agricultural areas, parks, and residential sites.

The county and USACE hired debris haulers to move debris from the curbs to staging areas. At each of the staging areas, personnel separated and inspected incoming loads and removed any hazardous waste. In the northern part of the county, the county government established 16 zones and assigned county resources to four zones, contracting out the work in the remaining 12 zones to qualified local contractors. The county divided up the number of contracts equally to firms owned by Whites, African Americans, and Hispanics. USACE contracted debris removal work in 13 zones to six out-of-state contractors. Metro-Dade County contracted with a private firm to haul debris from all of the staging areas to the private firm's landfills.

The Florida Department of Environmental Regulation allowed debris to be burned under an emergency 30-day order. USACE used air-curtain burners that met all federal and state requirements. Some other local burn sites, however, did not use state-of-the-art technology. Burning at these sites led to many public complaints and protests by environmental activists. As a result, county commissioners shut down all burning three weeks after it began. The major problem that arose during burning operations was commingled debris that did not burn efficiently. At USACE burn sites, the resultant ash was tested to determine if it was hazardous and disposed of accordingly. After debris collection and staging areas were cleared of all debris, the county conducted soil and water testing for hazardous waste contamination.

Communication

Metro-Dade County used different communications strategies for each stage of the debris management effort. In the days following the hurricane, city officials gave about 10 television and radio interviews each day, in which they asked residents to carry their garbage to the nearest cleared street. Later, the county used television, radio, and direct mail advertisements. Newspaper advertisements were not an option since the hurricane had temporarily halted publication of Miami's daily newspaper. Because most access into the hurricane zone was by highway, the county also distributed flyers at highway toll plazas. Through all of these communication vehicles, the county told residents and building contractors how to set out debris, the status of debris collection in each zone, and the sanctions against illegal dumping. The county also added new telephone lines and work stations and hired and trained new staff to handle thousands of calls each month about debris. Every call complaining about debris piles or illegal dumping was recorded, routed to the appropriate agency for action, and mapped on a geographic information system to help identify problem areas.

Outside Assistance

Metro-Dade County received extensive assistance from USACE in managing its hurricane debris. Within three days, two general contractors had been awarded debris removal contracts for $3 million and had begun removal efforts. USACE took responsibility for the harder hit southern half of the county, while

the county crews concentrated on the northern half. USACE debris removal work went on for over two years and totaled over $375 million.

Mecklenburg County, North Carolina — Hurricane Hugo

In September 1989, Hurricane Hugo created a solid waste crisis for Charlotte, North Carolina. In Mecklenburg County, North Carolina, alone, the equivalent of 10 years' worth of green waste was generated in just over three hours.

Collection and Recycling

The Charlotte/Mecklenburg Emergency Management Office was well prepared to handle the variety of medical, housing, and communication needs presented by this disaster. Mecklenburg County did not, however, have a plan to deal with the enormous quantity of debris generated by the storm. When Hugo hit, the county was down to its last municipal solid waste landfill, which had only 2 1/2 years of capacity remaining. The county did not want to use up its remaining landfill capacity. Because of existing air pollution problems, burning was not a viable option either. County officials determined the best option would be to collect and shred the green waste--by far the largest category of waste--and distribute the resulting product for use as mulch and boiler fuel.

The city of Charlotte and six other municipalities in Mecklenburg County were responsible for collecting the hurricane debris. Working together, these communities spread collection and storage locations throughout the county. Eleven public properties were designated as green-waste dropoff sites, including former, present, and future landfill sites and a parcel of land at the Charlotte airport. Private citizens also volunteered land for collection sites.

More than 175,000 vehicle loads dumped a total of 400,000 tons of green waste at the collection sites over a 10-month period. Officials feared that such a large quantity of green waste would be accompanied by a high level of non-organic contaminants. The contaminant level was very low, however, due primarily to three factors:

- During the three weeks immediately following the storm, the county landfill accepted all storm-related, non-green-waste debris free of charge. This debris totaled 6,300 tons and consisted primarily of C&D waste.
- All entrances to green-waste sites were staffed during operating hours, and staff strictly enforced the prohibition of other types of waste.
- The city of Charlotte resumed weekly curbside trash collection two days after the storm, providing convenient disposal of other types of waste for all residents.

