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FOREWORD

Each year, local officials from hundreds of communities are faced with the task of removing debris caused by natural disasters. In the past 20 years alone, over 700 major disasters have been declared by the President to facilitate Federal assistance to communities struck by hurricanes, tornadoes, floods, earthquakes, wild fires and other natural disasters.

In some cases, debris clearance, removal and disposal actions can be accomplished quickly using community resources augmented by assistance from neighboring communities, State agencies and contractor resources. In many other cases, however, the damage and debris are so extensive that a comprehensive debris clearance, removal and disposal management plan is required to efficiently and effectively control the operations.

We have developed this document to provide guidance to community leaders in planning, mobilizing, organizing and controlling a large-scale debris clearance, removal and disposal operation. Although this manual has been developed for large-scale debris clearance, removal and disposal operations, portions of all chapters can be utilized on smaller operations. The chapters are arranged to enable the reader to progress in a logical manner from one planning element to another. It is recommended that the chapters be read consecutively because information presented in one chapter will be helpful in understanding materials presented in subsequent chapters. The guide does not address the removal or disposal of material and products from institutional, commercial, recreational, industrial or agricultural sources that contain certain chemicals as defined by the Environmental Protection Agency to be toxic, flammable, corrosive or reactive.

We encourage local officials to review their community's vulnerability to a disaster and to consider how to manage a large-scale debris clearance, removal and disposal operation should the need arise. Your State Emergency Management Agency and the Federal Emergency Management Agency (FEMA) Regional Office may provide additional technical assistance in your area.

ACRONYMS USED IN THIS DOCUMENT

C&D	Construction and Demolition
DMTF	Debris Management Task Force
DOT	Department of Transportation
DPW	Department of Public Works
DRM	Disaster Recovery Manager
EOC	Emergency Operations Center
EPA	Environmental Protection Agency
ER	Emergency Relief
ESF	Emergency Support Function
FCO	Federal Coordinating Officer
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FRP	Federal Response Plan
GAR	Governor's Authorized Representative
GIS	Geographic Information System
HHW	Household Hazardous Waste
PA	Public Assistance
PIO	Public Information Officer
SCO	State Coordinating Officer
SHPO	State Historic Preservation Office
SWM	Department of Solid Waste Management
TDSR	Temporary Debris Storage and Reduction
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture

TERMS USED IN THIS DOCUMENT

Chipping. Reducing wood related material by mechanical means into small pieces to be used as mulch or fuel. Chipping and mulching are often used interchangeably.

Debris. Scattered items and materials either broken, destroyed, or displaced by a natural disaster. Example: trees, construction and demolition material, personal property.

Debris Clearance. Clearing the major road arteries by pushing debris to the roadside to accommodate emergency traffic.

Debris Removal. Picking up debris and taking it to a temporary storage site or permanent landfill.

Debris Disposal. Placing mixed debris and/or residue from volume reduction operations into an approved landfill.

Department of Public Works (DPW). Department typically responsible for clearing debris from the roads and rights-of-way.

Department of Solid Waste Management (SWM). Department responsible for managing and overseeing the collection and disposal of garbage, trash and disaster related debris.

Federal Response Plan. A plan developed to facilitate the delivery of all types of Federal response assistance to States following a disaster. It outlines the planning assumptions, policies, concept of operations, organizational structures and specific assignments and agencies in providing Federal response assistance to supplement the State, tribal and local response efforts.

Force Account Labor. State, tribal or local government employees engaged in debris removal activities.

Garbage. Waste that is regularly picked up by the Department of Solid Waste Management. Example: food, plastics, wrapping, papers.

Hazardous Waste. Material and products from institutional, commercial, recreational, industrial and agricultural sources that contain certain chemicals with one or more the following characteristics, as defined by the Environmental Protection Agency: 1) Toxic, 2) Flammable, 3) Corrosive; and/or 4) Reactive.

Household Hazardous Waste (HHW). Used or leftover contents of consumer products that contain chemicals with one or more of the following characteristics, as defined by the Environmental Protection Agency: 1) Toxic, 2) Flammable, 3) Corrosive and/or 4) Reactive. Examples of household hazardous waste include small quantities of normal household cleaning and maintenance products, latex and oil based paint, cleaning solvents, gasoline, oils, swimming pool chemicals, pesticides, propane gas cylinders.

Hot Spots. Illegal dump sites that may pose health and safety threats.

Mutual Aid Agreement. An understanding between communities and States obligating assistance during a disaster.

Recycling. The recovery and reuse of metals, soils and construction materials that may have a residual monetary value.

Rights-of-Way. The portions of land over which a facility, such as highways, railroads, or power lines are built. Includes land on both sides of the highway up to the private property line.

Scale/Weigh Station. A scale used to weigh trucks as they enter and leave a landfill. The difference in weight determines the tonnage dumped and a tipping fee is charged accordingly.

Storage Site. A location where debris is temporarily stored until it is reduced in volume and/or taken to a permanent landfill.

Sweeps. The number of times a contractor passes through a community to collect all disaster-related debris from the rights-of-way. Usually limited to three passes through the community.

Tipping Fee. A fee based on weight or volume of debris dumped that is charged by landfills or other waste management facilities to cover their operating and maintenance costs.

Trash. Non-disaster related yard waste, white metals, or household furnishings placed on the curbside for pickup by local solid waste management personnel. A resident must call for pick-up. Not synonymous with garbage.

United States Army Corps of Engineers (USACE). A component of the U.S. Army that is responsible for constructing and maintaining all military bases and other government-owned and controlled entities. The USACE may be used by FEMA when direct Federal assistance, issued through a mission assignment, is needed.

White Metals. Household appliances, such as refrigerators, freezers, stoves, washers and dryers.

Chapter 1

LOCAL, TRIBAL, STATE AND FEDERAL DISASTER RESPONSE ACTIONS

This chapter provides an overview of local, tribal, State and Federal disaster response actions available following a debris-generating natural disaster.

Detailed information on the declaration process and eligibility criteria is contained in the Public Assistance Guide, FEMA 322.

Natural Disasters

Hurricanes. The damaging forces of hurricanes and tropical storms include high-velocity winds (up to 150 miles per hour or higher in gusts), storm surge and wave action. The most severe damage frequently occurs in the shorelands adjacent to the ocean. The resultant debris consists primarily of trees; construction materials from damaged or destroyed structures, personal property and sediment. Although the greatest concentration of debris will be located along the shoreline, flooding and tornadoes spawned by hurricanes can cause damage and leave extensive amounts of natural and manmade debris far inland.

Tornadoes. Damage from tornadoes is caused by high-velocity rotating winds. The severity of the damage depends on the velocity of the tornado funnel and the length of time the funnel is on the ground. Tornado debris consists primarily of trees, construction materials from damaged or destroyed structures and personal property. Damage is generally confined to a narrow path, which can be up to ½ mile wide and from 100 yards to several miles long.

Floods. Damage to structures from flooding is caused either by inundation or high velocity water flow. Structural damage is usually limited to the floodway and the floodplain area immediately adjacent to the river. Heavy structural damage may result from high velocity waters in mountainous areas or failure of a flood control project, such as a dam or levee. Flood debris consists of sediment, wreckage, personal belongings and sometimes hazardous materials deposited on public and private property. Additionally, heavy rains and floods may produce landslides; in such cases, debris consists primarily of soil, gravel, rock and some construction materials.

Earthquakes. Damage to structures is caused by shockwaves and earth movements along fault lines. Secondary damage, such as fires and explosions, may result from the disruption of utility systems. Debris consists of building materials, personal property and sediment caused by landslides.

Wildfires. Debris from wildfires consists of burned out structures, cars and/or other metal objects, ash and charred wood waste. Large-scale loss of ground cover may lead to mudslides, resulting in clogged drainage structures and possible damage to homes and bridges.

Ice Storms or Snowstorms. Debris from ice storms or snowstorms will consist of significant amounts of woody debris from broken tree limbs and branches.

Local Disaster Response Actions

Local government is the first to respond to a disaster. Response efforts are first directed to activities that protect lives, public health and safety, such as evacuations, sheltering, fire fighting, utility restoration and clearing roads of debris. These response efforts may be accomplished with local force account labor and equipment, contractors, volunteers and assistance from adjacent communities.

A community should have an Emergency Operation Plan and a Debris Management Plan that identifies key staff members and their responsibilities for managing and controlling debris clearing, removal and disposal operations. This staff should be immediately activated whenever a natural disaster occurs. Staff members should document the critical decisions made in response to the disaster and provide the debris manager and local, tribal, State and Federal officials with a clear plan of action. The debris clearing, removal and disposal operations may extend for weeks or months and insufficient documentation of the evolving plan could cause confusion and inefficiency.

Damage assessments should be conducted to identify necessary lifesaving actions, assess the magnitude of damage and determine if additional resources are needed from other local governments and the State. The format for the damage assessment report should be in accordance with the local, tribal or State Emergency Operation Plan.

The Debris Management Plan should divide the community into sectors to assess the extent of debris. Sector boundaries can be determined based on the following criteria:

- Type of debris (structural, trees, sediment and mixed).
- Location of debris.
- Volume of debris (large versus small).
- Land use (residential, business, agricultural).
- Location of existing and potential temporary storage and volume reduction sites.
- Location of existing and potential permanent disposal sites (public and/or private landfills).

The damage assessment team should then investigate the damaged areas by sector to record the extent of damage and to identify specific assistance requirements. Damage assessment teams should also estimate the amount and composition of debris observed in each sector and annotate the locations on community maps.

The debris staff should initiate actions to assess the availability of local, tribal, State, Federal and other resources to provide immediate and long-term assistance. Experience has shown that resources will not be used effectively unless work assignments and cleanup priorities are coordinated and controlled by the designated debris manager. The designated local debris manager should have total responsibility and authority for managing the debris cleanup operation. The following are examples of local, State, Federal and other resources available for cleanup activities:

Local Government. Most local governments maintain equipment, such as trucks, rubber tire loaders, graders, chippers, chain saws, small cranes, dozers and backhoes with experienced operators who can be used to open roads and remove debris. Temporary hires may be added to

provide additional labor and equipment operators for 24-hour-a-day operations, if needed. The principal advantage to using local government force account equipment and operators is their lower cost and flexibility in assignment. This equipment generally represents the only resources the community can immediately commit to an emergency debris clearance and cleanup operation.

Mutual Aid Agreements. A Mutual Aid Agreement is an agreement among neighboring communities (and possibly States) to provide assistance to one another in time of need. The operators and equipment of neighboring communities can be used to quickly augment local force account resources and have many of the same advantages.

State Agencies. The National Guard, State Department of Transportation (DOT) and State Department of Natural Resources have equipment and personnel that may provide limited assistance on a short-term basis. The State DOT is normally responsible for debris clearance and removal on State roads. This assistance may be obtained by contacting the State Emergency Management organization.

Volunteers. Historically volunteers have played a significant role in large-scale debris removal operations. Volunteer organizations can assist private property owners or provide financial assistance in the removal of debris from private property. Additionally, community organizations, such as civic clubs, student groups and neighborhood organizations have proven to be a tremendous community resource in past disasters. To provide for maximum utilization of these resources, community leaders should be prepared to organize volunteer groups and keep the debris management staff informed of their activities. Communities should document the number of volunteers, the type of work performed and the hours worked. Sponsoring organizations should ensure that personnel are properly equipped and that common sense safety precautions are followed.

Federal Agencies. The U.S. Army Corps of Engineers (USACE) may be able to respond for up to 10 days without a Presidential Declaration. Additionally, the Federal Highway Administration (FHWA) may provide grant assistance to State governments for debris clearing, removal and repair of roads on the designated Federal Aid System.

Contractors. Labor and equipment for debris clearance, removal and disposal should be available from local contractors. Following a major disaster, emergency contracts can be executed to augment local force account resources.

Immediately following a disaster, engineering personnel on the debris management staff should explore alternative courses of action and update the existing Debris Management Plan based on the initial damage assessment, available resources and any new information. The updated plan can be hand-written initially and later converted to a more formal document.

Maps of the affected area should be annotated to identify damaged sectors, locations of key facilities and disposal sites and distributed with the updated Debris Management Plan. Information should also be entered into a Geographic Information System (GIS) database, if available.

State Disaster Response Actions

When the response efforts appear to be beyond the capability of local government, the State normally provides the next level of assistance by declaring a State of Emergency. The State Emergency Management Organization typically evaluates the disaster situation and provides advice to the Governor on the availability of State resources that could assist local efforts. State resources may consist of the DOT, the Health Department, the Department of Natural Resources and the National Guard. These State resources can assist local government in its immediate response efforts, including debris clearance, removal and disposal activities.

Federal Disaster Response Actions

The Robert T. Stafford Disaster Relief and Emergency Assistance Act, Public Law 93-288, as amended, was enacted into law in 1988. It is the centerpiece of the Federal Disaster Relief Programs that are managed by the Federal Emergency Management Agency (FEMA).

When a disaster occurs and a locality has responded to the best of its ability but is or will be overwhelmed by the magnitude of the damage, it turns to the State for help. The Governor, after examining the situation, may direct that the State's Emergency Plan be executed. If it is evident that the situation is or will be beyond the capabilities of local, tribal and State resources, the Governor may request that the President declare that an emergency or major disaster exists in the State under the authority of the Stafford Act.

