

**SITE SPECIFIC  
HEALTH AND SAFETY PLAN  
for  
Implementation II**

**Panama Project  
Panama  
(Sieykin, Panama )**

*Greater Austin Engineers Without Borders*

**TRAVEL DATES: July 11 – August 10**



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# PERSONAL HEALTH CHECKLIST (Form 603)

Name: \_\_\_\_\_

## Personal Health Checklist

This form must be completed by each person who is traveling and a copy should be brought along on the trip with the Site Specific Health and Safety Plan, by the Health and Safety Officer. **This form is not to be submitted to the EWB-USA office.** Consult the WHO <http://www.who.int/ith/preface.html> and CDC <http://www.cdc.gov/travel/> websites for travel and health advisories for the area.

Name: \_\_\_\_\_ Date of Birth: \_\_\_\_\_ Age: \_\_\_\_\_

Social Security#: \_\_\_\_\_ Home Address (city, state, zip): \_\_\_\_\_

Passport#: \_\_\_\_\_

Phone: (\_\_\_\_) \_\_\_\_\_ E-Mail Address: \_\_\_\_\_

**Emergency Contact:** (Name and relationship): \_\_\_\_\_

Phone: (\_\_\_\_) \_\_\_\_\_ Alternative Phone: \_\_\_\_\_ E-Mail address: \_\_\_\_\_

**Travel and Evacuation Insurance Information:** ([www.specialtyrisk.com](http://www.specialtyrisk.com) is one source)

*The plan must cover volunteer when s/he is out of the country and cover volunteer's evacuation in case of an emergency.*

Carrier or Plan Name: \_\_\_\_\_ Carrier address: \_\_\_\_\_

Name of Insured: \_\_\_\_\_ Insurance ID number: \_\_\_\_\_

Carrier Phone Number \_\_\_\_\_

**Allergies:** (Describe Reaction and management of the reaction. Attach additional sheets if needed)

**Medication Allergies:** \_\_\_\_\_

**Food Allergies:** \_\_\_\_\_

**Other Allergies:** (insect stings, hay fever, plants, animals, dust, etc.) \_\_\_\_\_

**Medications Currently Taking:** Please list all medications (including over-the-counter or non-prescription drugs) taken routinely or in case of emergency. Bring enough medication to last the entire trip. Keep medications in the original packaging/bottle that identifies the prescribing physician, the name of the medication, dosage, frequency of administration.

◇ I do not take any medication on a routine basis **OR**

◇ I take the following medications: (include birth control and all things that are taken on an as needed basis as well e.g. Epinephrine for allergic reactions, asthma inhalers... add additional pages as needed)

Med #1 \_\_\_\_\_ Dosage \_\_\_\_\_ Times each day \_\_\_\_\_ Reason \_\_\_\_\_

Med #2 \_\_\_\_\_ Dosage \_\_\_\_\_ Times each day \_\_\_\_\_ Reason \_\_\_\_\_

Name: \_\_\_\_\_

## Personal Health Checklist

Med #3 \_\_\_\_\_ Dosage \_\_\_\_\_ Times each day \_\_\_\_\_ Reason \_\_\_\_\_

**Eyewear:** If you wear glasses or contact lenses, make sure you have an extra pair and sufficient contact solution, etc. Contact lenses are often problematic due to weather conditions, dust, and poor sanitation. This can make it difficult to keep contact lenses clean and increase the risk of eye infections. **Bring a good pair of sunglasses.**

### **Current/Past Health History:**

Have you had a recent injury, illness or infectious disease? No \_\_\_\_\_ Yes \_\_\_\_\_

Do you have diabetes? No \_\_\_\_\_ Yes \_\_\_\_\_ Treatment \_\_\_\_\_

Do you have asthma? No \_\_\_\_\_ Yes \_\_\_\_\_ Treatment \_\_\_\_\_

Ever had seizures? No \_\_\_\_\_ Yes \_\_\_\_\_ Treatment \_\_\_\_\_

Do you have any psychiatric conditions that may require treatment? No \_\_\_\_\_ Yes \_\_\_\_\_

Any other Health issue someone should be aware of in an emergency? \_\_\_\_\_

What is your blood type? \_\_\_\_\_

### **Tuberculosis Screening**

Most Recent TB PPD Skin Test: Date \_\_\_\_\_ Size (mm) \_\_\_\_\_ Result \_\_\_\_\_  
(PPD test should be placed within two years prior to travel and repeated 3 months after return.)

If you have had a positive PPD Skin Test in the past, date of your most recent Chest X-ray and result: \_\_\_\_\_

Have you taken treatment for latent TB infection? When? (date) \_\_\_\_\_

**Immunization Record:** (Write in the dates you received the following immunizations);  
(Remember: Keep a copy at home and travel with your yellow international immunization card.)

### **Required Immunizations:**

DPT/DOPT/DtaP: #1 \_\_\_\_\_, #2 \_\_\_\_\_, #3 \_\_\_\_\_, #4 \_\_\_\_\_, #5 \_\_\_\_\_

Td (Tetanus) booster: (should be within the past 7 years): \_\_\_\_\_

Hepatitis A: #1 \_\_\_\_\_, #2 \_\_\_\_\_ (these must be 6 months apart)

MMR (Measles/Mumps/Rubella) #1 \_\_\_\_\_, #2 \_\_\_\_\_

Polio (oral or injected) #1 \_\_\_\_\_, #2 \_\_\_\_\_, #3 \_\_\_\_\_, #4 \_\_\_\_\_

Polio booster: \_\_\_\_\_

Yellow Fever (may be required, take your stamped WHO immunization card when you travel): \_\_\_\_\_

Japanese Encephalitis (may be required, depends on country): \_\_\_\_\_

### **Highly Recommended Immunizations:**

Varicella (chickenpox): #1 \_\_\_\_\_, #2 \_\_\_\_\_ or Date you had the disease \_\_\_\_\_

Hepatitis B: #1 \_\_\_\_\_, #2 \_\_\_\_\_, #3 \_\_\_\_\_

\*may do accelerated series, pending approval by health care provider, if unable to complete series before travel.

Typhoid: \_\_\_\_\_

Influenza: \_\_\_\_\_

Meningitis: \_\_\_\_\_

**Malaria Prophylaxis** (drug, dose, schedule): \_\_\_\_\_

Signature of physician or travel clinic nurse: \_\_\_\_\_

Name of physician: \_\_\_\_\_ Phone: \_\_\_\_\_ Alternative phone: \_\_\_\_\_

Volunteer Signature: \_\_\_\_\_ DOB: \_\_\_\_\_

## **SIGNATURE PAGE**

### **Engineers Without Borders - USA Site-Specific Health and Safety Plan**

#### **Project Information**






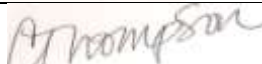
Name: Clean Water and Health Education  
Location: Sieykin, Panama  
Chapter: Greater Austin

#### **Travel Dates**

Start Date: July 11, 2011 End Date: August 7, 2011

#### **Project Team H&S Representative Signatures**

The undersigned confirm that all the information contained in this document is current and correct as of April 10, 2011 and that all travel team members will be briefed on the contents prior to travel.

Health & Safety Officer #1:		Date: <u>4/10/11</u>
Health & Safety Officer #2:		Date: <u>5/20/11</u>
Project Lead:		Date: <u>4/10/11</u>
Project Lead:		Date: <u>4/10/11</u>
Professional Mentor:		Date: <u>4/10/11</u>
U.S. Check-In Contact:		Date: <u>4/10/11</u>



## 1.0 INTRODUCTION

### ***1.1 Site Background & Description***

The Greater Austin Chapter of Engineers Without Borders (EWB-AUS) plans to improve the health conditions of the community of Sieykin by providing community members with access to potable water and basic health education. Sieykin is located in northwestern Panama and consists of 400 people belonging to the Naso indigenous tribe. The community, and most of the Naso people, lack access to many basic services, including water treatment, a reliable water distribution system, sanitation infrastructure, and comprehensive health services. This lack of access to basic services in Sieykin has resulted in numerous health and community development issues. The people of Sieykin consistently suffer from diarrhea, vomiting, fever, and other water-related illnesses due to contaminated drinking water. There are no roads or vehicles in Naso communities; all transportation is carried out on foot, in motorized canoes, by bamboo raft, and by horse. For maps of the area please refer to Attachment A – Area Map.

### ***1.2 History Of Prior Activities At The Site***

Prior to Engineers Without Borders – Greater Austin’s involvement, water projects had been undertaken in Sieykin by MINSA (the Panamanian Ministry of Health). Their activities included the construction of a 5000 gallon concrete tank, biosand water filter, and a distribution system. At the time our chapter became involved the biosand filter was unused, having been abandoned only a few years after it was built. Based on discussions with community members, the primary reason that this filter is not being used is that the community members were not involved in the decision-making process and MINSA did not properly educate them regarding the technology. The tank was functional but with a few leaks. The distribution system was unreliable, as the pipes are not properly fitted and are brittle, having been exposed to damaging UV radiation for 5+ years. The water collection boxes used in this distribution system were not properly designed and are subject to regular blockage from vegetation and debris which enter the streams in which they are located. Additionally these boxes are located downstream from the community pastures, leading to contamination of the drinking water of the community.

EWB-AUS has traveled to Sieykin three times for assessment and once for implementation. The assessment trips took place in January and August of 2009 and January of 2011 and included health surveys, investigation of the availability of materials, geographical surveying, assessment of several springs, and water quality assessments. Additionally, community health education took place during the assessment trips. The implementation trip (implementation phase 1) took place in July and August of 2010. This included the construction of a rural community water system for potable water use and the rehabilitation of an existing water system for non-potable uses such as clothes washing, bathing, and irrigation. The new water system consisted of a spring box, a flow equalization tank to handle peak demands, a gravity fed water main to the community, and a distribution system. For the non-potable portion old distribution mains were replaced.

### ***1.3 Contractors And Other Parties***

As decided in the last assessment trip, community members will be responsible for the labor required for construction. The Water Committee, recently elected by the Sieykin community, will organize this community labor. Committee members will assign tasks based on individuals' skill sets and participate in building the system themselves. The Water Committee will also coordinate with the community's boat drivers and community members to load the materials, transport them upriver, and carry them to the work site. Since the previous assessment trip, the EWB members have been in contact with the Peace Corp volunteer, Joshua Hardin (jhardin@live.com) to obtain further water quantity data and information relating to progress in the organization of the community as a whole. During implementation, the project team's role will be to provide oversight and direct the different aspects of the project (i.e. building the potable tank, digging the ditch to bury the pipe, laying/connecting the pipe, building a spring box, etc). Project members will work alongside community members. Section 7.0 of the Pre-Implementation Report contains the Memorandum of Understanding developed with the community during the third assessment trip. We are currently trying to locate a local mason who has experience in the construction of a spring box. We have delegated the task to the community members in the hope that they can find someone in which they trust and believe can help them.

## **2.0 ORGANIZATION AND COORDINATION**

### ***2.1 Key Project Personnel***

The key project personnel are identified in Table 2.1.

**Table 2.1 – Key Project Personnel**

POSITION	TEAM MEMBER	EMAIL	PHONE	CHAPTER
Project Lead #1	Corrie Thompson	<a href="mailto:cthompson@mail.utexas.edu">cthompson@mail.utexas.edu</a>	217-622-5876	Greater Austin
Project Lead #2	Luis Galindo	<a href="mailto:lcamgalindo20@gmail.com">lcamgalindo20@gmail.com</a>	512-698-5759	Greater Austin
Chapter Co-President	Charlotte Gilpin	<a href="mailto:charcamato@gmail.com">charcamato@gmail.com</a>	512-923-0706	Greater Austin
Chapter Co-President	Christopher Lombardo	<a href="mailto:lombardo@mail.utexas.edu">lombardo@mail.utexas.edu</a>	443-454-3207	Greater Austin
Mentor	Tim Ager	tager@bga.com	512-419-0545	Greater Austin
NGO/Community	Joshua Hardin	<a href="mailto:jhardin@live.com">jhardin@live.com</a>	+507-6688-3789	n/a
Translator	Luis Galindo	lcamgalindo20@gmail.com	512-698-5759	Greater Austin

### ***2.2 Health and Safety Personnel***

The health and safety personnel are identified in Table 2.2.