While awaiting shredding, wood was piled 10 to 15 feet high over 100 acres of land. One problem with storing this much wood was the fire hazard.

Green-waste mulch also was piled 10 feet high. When piled that high for more than a month, this mulch tends to heat up and can spontaneously combust. One mulch fire at a storage site took a week to extinguish.

The county initially hired a local contractor to shred the green waste into mulch using high-speed shredding equipment. One month after the hurricane, with four shredding systems working 12 hours per day, seven days a week, the county decided to contract for more grinders. Shredding was finally completed in February 1991 (16 months after the storm) at a cost of $7 million.

Communication

As the green-waste mulch was created, the county had yet another challenge on its hands: what to do with 400,000 tons of shredded green waste.

In October 1989, the county launched its "Take-a-Ton" mulch give-away program. The media was very supportive in getting the word out. The Charlotte newspaper published maps of the give-away locations, and radio and television stations ran announcements.

Initially, the product was too coarse to be used as mulch. But once the county reduced the shredder's screen size and provided loaders on site, citizens took home the mulch as fast as it could be produced. County officials also granted permits to contractors to haul away as much mulch as they could to sell to their customers. One company hauled away thousands of cubic yards to sell as boiler fuel to local paper mills.

Outside Assistance

State and federal sources, including FEMA, provided funding to Mecklenburg County. FEMA required the county to maintain data on all incoming debris and equipment operations. Five full-time staff kept detailed records of the county's recovery expenses. At the site, county personnel recorded information on each vehicle, including delivery date, time, truck type, and user. The county hired temporary staff to record similar information for contracted grinding operations. As a result of its diligent recordkeeping efforts, the county was reimbursed fully (75 percent from FEMA, 25 percent from the state of North Carolina) for its debris management costs, totaling over $7 million. The accounting also has proved helpful in planning for future natural disasters in the region.

Kauai, Hawaii — Hurricane Iniki

Hurricane Iniki struck the Hawaiian island of Kauai in September 1992. The storm generated more than 5 million cubic yards of debris--seven years' worth of Kauai's normal refuse--for a landfill with less than four years of remaining capacity. Kauai needed the four years to plan and design a new landfill, and shipping the debris off the island for disposal was not economically feasible. Island officials therefore chose to develop an efficient collection and recycling plan that saved both money and the dwindling landfill space.

Collection and Recycling

Within days of the storm, island officials, with the cooperation of local landowners, established five temporary hurricane debris receiving sites. Officials trained temporary site operators to separate recoverable materials on site, but encountered many problems during the early stages of the cleanup effort. Hauling contracts had been written quickly and did not include incentives to keep materials free of contaminants. Consequently, some reusable materials became unusable. Haulers mixed clean loads of

green waste with other trash and combined hazardous materials with recyclable debris. Stores and household refrigerators generated tons of food waste, which was mixed with recyclable materials. In the absence of instruction to do otherwise, residents began creating spontaneous dumps and at some sites burned or buried debris. In addition, the initial collection contractors were construction crews with little or no experience in handling and recovering solid waste.

Because Kauai is an island, officials could not easily spread the burden by transporting hurricane debris to unaffected communities. Without an adequate management plan, the collection sites were overwhelmed until December, when officials implemented a debris management plan and contracted with professional solid waste personnel to manage the sites and the collection process.

The island's solid waste management plan focused on recycling. From the beginning, local and state officials made a firm commitment to divert the massive amounts of debris from Kauai's landfill. A response team that included local, state, and federal government staff, contractors, and the county's solid waste consultants developed the plan. Team members agreed that materials recovery was the most environmentally sound and economical method of managing the hurricane debris.

The plan aimed to divert debris in a cost-effective manner by separating materials at the point of generation. It also proposed methods to maintain separation through the collection, transportation, storage, and processing stages. The plan required residents to separate materials into five piles at the curb: green waste; metals and appliances; wood debris; aggregate materials, including toilets, tile roofing, and concrete; and mixed debris. The plan also banned the burning of debris and instituted curbside collection across the island to accommodate those unable to haul the debris themselves. The plan ensured that processed debris was usable and met market specifications. Officials decided to hold off grinding any materials until a processing and end-use plan was developed. While this delay increased stockpiles of materials, it was essential to cost-effective diversion.