While the request is being processed, local, tribal and State government officials should not delay in taking actions to respond to and start recovery from the disaster. Such actions should not be dependent upon whether there will be Federal assistance. Commensurate with the supplemental nature of Stafford Act assistance, the Federal share of eligible recovery expenses for declared disasters is normally limited to 75% of eligible costs.

Disaster Declaration Process

The request for a declaration must come from the Governor or Acting Governor. Before sending a formal request letter to the President, the Governor should request that FEMA conduct a joint preliminary damage assessment (PDA) with the State to verify actual damages and estimate the amount of supplemental assistance that may be needed. After this assessment is complete and if the Governor believes that Federal assistance is necessary, the Governor sends the request letter to the President, through the Regional Director of the appropriate FEMA Region. The request is reviewed by the Regional Director and forwarded with a recommendation to the Director of FEMA who, in turn, makes a recommendation to the President. The President makes the decision whether or not to declare a major disaster or emergency. After the initial declaration, the person designated by the Governor as the Governor's Authorized Representative (GAR) may make requests for additional areas to be eligible for assistance or for additional types of assistance as deemed necessary.

After a declaration is made, FEMA will designate the area eligible for assistance and the types of assistance available. With the

declaration, a Federal Coordinating Officer (FCO) is appointed who is responsible for coordinating all Federal disaster assistance programs administered by FEMA, other Federal departments and agencies and voluntary organizations. At the same time, the Regional Director or one of his/her staff will be appointed as the Disaster Recovery Manager (DRM), who is responsible for managing the FEMA assistance programs. The same person most often holds these two titles (FCO and DRM). Similarly, the State Coordinating Officer (SCO) and the GAR are generally the same person.

Federal Response Plan

The Federal Response Plan (FRP) is implemented to coordinate the overall delivery of Federal assistance to disaster victims. The plan is organized functionally by Emergency Support Functions (ESFs). Each ESF is composed of a lead or primary agency and supporting agencies grouped together to deliver specific services and resources. Delivery of assistance under the plan is flexible to best meet the unique needs of each disaster. Under the Federal Response Plan, emergency assistance is provided either by Federal agencies under their own authorities, or under reimbursable mission assignments from FEMA.

FEMA Debris Mission Response Actions

In catastrophic disasters, FEMA can provide direct Federal assistance to support local, tribal and State governments in performing some of the activities related to debris clearance, removal and disposal. The response capabilities of the local, tribal and State governments must be clearly exceeded before this level of assistance can be provided. The work that can be performed under this authority is limited to emergency work and debris removal under Sections 402 (4), 403 and 407 of the Stafford Act. The assistance will be subject to the cost-sharing provisions as specified in the FEMA-State Agreement. The grantee will reimburse FEMA for the appropriate non-Federal share of the cost of the work, including any administrative costs of the performing Federal agency.

Following a Presidential Declaration, FEMA may elect to use its mission assignment authority to have the USACE contract for and manage debris clearance, removal and disposal operations. The debris and removal mission assignment is coordinated by Emergency Support Function #3 (ESF #3), Engineering and Public Works liaison officer.

An ESF #3 liaison officer should work directly with the FEMA debris staff to coordinate policy and guidance necessary to accomplish response and recovery missions assigned to the USACE by FEMA.

The ESF #3 liaison officer should meet regularly with FEMA and as needed with appropriate, local, tribal and State government officials to collect and coordinate information necessary to accomplish the assigned mission. The ESF#3 liaison officer should assemble information and provide tasks to the USACE staff for necessary action and ensure that contract scope requirements are accurate and timely. An ESF #3 officer is FEMA's direct liaison responsible for coordinating assigned missions. Daily assessments are made and reported to FEMA and others, as required, via coordination meetings and memoranda.

ESF #10, Hazardous Materials liaison officer should also be included in all debris planning to coordinate the cleanup, transportation and disposal of hazardous materials.

FEMA Debris Eligibility Criteria

FEMA Public Assistance (PA) funds may be used for debris clearance, removal and disposal operations. Debris that may be eligible for clearance, removal and disposal includes trees, sand and gravel, building wreckage, vehicles and personal property. The debris must be a direct result of the declared event, must occur within the designated disaster area and must be the responsibility of the applicant at the time of the disaster. Debris removal may be eligible when it:

- Eliminates immediate threats to lives, public health and safety;
- Eliminates immediate threats of significant damage to improved public or private property; and/or
- Ensures economic recovery of the affected areas to the benefit of the community-at-large.

Debris Removal from Public Property. In general, debris that is on public property must be removed to allow continued safe operation of governmental functions and, therefore, is eligible under one of the first two criteria. However, not all public property clearance is necessarily eligible. Debris that is blocking streets and highways is a threat to public health and safety because it blocks passage of emergency vehicles or it blocks access to emergency facilities such as hospitals. Debris in a stream or flood channel may cause flooding from a future storm. If such flooding would cause an immediate threat of damage to improved property, removal of the debris only to the extent necessary to protect against an event that could reasonably be expected to occur within five years may be eligible. On the other hand, removal of fallen trees in a forested or wilderness area is not normally eligible.

Debris Removal from Private Property. Debris on private property is treated somewhat differently. Debris removal from private property is the responsibility of the individual property owner, aided by insurance settlements and assistance from volunteer agencies. Most insurance policies, such as, homeowner, fire and extended coverage policies, have specific coverage for debris removal and demolition of heavily damaged structures. FEMA assistance is not available to reimburse private property owners for the cost of removing debris from their property; however, an eligible local, tribal or State government may pick up and dispose of disaster-related debris placed at the curb by those private individuals. Generally the extent and duration of this type of work is carefully controlled. FEMA, State, tribal and local officials will agree on a time frame during which pick-up from the curb will be eligible for PA funding.

If the debris on private business and residential property is so widespread that public health, safety, or the economic recovery of the community is threatened, the actual removal of debris from the private property may be eligible. In such situations, the work normally must be done or be contracted for by an eligible applicant.

See Chapter 6 for further information on removal of debris from private property.

Debris Removal from Drainage Structures. Debris removal from certain drainage structures may have to meet the following criteria:

Reservoirs. Removal of disaster-related debris from reservoirs may be eligible if evidence is provided to FEMA that the reservoirs were regularly cleaned prior to the disaster and the pre-disaster level can be established. In addition, removal of debris that poses an immediate threat of clogging or damaging intake or adjacent structures may be eligible.

Natural Streams. Debris removal from natural streams normally is not eligible for assistance. Only debris that causes a threat to lives or public health and safety or damage to improved property from an event that could be reasonably expected to occur within five years is eligible. Any work in natural streams must also be closely reviewed and monitored to minimize undesirable environmental effects. This type of work will often require a Clean Water Act Section 404 permit from the USACE. The Natural Resources Conservation Service also has the authority to clear streams of debris.

Engineered Channels and Debris Basins. Debris removal from engineered channels, lined or unlined and debris basins may be eligible. Knowing the pre-disaster level of debris in the channel or basin is required in determining the amount of disaster-related debris. Such facilities must also have had a regular schedule of debris removal to be eligible for clearance.

Debris Removal from Roads and Highways. Debris may be removed from roads and highways, including the travel lanes and shoulders, roadside ditches and drainage structures and the maintained right-of-way. Clearance from Federal-aid roads and highways follows these criteria except when the Emergency Relief (ER) program of the FHWA is activated. For highways being repaired by the ER program of FHWA, the debris is removed as part of that work. Even when the ER program is activated for an area, FHWA assistance is granted only for portions of the road actually damaged by the disaster. Debris on undamaged sections of highway may be eligible for FEMA assistance.

Debris Removal from Recreational and Wilderness Areas. The removal of debris from public parks and recreational areas used by the public is eligible when it affects public health or safety or proper utilization of such facilities.

Hazardous trees within a naturalized area of public parks or golf courses that are unstable and leaning into the areas used by the public are eligible for removal only, not replacement. Normally, trees requiring removal are flush cut at the ground. Hazardous limbs are also eligible for removal. Hazardous limbs are defined as limbs greater than two inches in diameter that are still hanging in the tree and are threatening a public-use area, such as a trail, sidewalk, road, or golf cart path.

Generally, stump removal is not considered eligible for reimbursement, except if the stump itself is determined to be a hazard, as when the tree has been uprooted. When eligible, stump removal is accomplished by the least expensive means.

A tree with more than 50% of the tree crown destroyed or damaged, a split trunk, or broken branches that expose the heartwood, or a tree that has been felled or

uprooted is eligible for removal, especially if it is in a location approximate to or within public-use areas. If the applicant chooses to attempt to save a tree that has any of the conditions described above that justify its removal, the expense is the applicant's.

Removal of debris that does not pose a health or safety threat in wilderness or forested areas of these facilities is not eligible for FEMA reimbursement.

FEMA Building Demolition Criteria

FEMA Public Assistance (PA) funds may be used for demolition and removal of resulting debris under the authority of Section 403, Essential Assistance, of the Stafford Act. This section allows for the demolition of unsafe structures that pose an immediate threat to life, property, or public health and safety.

Health and Safety. The primary responsibility for demolition of unsafe structures lies with the owner. Most insurance policies have a clause that provides payment for demolishing houses damaged beyond repair. The applicant must certify that no insurance exists that would pay for the demolition, the owner is not capable of paying for such work and there is no opportunity to recoup the cost from the owner. If permission for demolition is not provided, the applicant must follow legal condemnation. The applicant must obtain right of entry and hold harmless agreements prior to start of the work. The ownership of the property remains in the hands of the original owner.

All properties must be reviewed in accordance with environmental, historic and other Federal laws being provided for the demolition. The State should provide each applicant with a demolition checklist that must be completed and returned by the applicant prior to any actual demolition of the property.

The checklist should contain a list of items with which the applicant must comply prior to demolition. These items include verification that the applicant has obtained right of entry and hold harmless agreements and investigated insurance coverage and liens. The applicant will also be provided forms pertaining to historic preservation, environmental, hazardous materials and wetland/floodplain requirements. The applicant must sign and return these forms indicating he/she has read them and understands that it is his/her responsibility to ensure full compliance with all local, tribal, State and Federal rules and regulations.

The applicant must provide FEMA with a copy of the bid specifications, final property list and bid results prior to demolition. FEMA reviews the bid specifications to ensure that the specifications contain the proper scope of eligible work.

Once all necessary information has been received and reviewed, FEMA will notify the State that they have no objection to the applicant's proceeding with the demolition of the properties identified in the demolition bid. The State provides the applicant with written authorization to proceed with the demolition project.

Eligible work under health and safety demolition is limited to the demolition and removal of structures that may represent an immediate threat to public health and safety. An inspection team may inspect each facility to make a determination on the

structural integrity of the unit and review the reports of the applicant's building inspector.

Structures that are in danger of collapse, thus representing an immediate threat to life and safety, are documented and recommended as eligible for demolition.

Other eligible project descriptions under the health and safety category may include cleaning septic systems, backfilling basements, capping wells, clearing debris and any other actions to mitigate an immediate threat to public health and safety.

Items such as slabs on grade, driveways, fences and structurally sound buildings normally are not eligible for demolition under the public health and safety category because they do not represent an immediate threat to public health and safety.

At the completion of the project, the State notifies FEMA that the applicant's demolition has been completed. A joint FEMA/State team inspects the applicant's demolition sites to ensure full compliance with the project description identified in the report form.

Eligible costs may include any cost incurred by the applicant to complete the demolition project. Costs for monitoring and managing demolition and removal activities are eligible costs. Necessary costs of requesting, obtaining and administering the grant assistance, however, are covered by the Subgrantee Administrative Allowance and are not identified separately as eligible costs.

See the Public Assistance Guide, FEMA 322 for more information on the Subgrantee Administrative Allowance.

Archaeological sites or historic structures listed on the National Register of Historic Places or potentially eligible must be reviewed by the State Historic Preservation Officer (SHPO) prior to any demolition. Information and forms outlining the necessary step-by-step procedures to obtain SHPO approval should be provided to the applicant by the State. It is the applicant's responsibility to obtain SHPO approval before demolishing any possible historic structures or performing ground disturbing activities. Costs associated with the applicant's obtaining SHPO clearance may be eligible.

Each structure must be inspected for hazardous materials, such as asbestos or lead-based paint, prior to actual demolition of the structure. Normally, a representative of the applicant, such as a building inspector or fire marshal, will conduct a preliminary inspection of each structure. If hazardous materials are determined to exist in the structure, the applicant should contract with a certified asbestos or lead-based paint inspector. If the inspection report indicates the presence of asbestos material or lead-based paint, a certified abatement contractor must remove the material prior to demolition. Costs associated with asbestos and lead-based paint inspections, asbestos abatement and third party air monitoring may be eligible.

Attractive Nuisance. Private structures that are found to be structurally sound but require extensive repair are normally not eligible for demolition. The primary responsibility for securing the structures until repairs are completed lies with the owners. The applicant must certify that the structure is a health and safety threat to the public if the owners have no insurance or are not capable of paying for such work.

The applicant must obtain rights of entry and hold harmless agreements prior to start of the work.

Eligible work under this category is limited to securing the perimeter of the structure to prevent entrance into the structure and may include fencing, where necessary. FEMA can provide funding for materials (plywood or fencing) and labor as part of the project description to secure the structures from access. This funding meets the required need to protect life and safety.

Health Hazard. The project description on the report may include the cost of cleaning or removing items such as household hazardous waste (HHW), debris, food, chemical hazardous waste, freezers and refrigerators that may contain freon and other items that may represent a health hazard.