**Table 2.2 – Health And Safety Personnel**

POSITION	TEAM MEMBER	EMAIL	PHONE	CHAPTER
Health & Safety Officer #1	Tim Ager	tager@bga.com	512-419-0545	Greater Austin
Health & Safety Officer #2	Luis Galindo	lcamgalindo20@gmail.com	512-698-5759	Greater Austin
EWB-USA Health & Safety Chapter Contact	Ann Marie Spexet & Mike West			South Central TAC
U.S. Check-In Contact	Corrie Thompson	cthompson@mail.utexas.edu	217-622-5876	Greater Austin

### ***2.3 Team Member Responsibilities***

The team member responsibilities are identified in Table 2.3 “Team Member Responsibilities”.

**Table 2.3 – Team Member Responsibilities**

Name	Primary Role
Corrie Thompson	Project Lead /US Contact
Luis Galindo	Travler/Project Lead/Translator
Tim Ager	Travler/Mentor
David Rounce	Traveler
Hugo Landaverde	Traveler/Translator
Haley Born	Traveler/Translator
Korey Conley	Traveler
Belle Archaphorn	Traveler
Andrea Ryan	Traveler

### **3.0 TASK DESCRIPTIONS**

#### ***3.1 Specific Scope of Work***

This project will include the construction of a rural community water system for potable water use and the rehabilitation of an existing water system to henceforth be used for non-potable uses such as clothes washing, house cleaning, and bathing. Construction of the new water system will consist of construction of a spring box, construction of a gravity fed water main to the community, and construction of a distribution system with house connections. The implementation trip will involve the following specific work tasks:

1. Scheduled tasks in spring box construction include: clearing and assessing the site, excavation into an existing spring to expose the impermeable layer, construction of formwork for the spring box, mixing and pouring of concrete, filling the collection field with rock and gravel, installation of collection field vents, constructing formwork for collection field cap, final concrete pour, and backfilling.
2. Scheduled tasks for the river crossings include: site preparation, construction of pipe supports/preparation of trees for this purpose, assembly of pipes, suspension of pipes, and construction of pipe encasements for rocky areas.
3. Scheduled tasks for the construction of the pipeline and water distribution system include: staking out and clearing the path of the pipe line; continual excavation and pipe assembly; connections with the spring box, the tank, the sections constructed by the bridging team, and the houses; a pressure test; any necessary repairs; and backfilling.
4. Several of the tasks will require rocks, gravel, and/or sand to be gathered from the river, cleaned, and transported to the appropriate construction sites. Similar tasks required for several project aspects include transport of other building materials such as Portland cement and piping.

#### ***3.2 Point-to Point Travel Details***

The implementation trip will involve the following travel:

**Table 3.2: Point To Point Travel Details**

TRAVEL DATES	TRAVEL DESCRIPTION
7/11/11	Arrive in Tocumen International Airport
7/11/11 – 7/12/11	Overnight bus to Changuinola departing from Albrook Airport - <i>Food:</i> Airport - Grab something before leaving airport - <i>Lodging:</i> Bus
7/12/11	Arrive in Changuinola - Spend the day in Changuinola - Do shopping - Make phone calls, email, etc - <i>Food:</i> Restaurants in Changuinola - <i>Lodging:</i> Hotel Semiramis - Tel: (507) 758-5865

TRAVEL DATES	TRAVEL DESCRIPTION
7/13/11	Travel to Sieykin - Bus to El Silencio (15min) (~\$0.60 ea) - Boat to Sieykin (2 hours)(2 x \$25”Price of gas and oil” - <i>Food:</i> Breakfast in Changuinola, Lunch/Dinner in Sieykin - <i>Lodging:</i> Sieykin
7/13/11 – 8/09/11	- Group remains in Sieykin - <i>Food:</i> Sieykin - <i>Lodging:</i> Sieykin
8/09/11	- Depart Sieykin - Boat to Changuinola (45 min)(2 x \$25~gas and oil) - Bus to El Silencio (15 min) (\$0.60 ea) - Spend time in Changuinola (2x \$25~gas and oil) - Check email, make phone calls, etc - Bus from Changuinola to Panama City (overnight ~10 hours) - <i>Food:</i> Breakfast in Sieykin, Lunch/Dinner Changuinola (snacks for bus) - <i>Lodging:</i> Overnight Bus
8/10/11	- Arrive in Albrook Terminal - Ride to Tocumen International Airport - Depart back to the US

### 3.3 Project Schedule

The activities scheduled for this trip are indicated in Attachment N- Construction Schedule

## 4.0 TASK SAFETY AND HEALTH RISK ANALYSES

### 4.1 Preliminary Evaluation

Attachment I – Task/Hazard Matrix should be referred to. The task list was developed in conjunction with the project schedule and, as such, is organized similarly. Tasks are considered individually to determine all of the risks which will potentially be encountered over the course of the project. This represents a starting point in developing health and safety protocols for this implementation trip. Risks can be generally divided into three classes: chemical hazards, biological hazards, and physical hazards. These three are summarized below while greater detail about the protocols can be found in Section 6. References will be made to the complete task hazard management strategies which are available in Attachment I– Task Hazard Management Strategies.

**Table 4.1 – Task Health & Safety Risk Analysis**

### Implementation Trip

TASK ID	TASK	CHEMICAL HAZARDS	BIOLOGICAL HAZARDS	PHYSICAL HAZARDS
01	Travel to/from site		X	X
02	Eating/drinking on site		X	
03	Tour and stake out site		X	X
04	Excavate/Backfill Trench		X	X
05	Assemble piping	X	X	X
06	Springbox Construction	X	X	X
09	O&M training of locals	X	X	X
10	Investigate/Repair Distribution System (if needed)	X	X	X
12	Supplemental health assessment		X	X

### 4.2 Security

As of April 1, 2011 the ISOS Rating for Panama is LOW.  
See Attachment M: Panama Travel Security

### ***4.3 Chemical Hazards***

Chemical hazards will be encountered when working with the mixing and pouring of concrete, and when doing water quality tests. Management of chemical hazards will be accomplished by use of proper personal protective equipment and by adhering to the relevant hazard management strategies. During concrete mixing and pouring, dust masks, gloves, and safety glasses will be worn.

Relevant strategies include:

TH19 – Hazardous Materials Use and Storage

Attachment D – Personal Protective Equipment

See Attachment I – Task Hazard Management Strategies

### ***4.4 Biological Hazards***

Biological hazards include all potential exposure to food borne, waterborne, and other pathogens; as well as potential exposure to poisonous plants and animals. Food borne illness will be of concern throughout our time in country. This risk will be managed by ensuring that all food eaten by the travel team is properly prepared.

Water borne pathogens and parasites will be a concern whenever drinking or coming into direct contact with water. Because of the remoteness of the site it is impossible to transport adequate amounts of safe drinking water to the site. As a result, EWB group members will only drink water using their Katadyn purification water bottles. The community cooks are aware of EWB group members’ “sensitivity” to community water (and will be reminded of this again each trip), and boil water used during cooking or making juice/tea/coffee.

Additionally several of the tasks could result in direct exposure to water. These include: gathering and washing aggregate from the stream, mixing and pouring cement, and constructing structures over the river. To manage the risk of water borne illness through direct exposure, water-proof boots will be worn by any member working in the stream. In general, direct contact with the water will be avoided. If contact with water is necessary, hands will be sanitized afterwards. Additionally when performing water quality tests, gloves and safety glasses will be worn, and any waste generated during water quality testing will be discarded at a lab in Changuinola.

Local flora and fauna (including snakes, insects, arachnids, dogs, and plants) represent a potential biological hazard. The associated risks will be managed by consulting the villagers about how to avoid these hazards, and appropriate protocols in the event of exposure.

- Snakes typically are found in underbrush and tall grassy areas. If you encounter a snake, stay calm and look around. Turn around and walk away on the same path you used to approach the area. If a person is bitten by a snake,
  - Wash and immobilize the injured area, keeping it lower than the heart if possible.
  - DO NOT apply ice, cut the wound, or apply a tourniquet.
  - Try to identify the type of snake: note color, size, patterns, and markings.

- To repel insects, EWB members will sleep under mosquito nets and apply deet insect repellent daily. All EWB members will be taking anti-malaria medicine appropriately (different guidelines depending on medicine chosen) to develop resistance to malaria contraction during time in community.
- As working in vegetation increases the potential for tick bites, all exposed areas of the body will be covered and all travelers will use insect repellent containing DEET. Dogs residing outside will be avoided in the community to further prevent exposure. Ticks attach to the skin and intravenously feed on blood, creating an opportunity for disease transmission. Periodically during the workday, travelers will inspect themselves for the presence of ticks. If a tick is discovered, the following procedure will be used by group members to remove it:
  - DO NOT try to detach a tick with your bare fingers; bacteria from a crushed tick may be able to penetrate even unbroken skin. Fine-tipped tweezers should be used.
  - Grip the tick as close to your skin as possible and gently pull it straight away from you until it releases its hold.
  - DO NOT twist the tick as you pull and do not squeeze its body. That may actually inject bacteria into your skin.
  - Thoroughly wash your hands and the bite areas with soap and water. Then apply an antiseptic to the bite area.
  - Save the tick in a small container with the date, the body location of the bite and where you think the tick came from.
  - Notify the Health Point person immediately of any tick bites.

To further prevent illness, all travel team members will also be required to be current on any relevant vaccination for the area. These include all required vaccines listed in the Personal Health Checklist. Most young adults in the US have the majority of these; however some may be necessary to complete the list such as: Hepatitis A, Yellow Fever, Tetanus, and Typhoid. Anti-Malaria medications will be taken by all travelers. Additionally, exposure to blood borne pathogens will be limited by avoiding direct contact with blood by using appropriate PPE in the First Aid Kit (see Attachment H-1 – First Aid Kit Contents) in the event of an injury.

Relevant strategies include:

TH13 – Working Around Water

TH26 – Biological Hazards

TH29 – Personal Protective Equipment

See Attachment A– Task Hazard Management Strategies

#### ***4.5 Physical Hazards***

Various physical hazards are pervasive throughout all stages of the implementation project, and as such tasks which pose physical hazards include all specific tasks identified in Section 3. Appropriate hazard management protocols are listed below, and great detail about the various physical hazards is available in Section 6.

Relevant management strategies include:

- TH 01 Noise and Hearing Conservation
- TH 02 Inclement Weather
- TH 03 Heat stress
- TH 05 Foot care
- TH 08 Manual Lifting and Handling Of Heavy Objects
- TH 09 Rough Terrain
- TH 10 House keeping
- TH 11 Structural Hazards
- TH 12 Remote Areas
- TH 13 Working Over/Near Water
- TH 14 Traffic
- TH 16 Working At Elevations and Fall Protection
- TH 17 Ladders
- TH 18 Shoring and Trenching
- TH 19 Hazardous Materials Use and Storage
- TH 23 Hand and Power Hand Tools
- TH 24 Hand and Emergency Signals
- TH 26 Biological Hazards
- TH 27 Hazardous Materials
- TH 28 Clearing, Grubbing, and Logging
- TH 31 Falling Objects, Punctures, Abrasions, Dust, and Noise
- See Attachment I – Task Hazard Management Strategies

## ***5.0 COMMUNICATIONS***

### ***5.1 On Site Communications***

The project team will have the following on site means and methods of communication while on site and traveling thru the country:

The nature of this project and site requires that several groups be spread out working on different tasks. This will decrease the team's ability to promptly respond to emergency events and as such several protocols will be followed to mitigate this. We will use the buddy system and ensure that a person speaking both Spanish and English will be present with each group at any time to act as translator. Additionally, TH24 Hand and Emergency Signals (see Attachment I – Task Hazard Management Strategies) will be learned by each of the team members in case an emergency situation is encountered in which verbal communication is impossible. In the event of an emergency on site; team members will meet at the designated meeting place which will be the missionaries' house.

## 5.2 Offsite Communications

The project team will have the following off site means and methods of communication while on site and traveling thru the country:

Contacting the travel team can be accomplished through one of the several methods below.

- The satellite telephone number will be obtained upon trip approval, and will be provided to EWB-USA via e-mail as soon as the number is known. The satellite phone will be carried by the mentor Tim Ager.
- The on-the-ground e-mail will again be that of the mentor lead Tim Ager (tager@bga.com)

Important contacts for the travel team are listed below. These contacts will be carried by each team member while in country.

