I. COVERSHEET FOR ENVIRONMENTAL MITIGATION PLAN & REPORT (EMPR: DEBRIS REMOVAL)

USAID MISSION SO # and Title: _____

Title of IP Activity: _____

IP Name: __ _____

Funding Period: FY_____ - FY_____

Resource Levels (US$): _____

Report Prepared by: Name:_____ Date: _____

Date of Previous EMPR: _____ (if any)

Status of Fulfilling Mitigation Measures and Monitoring:

_____ Initial EMPR describing mitigation plan is attached (Yes or No).

_____ Annual EMPR describing status of mitigation measures is established and attached (Yes or No).

_____ Certain mitigation conditions could not be satisfied and remedial action has been provided within the EMPR (Yes or No).

USAID Mission Clearance of EMPR:

Contracting Officer's Technical Representative:_____ Date: _____

Mission Environmental Officer: _____ Date: _____
( )

Regional Environmental Advisor: _____ Date: _____
( )

List of CHF Haiti projects covered in this UEMPR (Debris Removal)

1. Background, Rationale and Outputs/Results Expected:

In response to the January 12, 2010 earthquake in Haiti, CHF International's CLEARS program focuses on creating an environment for economic, social, and political recovery through the removal of debris. Rubble removal will set the stage and clear the space needed for communities to begin rebuilding. The CLEARS program will adopt a flexible approach informed by the results of ongoing needs assessments. With a presence in Port-au-Prince, Petit Goave, Gonaives, St. Marc and Cap Haitien, CHF is well positioned to quickly respond to changes on the ground.

According to the February 8th CLEARS Proposal, CHF will use the methodologies, fine-tuned administrative and financial systems, networks and partnerships that have proved successful over three years of implementing the $104 million, USAID-funded KATA job creation and infrastructure development program. In particular, CHF's community-based approach to project identification and prioritization has created strong relationships at community and municipal government levels of Haitian society. These relationships are essential for ensuring that the CLEARS program interventions are designed and implemented to maximize impact. The ongoing implementation of the KATA Program, with its focus on long-term development, also uniquely positions CHF to smoothly transition recovery activities into long-term development initiatives. Beneficiaries of the CLEARS program will also benefit from the KATA program's medium to long-term livelihoods work, especially workforce development and micro- and small enterprise development.

Following an earthquake of this magnitude, removing rubble is an essential first step toward recovery. Understanding the complexity of this process, CHF proposes that heavy machinery and cash-for-work be used for clearing critical infrastructure, identified as roads, drainage channels, locations for shelter and public buildings. CHF's rubble removal priorities follow those set at the USAID partners coordination meeting held on January 31, 2010 at the US Embassy which is as follows (in order of highest priority):

a. Roads
b. Drainage Canal
c. Public Buildings (archives, schools, hospitals, etc)

In addition, under the CLEARS program, CHF will use manual labor crews to remove rubble from private residential property to facilitate the construction of transitional shelters on private land. Clearing of these sites will emphasize recycling of materials for rebuilding on the same site. Prioritization of rubble clearance sites within the categories above will be in coordination with other agencies through the cluster system and based on selection criteria determined with mayors and affected communities.

Through a successful partnership with Caterpillar, and HayTrac, the Caterpillar dealer in Haiti, CHF will remove earthquake debris utilizing needed heavy equipment. This machinery will enable CHF to work on ten sites simultaneously, clearing on average 2,035 cubic meters of rubble per day. CHF will employ teams of manual labor working in tandem with heavy equipment that will work differently based on the characteristics of the site. For example, in an open space, large heavy equipment will do the majority of the debris removal, with CFW teams responsible for gathering and crushing smaller pieces of debris not picked up by a loader or excavator. In smaller spaces such as drainage canals and narrow streets, manual labor will do the

majority of the clearing and concentrating of the rubble with hand tools such as shovels, hammers and wheelbarrows, which will be picked up by a smaller loader to be loaded onto a dump truck for disposal. Finally, in order to ensure safety at work sites, CHF will hire first aid personnel to provide safety training to project foremen, CHF engineers and CFW crews.