All of the metals, appliances, tires, and aggregate materials were reused. The aggregate was used to make revetment walls to shore up county shore-front property. A local company processed more than half of the 100,000 tons of green waste created by the storm into compost, thereby saving the county millions of dollars and precious landfill space. As a result of delays, the recycling plans for the remainder of the green waste and mixed debris fell through, and the waste was buried or landfilled.

Although the plan took three months to prepare, it resulted in much higher debris diversion rates, minimized environmental impacts, reduced waste management costs, minimized threats to health and safety, and significantly shortened the duration of the cleanup effort. In addition, the plan instituted specific controls at collection sites across the island to monitor incoming debris, contain odors, and minimize water runoff.

Communication

One of the first orders of business after the storm was to inform residents about what to do with hurricane debris scattered across their property. With all communication systems down for several weeks, however, it was nearly impossible to reach all island residents to instruct them on how to separate materials. Kauai had only a fledgling recycling program, and source separation was not a household practice. As the

communication systems recovered, island officials posted signs, ran articles in the newspaper, and broadcast radio announcements to inform citizens of upcoming collection efforts. After several weeks of intense outreach, the public caught on and began separating materials before pickup or dropoff. Discrete piles of green waste, metals, wood, and mixed debris soon lined the streets of Kauai. During this process, island officials realized that mobilization for recovery would have occurred more rapidly and effectively if they had planned ahead. By developing a clearly defined organizational structure and public information materials in advance, officials could have saved time and money and streamlined cleanup efforts in the chaotic aftermath of the storm.

Outside Assistance

Most of the funding for the cleanup efforts came from a FEMA grant. Shortly after the storm, more than 2,000 military and National Guard personnel arrived to help in the cleanup effort, and the aid of 27 private contractors was secured. Together with county and state road crews, military units and contractors systematically swept the entire island to collect source-separated debris placed curbside by residents. With FEMA's assistance, officials are preparing for future disasters by establishing a permanent collection and storage site with proper environmental controls.

LIVING EARTH™

Storm Debris Management

What Happens When Storm Debris is NOT Managed Properly?

- Citizens are upset
- Fire issues
- Odor issues
- Dust issues
- Traffic problems
- Compliance issues
- Bad Press

City Of Dallas McCommas Landfill Sunday Night April 25th, 2010
Strom Debris From Snow Storms

We were told the pile was 600,000 Cubic Yards

Smelly mounds of Ike debris tower over Pleasantville

By BRADLEY OLSON

Jan. 14, 2009, 8:38AM

1 2

Melissa Phillip | Chronicle
Martha Solomon looks at mountains of mulch piled in a lot near her back yard Tuesday.

Felton Lee does not remember the exact day when trucks started dumping heaps of tree debris about 20 feet from his backyard.

By the time they were done, the load had grown to fill a space roughly the size of a football field. Now, stacks of chipped wooded waste from Hurricane Ike loom like browned mountains high above his Pleasantville home. The odor is pungent, so strong that the city Health Department recently issued a citation to the company that began dumping debris at the site several weeks ago.

"It's terrible to live out here with this kind of mess. It just takes your breath away," Lee said of the smell. "I couldn't believe they didn't mention anything to anyone here. All of a sudden, there was just a bunch of junk back there."

Although the city's cleanup of more than 5 million cubic yards of tree debris after Hurricane Ike has been widely praised, the mulch-like piles of waste in Pleasantville have laid bare an unexpected downside. The city's commitment to keeping the wood chips from filling up landfills has led its main contractor to sell it off to third parties and subcontractors. After that, the city has little means of controlling where it ends up.

According to city officials, the site has been leased by Copeland Construction Group, or CCG, a company that bought wood chips from DRC Emergency Services, the prime debris contractor.

CCG could not be reached for comment.

There was no answer Tuesday at two local phone numbers for the company maintained by the city and DRC, and neither allowed callers to leave a message.