- US Consulate
  - Location:  
Building No.783, Avenida Demetrio Basilio Lakas, Clayton, Panama City
  - International mailing address:  
Apartado 0816-02561, Zona 5, Panama, Republic of Panama
  - Phone Numbers:  
Main (011-507-207-7000), After Hours (011-507-207-7200), Consular Section (011-507-207-7030), and Fax (011-507-207-7278 or 011-507-207-7303)
- Changuinola Hospital/Clinic (nearest hospital to site)
  - Location:  
Ave. 17 de abril. (main street where the Hotel Semiramis is located as well)
- Clinica Cattan (nearest major hospital recommended by the Peace Corps)
  - Location:  
Frente al antiguo hospital  
Obaldia, David, Chiriquí, Republica de Panama
  - Phone number: 001-507-775-7099 (if calling from the U.S.)
- Corrie Thompson (emergency contact in the US)
  - Phone: 217-622-5876
- International SOS
  - Phone Number: 001 215 942 8226
  - EWB-USA Membership number: 11BCPA000270

To call Panama from the US use the format; 011+507+XXXXXXX (011 is the US exit code which must be dialed for all international calls made from the USA or Canada, and 507 is the country code for Panama). To call the US from Panama first dial the International Dialing Prefix; either 00 (if calling from Cable or Wireless), 08800 (if using Telecarrier), or 05500 (if using ClaroCom). After this dial 1+ Area Code + Number.

More contact information can be found in Attachment J – Emergency Contacts.

### 5.3 U.S . Check-In Contact

The US Check-In Contact is Corrie Thompson. We will her once a week via cell phone calls. Cell phone signal in the community is not great, but the team has located a spot in the community that has reliable signal. If a signal cannot be obtained, the team will also have a satellite phone as a backup.

More contact information can be found in Attachment J – Emergency Contacts.

## **6.0 PROTOCOLS**

### ***6.1 Task By Task Health & Safety Protocols***

The following are relevant protocols for managing risks associated with each of the tasks as outlined in the Task Hazard Matrix (Attachment I– Task/Hazard Matrix)

#### **01 Noise and Hearing Conservation**

Noise is defined as unwanted sound. Noise can cause:

- sudden traumatic temporary or permanent hearing loss,
- long term-slowly occurring sensory-neural and irreversible hearing loss,
- disruption of communication,
- masking of warning devices and alarms,
- increased stress levels and
- effects on the cardiovascular and nervous systems.

The goal of this operating practice is to reduce and potentially eliminate hazardous levels of noise exposure.

Some of the sources of hazardous noise are demolition operations and construction, drills, hammer blows, compressed air tools and heavy equipment. Examples of approximate noise levels from various activities are as follows:

Rock Drilling	up to 115 dBA	Lawn Mower	up to 96 dBA
Chain Saws	up to 125 dBA	Workshop Tools	up to 96 dBA
Abrasive Blasting	up to 110 dBA	Food Blender	up to 90 dBA
Heavy Equipment	95 to 110 dBA	Vacuum Cleaner	up to 88 dBA
Demolition	up to 117 dBA	Sewing Machine	up to 73 dBA
Needle Guns	up to 112 dBA	Electric Can Opener	up to 77 dBA
Riveter/Chipper	up to 120 dBA	Dishwasher	up to 72 dBA
Conversational Speech	60 dBA	Air Conditioner	up to 68 dBA
Leaf Blowers	up to 112 dBA	Washing Machine	up to 72 dBA

For detailed information, refer to TH01 Noise and Hearing Conservation (Attachment I – Task Hazard Management Strategies).

## **02 Inclement Weather**

Inclement weather will potentially be a hazard for travel to the site and during all construction tasks. This potentially includes include hot and humid conditions, and excessive rainfall over the travel period. Sun protective gear such as wide-hats, long-sleeved shirts and sun block will be used to reduce exposure. Ponchos and waterproof gear will also be advised for participants. For detailed information refer to TH02 Inclement Weather (Attachment I – Task Hazard Management Strategies).

## **03 Heat Stress**

Heat stress will be of concern during travel to the site and all construction tasks. Heat stress could be a hazard on our project due to the heat and humidity of the area and the physically demanding nature of several of the project tasks. The best approach to heat stress is preventative heat stress management. This includes the regular and adequate intake of fluids and electrolytes, proper scheduling of strenuous tasks for early morning and evening, mandatory breaks in cool shaded areas during strenuous tasks, and the wearing of proper clothing and sunscreen. Additionally, prior to travel, team members will learn the symptoms of each of the stages of heat stress; including heat rash, heat cramps, heat exhaustion, and heat stroke, and be responsible for monitoring themselves and others while on site. For detailed information refer to TH03 Heat Stress (Attachment I – Task Hazard Management Strategies).

## **05 Foot Care**

Foot care will be of concern for all participants while working on construction projects and while walking around the site. To manage this risk, proper footwear (i.e. sturdy work boots or hiking shoes) will be required for all participants. This will be necessary to provide adequate ankle support for the rough terrain which will be encountered, and puncture protection from any sharp objects. During tasks which involve work in the river, water proof boots will be required to keep feet dry and reduce exposure to pathogens in the water. Steel toed boots will not be required, but we will recommended all participants consider the tasks they will be performing and possibly using steel toed boots. For detailed information refer to TH05 Foot Care (Attachment I – Task Hazard Management Strategies).

## **08 Manual Lifting**

Proper lifting techniques for back safety will be demonstrated at an information session for all participants prior to travel, and team members will observe others during construction and continually remind each other of proper lifting techniques. At the daily safety meeting there will be a stretch circle and a discussion of the lifting projects ahead for each day. For detailed information refer to TH08 Manual Lifting (Attachment I – Task Hazard Management Strategies).

## **09 Rough Terrain**

Rough terrain exists throughout the community. Steep slopes, cliffs, dense vegetation, and uneven surfaces will make rough terrain a constant hazard at all times while on site with consequences ranging from rolled ankles to potentially serious falls. Management will consist of proper footwear, an emphasis on team members being aware of ground conditions, and fall protection if necessary. For detailed information refer to TH09 Rough Terrain (Attachment I – Task Hazard Management Strategies).

## **10 Housekeeping**

Tasks during which proper housekeeping practices will be necessary include all construction related tasks. Proper housekeeping means that the site will remain clean and organized. This reduces clutter and confusion and will help eliminate general site hazards such as tripping and hand tool accidents. Protocols will include: designated areas for construction materials, designated stockpiles for excavated soil, staging areas away for tools not currently in use, designated break areas, and daily clean up. These simple protocols will help ensure risk prevention as well as in increasing work efficiency. For detailed information refer to TH10 Housekeeping (Attachment I– Task Hazard Management Strategies).

## **11 Structural Hazards**

Tasks during which structural hazards will be of concern include the construction of the river pipe crossings; any task involving work in or around a village house; excavation, form construction, and concrete pouring for tank and spring box construction; and potential hazardous structures when traveling to the site. For detailed information refer to TH 11 Structural Hazards (Attachment I – Task Hazard Management Strategies).

## **12 Remote Area**

As the village is located in a very remote area only accessible by boat and as such, the hazards associated with being in a remote area will be a concern for all participants during the duration of the trip. Participants will attend information sessions on wilderness first aid and basic rural survival tips before traveling. Every morning, the group will convene for a safety meeting where the location of the mobile phone will be made known to all team members. Additionally, participants will travel around in groups at all times. In the event of an emergency, procedures have been developed for different levels of emergency. These can be found in Section 10.3 – Medical Support. For detailed information refer to TH12 Remote Area (Attachment I – Task Hazard Management Strategies).

## **13 Working Over or Near Water**

Tasks during which working over water will be of concern include all tasks when constructing the river crossings, gathering and washing sand and stones for concrete, improvements to the existing river intake, excavation of spring (as the excavation could fill with water), and transportation to the community (as a portion will be by boat). During transport to the community, lifejackets will be utilized. There should not be a clear potential for drowning at any point during construction as the river discussed above is generally only one to two feet deep and those portions of construction should involve larger groups. If however it appears that this is a concern, lifejackets will be worn. For detailed information refer to TH13 Working Over/Near Water (Attachment I – Task Hazard Management Strategies).

## **14 Traffic**

Participants will be exposed to traffic when traveling between the airport and Changuinola, during which caution will be exercised. For detailed information refer to TH14 Traffic (Attachment I – Task Hazard Management Strategies).

## **16 Fall Protection**

Falls will be a concern during any task that involves being on top of the water tanks or which requires entering one of the villager's dwellings. The tanks are approximately five feet tall. Because of the low height; just below a height requiring safety harnesses, and the short time period that will be spent upon the tank, we do not anticipate that safety harnesses will be required as outlined in TH16. Villager's houses are on stilts and with the floor not higher than 10 feet above the ground. All of these elevated locations will have walls separating the travelers from the edge upon entry into the dwelling so safety harnesses are not necessary. However, caution will be exercised when climbing ladders and entering structures. Additionally, falls will be of concern when assessing previously built structures over the river, and assessing locations of future river bridging structures. This concern is due to some sudden drop-offs into the river. Common sense will be used before approaching any of these edges. Protocols will be followed as outlined in TH17 and TH11 respectively. For more detailed information refer to TH16 Fall Protection (Attachment I– Task Hazard Management Strategies).

## **17 Ladders**

Tasks during which ladders will be utilized include any involving entering a villager's house. Protocols to be followed will be the same as those outlined under Structural Hazards above and in TH17 Ladders. For more detailed information refer to TH17 Ladders (Attachment I – Task Hazard Management Strategies).

## **18 Shoring and Trenching**

The construction of the spring box will involve the excavation of the spring to expose the impermeable layer. We do not anticipate that our spring box will not require excavation deeper than 2 to 3 feet from our previous site inspection. However, regardless of depth, we will slope the walls at a 1.5 horizontal to 1.0 vertical slope as a precaution and store stockpiles a significant distance away in accordance with good housekeeping. Additionally appropriate measures will be taken to drain water from the area. The HSO responsible for overseeing these activities will be the professional mentor, Tim Ager who has construction experience and is first aid certified. Though the Shoring and Trench Task Hazard protocol is not completely relevant in this case due to the shallow depth of excavation, more detailed information is available in TH18 Shoring and Trenching (Attachment I – Task Hazard Management Strategies).

## **19 Hazardous Material Use and Storage**

Hazardous material use and storage will be a hazard during pipe disinfection and cement mixing/pouring. Spring box construction will require cement to be mixed on site. A breathing mask will be worn while mixing cement to avoid inhalation of fine silica particles and gloves will be worn to limit direct contact of cement with skin. Any skin exposure will be washed off immediately. Cement will be kept in a designated dry storage area while not in use. For more detailed information refer to TH19 Hazardous Material Use and Storage (Attachment I – Task Hazard Management Strategies).

## **23 Hand and Power Hand Tools**

Non-powered hand tools will be used on most tasks. Tools to be used throughout the project include shovels, machetes, saws, hammers, wrenches, screwdrivers, and cement working equipment. The only power tool used in the community is a chain saw, however, EWB members

will rely on community members to operate chain saw and will not be operating one themselves. Similarly, though machetes are a very common tool used in the community, EWB members will not wield one. Proper training procedures for tools will take place at onsite training events; see Section 7.2 – On-Site Training. Each tool will be inspected by the HSO to ensure they do not pose a hazard, and proper PPE will be worn for every tool used. For more detailed information refer to TH23 Hand and Power Hand Tools (Attachment I – Task Hazard Management Strategies).

## **24 Hand and Emergency Signals**

Hand and emergency signals will be required when the ability to vocally communicate is lost. The likelihood of needing emergency signals is likely to be slim but may be necessary in the event of a storm, natural disaster, or security situation. Hand signals are more commonly needed when other sounds drown out the voice, or if persons communicating are out of vocal distance, but have visual contact. For more detailed information refer to TH24 Hand and Power Hand Tools (Attachment I – Task Hazard Management Strategies).

## **26 Biological Hazards**

Biological hazards are a concern throughout the course of the trip, with common hazards food and water borne diseases, blood borne diseases, and local plants and animals. Additional information about these risks can be found under in Section 4.3 – Biological Hazards above and in TH26 Biological Hazards (Attachment I – Task Hazard Management Strategies).