The applicant must certify that no insurance exists that would pay for such work, the owner is not capable of paying for such work and there is no opportunity to recoup the cost from the owner. The applicant must obtain rights of entry and hold harmless agreements prior to start of the work.

Chapter 2

PRE-DISASTER PLANNING

Major natural disasters can generate enormous volumes of debris in short periods of time. Debris clearance, removal and disposal operations must be implemented quickly to expedite recovery operations and to protect public health and safety of the local population. However, the speed of initial debris clearance, removal and disposal operations depends upon the depth of pre-disaster planning by local, tribal and State Emergency Managers.

This chapter discusses four important pre-disaster planning actions:

1. *Identifying potential types and amounts of debris.*
2. *Identifying temporary debris storage and reduction sites.*
3. *Developing a Debris Management Plan.*
4. *Negotiating Mutual Aid Agreements.*

Identifying Potential Types and Amounts of Debris

Before selecting temporary debris storage and reduction sites, it is necessary to identify the areas that may be subject to widespread devastation (such as parks, tree-lined streets, orchards, groves, nurseries, mobile home parks and residential, commercial and industrial areas) and the types and amounts of resultant debris. The types and amounts of debris can be forecast on a land-use basis (such as rural, urban, industrial, or mixed use) and by examining historic records. For example, if an area has not been affected by a major storm for a long period of time, a dense tree canopy may have developed, which will result in a large amount of vegetative debris following a major storm.

In addition, the U.S. Army Corps of Engineers (USACE) Emergency Management staff has developed a modeling methodology designed to forecast potential amounts of hurricane-generated debris using actual data from Hurricanes Frederic, Hugo and Andrew. The estimated quantities produced by the model have a predicted accuracy of ± 30%. The primary factor used by the model is the number of households in a developed urban/suburban area. The other factors are cubic yards of debris generated per household, vegetative cover, commercial density and precipitation.

See Appendix A for a detailed discussion and example of the USACE Debris Estimating Model.

Identifying Temporary Debris Storage and Reduction Sites

All activities associated with massive debris clearance, removal and ultimate disposal operations depend upon the availability of suitable temporary debris storage and reduction sites. Identifying these potential sites before a major natural disaster will expedite debris removal and subsequent volume reduction and disposal actions. The designated debris manager and staff should work closely with other local, tribal and State officials to develop and maintain current listings of potential debris storage and reduction sites in areas prone to natural disasters. Pre-disaster site selection teams should include local officials who are familiar with the area. The teams should also consult and coordinate with local

residents, conservation agencies and environmental groups, if possible, to help identify potential problems.

Considerations for evaluating potential temporary debris storage and reduction sites include the following:

- Use public lands first to avoid costly leases. Pre-designated sites should be on public property and consist of between 50-100 acres, depending on anticipated needs. Consider the locations with respect to noise, traffic and the environment. Use private land only if public sites are unavailable.
- When selecting public or private sites consider pre-existing conditions that will have to be restored upon site closeout. Have attorneys review leases for private land to avoid extensive damage claims upon site closeout.
- The required size of the site will depend on the expected volume of debris to be collected and planned volume reduction methods. As a general rule, larger sites mean fewer sites and, hence, easier site closeout. However, larger sites may create logistical problems.
- Environmentally sensitive areas (such as wetlands, areas with endangered animal and plant species, critical habitats, well fields and surface water supplies and historic/archaeological sites) should be avoided. However, if use of such areas is unavoidable, procedures for temporary waivers should be developed.

Consult and coordinate with local residents, conservation agencies, environmental groups and agencies and the State Historic Preservation Office (SHPO).

- Public acceptability is largely dependent upon the activities planned for the site. Smoke from burning, around-the-clock light and noise from equipment operation, dust and traffic are tolerated early in the disaster, but may have to be curtailed later. Whenever possible, avoid locating near residential areas, schools, churches, hospitals and other such sensitive areas. Notify citizens early about planned site activities and possible ramifications.
- Look for sites with good ingress/egress to accommodate heavy truck traffic.
- Consider adjusting traffic signals to accommodate projected truck traffic on critical haul routes.
- Identify nearby landfills and determine their present debris capacity and logistical capabilities. Also include any State-to-State or county-to-county agreements.
- Identify recycling possibilities, such as timber agreements, mulch and chip disposal in the agriculture community and fuel sources for incinerators or heating. Recycling success will depend on the types of debris and the local recycling environment.
- Review local, tribal and State ordinances on such items as tarps and tailgates on trucks, traffic control, truck priority, curfew, defining roadway rights-of-way and load limits. Coordinate with responsible agencies to develop waiver procedures to expedite emergency operations.
- Clearly show critical routes and priorities for clearing debris on local maps. Target emergency routes for local, tribal, State or Federal clearance efforts. GIS should be used as an efficient mapping tool, if available.

The following questions will help to identify and prioritize appropriate sites based on local requirements and conditions.

Potential Site Ownership.

- Are public lands available?
- Are private land lease terms long enough?
- Are private land lease terms automatically renewable?
- Does the private land lease include a landscape restoration agreement?

Potential Site Size.

- Is the site large enough to accommodate the planned debris storage and/or reduction methods?
- Will the site configuration allow for an efficient layout?

Potential Site Location.

- Does site have good ingress/egress?
- Does site have good transportation arteries?
- Does site have open, flat topography?
- Does site have wetlands? If unavoidable, require the contractor to flag the area and establish buffers and/or sediment barriers.
- Does site have public water supplies, including well fields and surface waters?
- Does site have threatened and endangered animal and plant species?
- Does site have threatened and endangered species' critical habitats?
- Does site have rare ecosystems?
- Does site have historic sites?
- Does site have archaeological sites?
- Does site have sensitive surrounding land use, such as residential, school and church?

Developing a Debris Management Plan

Local, tribal and State Emergency Managers should have a Debris Management Plan that defines the roles of essential personnel and agencies necessary to execute debris clearance, removal and disposal operations. The following is a suggested format for a debris management plan:

Mission. Identify how debris management activities will be facilitated and coordinated. Include local situations and assumptions.

Organization. Define who has the overall responsibility for managing the debris clearance, removal and disposal operations and supporting agencies/staff.

Concept of Operations. Detail how the responsible agency/designated individual will manage and coordinate the debris clearance, removal and disposal operation. Include the following:

- Contracts and cooperative agreements.
- Temporary and permanent site selection criteria.
- Debris removal priorities.
- Debris classification.

Responsibilities. Detail specific responsibilities for each department involved with debris clearance, removal and disposal operations. These departments might include General Services, Environmental Quality, Emergency Services, Solid Waste Management, Public Works, Transportation and Forestry/Natural Resources.

Normal Operations. List routine actions necessary to develop or update the debris management plan.

Increased Readiness. Identify pre-disaster actions, if a potential disaster is threatening the local area. Designate the Debris Staff Manager.

Response. Identify how the plan will be activated and implemented.

Recovery. Identify who has responsibility for monitoring debris removal contracts and updating the plan as required.

Legal Authority. Identify state, tribal and local authorities, limitations, statutes, ordinances and regulations. Examples include:

- Condemnations
- Indemnification
- Procurement
- Environmental
- Logistical Requirements

Recommended Appendices.

- Debris classification.
- Location and status of temporary storage sites.
- Location and status of landfills.
- Maps showing locations of removal sectors and temporary storage sites.
- Site closure and restoration guidance.

See Appendix B for an example of a Debris Management Plan Outline.

See Appendix C for an example of a Local Debris Management Plan Strategy.

Mutual Aid Agreements

Mutual aid agreements should be negotiated and in place prior to a disaster. Mutual aid providers normally consist of local and county Departments of Public Works from around the State. These departments usually offer their assistance in the form of equipment and personnel.

The mutual aid agreement should outline the responsibilities of each party, including the types of costs that will be reimbursed. To ensure that mutual aid providers adhere to the agreements, the designated debris manager should assign coordinators to monitor each provider. The coordinators should be responsible for tracking the type of work performed and type of equipment used by each mutual aid provider.

To be eligible for FEMA assistance, reimbursement by the receiving party must not be conditioned on receipt of FEMA assistance.

See Appendix D for an example of a Mutual Aid Agreement.

Chapter 3

DEBRIS MANAGEMENT STAFF ORGANIZATION AND RESPONSIBILITIES

This chapter provides guidelines for debris management staff organization and defines the key responsibilities involved in pre- and post-disaster planning and information management.

Debris Management Staff Organization

The size and composition of a staff organized to deal with debris clearance, removal and disposal issues will depend on the magnitude of the disaster and the size of the community. A pre-disaster debris planning staff may be quite small; however, following a major disaster, additional staff members may be required. The local, tribal or State debris staff should be comprised of full-time personnel supplemented with personnel from other staffs and agencies. It is essential that prospective staff members have as much training as possible and interface with other agencies responsible for debris clearance, removal and disposal activities, such as the National Guard, State Department of Transportation (DOT), State Police, Federal Emergency Management Agency (FEMA) and the U.S. Army Corps of Engineers (USACE), prior to any anticipated disaster.

The staff should be comprised of personnel to perform the following functions:

Administration. Housekeeping supplies, equipment, funding and accounting.

Contracting and Procurement. Bidding requirements, advertisements for bids, instructions to bidders and contract development.

Legal. Contract review, rights of entry permits, community liability, indemnification, condemnation of buildings, land acquisition for temporary staging and reduction sites, site closure/restoration and insurance.

Operations. Supervision of government and contract resources and overall project management.

Engineering. Detailed damage assessments, identification of project tasks, assignments of tasks, preparation of cost estimates, scopes of work and specifications for debris contracts.

Public Information. Coordination of press releases, maintenance of contacts with local organizations, individuals, the media and drafting of public notices for debris clearance, removal and disposal operations.

General Debris Staff Responsibilities

Key personnel should be alerted before the disaster, if possible and deployed either before or immediately after the disaster. If possible, they should remain part of the debris management staff throughout the disaster cleanup to maintain continuity during the debris clearance, removal and disposal operations. The staff should develop disposal plans either in advance or concurrently with the removal efforts.

Failure to address debris disposal requirements early may lead to complex problems later.

The designated debris manager and debris management staff should be responsible for coordinating all removal and disposal activities. The staff will need to coordinate closely with all local, tribal, State and Federal agencies responsible for disaster response and recovery operations. They may also need to contract removal and disposal services and develop requests for additional assistance from FEMA. They must be prepared to react to evolving needs and available technologies. The staff must be able to assess debris based on:

- Quantities and types.
- Rural, urban and/or agricultural locations.
- Number of private homes, mobile homes, public facilities and commercial establishments damaged or destroyed.
- Miles of roads affected, categorized by type, such as rural, urban and/or expressways.
- Quantity and types of household hazardous wastes.

The designated debris manager and debris staff should be prepared to take the following actions:

- Develop a reliable initial assessment of the disaster's magnitude. This will enable decision-makers to assess human and material requirements for responding to the debris disposal situation.
- Coordinate with local procurement agencies to establish a contracted work force capable of expeditiously removing the debris.
- Identify the need to consult with an environmental or historic preservation specialist to assure that legal requirements in these areas are met.
- Evaluate damaged utility systems, structurally unstable buildings, other heavily damaged public facilities and determine if they should be expeditiously repaired, deactivated, barricaded or removed. Activities involving these facilities should be closely coordinated with their owners and/or operators. Demolition of unsafe structures that constitute a public health and safety threat may be deferred if access to the area can be controlled.
- Develop an independent team using local, tribal and State personnel to monitor the debris removal activities. This will allow the designated debris manager and debris staff to obtain accurate information about the progress of the debris removal operation. The field inspection team becomes the debris manager's "eyes and ears" in the field. The cost for personnel to monitor debris removal activities is reimbursable.
- Conduct daily update briefings with key debris managers and other officials. Ensure that all debris clearance, removal and disposal actions are reviewed and approved by the local or tribal debris manager.
- Ensure that a debris staff representative attend all briefings to resolve any coordination problems between State and Federal debris removal efforts and local debris removal and disposal efforts.
- Coordinate with local, tribal and State DOT and law enforcement authorities to ensure that traffic control measures expedite debris removal activities.
- Develop a traffic control plan. Traffic control devices should not be allowed to return to normal operations until all

debris operations have been completed. Debris clearance and removal activities must be given priority at every major intersection to ensure efficient and timely debris operations.
- Establish and maintain direct coordination with other local, tribal and State officials and their staffs with regard to priorities and areas of responsibility.

Finally, the debris staff must be able to inform the public in understandable terms of the magnitude of the disaster and about actions the public must take.

Engineering Staff Responsibilities

The debris management staff should have access to qualified engineering expertise to assess the full scope of the debris clearance, removal and disposal effort. The community may wish to hire a local engineering firm if the community's internal engineering staff is heavily involved with the repair and replacement of publicly owned facilities damaged by the disaster. The engineering organization will need the following personnel:

- Inspectors to inventory the type and amount of debris within the disaster area.
- Engineers to plan the work for maximum efficiency and to develop the government debris clearance, removal and disposal cost estimate.
- Contract specialists and draftspersons to prepare contract scopes of work and/or specifications.

Engineering personnel perform tasks such as the following:

- Define the project scope, if the community elects to contract the debris clearance, removal and disposal effort. This is done by specifically defining the disaster area in which work is to be contracted and by developing a quantitative and qualitative estimate of the debris to be removed and disposed of for that area.
- Determine if the existing landfills have sufficient capacity for the expected volume of debris from the preliminary damage assessment.
- Consider using pre-identified temporary storage sites for reducing the volume of debris by incinerating, grinding and/or recycling to reduce the impact on landfill sites.
- If sufficient landfill capacity is not available, identify alternative landfill sites.