CHF is currently dumping removed rubble at a temporary site close to the airport which was identified in coordination with local mayors. The Government of Haiti is in the process of identifying permanent disposal sites in coordination with USAID and the US Army Corps of Engineers. Based on information from USAID, it seems that rubble will be transported from temporary sites to a permanent site by the US Army Corps of Engineers once a site has been identified. For the temporary sites, Sun Mountain International has been ensuring there is minimal negative environmental impact from rubble removal activities until debris can be moved to permanent disposal locations. Sun Mountain will carry out environmental assessments and complete environmental monitoring reports for the CLEARS Program as it has done successfully as a partner on CHF's USAID-funded KATA Program.

Estimate of Rubble Removed:

Due to the volume of debris and rubble that remains in earthquake-affected areas, CHF estimates that 1% of Port-au-Prince will be cleared of rubble as a result of the CLEARS program. The basis of CHF's estimate is as follows:

The US Army Corps of Engineers conservatively estimates that there are 20 million cubic yards of debris to be removed after the earthquake (Idaho Statesman World News Report).

20 million cubic yards = approximately 15,291,000 m^3 of rubble in the city to be cleared
CHF will clear 2035 m^3 of rubble daily * 25 days per month * 3 months = 152,625 m^3 of rubble
(152,625 m^3 / 15,291,000 m^3)*100 = 1%

Through the debris removal projects, CHF hopes to achieve the following goals:

1) Remove debris over roads that are critical for economic progress.
2) Remove debris in drainage canals.
3) Remove debris in affected buildings, including schools, archives, and hospitals.
4) Employ teams of manual labor working in tandem with heavy equipment.
5) Through a successful partnership with Caterpillar and Haytrac, utilize heavy equipment to remove debris and dump at a site identified in conjunction with local mayors.

2. Activity Description:

This EMPR covers all activities directly related to debris removal and disposal. Any other project that involves debris or rubble removal or disposal can also consult this EMPR for general mitigation measures that should be incorporated into project activities.

Certain activities are common throughout all different types of debris removal projects. The following are common activities throughout many of these projects:

1. Design a methodology for debris removal depending on debris type
2. Manual removal of debris
3. Mechanical removal of debris
4. Transport of waste and debris
5. Site Selection and design for debris storage and/or waste disposal location
6. Crush debris of smaller size using hand tools. Crush larger size debris using machinery
7. Decommissioning of site

However, depending on the sub-type of the debris removal project, there may be different project activities.

Activities specific to removal of hazardous waste projects most often include:

a) Separation of non-hazardous and hazardous wastes

Activities specific to the disposal of hazardous waste most often include:

a) Medical waste incineration
b) Use proper medical waste land disposal techniques
c) Site selection, design and management of hazardous waste landfills

3. Environmental Baseline:

On January 12, 2010, a 7.0-magnitude earthquake struck Haiti 10 miles southwest of Port-au-Prince, home to approximately 3 million people. The earthquake pushed an already vulnerable population from a generally precarious economic status into a large-scale humanitarian crisis.

Throughout the affected areas, public and private infrastructure such as homes and roads have been damaged or destroyed, cutting supply chains, severely affecting economic systems and market networks, and leaving over 900,000 to 1.1 million households without adequate shelter. Hard-won stability and economic recovery over the last few years now hangs in the balance, and the potential is high for Haiti to fall back into instability and conflict. The earthquake resulted in an estimated 210,000 deaths, and the damage or destruction of 285,000 housing units. In addition, up to 598,000 persons left the city of Port au Prince soon after the earthquake due to scarcities of shelter, food and other basic needs.