## **27 Hazardous Materials**

Exposures to hazardous (flammable, corrosive, toxic, or reactive) chemicals can potentially occur from materials purchased for use on a project (e.g., paints or pesticides), those found on-site (e.g., lead-based paints or asbestos), or those created during a project (e.g., phosgene created when welding is conducted in the presence of chlorinated hydrocarbons). Careful attention to project planning, site assessment, and protection of team members and partners can minimize the risk of exposures to hazardous materials.

Chemicals may enter the body through ingestion (swallowing), inhalation, skin absorption, or injection (such as a needle stick or puncture wound). Good industrial hygiene<sup>1</sup> practice dictates a “hierarchy of controls” to minimize exposures (decreasing levels of efficacy):

- Control at the source
  - Substitution
  - Mechanize the process
  - Isolate/enclose the process
- Control along the path of exposure
  - Local exhaust ventilation
  - General ventilation
  - Housekeeping
- Control at the worker
  - Worker education
  - Enclose the worker

Industrial hygiene is the science and art of anticipation, recognition, evaluation, and control of environmental factors arising in or from the workplace that may result in injury, illness, impairment, or affect the well-being of workers and members of the community.

- Personal protective equipment (PPE)
  - Respirators, gloves, chemical protective clothing, eye and face protection
- Clean lunch / break room
- Locker and change room
- Lavatories
- Clean change of clothing
- Emergency eyewash and shower

Control at the source is more effective than the other two methods (along the path, at the worker) because it eliminates or reduces any hazard, rather than just placing a barrier between the worker and the hazard. Obviously, some of these controls make more sense in a traditional work place than on a EWB project site. For example, it is much easier to substitute a safer chemical (e.g., a lead-free, water-based paint) than to mechanize a process or to enclose a team member working on a task. However, by paying close attention to the project design, the site assessment, and site factors, by educating ourselves on hazardous chemicals, and by consulting experts when needed, we can all work together to minimize exposure of EWB team members and partners to hazardous materials. For more detailed information refer to TH27 Hazardous Materials (Attachment I – Task Hazard Management Strategies).

### **28 Clearing Grubbing and Logging**

Tasks during which clearing, grubbing and logging will be of concern include path clearing rocks, soil and vegetation for the potable water pipe, bridge and spring box construction site. Laying pipe and bridge building will require pre-clearing with hand-saws and machetes. These tools will be safely kept while not in use, and will be instructed to maintain a safe distance from others while operating the tools. Operators will be instructed to wear gloves and safety goggles, and participants will be well versed in proper handling procedures through an information session. Daily briefings will outline the specific use of the saws and machetes. For more detailed information refer to TH28 Clearing Grubbing and Logging (Attachment I – Task Hazard Management Strategies).

### **31 Falling Objects, Punctures, Abrasions, Dust, and Noise (Personal Protective Equipment)**

Falling objects could be a concern when constructing the spring box, when building the river crossings, or when near one of the villager's elevated dwellings. Preventative measures, such as those outlined in TH10 – Housekeeping, are the best means of preventing this hazard. Additionally several hard hats will be brought along in the event that they are deemed necessary during any phase of construction. Additionally, dropping objects on the feet is a risk during all construction tasks, and appropriate foot wear will be worn to prevent damage. Dust is a concern when mixing concrete and will be managed with the use of dust masks. More information on these topics are available in Section 8 – Personal Protective Equipment.

## **Travel in Panama**

The main risks associated with traveling in Panama include petty crime. This is more of a risk at night and in the dangerous areas of Panama City. EWB members will not walk around in any city at night in an identified risky/unpopulated area, and will definitely never walk alone in any city. EWB members will also avoid noticeably speaking English and walking in one big group of 8 people while traveling through cities, in order to avoid attracting unwanted attention and will instead stagger into smaller groups of 2-4 people. Money/valuables will be carefully placed and protected while traveling. If the group breaks up for any reason, each subgroup will consist of at least 1 Spanish speaker that is comfortable and familiar with navigating in Panama/other Latin American countries. For more detailed information see Attachment J International SOS Travel Security Brief for Panama.

### **31 Falling Objects, Punctures, Abrasions, Dust, and Noise**

Close toed shoes and sturdy pants are required for the implementation. No open shoes, shorts, or sandals are allowed during the site assessment.

## ***6.2 Emergency Response Plans***

### **Designated Meeting Point**

The designated meeting point for all team members in the event of an emergency will be the housing arrangements that have been set up by the community. Every team member is to report to this location in the event of any emergency.

### **Land Ambulance Service**

The land ambulance service is unavailable in the community to the lack of communication with the nearest town and roads to travel on. The best solution would be to travel down the river and seek medical attention at the Changuinola Hospital.

### **Air Ambulance Service**

Air ambulance service is available thru ISOS. The phone number for the ambulance service is 269 9779, 800 0911

## **7.0 TRAINING**

Training will be provided prior to the team departing on the trip and while on site during daily task hazard review meetings.

### ***7.1 Pre Mobilization Training***

Pre-training will be held in a safety information sessions. There will be a detailed review of the Health and Safety report with all traveling members present. It will be administered by the HSOs followed by an open discussion. During this discussion protocols which travelers are unsure about and tasks which are deemed to be particularly risky will be identified.

## ***7.2 On Site Training***

On-site training will be provided as needed for travelers and community members. It will generally take place following the daily safety meeting (see below) and will be administered within the specific groups. Example situations in which on-site training could be necessary includes reviews of Task Hazard protocols relevant for that day, and special instructions for hand tools or personal protective equipment.

## **8.0 PERSONAL PROTECTIVE EQUIPMENT (PPE)**

Required Personal Protective Equipment (PPE) will include hardhats, safety glasses, and sturdy hiking boots. Additional PPE, which is task dependent, includes gloves, waterproof boots, and harness and lanyards.

### ***8.1 Rationale for Use***

PPE helps avoid serious injury and reduces direct risk of physical harm to workers. PPE which will be used over the course of the project will include leather gloves, lab gloves, safety glasses, sturdy work boots, and water proof boots. At all times appropriate boots will be worn and leather gloves and safety glasses will be on hand to be used as necessary.

### ***8.2 Criteria For Selection***

Construction gloves will be tough leather to prevent tearing and harm to the hands. They will also be water resistant and rated for concrete work to endure the caustic nature of Portland Cement. N100 dust masks are of sufficient quality to prevent inhaling particles during cement mixing. Hardhats will meet ANSI standards. Eye protection will comply with ANSI Z87.1-1989 standards. Construction boots will not be the responsibility of individual travelers. They will not be required to be steel toed though this will be recommended to travelers.

### ***8.3 Listing By Task***

All participants will wear gloves and boots at all times. The use of safety glasses will be necessary when using any hand tools and when working with cement. Safety glasses will be carried by all team members during construction task and will be used additionally at the discretion of the traveler. Dust masks will be used during cement mixing. Hard hats will be brought as their use may be necessary during construction. Water proof boots will be used in instances where the river must be entered such as during aggregate gathering or pipe river crossing construction.

## **9.0 SITE CONTROL MEASURES**

### ***9.1 Exclusion Zones***

Zone 1: Spring Box Excavation Area

Due to the hazardous nature of excavation, the area surrounding the excavation of the spring will be off limits to those not directly involved in this task. This is to avoid unnecessary loading to

the walls of the excavation, avoid persons falling or objects being dropped into the excavation, and decrease site area noise and confusion. Only those with knowledge of safe excavation practices and wearing proper PPE will be allowed in the excavation area. As mentioned in Section 6, the subsection titled, Shoring and Trenching, initial data gathered during the first trip will include a detailed site layout with location of trees, stones, and other existing sources of soil loading; a classification of the soil; and a probing of the subsurface to determine the depth of the impermeable layer. These activities will be overseen by Professional mentor and HSO Tim Ager. With this information, we will have a better indication of how deep we will need to excavate. This information will be sent back to the second travel team in Austin to adequately prepare for excavation and design of the spring box.

- The site will be cleared of any vegetation and fallen tree branches. Pictures of the work site are located in Appendix L of the 525-Pre-Implementation Report submitted with this Health & Safety Plan for reference.
- A diversion ditch will be dug upslope from the site to divert surface water runoff away from the spring.
- The ground will be dug out around the spring until a single source flow is found. Via information gained on from the travel team, we will be adequately prepared to follow OSHA safety requirements. Subpart P of 29 CFR 1926 will strictly be adhered and a copy of the safety protocols will be on hand.

TH18 Shoring and Trenching attached to this document will also be referenced.

#### Zones 2 & 3: Concrete Mixing and Pouring Areas

During construction of the spring box and the flow equalization tank concrete will be mixed and poured. Because airborne Portland Cement and dust generated during these tasks will pose a health concern in the form of irritation to the eyes and respiratory system, these two sites will be designated as exclusion zones. Only those directly involved in this work and wearing proper PPE will be allowed in these zones.

### ***9.2 Site Hygiene***

Protocols outlined in TH10 Housekeeping (Attachment I – Task Hazard Management Strategies) will be followed while at all construction sites. This will include; designated areas for construction materials, designated stockpiles for excavated soil, staging areas away for tools not currently in use, designated break areas, and daily clean up. These simple protocols will help ensure risk prevention as well as increasing work efficiency. While in the community, the primary toilets used will be those at the school. Hand sanitizer will be brought and used after using the bathroom by team members to manage this potential biological hazard.

## **10.0 MEDICAL CONSIDERATIONS**

### ***10.1 Medications and Vaccinations***

All traveling members will be required to be in good health and physically fit enough to handle the physical demands of this implementation; and it is recommended that travelers have a checkup by a physician prior to travel to confirm this. All travelers must fill out a personal health and emergency contact form prior to travel which will list any medical conditions, medications currently prescribed and their uses, person specific protocols in the event of emergency, and

emergency contact information. Additionally, and as was mentioned in Section 4.3 – Biological Hazards several immunizations are required for travel. The complete list of these can be found in the Personal Health Checklist.

### ***10.2 Location of and person responsible for First Aid Kit(s)***

At all times two people with First Aid Certification will carry the first aid kits. Due to the dispersed nature of the group during construction at many times, there will be more than two groups and it will be impossible for there to be an individual with First Aid Certification and a First Aid Kit with all groups at all times. In consideration of this, two individuals with First Aid Certification will carry the First Aid Kits. Additionally an attempt will be made to keep those with the first aid kits at different locations at any given time. More about communication plans can be found in Section 5.1 On-Site Communication, and the contents of the medical kit can be found in Attachment Table H-1 – First Aid Kit Contents.

### ***10.3 Exposure/Injury/Medical Support (on site and off)***

Because of the remoteness of the site, careful planning for medical emergencies is necessary. The closest medical facility is the clinic in Changuinola, and the closest Peace Corps recommended hospital is in David; the locations and contacts of which have been outlined in the Section 5.2 – Off-Site Communications. Because there is not any direct route to these hospitals; a classification system of emergency situations and the appropriate protocols for dealing with these has been developed and is listed below.

- **MINOR INJURIES AND ILLNESSES** (examples: minor cuts, scrapes, bruises, mild gastrointestinal illness, etc.)
  - Participant will be treated on-site using equipment in the EWB Greater Austin first aid kit or otherwise available at the site. A first-aid manual will be included in the first-aid kit. All participants will have received training on use of the equipment available in the EWB Greater Austin first aid kit.
- **MODERATE OR CONTINUING INJURIES AND ILLNESSES:** (examples: larger cuts, scrapes, bruises, severe food poisoning, infections, etc.)
  - Participant will be first treated on-site using equipment in the EWB Greater Austin first aid kit according to the first aid manual.
  - Participant will be transported down the Teribe River to the Changuinola health clinic specified on the Emergency Procedures document.
- **SEVERE ILLNESSES OR INJURIES (NON-IMMEDIATE):** (examples: broken bones, severe dehydration, infections, etc.)
  - Participant will be first treated on-site using equipment in the EWB Greater Austin first aid kit according to the first aid manual.
  - Participant will be transported down the Teribe River to the Changuinola health clinic specified on the Emergency Procedures document. The Changuinola health clinic will be responsible for determining whether the participant should be transported to a major hospital in David or Panama City. Changuinola has a regional airport with commercial flights and small planes that can be chartered on short notice.
  - With the injured/ill participant's consent, EWB Greater Austin will contact their emergency contacts in the US.