The engineering staff might be required to develop scopes of work and specifications if local contractors are used for debris clearing, removal and disposal operations. The following factors should be considered because they will affect overall contract costs:

- **Truck Size.** Smaller trucks require more trips for a given volume of debris, which increases the driver's time, fuel cost, maintenance and depreciation cost.
- **Length of Haul.** The longer the haul, the greater time required to reach the disposal site, which increases costs for labor and equipment.
- **Traffic Conditions.** Hauling over heavily traveled streets and roads also increases labor and equipment costs.
- **Roadway Conditions.** Poor roadway conditions, such as potholes, unpaved surfaces and deteriorated pavement,

increase maintenance costs as well as operational costs.

- **Temporary/Permanent Site Access.** Single lane unpaved access roads increase cost because of delays caused by restrictions for allowing loaded and empty trucks to pass. In addition, poor weather conditions may make the access road impassable.

Once the above factors are considered, the limits of the disaster area can be clearly defined. For debris contracting and debris management purposes, the boundaries of the disaster area should be delineated on a map. The map should identify the work area or areas to be included in the contract. If multiple contracts are used, this element of contract preparation is extremely important to ensure that the contractors remain in their assigned work areas. The establishment of the work area is also important to identify key items, such as ingress and egress routes to the debris removal area, location of utilities and distance to temporary staging and reduction sites or permanent landfill sites.

A quantitative estimate is extremely important to clearly identify to contractors the scope of work they are being asked to perform. This estimate will also assist in preparing project cost data.

Quantity estimates, or "takeoffs," should be made in the units that are going to be used in establishing contract line-item prices. Units should be selected based on the method that will be used to verify pay quantities for work under the contract. For debris removal, units are normally “cubic yards,” “tons,” or “each.” Therefore, if a contractor is to be paid for the volume of material removed from a work site by approximate measurement of that volume, the unit should be cubic yards. If it is more convenient to pay the contractor by weighing the trucks used to haul the material to a disposal site, the units should be by weight (tons). If the contractor is to be paid by the number of items removed from the project site (i.e., trees, damaged vehicles, etc.), the unit should be established as "each." Because it is difficult in most debris operations to estimate the weight of material to be removed, the general rule is to use volume and number measurements. An estimate of length, width and height of the material can approximate the volume of debris in question. The amount of material to be removed and the accuracy desired in the estimate will determine the procedures used for this volume measurement. For a large-scale disaster, marking the area on a scaled map and approximating an average height can derive an approximate quantity estimate. When developing quantity estimates, inspectors should be instructed to note the type and location of the debris.

The next step is to develop unit cost data after the quantity, location and type of the debris within the disaster area has been established. Several sources exist that may assist in determining the proper unit price to be used once the project scope has been defined and contract type selected. Many nationally published cost data reports do not take into account the abnormal conditions encountered by contractors in debris operations. They also do not account for the increase in cost due to a disaster or emergency situation. The following sources should be able to provide current cost data necessary to develop the unit price estimate:

- Area engineering and construction firms.

- Local Street or Public Works Departments.
- State DOT and State Department of Forestry.

The development of a government estimated unit price includes many variables. Factors that influence the unit price are the type of debris, method of removal, distance to the disposal site, routes to the disposal site, permitting requirements and work-site limitations.

The damage assessment report should provide the engineering staff with information that addresses all items to be included in the government cost estimate. These items will include the actual work that may be required to accomplish the specific tasks.

The individuals performing the government cost estimate should put themselves in the place of the contractor who is being asked to submit a price for the work. This is very important in a disaster situation, where there might be a considerable variety of factors affecting the contractor's pricing. After the cost estimate is prepared, the scope of the project can be defined and the type of contract selected.

The engineering staff should have an understanding of FEMA debris eligibility criteria and be aware that FEMA will only reimburse "reasonable costs" associated with debris clearance, removal and disposal actions. Moreover, plans must include a means to monitor the contractor's activities and certify the accuracy of the amount of debris handled.

See Chapter 5 for additional information on contracting procedures.

Public Information Management

Public Information Specialist. A full-time public information specialist should be assigned to the debris management staff. This specialist should be responsible for coordination with other public information agencies to keep the public informed on all debris removal activities and schedules. Immediately after a disaster and continually throughout the removal and disposal operation, this person should arrange public notification of all ongoing and planned debris clearance, removal and disposal activities. Notification should include information bulletins, hotline responses, public service announcements for radio and television, handbills, door hangers and newspaper notices in the language(s) prevalent in the affected communities. Provision should be made to compensate for disruption of normal means of mass communication caused by power outages following a major natural disaster.

Public Participation. Public notices should emphasize actions that the public can perform to expedite the cleanup process, such as the following:

- Separating flammable and nonflammable debris.
- Segregating household hazardous waste.
- Placing debris at the curbside.
- Keeping debris piles away from fire hydrants and valves.
- Reporting locations of illegal dump sites or incidents of illegal dumping.
- Segregating recyclable materials.

Important Debris Removal Activities. The public should be kept informed of the following debris removal activities and regulations:

- Debris pick-up schedules.
- Disposal methods and ongoing actions to comply with State and Environmental Protection Agency regulations.
- Disposal procedures for self-help and independent contractors.
- Restrictions and penalties for creating illegal dumps.

Questions from the Public. The information specialist should develop a means of responding to debris removal questions from the press and local residents. Questions that might be asked include the following:

- What is the pick-up system?
- What is the schedule of pick-up in my area?
- Who will pick-up and how can I contact the operator?
- Should I separate the different debris materials and how?
- How do I handle household hazardous waste?
- What if I am elderly or infirm?

Chapter 4

DEVELOPING A DEBRIS CLEARANCE, REMOVAL AND DISPOSAL STRATEGY

In a few hours or even minutes, major natural disasters can generate large amounts of debris. The debris may be equally heavy in urban and rural areas, depending on the magnitude of tree blow-down and associated structural damage to homes, businesses, utilities and signs. Debris clearance must begin immediately to protect public health and safety. Debris clearance, removal and disposal activities are a visible sign of action that helps restore a sense of normalcy to a stunned community.

This chapter discusses how to develop a large-scale debris clearance, removal management strategy by dividing the operation into two phases. Phase I consists of clearing the debris that hinders immediate life saving actions and that poses an immediate threat to public health and safety. Phase II consists of removing and disposing the debris that hinders the orderly recovery of the community and poses less immediate threats to health and safety. The entities responsible for implementing the strategy should be identified in advance.

Phase I: Emergency Roadway Debris Clearance

The designated debris manager and staff should identify in advance which routes are essential to emergency operations. This will allow them to direct local efforts and to target areas for possible State/Federal assistance.

The designated debris manager and staff should be aware of local, tribal and State agencies' capabilities to provide service for emergency roadway debris clearance. Available resources should include the following:

- Municipal force account workers and equipment.
- Local, tribal and State Department of Transportation (DOT) workers and equipment.
- National Guard.
- Local contractors hired by local and tribal governments.

The Department of Public Works (DPW) should be responsible for debris clearance activities. The DPW has the necessary personnel, equipment and contracting experience.

A few days before a foreseeable disaster, the DPW portion of the debris management plan should be put into effect. The DPW should disperse vehicles throughout the area to minimize the risk of vehicle damage. Anticipated supplies and equipment necessary to complete the work should be purchased or rented. A strategy should be developed to clear all designated emergency roads using all available local force account labor and equipment, military personnel, mutual aid providers and local contractors.

Following a disaster, the top priority is to clear major arterial roads, including roads leading to health care facilities. The DPW should organize participants based on personnel and equipment and assign each of them responsibility for certain roadways. At

least one lane should be cleared on each arterial, major and secondary road as soon as possible. Available public property should be identified for use as temporary storage areas, with preference to locations that would be less expensive to restore, such as open fields and parks.

Debris may include tree blow-down and broken limbs; yard trash such as outdoor furniture and trash cans; utility poles, power, telephone and cable television lines, transformers and other electrical devices; building debris, such as roofs, sheds, block walls and chimneys; and personal property, such as clothing, appliances, boats, cars, trucks and trailers.

In Phase I, roadway debris is quickly moved to the side of the road to provide access into devastated areas. No attempt is made to remove or dispose of the debris, only to provide clear access routes to allow for:

- Movement of emergency vehicles.
- Law enforcement.
- Resumption of critical services.
- Damage assessment of critical public facilities and utilities.

The requirements for government services increase dramatically following a major natural disaster. Therefore, after emergency access has been provided to hospitals and police and fire stations, the next priority is to open access to other critical community facilities, such as schools, municipal buildings, water treatment plants, wastewater treatment plants, power generation units, airports and seaports.

The difficulty of assessing the amounts and types of debris to be removed from key routes slows the deployment of the right mix of equipment and labor, especially when contracting for additional resources. Moreover, local equipment and labor capabilities could be limited. Therefore, communities should be prepared to execute Time and Material (Equipment Rental) contracts during Phase I operations. They allow the flexibility to respond to local hot spots at a reasonable cost. Time and Material contracts for services should be very limited in scope and duration. For example, a local construction company may be awarded a Time and Material contract as a stop-gap measure to clear debris from the right-of-way by pushing it to the roadway shoulders until larger regional contractors are mobilized under unit price contracts.

See Chapter 5 for additional information on contracting procedures.

Phase II: Debris Removal and Disposal Responsibilities

The Department of Solid Waste Management (SWM) should be responsible for coordinating all debris removal and disposal activities to include normal garbage pickup. These actions should be closely coordinated with the DPW to ensure a smooth transition.

The initial roadside piles of debris created during Phase I will become the dumping locations for additional yard waste and other storm-generated debris. Therefor, a private contractor may be required to perform the final disposal of all disaster-related debris from the rights-of-way or storage and reduction sites. The contract should cover hauling and disposal of debris at an approved landfill. If local contractors are used, the area should be divided into definable sectors for control purposes and bids solicited based on the sectors and the

estimated cubic yards of debris in each. Contractors are then responsible for hauling debris from the public rights-of-way to assigned temporary storage areas or approved landfills.

SWM should issue and monitor local government debris disposal contracts to ensure that public funds are properly accounted for and that contractors perform according to contract requirements.

Debris Issues Requiring Close Coordination

The designated debris manager and debris staff will be faced with a monumental task of coordinating removal of debris that represents a significant health and safety hazard to the community. There will be requests from residents who want to start putting their lives and property in order. Expedient removal of debris from in front of residents' homes becomes a high priority because it is a positive sign that recovery actions are underway and expedites the replacement of key utilities located along public rights-of-way.

The following issues will require close coordination when removing debris from public rights-of-way:

Curbside Separation. Good curbside separation is critical in the early stages of cleanup. However, even when the homeowner takes time to separate flammable, nonflammable and other hazardous debris, many contractors place everything into the truck or push the curbside debris to a cul-de-sac or an intersection and load it there. Therefore, contractor performance should be closely monitored, with emphasis being placed on curbside sorting. This monitoring will pay dividends in the long run because good sorting will make the final disposal much faster and cheaper.

Monitoring Contractor Activities. To ensure that contract haulers are in compliance with their contract, the DPW/SWM should use their own personnel or hire a local engineering consulting firm to serve as contract monitors.

The monitors should be responsible for initial load tickets where trucks are loaded and verifying the estimated amount of debris hauled at the temporary storage area or landfill. DPW/SWM officials should provide overall supervision.

The contractor must provide a notarized listing of the measured bed size in cubic yards and license plate number of all trucks to be used to move debris upon award of the contract.

Once a truck is loaded with debris at the work site, the site monitor should fill out a load ticket, which usually consists of one white original copy and two carbon copies (yellow and pink). The load tickets issued by the monitors are the basis for debris contractor payment.

Each ticket should include the following information:

- Preprinted ticket number.
- Contract number.
- Prime Contractor's name.
- Date.
- Truck number.
- Truck capacity in cubic yards.
- Load size, either cubic yards or tons.
- Truck driver's name.

- Debris classification.
  - Burnable
  - Non-burnable
  - Mixed
  - Other

- Zone/Sector.
- Dumpsite location.
- Loading time (from work site).
- Dumping time (at disposal site).
- Loading site monitor.
- Dumping site monitor.

See Appendix F for a sample load ticket.

The load ticket copies should be processed in the following manner:

White copy. The pickup site monitor should fill in the date, truck number, contractor and departure time and sign the ticket. The pickup site monitor should keep the white copy and give the other two copies to the driver.

Yellow copy. Upon arrival at the disposal facility, the driver should give both the yellow and pink tickets to the disposal site monitor. The disposal site monitor should fill out the arrival time, estimate the amount of material on the truck in cubic yards and sign the ticket. The disposal site monitor keeps the yellow ticket.

Pink copy. This copy should be returned to the driver, who then provides it to the contractor.

At the end of each day, the white and yellow copies should be submitted to DPW or SWM personnel, who should match and compare the tickets. These procedures can be modified to meet local requirements.

The Federal Emergency Management Agency (FEMA) will reimburse only reasonable costs. Therefore, it is essential that the community be responsible for monitoring debris clearance, removal and disposal activity and be prepared to certify the accuracy of the amounts of debris hauled.