No one was at the site Tuesday afternoon. The debris piles line up along Munn between Pearl and Demaree in Pleasantville, which abuts a host of industrial businesses and rail lines not far from the intersection of the East Freeway and the 610 East Loop.

Five piles of debris sit on the site in rows about 300 feet long, 20 feet wide and up to 20 feet tall. They tower over the neighborhood, mere steps from dozens of homes and about two blocks from the Port of Houston Elementary School and a nearby Pentecostal church.

Unbearable odors

Neighbors say that when it rains, the smell becomes almost unbearable.

"The city can go out and continually monitor for nuisance odors," said Gary Readore, chief of staff of the city's Department of Solid Waste Management, which has managed the debris removal process. If it rains, the city can ensure that runoff does not flow into the street, Readore said.

Patrick Trahan, a spokesman for Mayor Bill White, said that's exactly what the city will continue to do, as well as urge CCG to find a better place for the waste.

"We like the fact that we have found a constructive partner to help us reduce our piles of debris, but we would encourage that subcontractor to continue to look for a better place," he said.

Beyond that, city officials say, there are few options. Because the city does not own the debris, officials said they have no way to control what happens to it.

Tom Combs, a spokesman for DRC said that company also has little recourse.

"We can't do anything about what's there, but we're not sending anything else there until the problem's taken care of," he said.

H.C. Wolfe, who has lived in the neighborhood for 54 years, said he has felt sickly since the debris was dumped across the street from his home: coughing more frequently and experiencing congestion. He worries that the smell could be harmful to many of the retirees who live in the neighborhood.

Wolfe said he witnessed a number of dangerous incidents in the neighborhood's history – such as fires involving activity from nearby companies – but as far as he knew, those stemmed from accidents.

"This, they've done it on purpose," said Wolfe, 85, who said it is harder for him to sit outside his home now to get fresh air. "I don't know who's responsible, but it's not good. Not for me or anybody else around here."

bradley.olson@chron.com

What is Required of Private Brush Recycling Facility?

- TCEQ MSW Number
- NOI Notice of Intent
- Financial Assurance Plan
- Fire Plan
- Method to Control Dust
- Proof/Records Showing the Recycled Material is Marketed/Sold
- Log Showing Rejected Loads

Things to Consider When Choosing a Company to Recycle Your Storm Debris

- Are they very strong financially? Getting paid for storm can take a long time…
- Do they have insurance that meets your standards?
- Do they have outlets/relationships to sell the recycled material?
- Do they own their own equipment?
- Is their staff experienced and trained?

Ready To Go!

- LIVING EARTH was open for business the Monday following Ike.
- Started receiving brush from private contractors immediately.
- The City of Houston started coming in on Tuesday.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281-890-7424


DEERE
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- LIVING EARTH was able to help other contractors that had no place to go with their ground material.


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320C
CAT

KEEP IT CLEAN!

- Brush that has trash in it CAN NOT be made into mulch. It can not be “picked” to make it clean enough.
- Wood boiler fuel CAN NOT have trash in it. The TCEQ has cited companies for burning boiler fuel that has paper, plastic etc… for Air Permit violations.

- The City of Houston does an outstanding job keeping the brush clean!


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FREQUENT
STOPS
CAUTION
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McCARTY ENVIRONMENTAL COMPLEX
COMPOST & MULCH
FACILITY
REPUBLIC AND LIVING EARTH PARTNERS
IN RECYCLING

Some Suggestions

- Pick a site well in advance.
- Choose a qualified contractor to operate the facility.
- Make collection plans and schedules in advance.
- Print and be ready to distribute how you need the materials to be collected and separated, and tell them why.
- Have a manned collection center.

Why Living Earth?