- **LIFE THREATENING ILLNESSES OR INJURIES (IMMEDIATE):** (examples: venomous snake bites, internal injuries, unconsciousness, cardiac arrest)
  - A satellite phone call will be placed to International SOS which will give directions on how to proceed.
  - The injured/ill participant will be treated according to the first aid manual, advice from local healthcare practitioners, and instructions from International SOS.
  - Certified individual will provide CPR if appropriate.
  - International SOS has provided us with evacuation procedures (Attachment M - International SOS Evacuation Procedures) that outline their plans to provide helicopter air ambulance evacuation directly from Sieykin.
  - After emergency transportation has been arranged, project lead will communicate with participant's emergency contacts in the US.
- **NON-MEDICAL EMERGENCIES (PARTICIPANT ARREST, ABDUCTION, ETC)**
  - Project lead or other participant will contact the U.S. consulate office via satellite phone to determine how to proceed.

#### ***10.4 Medical Treatment Facilities (Location & Transportation)***

All travelers must also register with International SOS and the State Department, and travelers are required to carry emergency contact numbers listed below. More information about this can be found in Section 5.2 Off- communication or in Attachment J – Emergency Contacts.

- U.S. Embassy in Panama City
  - American Embassy Panama  
P.O. Box 0816-02561  
Panama, Republic of Panama
- Nearest health clinic in Changuinola, Panama
- Changuinola: Clínica Santa Isabel
- Nearest major hospital in David, Panama
  - Clinica Cattán, Frente al antiguo hospital, Obaldía, David, Chiriquí, República de Panama. Phone number: 001-507-775-7099 (if calling from the U.S.)
- Emergency contact in the US
  - Christopher Lombardo: Phone number – 443-454-3207
- International SOS
  - Phone Number: 001 215 942 8226
  - UT Membership number: 11BSGC000037

#### ***10.5 Incident Report***

The attached form in Attachment K – Blank Incident Report Form and Root Cause Analysis will be completed within 24 hours of any incident. The incident will be reported to the appropriate Health and Safety Committee member at the earliest possible time.

## **11.0 POST MOBILIZATION REPORTING**

### ***11.1 System To Capture And Report Project Related Injury And Illness***

After travel we will continue to work with the Health and Safety Committee member to resolve the cause of any incidents during the trip and identify appropriate protocols to avoid future incidents of the same nature. Additionally we will keep in touch with all members of the travel team and conduct a survey one to several months after we return to evaluate delayed effects of any incidents in order to improve the health of travelers during and after future trips. These could include parasites, diseases, physical conditions, nutritional problems, and issues which cannot be anticipated.

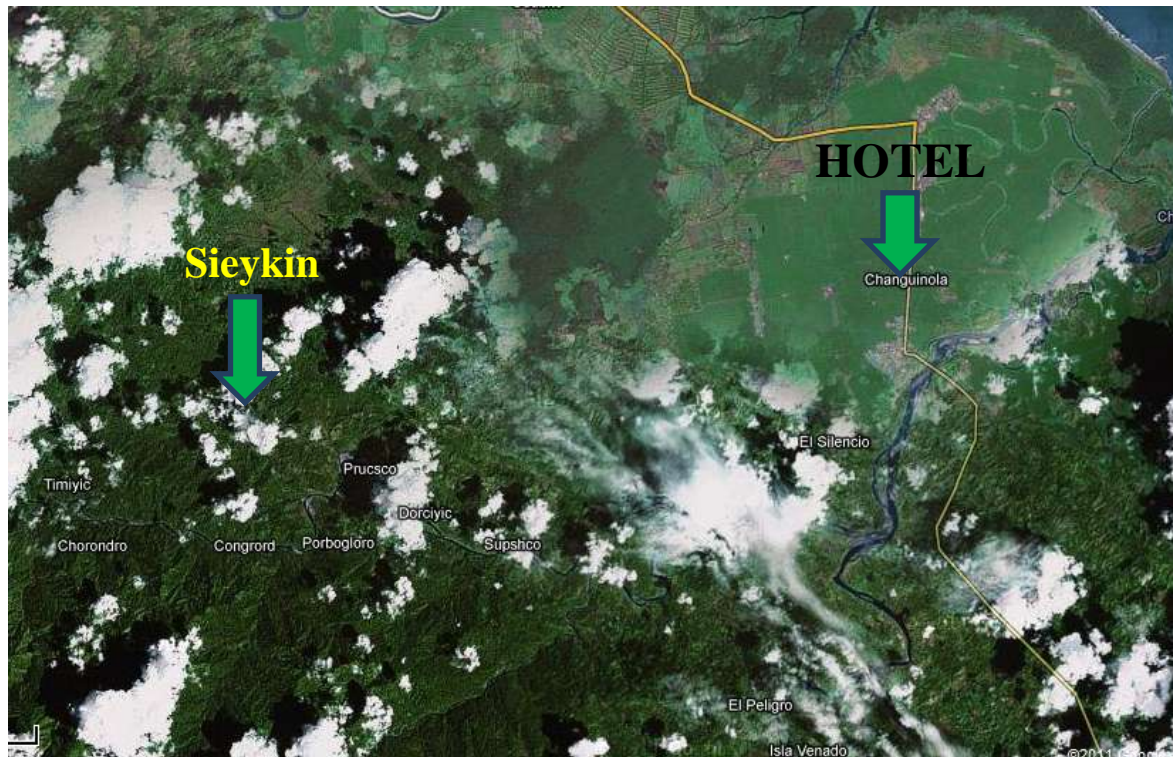
### ***11.2 Participant Signatures***

Every member of the EWB Greater Austin Chapter travel team will attend a briefing organized by the HSOs and will have this document available for them to read in its entirety before travel. All members are required to acknowledge that they have read, understand, and will comply with all the protocols contained within this document. Their agreement will be indicated upon signing the travel waiver document submitted to EWB-USA.

## ATTACHMENT A: AREA MAP

### *Picture A-1: Area Map*

Sieykin: Longitude: 82°40'50.92"W  
Latitude: 9°23'58.85"N  
Hotel (Changuinola): Longitude: 82°31'12.69"W  
Latitude: 9°25'26.57"N



**PICTURE A-2: AIRPORT MAP**



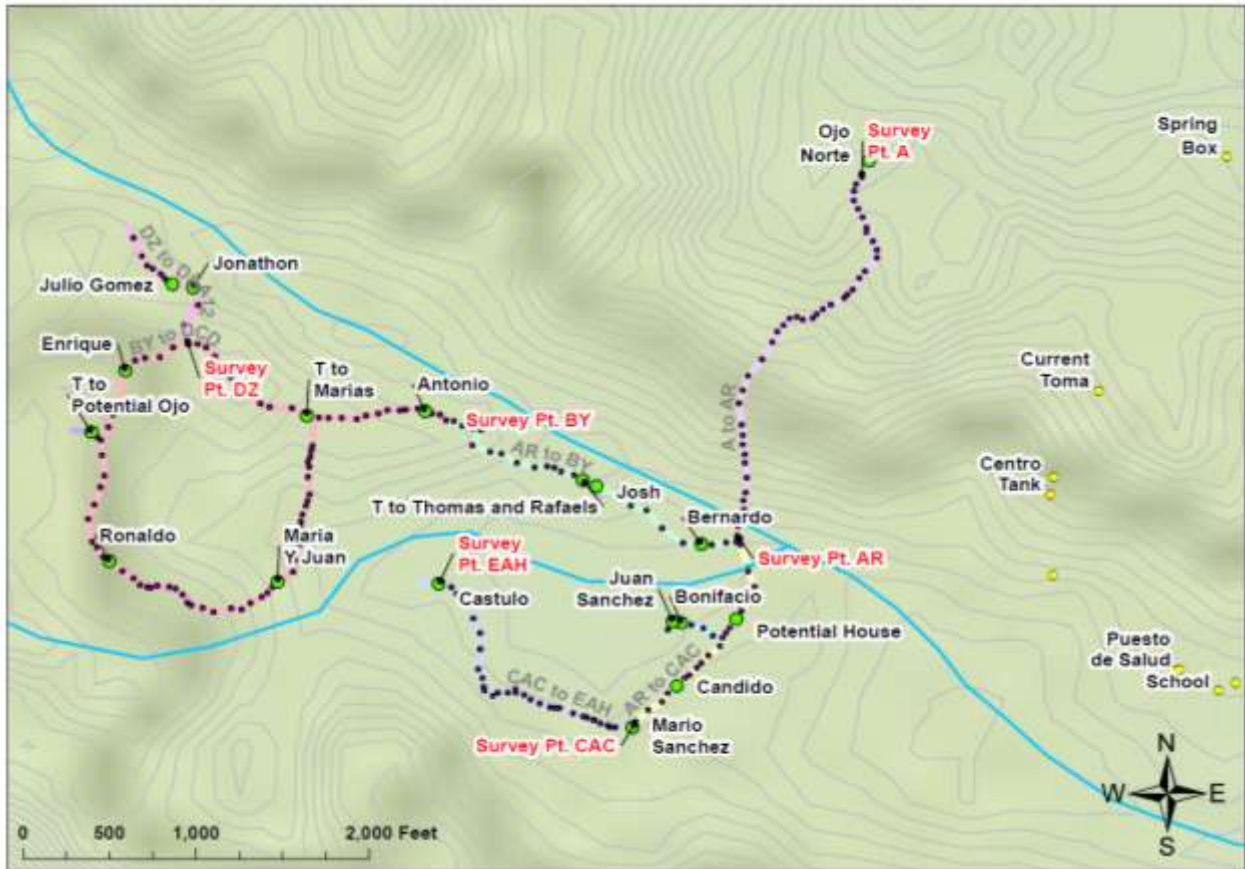
## **ATTACHMENT B: PROJECT SITE MAP**

***Table B-1: Site Coordinates***

**Longitude:** 82° 40' 6.7"W

**Latitude:** 9° 24' 12.9"N

***Picture B-1: Project Site Coordinates***



# ATTACHMENT C: TASK HAZARD ANALYSES

Table C-1 titled “Site Specific Task Hazard Analysis” summaries the tasks and the anticipated hazards associated with each activity.

**Table C-1 – Site Specific Task Hazard Analysis**

TASKS	TYPE			INDIVIDUAL HAZARDS																					
	CHEMICAL	BIOLOGICAL	PHYSICAL	TH 01 – Noise And Hearing	TH 02 – Inclement Weather	TH 03 – Heat Stress	TH 05 – Foot Care	TH 08 – Manual Lifting	TH 09 – Rough Terrain	TH 10 – Housekeeping	TH 11 – Structural Hazards	TH 12 – Remote Areas	TH 13 – Working Over /Near Water	TH 14 – Traffic And Vehicles	TH 16 – Fall Protection	TH 17 – Ladders	TH 18 – Shoring And Trenching	TH 19 – Hazardous Mat Use Storage	TH 23 – Hand and Power Tools	TH 24 – Hand & Emergency Signals	TH 26 – Biological Hazards	TH 27 – Hazardous Materials	TH 28 – Clear, Grubb, Logging	TH 31 – Falling Objects, Punctures, Abrasions, Dust, And Noise (PPE)	
01	Travel	X	X		X	X	X		X			X		X								X			
02	Eating / Drinking		X			X			X		X										X				
03	Trail Hiking		X	X		X	X	X			X	X			X							X			X
04	Work Site Inspection		X	X	X	X	X	X	X	X	X	X	X	X	X		X					X			X
05	Labor Oversight		X	X	X	X	X	X		X		X	X		X		X					X			X
06	Surveying		X	X		X	X	X				X										X			X
07	Excavate/Backfill Trench		X	X		X	X	X	X			X	X				X		X						
08	Assemble piping		X	X	X	X	X	X		X		X	X						X			X			
09	O&M Training of Locals	X	X	X		X	X	X		X		X						X				X			
10	Investigate/Repair Distribution System (if needed)		X	X	X	X	X	X	X	X	X		X			X	X		X			X			
11	Soil investigation		X	X		X	X	X		X												X			
12	Supplemental health assessment		X	X		X	X	X		X												X			
13	Existing latrine documentation					X	X	X			X											X			

## ATTACHMENT D: PERSONAL PROTECTIVE EQUIPMENT ANALYSES

Table D-1 titled “Site Assessment & Investigation PPE Analysis” summaries the tasks and the PPE associated with each activity.