Special Monitoring Issues. The issues described below highlight the need for local DPW/SWM officials to closely monitor large contracted debris clearance, removal and disposal activities. The issues focus on some of the problems associated with major debris disposal contracts and justifies the need to monitor activities at local temporary storage and reduction sites and at final disposal landfill sites. Many of the questionable actions can be attributed to human error or they may be deliberate attempts to defraud the Federal government. In either case, it is essential that DPW/SWM contracting officials work closely with FEMA to ensure that contractor's perform the services required and that the services are performed at a reasonable cost.

Site delays. Delays in moving debris and traffic problems on adjacent highways can be caused by the need to establish initial tare weights for each truck going across the landfill site's scale. Tare weights should be established using other scales, if available, before debris hauling begins.

Overweight or unsafe trucks. State DOT enforcement officers should be available to issue fines for overweight vehicles and/or obvious safety hazards.

Tipping fees. Vehicles other than those under contract to the DPW, SWM and USACE should be required to pay the

normal tipping fee at the landfill. Commercial containerized haulers should not be allowed to dump for free because they normally include the tipping fee as part of their overall costs.

Excessively wet debris. Local site monitors should monitor temporary storage area loading sites to ensure that contractors do not add excessive amounts of water to debris prior to loading. This practice will add unnecessary weight to the load, resulting in overpayment based on weight. Minimal amounts of water may be necessary to keep down dust.

Excessive dirt and sand. Local site monitors should monitor storage area loading sites to ensure that contractors do not add excessive amounts of non-debris-related dirt and sand. Excavating dirt and sand from a site will add unnecessary weight to the load, resulting in overpayment based on weight and will add to the cost of site restoration. Some minimal dirt pickup is unavoidable.

Chapter 5

CONTRACTING PROCEDURES

This chapter highlights the procedures necessary to contract additional private debris clearance, removal and disposal resources and services. Contracting for labor and equipment may be necessary if the magnitude of the emergency debris clearance, removal and disposal operation is beyond the capabilities of local force account resources, State resources, mutual aid agreements and volunteer labor and equipment. The designated debris manager and staff should be familiar with contracting procedures, as they will be required to define specific debris removal tasks and recommend specific contract types based on the magnitude of the debris clearance, removal and disposal operation and the site clearance and restoration requirements.

Contracting Office Responsibilities

The local contracting office should have key personnel available to develop, process and administer debris clearance, removal and disposal contracts. The responsibilities entail the following actions:

- Determine the type and method of contracting needed to satisfy specific debris clearance, removal and disposal requirements of an unusual and compelling urgency.
- Solicit bids, evaluate offers, award contracts and issue notices to proceed with all contract assignments.
- Supervise the full acquisition process for service and supply contracts and the oversight of contract actions to ensure conformance to regulatory requirements.
- Coordinate with the Department of Public Works and Department of Solid Waste Management staffs.
- The contracting office must take care to avoid the solicitation of assistance from the general public and giving the impression that compensation will be provided for such assistance. Such instances would be considered by FEMA as a request for volunteer resources and treated in that manner. In addition, there are a number of other issues involved with such a solicitation, including licensing, bonding, insurance, the potential for the communities to incur liability in the event of injury or death, supervision and certification of work done.

Contracting Procedures for Immediate Response (Phase I)

Most State procurement regulations allow for abbreviated contract procedures when the Governor declares a State of Emergency. In emergency situations, communities normally solicit bids for equipment and labor by using public service announcements on radio, television and newspapers, as well as by directly soliciting local contractors in the area.

Although normally not an ideal alternative, the Time-and-Material (Equipment Rental) contract is an acceptable method of contracting during Phase I. Under this type of contract, the contractor is paid on the basis of time spent in accomplishing a particular task. The contract should be set on an hourly basis for the equipment and operator because Phase I debris operations involve primarily equipment usage. Work

orders should be issued for a particular piece of equipment and operator for a set number of hours. To ensure competitive bidding, hourly rates should be solicited from several contractors. Additionally, for simplicity, bid requests should specify that the hourly rate includes the operator, fuel, maintenance and repair. This will greatly simplify bookkeeping, auditing and monitoring of the work.

A Time-and-Material contract should clearly state that:

- The price for the equipment applies only when the equipment is operating.
- The hourly rate includes the operator, fuel, maintenance and repair.
- The community reserves the right to terminate the contract at its convenience.
- The community does not guarantee a minimum number of hours.
- The contract has either a dollar ceiling or a not-to-exceed number of hours clause.

Time-and-Material contracts should be limited to a maximum of 70 hours of actual emergency debris clearance work and should be used only after all available local, tribal and State government equipment has been committed. **Time-and-Material contracts for debris clearing, hauling and/or disposal should be terminated once the designated not-to-exceed number of hours is reached**. On occasion, Time-and-Material contracts may be extended for a short period when absolutely necessary, for example, until appropriate Unit Price contracts have been prepared and executed.

Supervision of Time-and-Material contracts is extremely important. Work inspection reports should be prepared each day. These reports should clearly state the amount of work accomplished that day in quantitative terms, such as the number of cubic yards of debris hauled, the type and number of trucks used and the number of hours worked.

Load tickets may be used if debris is being hauled based on cubic yards under a Time-and-Material contract as a way of checking contractor efficiency.

DPW inspection personnel should verify certification of work performed and copies of the inspection reports should be furnished to the contractor to expedite the submittal of invoices for payment.

See Appendix E for an example Scope of Work for an Equipment Leasing Contract.

Table 5-1 summarizes the key elements of a Time-and-Material contract.

Time-and-Material (Equipment Rental) Contract

Summary

- Extremely flexible, not scope-dependent.
- Wide range of uses.
- Great for emergency "hot spots" and early debris rights-of-way clearance.
- Should not exceed 70 hours of actual emergency debris clearance work.
- Contractor must be directed as to what work to perform.
- Requires full-time contract monitors.
- Requires documentation of actual hours worked by equipment and operators.
- Requires competitive bids or negotiate reasonable hourly rates for equipment and operators.
- Specify equipment as generically as possible to encourage competition.
- Need trained contract monitors to document actual equipment usage.

Table 5-1 Time-and-Material (Equipment Rental) Contract Summary

44 Code of Federal Regulations 13.36 discusses good contract administrative procedures, the importance of competition, methods of procurement and some basic contract provisions.

Contracting Procedures for Recovery Operations (Phase II)

It should become readily apparent during Phase I whether the magnitude of the debris clearance, removal and disposal operation is within the capabilities of local force account, mutual aid agreements, State and limited contract resources. If it is determined that the situation is beyond the capabilities of existing resources, immediate action must be taken to develop an organization to administer and manage Phase II recovery operations using contractors. The Department of Solid Waste Management is normally designated to administer and manage Phase II contracting actions.

The primary factors influencing Phase II recovery operations are the composition and volume of debris, the size of the area of debris concentration, the location of temporary storage and volume reduction sites, the location of public or private landfill disposal sites, the need for private property debris removal and requirement for site closure and restoration.

Unit Price and Lump Sum Contracts

Unit Price and Lump Sum contracts are recommended after the immediate response phase.

Cost plus percentage-of-cost contracts and contingency contracts are not eligible for FEMA reimbursement and should not be used.

A contract proposal should always be structured to encourage prompt performance of the work; however, the proposal should not, by its requirements, place heavy or unusual risk factors on the contractor. Such risk will be reflected in higher bids.

Unit Price Contract. The unit price contract uses construction units and prices for these units to develop line item costs and total contract cost. ***The unit price contract is used when the scope of work is difficult to define and is based on estimated quantities.*** It should be noted that the total "bottom line" of the contract could increase or decrease depending upon the accuracy of the final unit quantity. For this reason, it is as important to properly estimate units as it is to estimate unit cost. Change orders to adjust the estimated bid quantity to that quantity actually removed may be issued during or at the end of the contract.

The advantage of the unit price contract is that the scope of work can be easily increased or decreased, because unit pricing for the work accomplished is established at the time of the bidding process. The contract also provides line items for the contractor to list all charges associated with the work, thereby taking the guesswork out of the contractor's bidding procedure. The units used in the unit price contracts should be as accurately estimated as possible; otherwise, the final amount of the contract could be significantly different from the contract bid received at the bid opening. An example of a unit price contract line item is shown in Table 5-2.

Item	Quantity	Unit	Description	Unit Price	Price
1	150	CY	Remove sandbar at site 3	$1.00	$150.00

Table 5-2 Example of a Unit Price Contract Bid Item

See Appendix F for an example Scope of Work for a Unit Price Contract.

Table 5-3 summarizes the key elements of a unit price contract based on cubic yards.

Unit Price Contracts
- Cubic Yard -

Summary

- Flexible; intervention will not change contract conditions.
- Accurate account of actual quantities removed.
- Wide range of competition because of simplicity of contract.
- Low contractor risk.
- Full-time trained contract monitors required.
- Possibility of contractor fraud if loading and dumping is not closely monitored.
- Segregation of debris will complicate contract.
- Trucks must be measured and numbered.
- All truckloads must be documented using a pre-numbered load ticket.
- **Load tickets are the verification of the estimated quantity of debris in cubic yards or tons deposited at the dumping site.**

Table 5-3 Unit Price Contract Summary - Cubic Yard

Unit Price Contract Verification. Proper and efficient management of a temporary storage and reduction site or landfill disposal site is essential with unit price contracts because the site becomes the focal point for quantity verification for payment.

Well-organized and managed inspection stations should be established near the entrance of the site. When the contract unit of measurement is based on weight, provisions should be made for weighing trucks as they enter the site. If the contract unit of measurement is cubic yards, inspection stands should be built for the inspection of loaded trucks.

Payment under a unit price contract is normally made on the basis of load tickets. The following procedures should be followed when using load tickets:

- Load tickets should be treated as accounting forms.
- A work site supervisor should examine all contract trucks leaving a designated contract area and record the following information on the load ticket:

Each ticket should include the following information:

- Preprinted ticket number.
- Contract number.
- Prime Contractor's name.
- Date.
- Truck number.
- Truck capacity in cubic yards.
- Load size, either cubic yards or tons.
- Truck driver's name.
- Debris classification.
  - Burnable
  - Non-burnable
  - Mixed
  - Other
- Zone/Sector.
- Dumpsite location.
- Loading time (from work site).
- Dumping time (at disposal site).
- Loading site monitor.
- Dumping site monitor.

- To expedite filling out the form, all contract trucks should have the contractor's name or initials, the truck number and the measured capacity of the truck, as determined by a government representative, clearly visible on both sides of the vehicle.
- The work site monitors should retain one copy of the form, which is returned to the operations office and give two copies to the truck driver after completing the initial information.
- The temporary storage and reduction site or disposal site monitor should estimate the volume of debris and note arrival time and volume in cubic yards on the load ticket. The truck driver should keep one copy and the site monitor should keep the other. The site monitor's copy should be returned to the operations office to be matched against the work site inspector's copy for pay verification. The truck driver's copy is the basis of contract billings.
- All monitors should read and become familiar with the technical provisions of the contract and should conscientiously estimate each load hauled by the contractor. Improper estimates can lead to large and unnecessary government expenditures. If loads are not properly loaded or compacted, monitors should reduce the rated volume of the truck accordingly. Monitors should always be fair and consistent in dealing with contractor personnel.
- A government staff member should be designated as the temporary storage and reduction site and/or disposal site manager. The site manager should serve as the overall supervisor of the site inspection operation and should coordinate dumping efforts with the temporary site/landfill owners or operators. The site manager should also serve as the initial arbitrator for differences in opinion between the government representative and the contractor's representative regarding the estimated loads for payment.

Lump Sum Contract. The lump sum contract establishes a total contract price by a one-item bid from the contractor. It is understood in a lump sum contract that the price for the work is fixed, unless the scope of work changes; therefore, the bottom line of the contract is not in question, as it is with the unit price contract.

The main disadvantage of the lump sum contract occurs if the scope of work is not well defined. In that case, the quantity estimate and the definition of the scope of work become the responsibility of the contractor bidding the project. Experience has shown that the contractor passes this burden back to the government in the form of contingencies, which are incorporated into the bid price. ***Therefore, the lump sum contract should be used only when the scope of work is clearly defined and the areas of work can be specifically quantified.***

The lump sum contract is:

- Easy to monitor when the scope of work is well defined.
- Easy to determine when a contractor has completed all work.
- Easy to establish the cost of the work at the time of bid opening.

An example of a lump sum contract line item is shown in Table 5-4.

Item	Quantity	Unit	Description	Price
1	1	Lump Sum	Demolish and remove structure	$10,000

Table 5-4 Example of a Lump Sum Contract Bid Item

Tables 5-5 and 5-6 summarize the key elements of a lump sum contract for debris removal based on the Area Method and on the Pass Method, respectively.

Lump Sum Contracts
- Area Method -

Summary

- Minimum labor required for monitoring.
- Contractor shoulders most of the risk.
- Quantities do not need to be documented (as they are in a unit price contract).
- Must have a clear, definable scope of work that can be quantitatively measured by the contractor.
- Often difficult to quantify what debris will be brought to the right-of-way for removal.
- High probability of claims if debris estimates are difficult to estimate and require speculation.
- **Use only when the Scope of Work is clearly definable.**

Table 5-5 Lump Sum Contract Summary - Area Method

Area Method Example. Once all debris within a well-defined geographic area has been placed at the curbside a scope of work can be written that requires the contractor to conduct a one-time pass to remove all debris from the curbside and deposit it at the local landfill for a fixed fee.