Although infrastructure assessments are ongoing, according to UNOCHA, approximately half of all the structures in Port-au-Prince have collapsed. Closer to the epicenter, a joint UNDAC/EU/WFP assessment found 80-90 percent of the buildings destroyed in Leogane, the most severely damaged area west of the capital; and 40-50 percent in Carrefour and Gressier. Further west of Leogane, the city of Petit Goave also suffered significant damage, with 20 percent of the buildings destroyed. Southwest of the capital on the southern coast of Haiti, the

city of Jacmel also sustained severe damage, with 40 percent of houses destroyed and 30,000 people left without homes, according to AlertNet. Relative security of tenure prior to the earthquake, even in informal settlements - evictions are rare –has had the effect of encouraging gradual investment in more expensive heavyweight structures. At the same time, the lack of building codes, planning standards and a framework for enforcement as well as poor design, construction and materials mean that these heavyweight structures collapsed on a catastrophic scale.

The average annual rainfall is 140 to 200 centimeters, but it is unevenly distributed. Heavier rainfall occurs in the southern peninsula and in the northern plains and mountains. Rainfall decreases from east to west across the northern peninsula. The eastern central region receives a moderate amount of precipitation, while the western coast from the northern peninsula to Port-au-Prince, the capital, is relatively dry. Some regions have two rainy seasons, lasting from April to June and from August to October, whereas other regions experience rainfall from May to November. Annual variations of precipitation can cause droughts, widespread crop failures, and famine.

Temperatures are almost always high in the lowland areas, ranging from 15° C to 25° C in the winter and from 25° C to 35° C during the summer. Haiti is located on the leeward side of Hispaniola, which means that the influence of humid trade winds is not as great as in The Dominican Republic. The more humid districts are found on the northern and eastern slopes of the mountains.

Only 54% of the population in Haiti has broad definition access to potable water, while only 30% have access to sanitation coverage, according to a WHO/UNICEF report in 2006.

According to CIA world fact book, about 66% of all Haitians work in the agricultural sector, which consists mainly of subsistence farming on a small scale. Mangoes and coffee are the country's most important exports; however, agriculture only makes up 30% of the country's GDP.

In order to alleviate the pressures put upon the Haitian population due to the level of environmental degradation in the country, as well as promote long-term sustainable development as to allow for reforestation and environmental recuperation, development agencies must, "be part of an integrated approach, directly linking natural resource management with other pertinent sectors such as early warning, urban planning, reproductive health, and job creation programs" (Smucker, v).

4. Evaluation of Environmental Impact Potential of Activities (Table 2):

Excess in Landfill:
Dumping of unsorted debris, garbage and construction materials in a landfill will greatly reduce the life of landfill.

Contaminated Water:

Inadequate water/sanitation services for workers can contaminate water with coli form bacteria and or lead to disease-vector breeding, odors, and other health / environmental hazards.

Risk of Injury or Disease Spread:
Poor site selection for hazardous waste storage and/or hazardous waste disposal can increase the risk of human injury or disease spread and/or disrupt normal activities in the area.

Exposed Medical Waste:
Exposure medical waste can lead to health and environmental risks.

1. **Environmental Mitigation Actions (Tables 2 & 3) (this section is part of the annual EMR, but not the initial):**

CHF will implement the following strategies to mitigate the potential impacts described above:

- Promote a debris removal methodology that reduces the potential risks of water contamination;
- Provide workers with potable water and promote adequate disposal and/or reuse of plastic containers;
- Construct temporary pit latrines at least 30m away from any water source and with adequate depth of pit;
- Ensure hazard material storage or disposal site is placed close enough to Port Au Prince to allow for efficient and cost-effective transport, but far enough away from any heavily settled area so as to minimize any public disruption or threat that the site could cause to community members;
- Do not site hazardous material storage or disposal sites in wetlands or areas with a high water table, in floodplains, near drinking water supplies, or within two Kilometers of an airport. Instead, seek out sites above clay or igneous rock;
- As land disposal is the least expensive, and currently, the most feasible disposal option given the limitations to infrastructure, medical waste should be packaged and buried under at least 2m of mature landfill waste.

Tables 2 and 3 provide additional detail on the mitigation measures and monitoring strategy to be implemented by CHF Haiti.