**Table D-1 – Site Assessment & Investigation PPE Analysis**

TASK	GENERAL					FOOTWEAR			EYE / HEARING			HAND PROTECTION			Personal Fall Protection	Respiratory Protection	Excavation
	Seat Belts	Hard Hats	Long Pants	Long Sleeve Shirt	Rain Gear	Work Boots	Rubber Boots	Safety Glasses	Safety Goggles	Welding Helmet with Lens Shade	Hearing Protection	Leather Gloves	Alkali- Resistant	Rubber Gloves			
Travel to/from site	X				A												
Eating/drinking on site					A												
Cut and bend rebar			x	x	A	x		x									
Concrete pouring			x	x	A	x	x										
Concrete mixing		x	x	x	A	x	x									A	
Building formwork		x	x	x	A	x		x									
Installing plumbing			x	x	A	x		x									
Painting			x	x	A	x		x									
Chemical Handling			A	A	A	A	A									A	
Taking pictures of site			A	A	A	A	A				A						

A = As Required

X = Required

?? = HSO To Determine

# **ATTACHMENT E: MATERIAL SAFETY DATA SHEETS**

## **(MSDS)**

### ***Anticipated Chemicals***

Portland Cement is the anticipated chemical that can be found in the concrete mixing throughout the construction of the springbox.

### ***Portland Cement General Information***

#### **General Information**

#### ***Section 1 – IDENTIFICATION***

##### Supplier/Manufacturer

CEMEX, Inc.  
CEMEX California Cement LLC  
Victorville Cement Plant  
16888 North "E" Street  
Victorville, California 92394-2999

##### Emergency Contact Information

(619) 381-7600

##### Chemical name and synonyms

Portland Cement (CAS #65997-15-1)

##### Product name

"CEMEX Type I/II"  
"CEMEX Type III"  
"CEMEX Type II/V"  
"CEMEX Type V"  
"CEMEX Block"  
"CEMEX Class G"

##### Chemical family

Calcium salts.

##### Formula

3CaO.SiO <sub>2</sub>	(CAS #12168-85-3)
2CaO.SiO <sub>2</sub>	(CAS #10034-77-2)
3CaO.Al <sub>2</sub> O <sub>3</sub>	(CAS #12042-78-3)
4CaO..Al <sub>2</sub> O <sub>3</sub> Fe <sub>2</sub> O <sub>3</sub>	(CAS #12068-35-8)
CaSO <sub>2</sub> .2H <sub>2</sub> O	(CAS #13397-24-5)

Other salts:

Small amounts of MgO, and trace amounts of K<sub>2</sub>SO<sub>4</sub> and Na<sub>2</sub>SO<sub>4</sub> may also be present.

#### ***Section 2 - COMPONENTS***

##### Hazardous Ingredients

Portland cement clinker (CAS# 65997-15- 1) - approximately - 93.5-96.0 % by weight

ACGIH TLV-TWA (2000) = 10 mg total dust/m<sup>3</sup>

OSHA PEL (8-hour TWA) = 50 million particles/ft<sup>3</sup>

Gypsum (CAS# 7778-18-9) - approximately - 4.0-6.5 % by weight  
ACGIH TLV-TWA (2000) = 10 mg total dust/m<sup>3</sup>  
OSHA PEL (8-hour TWA) = 15 mg total dust/m<sup>3</sup>  
OSHA PEL (8-hour TWA) = 5 mg respirable dust/m<sup>3</sup>

Respirable quartz (CAS# 14808-60-7) – greater than 0.1% by weight  
ACGIH TLV-TWA (2000) = 0.05 mg respirable quartz dust/m<sup>3</sup>  
OSHA PEL (8-hour TWA) = (10 mg respirable dust/m<sup>3</sup>)/(percent silica + 2)

### Trace Ingredients

Trace amounts of naturally occurring chemicals might be detected during chemical analysis. Trace constituents may include up to 0.75% insoluble residue, some of which may be free crystalline silica, calcium oxide (Also known as lime or quick lime), magnesium oxide, potassium sulfate, sodium sulfate, chromium compounds, and nickel compounds.

### **Section 3 - FIRST AID**

#### Eyes

Immediately flush eyes thoroughly with water. Continue flushing eye for at least 15 minutes, including under lids, to remove all particles. Call physician immediately.

#### Skin

Wash skin with cool water and pH-neutral soap or a mild detergent. Seek medical treatment in all cases of prolonged exposure to wet cement, cement mixtures, liquids from fresh cement products, or prolonged wet skin exposure to dry cement.

#### Inhalation of Airborne Dust

Remove to fresh air. Seek medical help if coughing and other symptoms do not subside.

#### Ingestion

Do not induce vomiting. If conscious, have the victim drink plenty of water and call a physician immediately.

### **Section 4 - PHYSICAL AND CHEMICAL, PROPERTIES**

Appearance.....	Gray Powder	Odor.....	No distinct odor
Physical state.....	Solid (powder)	pH (in water).....	12 to 13
Solubility in water...	Slightly soluble (0.1 to 1.0%)	Vapor pressure.....	Not applicable
Vapor density.....	Not applicable	Boiling point.....	Not applicable (i.e., > 1000 C)
Melting point.....	Not applicable	Specific gravity (H2O = 1.0).....	3.15
Evaporation rate.....	Not applicable		

### **Section 5 - STABILITY AND REACTIVITY**

#### Stability

Stable.

Conditions to avoid

Unintentional contact with water.

Incompatibility

Wet Portland cement is alkaline. As such it is incompatible with acids, ammonium salts and phosphorous.

Hazardous decomposition

Will not spontaneously occur. Adding water produces (caustic) calcium hydroxide

Hazardous Polymerization

Will not occur.

## **ATTACHMENT F: POTENTIAL VENOMOUS SNAKES & SPIDERS**

From the Armed Forces Pest Management Board Living Hazards Database

### **Agkistrodon bilineatus**

#### **Identification**

**Family:** Viperidae

**Scientific Names:** Ancistrodon bilineatum, A. bilineatus, Agkistrodon bilineatum, A. bilineatus bilineatus, A. b. howardgloydi, A. b. lemosespinali, A. b. russeolus, Trionocephalus bilineatus, T. specialis

**Common Names:** Cantil, Mexican Moccasin, Mokassinslange, common cantil, vibora castelana, k'an ti, q'an ti, cazadora, cumcoatl, cantil de agua, cuatro narices, gammarrilla, volpochh, bil palka, kantiil [plus >10 additional local dialect names]

**Description** Large, heavy-bodied pitviper, adults usually 80-120 cm (max. 138 cm) long w/ fairly long slender tail, fangs may be 12 mm long. Color variable, usually dark gray to almost black w/ 10-19 (usually 12-15) brown to black crossbands, often outlined by thin whitish lines; body may also have yellow, red, or lavender scales; w/ 2 distinct pale lines along sides of head. Belly dark grayish to reddish-brown, lightest along middle, w/ scattered whitish spots (& often w/ dark chestnut-brown lateral spots).



#### **Habitat**

Most commonly found in seasonally dry, tropical deciduous scrub forest & large grassy plains w/ scattered trees, mainly in coastal foothills in parts of southern & western Mexico & Central America. Often shelters in crevices or under rocks. Mainly found in lower to moderate elevations, usually <600 m (max. about 1,500 m). Also found in the Rio Chixoy (Negro) Valley in central Guatemala.

#### **Activity and Behavior**

Mainly terrestrial & mainly nocturnal. Aggressive when provoked; will strike repeatedly. Ovoviviparous w/ each female bearing about a dozen 10-inch long neonates/ litter. Preys on available small mammals, lizards, birds, amphibians & reptiles. Juveniles often eat invertebrates, too.

#### **Venom Characteristics**

- Primarily hemotoxic, necrotic effects reportedly often extensive; serious human envenomations & fatalities have occurred. This species is the third most frequent cause of snake envenomations of humans in the Yucatan Peninsula of Mexico.

**Atropoides occiduus**

**Identification**

**Family:** Viperidae

**Scientific Names:** *Atropoides nummifer* (in part), *Bothriechis nummifera* (in part), *Bothriopsis affinis* (in part), *Bothrops affinis*, *Bothrops nummifer nummifer*, *B. n. occiduus*, *Porthidium nummifer occiduus*, *Trimeresurus nummifer* (in part), *T. n. nummifer* (in part)

**Common Names:** Guatemalan jumping pitviper, mano de piedra, cantil sapo, chinchintor, sulcuat

**Description**

Small to medium-sized, very stout-bodied, terrestrial pitviper, adults usually 35-60 cm long (max. 79.5 cm). Body usually pale brown to burgandy-brown (rarely pinkish or purplish) w/ dark brown rhomboidal dorsal blotches, usually joined at vertebral line forming a zigzag pattern (at least on posterior half). Wide, dark brown postocular stripe. Middorsal scales strongly keeled, 21-27 midbody dorsal scale rows, belly usually lighter, often w/ dark spots or blotches, especially along sides.

**Habitat**

Mainly found in subtropical wet forest along the Pacific versant from southeastern Chiapas, Mexico to western El Salvador; but also in seasonally dry pine-oak forest near Guatemala City. Found mainly at medium to higher elevations (1,000-1,600 m).

**Activity and Behavior**

Terrestrial, mainly nocturnal, but sometimes basks in sun. Sluggish, non-aggressive during the day. Can only strike for about 1/2 its body length (does not actually "jump" or launch itself). May open mouth very wide in a defensive display (usually while coiled) if molested. Sometimes holds onto prey after striking it. Ovoviviparous, preys mainly on small mammals, birds (sometimes also lizards & frogs).

**Venom Characteristics**

- Not well known, but probably mainly hemotoxic (w/ possible cytotoxic factors). Reportedly similar to *A. mexicanus* in having relatively less potent venom than other pitvipers found in the same areas (e.g., *B. asper*). Has envenomated humans, but only recently named, and may have been confused w/ similar species previously. No definitely documented human fatalities have been caused by this species so far.

**Centruroides spp.**

**Identification**

**Family:** Buthidae

**Scientific Names:** Scorpio spp. (in part), Centruroides spp. (in part), Rhopalurus spp. (in part). [ Note: There are currently 50+ named species recognized in this genus, but only about 6 spp. are of medical importance (see medically important spp. addressed separately, individually).]

**Common Names:** Bark scorpions, house scorpions, common scorpions, "sculptured" scorpions

**Description**

Medium to large-sized, moderately-slender scorpions, adults usually 50-80 mm long (max. 110+ mm; varies by spp.). Body usually pale yellowish to medium-brown (some spp. dark brown), w/ varying patterns of darker gray or brownish dorsal stripes or blotches. Tail (postabdomen) rather slender, pincers rather slender & not very robust (= usually thin), legs usually pale yellow-brown. Most spp. are sexually dimorphic w/ thinner, longer males & stouter, shorter females.



**Habitat**

Found mainly in warm, relatively dry areas, usually w/ sandy soil & lots of loose bark (e.g. on or under logs), leaves, surface debris or crevices in which to hide. Most spp. limited to arid or semi-arid regions of the southwestern U.S., Mexico, Central America, the Antilles, &/or northern South America.

**Activity and Behavior**

Nocturnal, usually hide in crevices or under bark or debris by day, often come into houses. Prey mainly on available insects & other arthropods. Avoid humans unless cornered, stepped on or brushed against (usually while hunting at night or if trapped in clothing being donned), then sting quickly & try to escape. Ovoviviparous, >20 per "litter," young may ride on mother's back until 2nd instar. Whole body fluoresces (usually yellowish-green) in certain wavelengths of UV light.

**Venom Characteristics**

- Mainly neurotoxic, w/ cytotoxic factors in some spp. Potency varies w/ different spp. A sting (envenomation) usually causes local pain, swelling, redness & discomfort (may be delayed 1-24 hrs.); sometimes spreads & includes numbness. Systemic effects may include muscle twitching, nausea, rapid heartbeat, slurred speech, sweating, coma & death (for some spp.). Cardiac failure reportedly causes most human deaths. Venom effects more severe in children than adults.