Lump Sum Contracts
- Pass Method -

Summary

- Minimum labor required for monitoring.
- Defines scope better than area method and decreases the risk of claims caused by quantity speculation.
- Quantities do not need to be documented (as they are in a unit price contract).
- Must have accurate, up-to-date plans and information on all roads that will be included in the "pass" scope of work.
- Public must cooperate in the removal process.
- Contracting agency must be successful in communicating with the public in the removal area.
- Provide three to four passes, depending on the magnitude of the disaster.
- Solicit a price for each pass and a total job price.
- Clearly define any debris segregation requirements, road locations, time intervals between passes and required time frame to complete each pass.
- **Use only when the Scope of Work is clearly definable**.

Table 5-6 Lump Sum Contract Summary - Pass Method

Pass Method Example. Debris will be placed at the curbside as homeowners repair their homes over a 3-week period. The scope of work requires the contractor to conduct a minimum of three passes throughout the community during the 3-week period (one pass per week) and deposit the debris at the local landfill for a fixed fee.

Contract Monitoring Responsibilities

The designated debris manager should assign a debris staff member to work directly with other local officials in developing and monitoring debris clearance, removal and disposal contracts. The following should be considered when developing and monitoring local debris removal and disposal contracts:

- Existing landfill capacities.
- Tipping fees.
- Scalehouse operations.
- Private commercial haulers.
- Law enforcement.
- Ingress/egress to site.
- Site logistics.
- Truck weight restrictions.
- Highway and bridge weight restrictions.
- Household hazardous waste.
- Hazardous and toxic waste.
- Mixed debris.
- Construction and demolition debris.
- Ash.
- Traffic control.
- Illegal dumping.
- Environmental issues.
- Site closure/restoration requirements.

Contract Administration. This term is generally used to encompass all of the activities that should take place after a contract is awarded and work commences. Contract administration ensures that the contract is performed as agreed.

Monitoring Performance. Continuous monitoring of all activities of a contractor promotes satisfactory performance. In evaluating a contractor's performance, primary interest is in the progress toward completion of the services called for and the financial status of the contract. It is important that the contract provide for submission of reports and payment estimates to aid in evaluating the contractor's progress. In lieu of progress reports, frequent visits to the job sites can be a productive method of monitoring performance.

Contract Modification. During the administration of the contract, modifications may be necessary to provide contractual coverage for situations that develop after the contract is awarded. All modifications should be in writing to protect the interests of both parties. The contract should contain a clause that permits the Contracting Officer to make changes unilaterally within the scope of the contract, subject to an equitable adjustment of the contract price.

Inspection. Local governments should maintain an inspection and control system under their own supervision to ensure that the work being performed complies with the terms of the contract. In addition to load ticketing, the inspection and control process should consider the following factors:

- Bond requirements.
- Insurance requirements.
- Rights-of-way and indemnification.
- Mobilization of proper equipment.
- Posting of permits.
- Contractor personnel safety standards.
- General public safety standards.
- Completion schedules.
- Clearance procedures.
- Demobilization procedures.
- Site closure/restoration procedures.

Acceptance and Payment. Final inspection and the method of interim and final payments are part of the general

conditions of the contract. The following should be set forth in the original specification or other contract documents:

- Parts of or all of the work should be accepted only after verification through the inspection process that the work was performed in accordance with the standards stipulated in the contract.
- If the contract period is less than one calendar month, normal payment should be made in one total sum. In the event the authorized work tenure exceeds a period of one month, provisions can be made to make progress payments to the contractor at least monthly.

Closing Out Contracts. A contract is complete when all of the services or items called for have been delivered or performed and accepted. The contract is not administratively complete, however, until all actions taken in compliance with the contract have been properly documented and final payment has been made.

Chapter 6

SPECIAL DEMOLITION AND DEBRIS REMOVAL SITUATIONS

This chapter provides guidance on private property demolition and removal of debris from mobile home parks and marinas that may present a health and safety hazard.

Private Property Demolition and Debris Removal

Private Property Demolition. Although flood insurance policies do not provide coverage for debris removal, most homeowner, fire and extended coverage insurance policies have specific coverage for debris removal from private property and for demolition of heavily damaged structures.

Demolishing or securing remaining structures that threaten the health and safety of adjacent residents should be the responsibility of the owner or local government; however, experience has shown that unsafe structures will remain because of lack of insurance, absentee landlords, or understaffed and under-equipped local governments. Consequently, ensuring the demolition of these structures may become the responsibility of the local designated debris manager and staff, which requires complete cooperation of numerous local, tribal and State government officials and may require resources from any or all of the following:

- Tax office.
- Local law and/or code enforcement agencies.
- State Historic Preservation Office.
- Environmental contractors qualified to remove asbestos and lead-based paint.
- Field teams to photograph and document the sites before and after demolition.

Health and safety program requirements contained in 29 CFR should be adhered to with respect to hazardous waste. When removing any suspected hazardous waste workers should only work in well-ventilated areas, wear chemical protective clothing and evacuate the area if a chemical odor is noticed.

Communities in disaster-prone areas should have copies of required ordinances as part of their local emergency management plan. The ordinances should be activated when a State of Emergency is declared, eliminating any unnecessary waiting period. All of these actions should be accomplished prior to a disaster.

Demolition of private property will present significant coordination problems. The checklist shown below identifies key tasks that local officials should perform before the structure is approved for demolition. To expedite the overall effort, many of the tasks should be conducted concurrently.

Private Property Documentation Checklist.

☐ Obtain copies of all ordinances that authorize the community to condemn privately owned structures. The authority to condemn privately owned structures might be different from the authority for the demolition of publicly owned structures.

- ☐ Coordinate use of adjacent lands, easements and rights-of-way necessary for accomplishing the approved work.
- ☐ Implement laws that reduce the time it takes to go from condemnation to demolition.
- ☐ Obtain copies of all applicable permits required for demolition of subject structure(s).
- ☐ Document the age of the structure to determine if eligible or on the National Registration of Historic Places with the SHPO.
- ☐ Obtain copies of pertinent temporary well-capping standards.
- ☐ Obtain executed right-of-entry and hold harmless agreements that have been signed by the owner and by renter, if rented. Right-of-entry should indicate any known intent by owner to rebuild to ensure foundation and utilities are not damaged. If these agreements are not executed, document reason(s).

See Appendix G for a Right-of-Entry Agreement example.

- ☐ Use radio, public meetings and newspaper ads to give notice to property owners and their renters to remove personal property in advance of demolition.
- ☐ Document name of owner on the title, the complete address and legal description of the property and the source of this information. Document name of renter, if available.
- ☐ Ensure property will be vacated by demolition date.
- ☐ Provide written notice to property owners that clearly and completely describe the structures designated for demolition. Additionally, provide a list that identifies related structures, trees, shrubs, fences and other items to remain on the respective property.
- ☐ Notify mortgagor of record.
- ☐ Provide the property owner the opportunity to participate in the decision on whether the property can be repaired.
- ☐ Determine the existence and amount of insurance on the property prior to demolition.
- ☐ Specify procedures to determine when cleanup of a property is completed.

Private Property Inspection Checklist.

- ☐ Coordinate all pertinent site inspections with local, tribal, State and Federal inspection team(s). Identify asbestos and lead-based paint materials prior to demolition.
- ☐ Notify the owner and/or renter of all site inspections.
- ☐ Verify that all personal property has been removed from private structure(s).
- ☐ Immediately prior to demolition, verify that the building is unoccupied.
- ☐ Ensure that the property is properly posted.
- ☐ Obtain a clear, concise and accurate property description and demolition verification.
- ☐ Include a Public Health official on the demolition inspection team.
- ☐ Evaluate the structural integrity of the building and also demonstrate "imminent and impending peril" to public health and safety caused by the structure.

- ☐ Make arrangements to remove and transport all asbestos and lead-based paint materials to a permitted facility prior to building demolition.
- ☐ Obtain photographs of the property and verify the address. Provide additional photographs of the property taken immediately prior to and following demolition.

Private Property Utilities Checklist.

- ☐ Locate, mark, turn off and disconnect all water and sewer lines.
- ☐ Locate, mark, turn off and disconnect electrical, telephone and cable television services.
- ☐ Locate, mark, turn off and disconnect gas service.

Private Property Debris Removal Checklist. The following actions will require close coordination when removing debris from demolished buildings on private property:

- ☐ Ensure that buildings have been properly condemned according to local ordinances.
- ☐ Ensure that right-of-entry and hold harmless agreements are properly executed.
- ☐ Ensure that local officials remove any legal residents or squatters from the building before demolition and debris removal begins.
- ☐ Ensure that buildings identified for demolition are properly inspected to verify that they are unsafe, cannot be repaired and present a hazard to the community.
- ☐ Ensure that the inspection team includes a structural engineer and a hazardous materials specialist. Any household hazardous waste, such as paints, oils, cleaning supplies and pesticides that are found should be removed prior to demolition. Houses that contain asbestos or lead-based paint should be demolished and debris removed according to current environmental regulations under a separate contract.
- ☐ Local code enforcement officers should accompany the contractor to ensure that they do not tear down the wrong house. The responsibility is on the community to identify the correct structure.
- ☐ Demolition work and debris removal should be coordinated with utility companies to ensure that all services are turned off.

Mobile Home Park Debris Removal

Post-Disaster Requirements. Hurricanes and tornadoes can cause severe damage to mobile homes and create extensive amounts of mixed debris confined to relatively small areas. The following are examples that comprise mixed debris:

- Tree blow-down.
- Out buildings.
- Screened porches.
- Mobile home frames.
- Personal property, such as clothing, food and furniture.
- Appliances, such as stoves, refrigerators, washers and dryers.
- Household cleaners and paints.
- Propane and oxygen tanks.
- Gasoline, oil and lubricants.
- Automobiles, trucks and boats.
- Bicycles and lawn mowers.
- Utility hookups.

Local mobile home parks should be surveyed and arrangements should be made with park owners for local, tribal or State agencies or contractors to clear the parks of debris. The local designated debris manager and staff will need to closely coordinate the cleanup activities and enforce condemnation procedures. Legal, health and safety concerns will have an important impact on the debris removal activities.

Planning Issues. Prior to a major natural disaster, local officials should do the following:

- Develop generic scopes of work for debris removal.
- Identify sites suitable for temporary storage of mobile home debris.
- Prioritize mobile home parks for debris removal.
- Develop a set of procedures to be followed that will combine debris removal activities and utility repair/replacement at mobile home parks into a single operation.

Documentation Checklist. Local officials should provide the following documentation:

- ☐ Copies of the local ordinance authorizing condemnation of mobile home parks. Condemnation for health issues is associated with prolonged exposure of trailer contents to the natural elements.
- ☐ A copy of the local government resolution with appropriate recitals required to support adoption or enactment of ordinances to condemn, demolish and remove mobile home park contents.
- ☐ Maps showing easements and rights-of-way access to the property.
- ☐ Documentation signed by the mobile home park owner and mobile home owner that holds the local, tribal, State or Federal government free from liability for damage caused by the requested work and indemnifies the local, tribal, State or Federal government against any claims arising from such work.
- ☐ Documents allowing right-of-entry to the mobile home parks.
- ☐ Notice to individual mobile home owners to remove items of personal property in accordance with local ordinances.
- ☐ Documentation providing the names of mobile home parks and of mobile home park owners, complete addresses and legal descriptions of the properties and limits, if any, of debris clearance to occur within the parks. Additional materials should include plats of the mobile home parks and any information about existing utilities.
- ☐ Standards for capping all utilities.
- ☐ All applicable permits necessary for any demolition work in the mobile home park.

Inspection Prior to Debris Removal.
Local officials should perform the following actions:

- Ensure that the mobile home park will be vacated prior to the removal of any debris from the site.
- Describe clearly and completely the extent of debris removal required within the mobile home park. Specify any structures, other than mobile homes, that are to be removed.
- Locate and estimate amount of household hazardous waste within the park and ensure that appropriate

procedures are established for separation and removal of such materials prior to debris removal. Household hazardous waste typically found on-site includes cleaning supplies, propane tanks, paint cans, paint thinners, pesticides, refrigerators and freezers. A qualified environmental contractor should be hired to ensure proper removal and disposal of asbestos, lead-based paint and other commercial, agricultural or industrial hazardous waste.

- Conduct initial inspections of the mobile home park with representatives from the local government, public health office, building and zoning office, real estate office and other State and Federal officials.
- Ensure that the contract scope of work reflects findings of the field inspection.
- Ensure that the mobile homes are unoccupied.
- Ensure that the property is posted in accordance with local regulations and that mobile home owners have removed their personal property.
- To avoid subsequent disputes, ensure that any agreement made with the mobile home park owner is in writing.
- Obtain photographic documentation of mobile home sites prior to commencement of work.
- Have organic and perishable materials removed from the site.

Mobile Home Park Utilities. Local officials should accomplish the following actions:

- Consider whether using heavy equipment will cause further damage to existing utilities.
- Be responsible for turning off utility services, such as water, telephone, electricity, natural gas and propane gas.
- Flag septic tank locations prior to debris removal. Special care must be given to protect septic tanks during debris removal operations.

Debris Removal Contracts. Contracts should include provisions for the following:

- Provide that all private automobiles are stored in a specific location within the park to be retrieved later by the owners.
- Provide salvage rights to the contractor for materials remaining on-site at the time of debris removal where beneficial to the government.
- Require flagging of existing utilities prior to debris removal.
- Use rubber tire vehicles and backhoe with grapple attachments to protect existing utilities.
- Require the contractor to phase debris removal operations to allow utility repair and or replacement to begin immediately after an area has been cleared.