III-A. Environmental Screening Form (Table 1):
*A screening form will be filled out for each individual project that falls under this UEMPR

III-B. Identification of Mitigation Plan (Table 2)

ACTIVITY/IMPACT/MITIGATION TABLE (USAID/KATA): DEBRIS REMOVAL/STORAGE/DISPOSAL/RECYCLING			
Project Type	**Activity**	**Description of Impact**	**Prescribed mitigation measures**
A. Debris Removal **See Sub-project type table for specific activities/impacts/ mitigations for removal of hazardous wastes and debris*	i. Design a methodology for debris removal depending on debris type	1. Without a clear methodology for debris removal, work will be inefficient and there may be a higher risk of injury for workers	a. Develop a debris removal methodology that defines the roles of every worker, the routes for removing and transporting debris, and areas for truck loading, in order to decrease the potential risk of injury
		2. Dumping of unsorted debris, garbage and construction materials in a landfill will greatly reduce the life of landfill.	a. To the degree possible, the separation and pre-sorting of metal and other recyclable materials should be done at the site of the destroyed/damaged building. This will reduce the quantity of debris to be moved to a secondary processing site.

			b. When sorting is impossible (i.e. machine removal of debris) USAID has established the following rules concerning debris dumpsite/staging allowances for non-construction and demolition materials. 0% of contents are to include human remains, hazardous materials and medical waste, and otherwise compostable organic materials. Up to 10% of other solids (glass, plastics, etc.) are permitted
			c. Sorted debris must be dumped in a specific debris landfill site, enabling greater reuse of construction materials.
		3. An unclear debris removal methodology may lead to water contamination in the event that the work site is near a water source	a. Promote a debris removal methodology that reduces the potential risks of water contamination. Ensure workers are not depositing various forms of waste in any nearby drainage canals
		4. Inadequate water/sanitation services for workers can contaminate water with coli form bacteria and or lead to disease-vector breeding, odors, and other health / environmental hazards	a. Provide workers with potable water and promote adequate disposal and/or reuse of plastic containers
			b. Construct temporary pit latrines at least 30m away from any water source and with adequate depth of pit

		5. Without consulting the former residents or owners of demolished building, debris removal can cause tensions and potential conflicts between residents/owners and debris removal workers	a. The public, and specifically persons who occupied damaged/destroyed buildings, should be advised and consulted in the debris removal process. Building/shop owners should be provided sufficient opportunity and assistance in recovering assets (e.g. furnishings, doors, commercial stock) before a building is removed.
			b. During the debris removal process, the owner of the building should be present to address where there may be hazardous materials, medical wastes, or human remains.
			c. Given that the deconstruction and removal process will most likely uncover possessions of some value, there will be a need for good security of work sites. This will require a police presence and barriers and controls to limit who can access work areas. These controls will also help increase the safety of operations and limit the risk of liability issues from injuries
	ii. Manual removal of debris	6. Inadequate protective gear and/or tools poses potential risk of injury to workers	a. Provide workers with adequate protective work gear and tools for the removal of debris. Goggles and masks must be provided to counter airborne hazards and disease, gloves and boots must be provided to counter injury and ground exposure.

			b. Train workers in adequate use of gear
		7. Potential health risks for workers during the manual removal of debris from buildings that have a high probability of containing human remains.	a. Special teams and procedures will be needed to handle buildings which contain human remains. For these cases, a qualified engineer will decide on how to best deconstruct a building, to ensure the remains are recovered at the least risk to those involved in the recovery process.
			b. When a body is found, work must stop immediately. The supervisor must call representatives from the mayor's office to retrieve the body before any work can resume
	iii. Mechanical removal of debris	8. Unsupervised machine excavation can lead to disruption of unseen hazards.	a. A spotter should be trained to supervise all heavy machine excavation to look out for down and overhead utility wires, human remains or other hazardous materials. Hand signaling should be the primary means of communication between spotter and machine operator.
		9. Inadequate maintenance of machinery may reduce their productivity, leading to higher oil consumption and emissions. Poor selection of storage site can also contribute to unnecessary emissions.	a. Ensure that an adequately trained machinery maintenance team exists on site and ensure they know proper cleaning, leak and damage checks, repairs, and used-oil disposal procedures
			b. Minimize distance between machine storage sites and removal sites.
		10. Theft of machinery and tools	a. Ensure storage of machinery and tools in a specific area with security guards