**Cerrophidion godmani**

**Identification**

**Family:** Viperidae

**Scientific Names:** Bothrops godmani, Bothriechis godmani, B. trianguligera, Lachesis godmani, Porthidium godmani, Trimeresurus godmani

**Common Names:** Engl.: Godman's montane pitviper, Ger.: Godman-Berggrubenotter, Costa Rica: borot kabi, dudaban, toboba de altura, Guatemala: cantil frijolillo, sheta, tamagas, Honduras: timbo chingo, tamagas cafe, Mexico: nauyaca del frio, Nicaragua: toboa oscura, toboita

**Description**

Small, moderately-stout, terrestrial pitviper, adults usually 46-50 cm long (max. 82 cm); colors & patterns quite variable, body usually brown, reddish-brown, grayish-brown to nearly orange; dark brown blotches often merge to form a zigzag dorsal stripe, 21 midbody dorsal scale rows, dark postorbital stripe, venter pale yellow to orange w/ no mottling, darker toward tail.



**Habitat**

Found in a wide range of low montane wet forest & cloud forest, lower montane dry forest, largely pin oak; & high montane forest & meadow. Occurs at 1,400-3,491 m elevation. Limited to higher elevations of parts of southeastern Mexico & Central America.

**Activity and Behavior**

Mainly terrestrial, & mainly diurnal, often seen crawling or coiled along forest paths. May rarely climb up onto a log or stump, but usually found beside or under logs, rocks, or other large pieces of debris. Can move very rapidly, usually avoids humans, but will strike quickly if disturbed. Ovoviviparous w/ 2-12 young/ litter observed for captured specimens. Prey on a variety of available arthropods, small mammals, reptiles (mainly lizards), salamanders, & sometimes birds.

**Venom Characteristics**

- Not well known. Mainly hemotoxic, w/ potent myotoxic & proteolytic factors. Symptoms of envenomation of humans may include: intense local pain, extensive local swelling (may involve whole limb), widespread itching, fever, headache, nausea & light-headedness (to the point of collapse in one observed case). Few bites & no fatalities of humans reported for this species.

**Crotalus simus**

**Identification**

**Family:** Viperidae

**Scientific Names:** *Crotalus durissus* (in part), *C. d. culminatus*, *C. d. durissus*, *C. d. neoleonensis*, *C. d. tzabcan*, *C. s. culminatus*, *C. s. tzabcan*, *C. s. simus*, *C. terrificus* (in part), *C. t. copeanus*

**Common Names:** Middle American rattlesnake, cascabel, vibora de cascabel, cascabela, chil-chil, kwechwah, quiakxop, sochaj, ahau-can, ah tsab ti'kkan, sakk ahaw kan, shunu, teotlacoauhqui, tepocolcoatl, teuhlacoauhqui

**Description**

Medium-to-large, stout rattlesnake, adults usually 130-160 cm long (max. about 180 cm); body gray-brown, reddish-brown, yellowish-gray, yellowish-olive, straw, or orange; w/ 18-35 rhombic or diamond-shaped dorsal blotches, 27-33 midbody dorsal scale rows, belly whitish, yellowish or buff w/ gray blotches darker posteriorly, dark postocular stripe, conspicuous spinal ridge of strongly-keeled scales, tail w/ dark crossbands.

**Habitat**

Found mainly in semi-arid regions, w/ dry to very dry tropical forest, arid scrub forest, & thorn woodlands, but also sometimes in mesic forests in limestone outcrop areas, & along breaks in cloud forests. Ranges from central Mexico to western Costa Rica. Usually below 1,000 m but sometimes found at 1,500-2,200 m elevation. Also occurs on the Atlantic coast of Columbia; but no verified specimens from Panama.

**Activity and Behavior**

Not well documented. Mainly diurnal, but often active at night, & mainly terrestrial. Ovoviviparous w/ 21 young/litter reported for a captured female. Prey on available small mammals (sometimes also lizards &/or other snakes).

**Venom Characteristics**

- Mainly hemotoxic, but may have some tissue-necrotic factor(s). Bites often locally painful, may progress to swelling & necrosis if severely envenomated.

**Crotalus spp.**

**Identification**

**Family:** Viperidae

**Scientific Names:** Aploaspis, Aechmophrys, Caudisona, Crotalinus, Crotalophorus, Crotalurus, Haploaspis, Paracrotalus, Urocrotalon, Uropsophus [Note: This genus includes at least 30 currently named spp., & is most diverse on the Mexican plateau & surrounding mountains.]

**Common Names:** Rattlesnakes, pitvipers ("new world"), vipers

**Description**

Small to large, mainly terrestrial, fairly stout-bodied pitvipers, w/ multiple hollow "scales" (at least 1) at the tail tip, usually retained through molting & "rattle" if tail is shaken. Body color may be brown, gray, green, red, pink or yellow, usually w/ dorsal pattern of darker rhombs, blotches or spots (varies by spp.), & belly lighter w/ darker spots or blotches, tail usually w/ multiple alternate dark & light rings (blend well w/ usual surroundings), w/ 2 folding, upper front fangs.

**Habitat**

Found in a wide range of habitats (varies by spp.), but most are found in brushy edges of open areas of forests or margins of dry, or seasonally dry (often desert), & often rocky areas. Found from below sea level to 4,500+ m elevation (varies w/ spp., see individual spp. listed).

**Activity and Behavior**

Most spp. mainly terrestrial & mainly nocturnal, but varies w/ physical conditions of typical habitat (esp. temperatures), & sometimes w/ season of the year. Most spp. wait in typical sites to ambush prey (usually small mammals, lizards etc.; & varies by spp.). All are ovoviviparous, litter numbers vary w/ spp. & female's body size.

**Venom Characteristics**

- Most spp. have mainly hemotoxic venom, often w/ additional tissue-necrotic factors (& sometimes neurotoxic or cardiotoxic factors). Many species can & do cause serious human envenomations & deaths each year (varies by individual spp.).

**Latrodectus mactans**

**Identification**

**Family:** Theridiidae

**Scientific Names:** Aranea mactans, Latrodectus albomaculatus, L. formidabilis, L. insularis insularis, L. i. lunulifer, L. intersector, L. mactans mexicanus, L. m. texanus, L. perfidus, L. sagittifer, Tetragnatha zorilla, Theridion lineatum, T. lineamentum, T. verecundum [Note: This is one of the 2 most geographically wide-spread & best known of at least 31 currently valid species in this genus.]

**Common Names:** Black Widow Spider, Southern Black Widow, red-back spider, jockey spider, Katipo, viuda negra, chiranthahua, arana brava, casampulga, la coya, arana naranja

**Description**

Medium-sized cobweb spider, females' body (cephalothorax + abdomen) usually 10-15 mm long, satiny dark-brown to black w/ reddish "hourglass" mark on posterior ventral abdomen, often w/ a reddish spot on dorsal abdomen just above its tip. Female abdomen rounded & globular. Males much smaller, rather slender w/ relatively long legs. Males & young often w/ varying pattern of many stripes or blotches of red, white & brown on body.



**Habitat**

Most often found hanging in typical "cobwebs" in upper corners of basements, crawl spaces, outbuildings, & under seats of outdoor privies, usually near garbage or debris, wherever insect prey is abundant. Geographically wide spread. Found in southern U.S. (New York to northern California & southward), several Caribbean islands, Mexico, & Central & parts of South America.

**Activity and Behavior**

Mainly nocturnal, hangs in web awaiting prey, usually tries to get away from large animals & people, but will often aggressively defend its egg clusters (sacs) which it has hung in its web. Feeds on nearly any kind of insect or arthropod which gets caught in its web. Males are not always eaten after mating w/ a female, usually only if female has not fed recently, but he is often "biologically spent" & dies soon afterward anyway.

**Venom Characteristics**

- Mainly neurotoxic (presynaptic sites). Bite usually like a pinprick, often not felt 'til 15 min. later, then pain may be locally intense. Severe envenomation causes symptoms like spreading intense pain, lots of sweating, fast & shallow breathing, eyelids swollen, alternating excess & lack of salivation, cardiac rate & rhythm changes, rigid abdominal muscles, sight impaired (seeing "light" spots). Human fatalities rare (<5%, untreated) & often due to additional medical problems.

**Micrurus nigrocinctus**

**Identification**

**Family:** Elapidae

**Scientific Names:** *Elaps divaricatus*, *E. fulvius*, *E. melanocephalus*, *E. nigrocinctus*, *Micrurus nigrocinctus* babaspul, *M. n. coibensis*, *M. n. divaricatus*, *M. n. mosquitensis*, *M. n. nigrocinctus*, *M. n. ovandoensis*, *M. n. ruatanus*, *M. n. wagneri*, *M. n. yatesi*, *M. n. zunilensis*, *Micrurus pacheoi*

**Common Names:** Central American coral snake, coral, Coral Centroamericana, coralillo, gargantilla, salviara, limlim, babaspul, coral macho

**Description**

Medium-sized 3-colored coral snake, adults usually 60-75 cm long (max. 115 cm). Quite variable; may be 2- or 3-colored. Snout black, usually w/ a yellow ring (red in bicolored specimens) of variable width on head at about the midpoint. Body pattern usually fairly broad red rings separated by much narrower sets of yellow-black-yellow rings (rybyr). Usually w/ 10-24 black rings on body, & 3-8 more on tail.



**Habitat**

Found mainly in lowland rain forest, lowland dry forest, thorn forest, lower montane wet (or moist) forest, & lower montane dry forest. Occurs mainly from sea level to 1,300 m elevation (one report at 2,000 m). Occurs from southern Mexico to northwestern Colombia, except no specimens from Belize, so far.

**Activity and Behavior**

Mainly nocturnal, but active at dusk, dawn & sometimes after rains. Mainly terrestrial & burrows in loose soil & leaf litter. Usually not aggressive, but will bite if restrained or molested. Oviparous (clutch size reportedly 2-11 eggs) & eats locally available other snakes (cannibalistic), lizards, amphibians, & invertebrates.

**Venom Characteristics**

- Has mainly potent neurotoxic venom which can be injected through a pair of grooved, upper, fixed front fangs. Due to the small size of their mouths, coral snake bites to humans usually occur on a finger or toe, & usually during attempts to catch the snake. This species is abundant throughout most of its range, & is the main cause of coralsnake bites of humans within its range.

**Pelamis platurus**

**Identification**

**Family:** Hydrophiidae

**Scientific Names:** Anguis platura, Hydrophis bicolor var. sinuata, H. pelamis, Hydrus bicolor, H. platurus, Pelamis bicolor, P. b. var. sinuata, P. b. var. variegata, P. ornata, P. platurus, P. schneideri

**Common Names:** Yellow-bellied sea snake, Pelagic sea snake, cantil listada, zapatilla, serpiente de mar

**Description**

Medium-sized, slender sea snake, adults usually <75 cm long (max. 113 cm). The tail is laterally flattened & oarlike. Body color pattern is highly variable (in detail) but basically involves a black or brown dorsum w/ a yellow or cream venter (lower half). Color of tail is yellow, w/ alternating upper & lower large dark blotches (sometimes w/ 1 or more stripes) on both sides.



**Habitat**

Found only in the Pacific & Indian Oceans; sometimes drifts in large numbers in offshore waters w/ temperatures >20 degrees C. Can be found in coastal (or even open ocean) marine waters from South Africa, to the Persian Gulf, to India, to Australia, to the western coasts of Central & northern South America. Rarely, individual specimens may be found outside this range (e.g, on western Mexican coast).

**Activity and Behavior**

Usually floats among flotsam or floating seaweed at the surface in tropical or subtropical zones of the Pacific & northern Indian Oceans. Captures small fish that happen near via a quick sideways lunge. Quite inoffensive, but when restrained or when stranded on a beach it will bite (& may actively strike) to defend itself.

**Venom Characteristics**

- Highly potent venom containing post-synaptic neurotoxins. Most natural marine predators, like predatory fish & even sharks, usually avoid this snake. Scavengers also tend to avoid specimens which have been washed up onto a beach & are dying.

**Phoneutria spp.**

**Identification**

**Family:** Ctenidae

**Scientific Names:** [Note: This genus currently includes 5 named species: *Phoneutria bahiensis*, *P. boliviensis*, *P. fera* (the largest, & shown here), *P. nigriventer* (bites sometimes lethal without use of antivenom), & *P. reidyi*.]

**Common Names:** Wandering spiders, banana spiders, South American wandering spiders

**Description**

Large, stout spiders w/ body (cephalothorax + abdomen) about 3.5 cm long, legs usually span 5+ cm. Body color light to dark-brown to black, covered w/ thick, short yellow to dark-brown hairs. Pattern varies by spp., usually a middorsal dark line on carapace & lines &/or bands of whitish spots (some spp. w/ dark-brown spots too) on top &/or sides of abdomen. Front 2 pairs of legs w/ distinct lighter ventral crossbands which show during threat displays.