- Living Earth has been in business for more than 25 five years.
- Nine Houston area locations authorized by the TCEQ to recycle brush.
- Living Earth makes and markets over three million yards annually of its compost, mulch and soil products.
- Living Earth has an outstanding marketing program and can be very creative

Why Living Earth? Page 2

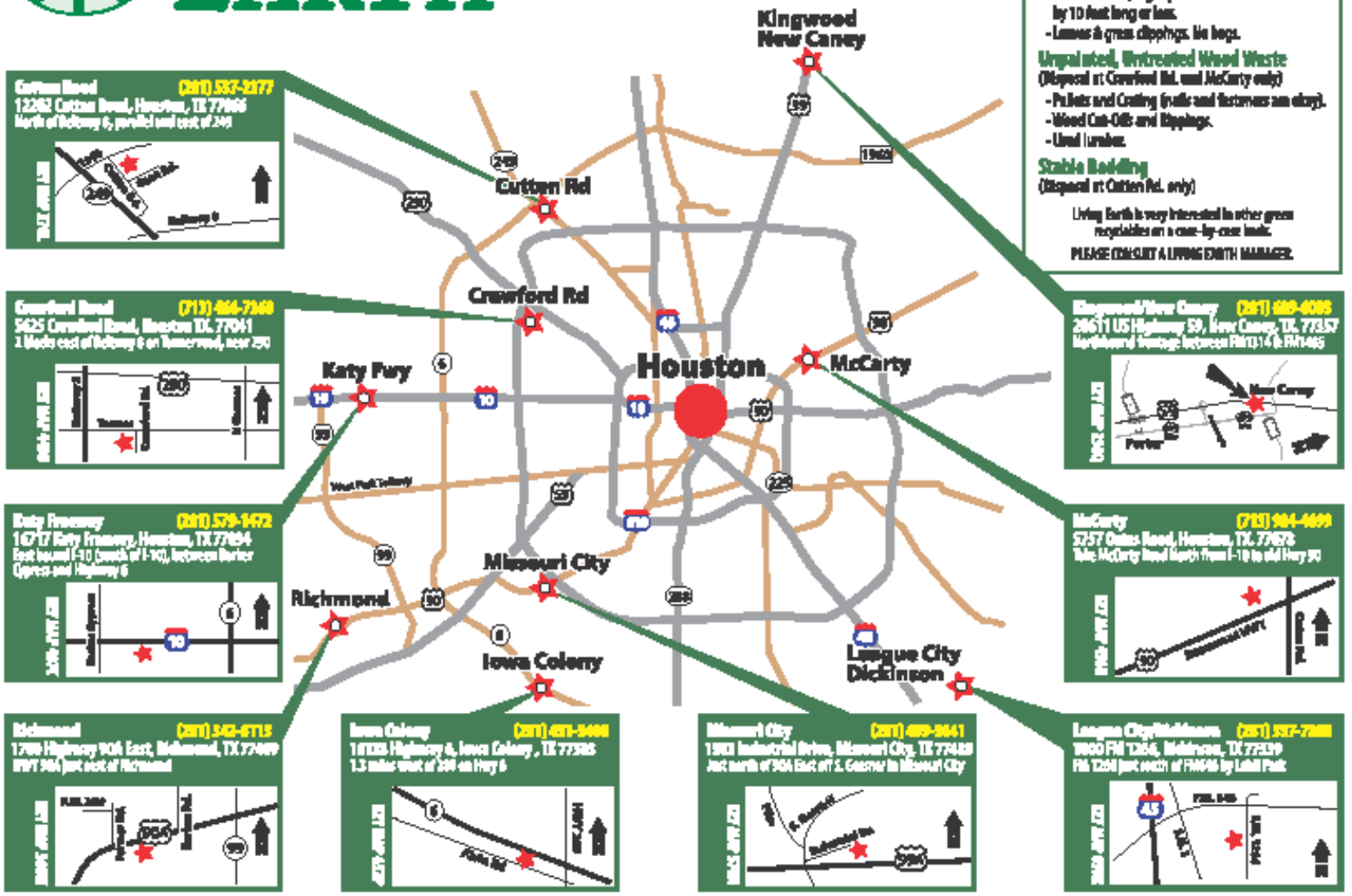
- Living Earth is an industry leader and brings instant credibility to any Green-Waste recycling program.
- Utilize one of Living Earth's facilities or Living Earth can operate your facility.
- Living Earth is financially strong and light on its feet. We can get things done!

We would love to hear from you!