	iv. Transport of waste and debris	11. Unsafe transport can lead to vehicle damage and public health risks.	a. Fill waste and debris to level just below height of bed walls and cover with a heavy duty tarp to prevent falling debris and waste.
			b. Do not unload debris while people are in bed of truck.
			c. Select shortest possible transportation routes between removal sites, temporary and permanent dump sites.
	iv. Decommissioning of site	12.Failure to fill in holes and level site can lead to water stagnation, disease-vector breeding and make any future construction activities on the site more difficult	a. Use machinery to level out site, filling in any holes and removing any unnecessary trash, equipment and tools
B. Debris storage and waste disposal **See Sub-project type table for specific activities/impacts/ mitigations for disposal of hazardous wastes*	i. Site Selection and design for debris storage and/or waste disposal location	13. Inadequate burial of latrine pits may cause contamination of water sources (coli form bacteria) and other direct effects on human/animal health	a. Fill and deconstruct any temporary work site latrine pits
		14. Poor site selection for debris storage and/or waste disposal can increase the risk of human injury or disease spread and/or disrupt normal activities in the area	a. Ensure storage or disposal site is placed close enough to Port Au Prince to allow for efficient and cost-effective transport, but far enough away from any heavily settled area to minimize any public disruption or threat that the site could cause to community members

			b. Do not site storage or disposal site in wetlands or areas with a high water table, in floodplains, near drinking water supplies, or within two kilometers of an airport. Instead, seek out sites above clay or igneous rock. Minimize the conversion of land use.
			c. Build fencing around storage or disposal site to keep unauthorized community members away, reduce potential health/injury risks and illegal dumping
C. Crushing, milling and reusing secondary stone and concrete materials	i. Crush debris of smaller size using hand tools. Crush larger size debris using machinery	15. Construction work potentially poses a human health and safety hazard to workers and local residents	a. Designate a material storage zone that does not cause an obstruction to functioning roads, canals or access to homes or tent camps
			b. Provide potable water, adequate tools and protective gear, appropriate sanitary and solid waste disposal facilities for workers

ACTIVITY/IMPACT/MITIGATION TABLE (USAID/KATA): DEBRIS REMOVAL/STORAGE/DISPOSAL/RECYCLING			
Project Type	**Activity**	**Description of Impact**	**Prescribed mitigation measures**
I. Removal of hazardous waste and debris	a. Separation of non-hazardous and hazardous wastes	16. Hazardous materials mixed in with non hazardous materials are more difficult to control, and can cause health and environmental risks once they are disposed	a. Separate hazardous and non-hazardous materials on site and be sure to transport hazardous waste separately to a hazardous waste specific dump site. Hazardous materials may include industrial chemicals, acids, lead paints, and LPG containers.

			b. Cars contain several hazardous materials. After legal consent, destroyed cars should have fluids and fuel drained into marked puncture proof containers, batteries salvaged for reuse, if possible, or sent to hazardous waste dump site.
		17. Without adequate training on and monitoring of the separation of wastes, workers are at risk of injury and diseases	a. Ensure that for sites where hazardous waste is expected, an expert trains the workers on proper use of tools, protective gear and separation practices and conducts periodic site visits to monitor waste removal
			b. Wastes should be identified and their level of hazardousness assessed (corrosive properties, combustibility when mixed, health impacts, etc.). Proper precautions during handling, containment and transport should be observed based on hazardousness of waste.
			c. In the case of medical waste ensure sharps are collected in puncture proof containers, and that hazardous chemicals and pharmaceuticals are segregated into separate bins to be brought to incinerator.
II. Disposal of hazardous wastes	a. When available, use chamber, oil drum or brick incinerators for medical waste incineration. Add kerosene if necessary to maintain combustion	18. Incinerators can emit fly ash, acid gases and some toxins, posing a threat to the health of nearby community members	a. Site incinerators far away from densely settled areas, and operate when winds are calm. Incineration is generally not recommended for urban areas.