Navigation Hazard Removal

Coordination. Damage to publicly owned marinas caused by a major natural disaster can include abandoned sunken boats and other debris that may impede navigation. The designated debris manager and staff should coordinate with the U.S. Coast Guard, State Marine Patrol, local government agencies, legal counsel, contractors specializing in marine salvage operations, commercial divers and certified surveyors to ensure that navigation hazards are removed safely and efficiently.

Navigation Hazard Removal Checklist. The following checklist should be used to ensure that all aspects of removing navigation hazards are considered.

- ☐ Coordinate with U.S. Coast Guard, State Marine Patrol, local government agencies and legal counsel.
- ☐ Inspect marinas to locate debris:
  - Visually by helicopter or boat.
  - Via side-scan sonar.
  - Via diving.
- ☐ Use Global Positioning System survey methods or some type of flotation marker to pinpoint location of sunken debris.
- ☐ Keep a log that reflects an accurate count of debris items with corresponding locations.
- ☐ Record the vessel registration number and photograph the wreckage.
- ☐ Provide notification by certified letter to private owners of impending vessel removal. This should be performed in accordance with legal constraints.
- ☐ Provide the owner an opportunity to remove the vessel prior to local, tribal, State or Federal government initiation of debris removal.
- ☐ Provide public notice in local newspapers.
- ☐ Generate scopes of work based on items to be removed.
- ☐ Maintain flexibility to allow for problems caused by tidal conditions. Problems can also occur as a result of wreckage removal by others prior to issuance of contract notice to proceed. Flexibility in contract execution can be achieved by issuing an equipment rental type contract. Fixed price contracts with each piece of debris indicated as a line item are not recommended because of the possibility of change orders. Incorporate in the contract appropriate regulatory concerns and/or applicable State laws.
- ☐ Maintain continuous communication with local, tribal and State authorities.
- ☐ Continually verify the number and location of sunken vessels and ensure that accurate records are maintained.
- ☐ Require that a bill of sale or a vessel registration be presented to the local government representative on-site if an individual claims a vessel during removal operations.
- ☐ Ensure that contracts and the cleanup schedule incorporate tidal constraints. Debris located in shallow areas may be inaccessible to contractor equipment during low tide.

Chapter 7

TEMPORARY DEBRIS STORAGE SITE OPERATIONS AND VOLUME REDUCTION METHODS

The preparation and operation of a temporary debris storage and reduction site are usually left to the contractor. However, the designated debris manager and debris staff should understand how a temporary debris storage and reduction site is set up and operated. This information will be extremely valuable in developing ultimate disposal plans, keeping local government officials and the public informed on debris clearance, removal and disposal operations and ensuring compliance with various regulations. This chapter provides guidelines on temporary site operations, the handling of household hazardous waste and the volume reduction methods of incineration, chipping, grinding and recycling.

Temporary Debris Storage Site

Site Preparation. The topography and soil/substrate conditions should be evaluated to determine best site layout. When planning site preparation, think of ways to make site closure and restoration easier. For example, if the local soils are very thin, the topsoil can be scraped to bedrock and stockpiled in perimeter berms. Upon site closeout, the uncontaminated soil can be respread to preserve the integrity of the tillable soils.

Site Operations. Lined temporary storage areas should be established for ash, household hazardous waste, fuels and other materials that may contaminate soils and groundwater. Plastic liners should be placed under stationary equipment such as generators and mobile lighting plants. These actions should be included as a requirement in the contract scope of work.

See Appendix H for an example Scope of Work for a Site Management for Debris Reduction Contract.

If the site is also an equipment storage area, fueling and equipment repair should be monitored to prevent and mitigate spills of petroleum products and hydraulic fluids. Include clauses in the contract to require immediate cleanup by the contractor.

Be aware of and lessen the effects of operations that might irritate occupants of neighboring areas. Establishment of a buffer zone can abate concerns over smoke, dust, noise and traffic.

Consider on-site traffic patterns and segregate materials based on planned volume reduction methods.

Operations that modify the landscape, such as substrate compaction and over excavation of soils when loading debris for final disposal, will adversely affect landscape restoration.

Debris removal and disposal should be viewed as a multi-staged operation with continuous volume reduction. There should be no significant accumulation of debris at temporary storage sites. Instead, debris should be constantly flowing to incinerators and grinders, or recycled with the residue

and mixed construction and demolition materials going to a landfill.

Baseline Data Collection. Private land and public land used as debris storage and reduction sites should be returned to its original condition following site closeout. Baseline data are essential to document the condition of the land before it is used as a debris storage and reduction site. As soon as a site is selected, the designated debris manager and staff should work closely with local, tribal and State officials to develop baseline data. The following actions should be taken to develop baseline data on all selected sites:

Videotape and Photograph the site. Thoroughly videotape and/or photograph (ground or aerial) each site before any activities begin and periodically update video and photographic documentation to track site evolution.

Document Physical Features. Notations about existing structures, fences, culverts, irrigation systems and landscaping can help evaluate possible damage claims made later.

Sample Soil and Water. Random soil samples can be easily collected prior to volume reduction activities. More time-consuming groundwater sampling can be done soon after operations commence. Household hazardous waste, ash and fuel storage areas should be sampled prior to site setup. Advance planning with community and State environmental agencies can establish requirements, chain of custody, acceptable collection methods, certified laboratories and test parameters. If in-house assets are not available, consider establishing an off-the-shelf contract with an environmental consulting firm that can respond rapidly.

Sketch Site Operation Layout. Periodically map or sketch activity locations so that areas of concern can be pinpointed later for additional sampling.

Document Quality Assurance Issues. Document contractor operations that will have a bearing on site closeout, such as petroleum spills at fueling sites, hydraulic fluid spills at equipment breakdowns, contractor installation of water wells for stock pile cooling or dust control, discovery of household hazardous waste in debris and details on any commercial, agricultural or industrial hazardous and toxic waste storage and disposal.

Plan Environmental Remediation. Final restoration of the landscape must be acceptable to the landowner. Therefore, plan the landscape restoration as early as possible, preferably incorporating a basic plan in the lease. Come to an agreement with the landowner prior to occupancy to establish reasonable expectations of site conditions upon site closeout.

Baseline Data Checklist. The following is a suggested baseline data checklist:

Before activities begin.

- ☐ Take ground or aerial video/photographs.
- ☐ Note important features, such as structures, fences, culverts and landscaping.
- ☐ Check with the State Historic Preservation Officer to determine if any structures identified are listed on or eligible for the National Register of Historic Places.
- ☐ Take random soil samples.

- ☐ Take water samples from existing wells.
- ☐ Check the site for volatile organic compounds.

After activities begin.

- ☐ Establish groundwater monitoring wells.
- ☐ Take groundwater samples.
- ☐ Take spot soil samples at household hazardous waste, ash and fuel storage areas.

Progressive updates.

- ☐ Update videos and photographs.
- ☐ Update maps and sketches of site layout.
- ☐ Update quality assurance reports and fuel spill reports.

Household Hazardous Waste

Pre-Disaster Planning. The designated debris manager and staff should be aware of the effects that household hazardous waste can have on the overall debris clearance, removal and disposal mission. Pre-disaster planning should include having professional hazardous waste response teams assigned ahead of time to provide assistance in identifying and disposing of household hazardous waste.

Household hazardous waste generated by a natural disaster may consist of common household cleaning supplies, pesticides, motor oil, lubricants, transmission and brake fluid, gasoline, anti-freeze, paints, propane tanks, oxygen bottles and batteries. Household hazardous waste may become mixed with other debris, requiring close attention throughout the debris clearance, removal and disposal process.

The designated debris manager and staff should implement the following pre-disaster planning actions:

- Assign trained hazardous waste response teams to collect, sort, store and dispose of excessive quantities of household hazardous waste.
- Have emergency hazardous waste contracts in place or prepare generic scopes of work that can be fine-tuned with minimal effort for removal and disposal of accumulated household hazardous waste.
- Coordinate with local, tribal, State and Federal regulatory agencies concerning possible regulatory waivers and other emergency response requirements.

Removal and Disposal Operations. Household hazardous waste items should be segregated at curbside or brought to a designated drop-off site. Specially trained field technicians can identify dangerous product constituents, segregate incompatible chemicals and properly store or pack the waste for transportation to a facility specially permitted to accept hazardous waste. The following actions are required to ensure that household hazardous waste items are removed and disposed of safely:

- Where possible, separate household hazardous waste from other debris before removal. Arrange for salvageable household hazardous waste materials to be collected and segregated based on their intended use.
- Properly trained environmental contractors or emergency response personnel should remove industrial, commercial or agricultural hazardous and toxic waste.

- Maintain contact with regulatory agencies to ensure cleanup actions meet local, tribal, State and Federal regulations.
- Complete household hazardous waste identification and segregation before any demolition work begins.
- Qualified environmental contractors should remove any questionable debris that may be contaminated by household or commercial hazardous waste.
- Regular demolition contractors can remove uncontaminated debris.

Special Handling at Temporary Storage Sites. A separate storage area for household hazardous waste materials, contaminated soils and contaminated debris should be established at each site. The household hazardous waste storage site should be lined with an impermeable material and bermed to prevent contamination of the groundwater and surrounding area. Household hazardous waste materials should be removed from the temporary storage area and disposed of by a qualified environmental contractor in accordance with local, tribal, State and Federal regulations.

Commercial, Agricultural and Industrial Hazardous and Toxic Waste

Removal and disposal of large quantities of commercial, agricultural and industrial hazardous and toxic waste, such as asbestos, lead-based paint, pesticides, or fertilizers, may require the use of professional hazardous and toxic waste contractors. A contractor's inspection team should do the following:

- Establish contacts with local, tribal, State and Federal regulatory agencies.
- Interview tenants and building owners.
- Assess sites to document potential commercial or agricultural hazardous and toxic waste problems.
- Search buildings to establish potential hazards, such as asbestos, lead-based paint and underground tanks.
- Prioritize problems based on risk to human health and safety.

Volume Reduction Methods

Volume Reduction by Incineration. There are several incineration methods available for volume reduction. Each method should be considered in developing a volume reduction strategy.

Uncontrolled Open-Air Incineration. The least desirable method of volume reduction is uncontrolled open-air incineration because it lacks any type of environmental control. However, in the haste to make progress, local officials and/or independent landowners may employ this method early in a disaster. Uncontrolled open-air incineration should be closely monitored to ensure that only clean, woody debris is incinerated.

Controlled Open-Air Incineration. Controlled open-air incineration is a cost-effective method for reducing clean, woody debris in rural areas. Incineration of clean woody debris presents little environmental damage and the local agricultural community can use the resulting ash as a soil additive. Local agricultural extension personnel should be consulted to determine if the resulting ash can be recycled as a soil additive. The controlled open-air incineration option should be terminated if mixed debris enters the waste stream.

Air Curtain Pit Incineration. Air curtain pit incineration offers an effective means to expedite the volume reduction process while substantially reducing the environmental concerns caused by open-air incineration. The air curtain incineration method uses a pit constructed by digging below grade or building above grade (if a high water table exists) and a blower unit. The blower unit and pit comprise an engineered system that must be precisely configured to function properly.

The blower units deliver air at predetermined velocities and capacities. The blower unit must have adequate air velocity to provide a "curtain effect" to hold smoke in and to feed air to the fire below. A nozzle 20 feet long will provide air at a velocity of over 120 miles per hour and will deliver over 20,000 cubic feet of air per minute to the fire. The air traps smoke and small particles and recirculates them to enhance combustion, which reaches over 2,500 degrees Fahrenheit. Manufacturers claim that combustion rates of approximately 25 tons per hour are achievable while still meeting emission standards.

Specifications and statements of work should be developed to expedite the proper use of the system. Before awarding a contract, the designated debris manager and staff need to ensure that the contractors are knowledgeable about air curtain pit incinerator design and operating procedures.

See Appendix H, Figures 1, 2 and 3 for air curtain site setup and pit specifications.

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Following are recommendations and warnings to assist the designated debris manager and debris staff in planning for air curtain pit incineration operations:

- Be aware that there are no industrial standards for air curtain pit incinerator operations. The set-up has to be customized using the information provided by the manufacturer and should consider such specifications as minimum blower air velocity, pit construction configuration, pit materials, ash handling, acceptable smoke levels and air monitoring requirements.
- Pits must be constructed out of a highly compacted material that will hold its shape.
- The water table elevation governs whether the pit is constructed above or below grade.
- Controls should be implemented to prevent contamination of the ground water. An acceptable solution is to use compacted limestone fill placed over an impervious clay layer.
- Planners should take the initiative in keeping the public informed. Local officials, environmental groups and local residents should be thoroughly briefed on the incineration means being used, how the systems work, environmental standards, health issues and the risk associated with each type of incineration. A proactive public information strategy should be included in any operation that uses incineration as a primary means of volume reduction.

Portable Air Curtain Incinerators.
Portable incinerators use the same methods as air curtain pit incinerator systems. The only difference is that portable incinerators use a pre-manufactured pit in lieu of an on-site constructed earth/limestone pit. Portable air curtain incinerators are the most efficient incineration systems available

because the pre-manufactured pit is engineered to precise dimensions to complement the blower system. The pre-manufactured pit requires little or no maintenance as compared to earth or limestone constructed pits, which are susceptible to erosion. Portable air curtain units are ideal for areas with high water tables and sandy soils and areas where smoke opacity must be kept to a minimum.