LIVING™ EARTH

HOUSTON AREA RECYCLING MAP

Yard Waste and Green Waste



RECYCLING / DISPOSAL GUIDELINES

Green Waste
(Disposal at all Living Earth Locations)
- Clean brush.
- Tree branches, logs up to a diameter of 24 inches by 10 feet long or less.
- Leaves & grass clippings, bio bags.

Unpainted, Untreated Wood Waste
(Disposal at Crawford Rd. and McCarty only)
- Pallets and Crating (nails and fasteners are okay).
- Wood Cut-Offs and Clippings.
- Used lumber.

Stable Bedding
(Disposal at Cutten Rd. only)

Living Earth is very interested in other green recyclables on a case-by-case basis.

PLEASE CONSULT A LIVING EARTH MANAGER.

Cutten Road (281) 537-2277
12262 Cutten Road, Houston, TX 77066
North of Beltway 8, parallel and east of 249

Crawford Road (713) 484-7949
5625 Crawford Road, Houston TX. 77041
2 blocks east of Beltway 8 on Tidwell road, near 290

Katy Freeway (281) 579-1472
16717 Katy Freeway, Houston, TX 77094
East bound I-10 (south of I-90), between Barker Cypress and Highway 6

Richmond (281) 342-8715
1700 Highway 90A East, Richmond, TX 77469
IH-69 (90A) just east of Richmond

Iowa Colony (281) 451-3400
16355 Highway 6, Iowa Colony, TX 77583
1.3 miles west of 288 on Hwy 6

Missouri City (281) 499-3641
1303 Industrial Drive, Missouri City, TX 77489
Just north of 90A East off S. Gessner in Missouri City

League City/Dickinson (281) 337-7888
1900 FM 1266, Dickinson, TX 77539
FM 1266 just south of FM518 by Label Post

Kingwood/New Caney (281) 689-4088
24611 US Highway 59, New Caney, TX. 77357
Northbound frontage, between FM1314 & FM1485

McCarty (713) 984-4699
5757 Oates Road, Houston, TX. 77076
Take McCarty Road North from I-10 to old Hwy 90

Mark Rose, President, The LETCO Group LLC, DBA Living Earth
mrose@letcogroup.com Phone 972-506-8575
Richard Stamper, Sales and Marketing Manager
rstamper@letcogroup.com Phone 713-466-7360

WASTE MANAGEMENT

Think Green.®

Disposal of Disaster Debris

Chuck Rivette

Mike Thompson

Post Storm Priorities

- Facility Assessment
- Reopen Facility
- Establish Public Notice / Contact
- Storm Debris Haulers/Municipal Identification-Contact

WASTE MANAGEMENT

Think Green.®

Post Storm Priorities

- Road Access to Post Collections Facilities
- Pre Arranged ID System

WASTE MANAGEMENT

Think Green.®

Facility Assessment

- Storm Damage

1. Same as Communities at Large (Infrastructure,Water,Power,People)
    - Assets Generally Low Risk
    - Road Access Sometimes Limited
    - Where are your people
    - Resilient to Storms

WASTE MANAGEMENT

Think Green.®

WASTE MANAGEMENT

Think Green.®

WM Post Collection Assets

- 5 Type I Landfills (All Non Hazardous MSW)
- 4 Type IV Landfills (Debris Only/Non-prutrescible)
- 2 Transfer Stations

Segregation – MSW from Debris for Type IV/No Hazardous Materials

WASTE MANAGEMENT

Think Green.®

Woody Debris Management

WASTE MANAGEMENT

Think Green.

WASTE MANAGEMENT

Think Green.®

Hurricane Ike

- Managed Wood Reduction at Six Locations
  - -Soil Improvement
  - - Erosion Control

Permit Restrictions by TCEQ on usage.

- Some sites temporary holding areas

WASTE MANAGEMENT

Think Green.

Lessons Learned

- Existing disposal contracts in place
- Advance planning for woody reduction needs to improve
- Coordination of traffic control with municipalities
- TCEQ/ Management of Chip Storage

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Customer Issues

- Expectations
  - Pricing/Disposal Agreements
  - Safety (No exceptions)
  - Tracking
  - Documentation
  - Communication
  - Payment

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