	b. When incinerators are not available use proper medical waste land disposal techniques.	19. Exposed medical waste can lead to health and environmental risks.	a. Land disposal is the least expensive disposal option. Medical waste should be packaged and buried under at least 2m of mature landfill waste.
	c. Special siting, design and management of hazardous waste landfills are required in the cases where incineration is not a viable option.	20. Poor site selection and design for hazardous waste storage and/or hazardous waste disposal can increase the risk of human injury or disease spread and/or disrupt normal activities in the area.	a. Ensure storage or disposal site is placed close enough to Port Au Prince to allow for efficient and cost-effective transport, but far enough away from any heavily settled area so as to minimize any public disruption or threat that the site could cause to community members
			b. Do not site storage or disposal site in wetlands or areas with a high water table, in floodplains, near drinking water supplies, or within two kilometers of an airport. Instead, seek out sites above clay or igneous rock
			c. Construct an impermeable or low-permeability lining (compacted clay or polyethylene are most common) along the bottom of the landfill
		21. A wide range of environmental risks are associated with hazardous wastes. They can be explosive, highly toxic and corrosive. Leachate can also contaminate	a. Develop a hazardous waste management plan for the landfill that will include relevant EMPR Debris Removal mitigation measures

		groundwater and soils.	b. Hazardous waste disposal should be carried out with respect to the type of hazard. In the likely absence of hazardous waste processing and neutralizing facilities, best practices include disposal of non-corrosive wastes in metal drums or in cement lined pits that are buried with at least 2m of mature landfill waste.
		22. Poor protection and closure of landfill can lead to human and animal health risks	a. Compact hazardous waste periodically to reduce the possibility that water can enter the landfill
			b. Construct fencing around the perimeter of the landfill to prevent community members and livestock from exposing themselves to dangerous medical wastes and chemicals
			c. Once the landfill reaches its capacity, seal with dirt and soils and apply a final cover (including vegetation). Apply land use restrictions on both the old landfill and surrounding areas. Apply long-term gas, leachate, surface and ground water monitoring

III-C. Environmental Monitoring and Evaluation Tracking Table (Table 3).

Environmental Monitoring and Evaluation Report (USAID/KATA) - DEBRIS REMOVAL/STORAGE/DISPOSAL/RECYCLING									
Impact No.	Description of Mitigation Measure	Responsible Party	Monitoring Methods			Results			Recommended Adjustments
			Indicators	Methods	Frequency	Dates Monitored	Problems Encountered	Mitigation Effectiveness	
A. Debris Removal									
1	a. Develop a debris removal methodology that defines the roles of every worker, the routes for removing and transporting debris, and areas for truck loading, in order to decrease the potential risk of injury		% of debris removal sites that are following an established methodology/ operational plan	Field Visit Report	Weekly				

2	a. To the degree possible, the separation and pre-sorting of metal and other recyclable materials should be done at the site of the destroyed / damaged building. This will reduce the quantity of debris to be moved to a secondary processing site.		% of metal and other recyclable materials sorted from debris						
	b. When sorting is impossible (i.e. machine removal of debris) USAID has established the following rules concerning debris dumpsite/staging allowances for non-construction and demolition materials. 0% of contents are to include human remains, hazardous materials and medical waste, and otherwise compostable organic materials. Up to 10% of other solids (glass, plastics, etc.) are permitted								

	c. Sorted debris must be dumped in a specific debris landfill site, enabling greater reuse of construction materials.								
3	a. Promote a debris removal methodology that reduces the potential risks of water contamination. Ensure workers are not depositing various forms of waste in any nearby drainage canals		% of debris removal sites that are following an established methodology/ operational plan						
4	a. Provide workers with potable water and promote adequate disposal and/or reuse of plastic containers		% of debris removal sites that provide adequate, temporary water and sanitation services to workers	Field Visit Report	Monthly				
	b. Construct temporary pit latrines at least 30m away from any water source and with adequate depth of pit								