Environmental Controls. The following are recommended environmental controls for all incineration methods:

- A setback of at least 100 feet should be maintained between the debris piles and the incineration area. Keep at least 1,000 feet between the incineration area and the nearest building. Contractors should use fencing and warning signs to keep the public away from the incineration area.
- The fire should be extinguished approximately two hours before anticipated removal of the ash mound. The ash mound should be removed when it reaches 2 feet below the lip of the incineration pit.
- The incineration pit should be either constructed above ground or below ground so that it is less than 8 feet wide and between 9 and 14 feet deep.
- The incineration pits should be constructed with limestone and reinforced with earth anchors or wire mesh to support the weight of the loaders. There should be a 1 foot impervious layer of clay or limestone on the bottom of the pit to seal the ash from the aquifer.
- The ends of the pits should be sealed with dirt or ash to a height of 4 feet.
- A 12 inch dirt seal should be placed on the lip of the incineration pit area to seal the blower nozzle. The nozzle should be 3 to 6 inches from the end of the pit.
- There should be 1 foot high nonflammable warning stops along the edge of the pit's length to prevent the loader from damaging the lip of the incineration pit.
- To prevent explosions, hazardous or contaminated flammable material should not be placed in the pit.
- The airflow should hit the wall of the pit approximately 2 feet below the top edge of the pit opposite the blower and the debris should not break the path of the airflow except during dumping.
- The pit should be no longer than the length of the blower system and should be loaded uniformly along its length.
- Check with appropriate State agencies for State specific requirements.

Smoke. Smoke generated by any of the above incineration methods is often interpreted by the general public as having an environmental impact. Therefore, it is important to also address smoke as part of the air monitoring guidelines. The visual measure of smoke emitted by a burning source is referred to as its "opacity." For disaster situations, the recommended opacity requirements should be set at 15% for 50 minutes out of an hour, not to exceed 40% for the remaining 10 minutes. This allows for additional debris that may be put into the incinerator during that hour. A 30-minute start-up time with a maximum of 40% opacity should be allowed.

Volume Reduction by Grinding and Chipping. Hurricanes, tornadoes and ice storms may present the opportunity to employ large-scale grinding and chipping operations as part of the overall debris volume reduction strategy. Hurricanes can

blow away scarce topsoil in the agricultural areas and cause extensive tree damage and blow-down. This two-fold loss, combined with local climatic conditions, may present an opportunity to reduce clean, woody debris into suitable mulch that can be used to replenish the topsoil and retain soil moisture.

The economic feasibility of grinding and chipping woody debris must be studied carefully. The cost of chipping and grinding is basically equal to that of incineration; however, there are significant differences in volume reduction. Incineration, for example, reduces the volume approximately 95%, leaving only an ash residue for disposal. Chipping and grinding reduces the volume on a 4-to-1 ratio (4 cubic yards is reduced to 1 cubic yard) or by 75%. For chipping and grinding to be feasible, the 25% of volume remaining must have some benefit or use. The ability to use the recycled wood chips as mulch for agricultural purposes or as fuel for industrial heating or in a cogeneration plant helps to tip the economic scale toward chipping and grinding. Because of shallow topsoil conditions in some locations, mulch is a desirable product. In other locations, however, the mulch may become nothing more than a landfill product. The designated debris manager and staff should work closely with local environmental and agricultural groups to determine if there is a market for mulch.

There are numerous makes and models of grinders and chippers on the market. When contracting, the most important item to specify is the size of the mulch. If the grinding operation is strictly for volume reduction, size is not important; however, mulch to be used for agricultural purposes must be of a certain size and virtually free of paper, plastic and dirt.

Grinders are ideal for use at debris storage and reduction sites because of their high volume reduction capacity. However, there is a need for a large area to hold the resulting mulch. Ingress and egress to the site is also an important consideration. Finally, properly locating the grinders is critical for noise and safety considerations.

The following specifications should provide a mulch product that is suitable for agricultural purposes:

- The average size of wood chips produced should not exceed 4 inches in length and ½ inch in diameter.
- Production output should average 100 to 150 cubic yards per hour when debris is moderately contaminated with plastic and dirt and feeding operations are slow and 200 to 250 cubic yards per hour for relatively clean debris. Note that this is not machine capability; this is contractor output or performance capability.
- Chips or mulch should be stored in piles no higher than 15 feet and located so as not to hinder hauling operations.
- Contaminants are all materials other than wood products and should be held to 10% or less for the mulch to be acceptable.
- Plastics should be eliminated completely. To help eliminate contaminants, root rake loaders should be used to feed or crowd materials to the chipper or grinder. Bucket-loaders tend to scoop up earth, causing excessive wear to the grinder or chipper. Hand laborers should remove contaminants prior to feeding the grinders. Shaker screens should be used when processing stumps with root balls or when large amounts of soil are present

in the woody debris. The separated soil can also be recycled back to the agricultural community.

Brush chippers are ideal for use in residential areas, orchards, or groves. The damaged and uprooted trees present significant problems if they are pushed to the right-of-way to wait for eventual pick-up and transport to storage and reduction sites. In addition, the use of on-site chippers allows the material to be used as mulch in the area where it is chipped, thereby saving the cost of transporting it.

Volume Reduction by Recycling. Recycling should be considered early in the debris clearance, removal and disposal operation because it may present an opportunity to reduce the overall cost of the operation. Metals, wood and soils are prime candidates for recycling.

Hurricanes and earthquakes may present opportunities to contract large-scale recycling operations and achieve an economic return from some of the prime contractors who exercise their initiative to segregate and recycle debris as it arrives at the storage and reduction sites.

Specialized contractors should be available to bid on disposal of debris by recycling, if it is well sorted. Contracts and monitoring procedures should be developed to ensure that the recycling contractors comply with local, tribal, State and Federal environmental regulations.

Residue that cannot be recycled, such as cloth, plastic, mattresses, rugs and trash, should be shredded to reduce volume before being sent to a landfill for final disposal.

The following materials are suitable for recycling:

Metals. Hurricanes and tornadoes can cause extensive damage to mobile homes, sun porches and green houses. Most of the non-ferrous and ferrous metals are suitable for recycling. Metal maulers and shredders can be used to shred trailer frames, trailer parts, appliances and other metal items. Ferrous and non-ferrous metals are separated using an electromagnet and then sold to metal recycling firms.

Soil. Cleanup operations using large pieces of equipment pick up large amounts of soil. The soil is transported to the temporary storage and reduction sites, where it is combined with other organic materials that will decompose over time. Large amounts of soil can be recovered if the material is put through some type of screen or shaker system. This procedure can produce significant amounts of soil that can either be sold or recycled back into the agricultural community. It is more expensive to transport and pay tipping fees at local landfills than to sort out the heavy dirt before moving the material. Shakers can be used to remove dirt from mixed debris. The dirt can be stored on-site, used as landfill cover material or sold to the agricultural community.

In agricultural areas where chemical fertilizers are used heavily, recovered soil may be too contaminated for use on residential or existing agricultural land. Monitoring and testing the soil may be necessary to ensure that it is not contaminated with chemicals. If the soil is not suitable for any agricultural use and is a risk to the public health, it may be used as cover material at a landfill.

Construction Materials. Construction and demolition waste is material generated in the demolition of disaster damaged structures and facilities. This waste stream includes concrete, asphalt, gypsum, wood waste, glass, red clay bricks, clay roofing tile and asphalt roofing tile. Much of this material can be recycled, if recycling contractors are readily available.

Wood. Clean, woody debris can be ground, chipped, shredded, or removed by timber operations or pulpwood cutters.

Chapter 8

TEMPORARY DEBRIS STORAGE AND REDUCTION SITE ENVIRONMENTAL CONSIDERATIONS

Debris clearance, removal and disposal activities can have significant environmental ramifications. The temporary storage and reduction sites must be set up, operated and closed out properly to minimize environmental harm. This chapter provides guidelines for air quality monitoring and site closeout procedures, including ash, soil and groundwater testing.

Air Quality Monitoring

Following a major natural disaster, emphasis is on rapid debris removal from the public rights-of-way. This results in debris coming into a temporary storage site faster than it can be reduced and ultimately disposed of. As a result, organic matter in debris piles begins to decompose and may create toxic or volatile vapors. Incineration operations may also produce pollutants that impact the air quality of the area. Air quality must be monitored to ensure compliance with local, tribal, State and Federal environmental regulations.

Air quality monitoring should be instituted at all debris storage and reduction sites to check for volatile organic vapors of a petrochemical origin and airborne pollutants caused by incineration operations.

Actions should be taken by the temporary debris storage and reduction site operators to keep pollutants at or below acceptable local, tribal, State and Federal environmental standards. Testing procedures should include readings for ozone, carbon monoxide, nitrogen dioxide, sulfur dioxide, lead and particulate matter smaller than 2.5 microns.

Flame- and photo-ionization detectors should be used to detect volatile organic vapors. The flame-ionization detector is used to establish parts-per-million at the debris pile. If readings are above acceptable standards, the photo-ionization detector should be used to verify the initial readings.

Incineration site readings should be taken at the edge of the incineration pit and approximately 150 feet away. Scattered locations should be established and checked periodically. Wind direction, temperature and any other pertinent meteorological information should be recorded.

Coordinate with the appropriate local, tribal, State and Federal environmental agency responsible for implementing the Quality Assurance Sampling Plan.

The following situations may negatively affect the air quality at a temporary storage and reduction site:

- The incineration pit is not properly constructed.
- The incineration pit has degraded to the point where key specifications are no longer met.
- A poorly trained operator improperly feeds the pits.
- The material is not properly segregated.

- Prolonged rains may accelerate the decomposition process, thereby causing the emission of volatile organic gases.

Site Closeout Procedures

Each temporary debris storage and reduction site will eventually be emptied of all material and restored to its previous condition and use. The contractor must assure the designated debris manager and staff that all sites are properly restored. Local, tribal, State and Federal government monitors should verify this. Site restoration will go smoothly if baseline data were properly collected and site operation procedures were followed.

Closeout Steps. The key to timely closeout of the sites is the efficient advance scheduling of activities for multiple sites. The basic closeout steps are:

- Remove all debris from the site.
- Conduct an environmental audit or assessment.
- Develop a restoration plan.
- Submit the plan for review and approval by the appropriate environmental agency.
- Execute the plan.
- Get acceptance from the landowner.
- Terminate lease payments.

Potential Problems.

- The length and terms of private property leases can create suspense dates that become very costly to meet and difficult to manage.
- Differences between local, tribal, State and Federal government environmental regulations may cause problems.
- Failure to collect baseline data can result in fraudulent claims for damage to nonexistent structures or the land itself. Videotape recordings and/or photographs should be taken prior to opening a site to prevent fraudulent claims. Background soil and water samples should also be taken before site activities begin to compare with closeout soil and water samples.

Planning Requirements. The following planning requirements should be implemented to closeout a temporary storage and reduction site:

- Coordinate with local, tribal and State officials responsible for construction, real estate, contracting, project management and legal counseling regarding requirements and support for implementation of a site restoration plan.
- Establish a testing and monitoring program for air, ash, soil and groundwater.
- Ensure that the contractors are required to remove all residual debris from temporary sites to approved landfills prior to closure.
- Reference appropriate and applicable environmental regulations.
- Prioritize site closures.
- Schedule closeout activities.
- Develop cost estimates.
- Develop decision criteria for certifying satisfactory closure based on limited baseline information.
- Develop administrative procedures and contractual arrangements for site closeout.
- Designate approving authority to review and evaluate contractor closure activities and progress.

- Retain staff during the closure phase to develop site-specific restoration actions.

Temporary Site Closure Checklist. The following is a recommended temporary site closure checklist. Narrative responses may be required along with other closure documents.

- ☐ Site number and location.
- ☐ Date closure complete.
- ☐ Household hazardous waste removed.
- ☐ Contractor equipment and temporary structures removed.
- ☐ Contractor petroleum spills cleaned.
- ☐ Ash piles removed.
- ☐ Comparison of baseline information to conditions after the contractor has vacated the temporary site.
- ☐ Appendices.
  - Closure documents.
  - Contracting status reports.
  - Contract.
  - Testing results.
  - Correspondence.
  - Narrative responses.

Ash, Soil and Groundwater Testing

Ash, soil and groundwater need to be tested to determine that no long-term environmental contamination is left on the site. High levels of site activity may require additional testing and contaminated material may need to be disposed of in an approved landfill.

Ash Testing. All ash piles should be tested using the Toxicity Characteristic Leaching Procedure. One composite sample from each separate ash pile should be analyzed. A minimum of ten samples taken from different strata within the pile is appropriate to develop the composite sample. If unacceptable contamination is not found, ash may be placed in a Class I landfill. If unacceptable levels of contamination are detected, the material should be further evaluated, if appropriate and placed in a hazardous material landfill, as appropriate.

Soil Testing. After the stockpiles are removed from the site, soils should be tested for the presence of volatile hydrocarbon contamination. Samples should be taken immediately below the surface, if it is determined that the contractor spilled hazardous materials, such as oil or diesel fuel, on the site.

The entire incineration site should be inspected for any areas of discoloration, odor, or obvious problems. Such areas should be identified and restored, as necessary.

Groundwater Testing. Runoff from the incineration sites and other debris stockpiled within storage areas have the potential to contaminate the aquifer. Although the probability of contamination is low, consideration should be given to placing ground water monitoring wells around the perimeter of the site, if it is adjacent to an important aquifer. Groundwater should be tested to determine the probable effects of rainfall leaching through either the ash areas or the stockpile areas and be compared to generally accepted water quality standards.