5	a. The public, and specifically persons who occupied damaged/destroyed buildings, should be advised and consulted in the debris removal process. Building/shop owners should be provided sufficient opportunity and assistance in recovering assets (e.g. furnishings, doors, commercial stock) before a building is removed.		Number of conflicts over the removal and ownership of property on debris removal sites	Field Visit Report	Monthly				
	b. During the debris removal process, the owner of the building should be present to address where there may be hazardous materials, medical wastes, or human remains.								

	c. Given that the deconstruction and removal process will most likely uncover possessions of some value, there will be a need for good security of work sites. This will require a police presence and barriers and controls to limit who can access work areas. These controls will also help increase the safety of operations and limit the risk of liability issues from injuries								
6	a. Provide workers with adequate protective work gear and tools for the removal of debris		Number of worker injuries or accidents on the debris removal site	Field Visit Report	Monthly				
	b. Train workers in adequate use of gear								

7	a. Special teams and procedures will be needed to handle buildings which contain human remains. For these cases, a qualified engineer will decide on how to best deconstruct a building, to ensure the remains are recovered at the least risk to those involved in the recovery process.		Number of worker health issues caused by direct contact with human remains	Field Visit Report	Monthly				
	b. When a body is found, work must stop immediately. The supervisor must call representatives from the mayor's office to retrieve the body before any work can resume								

8	a. A spotter should be trained to supervise all heavy machine excavation to look out for down and overhead utility wires, human remains or other hazardous materials. Hand signaling should be the primary means of communication between spotter and machine operator.		Y/N spotter with understood hand signals on site	Field Visit Report	Weekly				
9	a. Ensure that an adequately trained machinery maintenance team exists on site and ensure they know proper cleaning, leak and damage checks, repairs, as well as used-oil disposal procedures		% of on site machinery in good condition	Field Visit Report	Quarterly				
	b. Minimize distance between machine storage sites and removal sites.		Y/N shortest routes between storage and removal	Field Visit Report	Quarterly				

10	a. Ensure storage of machinery and tools in a specific area with security guards		% of sites with security guards hired to protect removal site, machinery and tools	Field Visit Report	Quarterly				
11	a. Fill waste and debris to level just below height of bed walls and cover with a heavy duty tarp to prevent falling debris and waste		Number of workers injured by vehicle negligence	Field Visit Report	Weekly				
	b. Do not unload while people are in bed of truck								
	c. Select shortest possible transportation routes between removal sites, temporary and permanent dump sites								
12	a. Use machinery to level out site, filling in any holes and removing any unnecessary trash, equipment and tools		% of sites leveled, cleaned and left in adequate condition for future construction projects to begin	Field Visit Report	Once at project completion				
13	a. Fill and deconstruct any temporary work site latrine pits								

B. Debris Removal and Waste Storage									
14	a. Ensure storage or disposal site is placed close enough to Port Au Prince to allow for efficient and cost-effective transport, but far enough away from any heavily settled area so as to minimize any public disruption or threat that the site could cause to community members		(1) Number of families living within a 1 Km radius of storage/disposal site and (2) Yes/no presence of contaminants seeping in groundwater supply	Field Visit Report	Once at project implementation and quarterly thereafter				
	b. Do not site storage or disposal site in wetlands or areas with a high water table, in floodplains, near drinking water supplies, or within two kilometers of an airport. Instead, seek out sites above clay or igneous rock. Minimize the conversion of land use								

	c. Build fencing around storage or disposal site to keep unauthorized community members away reducing potential health/injury risks and illegal dumping.								
C. Crushing, Milling and Reusing Secondary Stone and Concrete Materials									
15	a. Designate a material storage zone that does not cause an obstruction to functioning roads, canals or access to homes or tent camps		Number of injuries or health problems associated with the breaking up of recyclable debris	Field Visit Report	Monthly				
	b. Provide potable water, adequate tools and protective gear, appropriate sanitary and solid waste disposal facilities for workers								
Environmental Monitoring and Evaluation Report (USAID/KATA) - Sub Project Types: DEBRIS REMOVAL/STORAGE/DISPOSAL/RECYCLING									
I. Removal of Hazardous Waste and Debris									

16	a. Separate hazardous and non-hazardous materials on site and be sure to transport hazardous waste separately to a hazardous waste specific dump site. Hazardous materials may include industrial chemicals, acids, lead paints, and LPG containers.		Number of health problems associated with the collection and separation of hazardous waste	Field Visit Report	Weekly				
	b. Cars contain several hazardous materials. After legal consent, destroyed cars should have fluids and fuel drained into marked puncture proof containers batteries salvaged for reuse, if possible, or sent to hazardous waste dump site.		% of destroyed cars drained and salvaged	Field Visit Report	Monthly				
17	a. Ensure that for sites where hazardous waste is expected, an expert trains the workers on proper use of tools, protective gear and separation		Number of health problems associated with the collection and separation of hazardous waste						

	practices and conducts periodic site visits to monitor waste removal								
	b. Wastes should be identified and their level of hazardousness assessed (corrosive properties, combustibility when mixed, health impacts, etc.). Proper precautions during handling, containment and transport should be observed based on hazardousness of waste.								
	c. In the case of medical waste ensure sharps are collected in puncture proof containers, and that hazardous chemicals and pharmaceuticals are segregated into separate bins to be brought to incinerator.								
II. Disposal of Hazardous Wastes									

18	a. Site incinerators far away from densely settled areas, and operate when winds are calm		Number of incinerators located dangerously close to communities (less than 1 Km away)	Field Visit Report	Once at project implementation				
19	a. Land disposal is the least expensive disposal option. Medical waste should be packaged and buried under at least 2m of mature landfill waste.		Y/N Medical waste should be packaged and buried under at least 2m of mature landfill waste.	Field Visit Report	Weekly				
20	a. Ensure storage or disposal site is placed close enough to Port Au Prince to allow for efficient and cost-effective transport, but far enough away from any heavily settled area so as to minimize any public disruption or threat that the site could cause to community members		(1) Number of families living within a 1 Km radius of storage/disposal site and (2) Yes/no presence of contaminants seeping in groundwater supply		Once at project implementation and quarterly thereafter				

	b. Do not site storage or disposal site in wetlands or areas with a high water table, in floodplains, near drinking water supplies, or within two kilometers of an airport. Instead, seek out sites above clay or igneous rock								
	c. Construct an impermeable or low-permeability lining (compacted clay or polyethylene are most common) along the bottom of the landfill								
21	a. Develop a hazardous waste management plan for the landfill that will include relevant EMPR Debris Removal mitigation measures		Number of storage/disposal sites operating with an adequate debris storage/disposal site management plan	Field Visit Report	Once at project implementation and quarterly thereafter				

	b. Hazardous waste disposal should be carried out with respect to the type of hazard. In the likely absence of hazardous waste processing and neutralizing facilities, best practices include disposal of non-corrosive wastes in metal drums or in cement lined pits that are buried with at least 2m of mature landfill waste.								
22	a. Compact hazardous waste periodically to reduce the possibility that water can enter the landfill								
	b. Construct fencing around the perimeter of the landfill to prevent community members and livestock from exposing themselves to dangerous medical wastes and chemicals								

	c. Once the landfill reaches its capacity, seal with dirt and soils and apply a final cover (including vegetation). Apply land use restrictions on both the old landfill and surrounding areas. Apply long-term gas, leachate, surface and ground water monitoring								

References for UEMPR tables:

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