**Habitat**

Most spp. are found mainly at or near ground level in moist to seasonally dry margins of forest clearings or at agricultural sites (esp. around bananas), w/ vegetation, organic debris, & lots of hiding places (like between palm fronds) & ample prey. Some spp. common in & around humans' buildings. Individual species' ranges differ, most limited to central & northern South America (1 sp. in Central America) at low to moderate elevations. Often carried long distances in commerce.

**Activity and Behavior**

Mainly nocturnal, respond to vibrations, usually wait in hiding & "ambush" a wide variety of prey (mainly insects & other arthropods, but often small vertebrates, too). Surprisingly quick, fast, & agile for their relatively large size. Adult females can jump about 1 ft. laterally at the same level as their resting place. Aggressive if even slightly disturbed, usually raise front 2 pairs of legs (fully extended) in a threat display, just before rushing at an intruder.

**Venom Characteristics**

Mainly neurotoxic (w/ possible cardiotoxic factors), most spp. have large volume of venom available. Several spp. are easily provoked to bite if disturbed, stepped on (or near), or brushed against. Only 1 sp. (detailed separately) is known to cause human fatalities, but others can inflict very painful bites & may pose a health risk, especially to persons w/ other medical problems. For details of typical symptoms of serious envenomation, [See \*Phoneutria nigriventer\*](#).

**Porthidium ophryomegas**

**Identification**

**Family:** Viperidae

**Scientific Names:** Bothriechis ophryomegas, Bothrops ophryomegas, Bothrops ophryomegas, B. lansbergii annectens, Trimeresurus lansbergii annectens, T. ophryomegas

**Common Names:** Slender hog-nosed pit viper, Western hog-nosed pit viper, vibora castellana, tamagas negro, toboba, toboba chinga, toboba gata, corniz, chatilla

**Description**

Small, fairly slender pitviper w/ upturned snout, adults usually 40-50 cm long (max. 80 cm). Body may be tan, brown, gray, or grayish-brown, w/ a narrow white, yellow, or rust brown middorsal line, 23-28 (usually 25) midbody dorsal scale rows, & 24-40 dark rhombs along each side. Dark postocular stripe, belly paler w/ heavy dark brown mottling (esp. along front edge of each ventral scale). Some specimens very pale w/ much lighter markings. Tail heavily mottled on basal half, paler near tip.



**Habitat**

Mainly found in seasonally dry forests, including tropical dry & arid forest, subtropical dry forest, & the drier portions of tropical moist forest. Occurs from sea level to 1,000 m elevation. May occur in suitable habitats in southeastern Mexico, but no specimens documented from there, so far.


**Activity and Behavior**

Mainly terrestrial & mainly nocturnal; most active during local rainy seasons. Alert & quick to strike, especially if molested. Ovoviviparous w/ 12-19 young/ litter observed for captured specimens. Preys mainly on lizards, frogs, & small mammals.

**Venom Characteristics**

Not much known, but probably mainly hemotoxic w/ tissue-necrotic factors. Reportedly has relatively low venom yield, & envenomation should usually have only mild to moderately severe effects (mainly pain & swelling). No human fatalities reported, so far, from bites by this species.

# ATTACHMENT G: TRAINING COPY CERTIFICATES



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*Tim Ager*

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HAS PARTICIPATED IN A PEDIATRIC/ADULT  
FIRST AID COURSE

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*Luis Galindo*

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HAS PARTICIPATED IN A INFANT • CHILD • ADULT  
FIRST AID COURSE

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**APR 30 2011**

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DATE OF COURSE



**C.P.R. RESOURCES INC.**  
(512) 292-3130  
www.cpr-resources.com

**Basic Cardiac Life Support**

*Luis Galindo*

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has demonstrated proficiency in cardiopulmonary resuscitation

INFANT • CHILD • ADULT  
DEFIBRILLATOR (AED)

**APR 30 2011**

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Date of Course

## **ATTACHMENT H: REQUIRED MEDICAL KIT CONTENTS**

### ***Required Group Medical Kit Contents***

There will be one (1) large medical kit with the contents listed in Table H-1. Currently it is anticipated there will be 8 people traveling. Additionally, EWB-USA members will not provide treatment for host country community members beyond first aid unless they are licensed medical professionals and understand the local laws on practicing medicine.

Table H-1 – Required Medical Contents List

NUMBER IN KIT	ITEM
1	<b>Site Specific Health and Safety Plan</b> Page one is the Emergency Contact Page, laminated and printed on brightly colored paper The personal medical checklists should be placed in a sealed envelope immediately following the Emergency Contact Page, or the location of the Checklists should appear here. HSOs must return the checklists to their owners at the end of the trip.
1	A field manual of first aid can be very useful for rapid reference. One recommended book is: “The Field Guide of Wilderness and Rescue Medicine” by Jim Morrissey and David Johnson *
1	Small notebook and pen/pencil for recording vital signs
2	Safety glasses (for bloodborne pathogens)
2	CPR face shields or (even better) pocket mask
1 box	Sterile and non-sterile gloves, 1 box or a minimum of 12 pairs
1 box	Antiseptic wipes or “baby wipes” - 1 box
1 bottle	Alcohol-based gel hand cleanser - 1 bottle
12	Providone Iodine swabs or a small bottle of betadine
1 bottle	Antibacterial soap
1 bottle	Hydrogen peroxide
3 bottle	Sterile Eye Wash. Opened bottles should be replaced at the start of every trip
1	Cold pack – 4 in. x 5 in
3	Extra soft toothbrush for cleaning wounds
1 tube	Antibiotic ointment (Neosporin, Bacitracin, or generic equivalent) - 1 tube
1	Topical over the counter anesthetic (Anbesol or Chloraseptic spray) Fouille First Aid Ointment if you can get it.
1 box	Band-Aid assortment; and Blister dressings (Bandaid blister, moleskin, etc. Choose band-aids with elasticized cloth that stay on for days. Plastic ones don't last as long.)
3	Absorbent compress or Trauma Dressings ~ 32 sq. in. (81.3 sq. cm.) with no side smaller than 4 in. (10 cm)
1	Adhesive tape, 5 yd. (457.2 cm) total

Table H-1 – Required Medical Contents List

NUMBER IN KIT	ITEM
6	Burn treatment, 0.5 g (0.14 fl. oz.) applications
4	Triangular bandages, 40 in. x 40 in. x 56 in. (101 cm x 101 cm x 142 cm)
2	Roller bandage - 4 in. (10 cm)
1	Roller bandage - 2 in. (5 cm)
1	Ace Wraps – try to get a few sizes of these
1 box	Sterile gauze pads, 4x4”
1 box	Non adherent dressing (Telfa), 4x4”
1	Roll of Coban wrap (a.k.a. Vet Wrap)
2	Scissors, one pair of trauma shears for slicing bandages and cutting clothing, and one small pair for cutting more delicate things (like skin)
2	Tweezers, one small for pulling splinters and stingers, and a broader tip with grippers for picking rocks out of wounds.
Small box	Safety pins of various sizes
1	Thermometer
1	Ziplock bag containing a clean XL t-shirt. Can be cut up for bandages, used as a sling, or put on a patient for modesty.
Appropriate to trip duration and number of travelers	Iodine tablets OR chlorine tablets with neutralizer for disinfecting water * 1 ft square of muslin cloth for filtering sediment from water before disinfection *
1	Portable water filter, such as the ceramic type with the 0.2 pm filter. Three stage MSR or PUR water filters are probably the best. If the water is clear, the new light sterilizers work. *
1	Emergency Dental Kit (Cavit if you can get it) *
1	Stethoscope *
1	Four inch SAM splint *
1	Finger splint *
1 box each	Mylanta Pepto Bismol Imodium tablets Cimetidine * Motion sickness pills are useful in vomiting illnesses and much safer than what might be given at the local clinic Benadryl or generic diphenhydramine, 25 mg capsules Tylenol (500 mg tablets) Ibuprofen (200 mg tablets) Aspirin (for Heart attacks)

Table H-1 – Required Medical Contents List

NUMBER IN KIT	ITEM
Appropriate to trip duration and number of travelers,	Primatene Mist * Steroid cream for rashes Powder (Monkeybutt) for chafes * Antifungal cream * Antiyeast tablets or cream for women * NeoSynephrine nasal spray *
Up to 1/day	Gatorade packets
Appropriate for number traveling	Small hard candies like Jolly Ranchers or LifeSavers (must contain sugar – for diabetics) *
Appropriate for number traveling	Sodium tablets – for cramps in the heat *

## **ATTACHMENT I: TASK HAZARD MANAGEMENT STRATEGIES**

### *Task Hazards List*

TASK HAZARD	DESCRIPTION	REVISION DATE
TH 01	Noise and Hearing Conservation	May 2008
TH 02	Inclement Weather	May 2008
TH 03	Heat Stress	May 2008
TH 05	Foot Care	May 2008
TH 08	Manual Lifting and Handling of Heavy Objects	May 2008
TH 09	Rough Terrain	May 2008
TH 10	Housekeeping	May 2008
TH 11	Structural Hazards	May 2008
TH 12	Remote Areas	May 2008
TH 13	Working over or near water	May 2008
TH 14	Traffic and Vehicles	May 2008
TH 16	Working at Elevation and Fall Protection	May 2008
TH 17	Ladders	May 2008
TH 18	Shoring and Trenching	May 2008
TH 19	Hazardous Materials Use and Storage	May 2008
TH 23	Hand and Power Hand Tools	May 2008
TH 24	Hand and Emergency Signals	May 2008
TH 26	Biological Hazards	May 2008
TH 27	Hazardous Materials	May 2008
TH 28	Clearing Grubbing and Logging	May 2008
TH 31	Falling Objects, Punctures and Abrasions	May 2008

## TH 01 NOISE AND HEARING CONSERVATION

### General Information

Noise is defined as unwanted sound. Noise can cause:

- sudden traumatic temporary or permanent hearing loss,
- long term-slowly occurring sensory-neural and irreversible hearing loss,
- disruption of communication,
- masking of warning devices and alarms,
- increased stress levels and
- effects on the cardiovascular and nervous systems.

The goal of this operating practice is to reduce and potentially eliminate hazardous levels of noise exposure.

Some of the sources of hazardous noise are demolition operations and construction, drills, hammer blows, compressed air tools and heavy equipment. Examples of approximate noise levels from various activities are as follows:

Rock Drilling	up to 115 dBA	Lawn Mower	up to 96 dBA
Chain Saws	up to 125 dBA	Workshop Tools	up to 96 dBA
Abrasive Blasting	up to 110 dBA	Food Blender	up to 90 dBA
Heavy Equipment	95 to 110 dBA	Vacuum Cleaner	up to 88 dBA
Demolition	up to 117 dBA	Sewing Machine	up to 73 dBA
Needle Guns	up to 112 dBA	Electric Can Opener	up to 77 dBA
Riveter/Chipper	up to 120 dBA	Dishwasher	up to 72 dBA
Conversational Speech	up to 60 dBA	Air Conditioner	up to 68 dBA
Leaf Blowers	up to 112 dBA	Washing Machine	up to 72 dBA

### Procedure

Hearing protection devices are strongly recommended in any noisy environment, but are mandatory in the following situations:

- The eight hour average may equal or exceed 90 decibels.
- Any noise equal to greater than 110 decibels impact, continuous or intermittent.
- Any noise preventing normal vocal discussion between two individuals at arm's length distance ("arms-length rule") will dictate the need for hearing protection.

Not all hearing protection devices have the same noise reduction rating (NRR). Most EWB activities will require not more than 25 dBA noise reduction, but it is recommended that the chapters purchase 29-33 dBA earplugs in bulk. EWB volunteers shall wear their earplugs when exposed to loud noise, and it recommended that extra earplugs be brought to the site and shared with in country partners, particularly those operating heavy equipment.

Initial and daily on site briefings by the site Health and Safety Officer should address the effects of noise on hearing.

- The purpose of hearing protection, advantages, disadvantages, attenuation of various types, and the selection, fitting, use, and care of protectors.
- Recognition of hazardous noise.

### References

29CFR 1910.95

## **TH 02 INCLEMENT WEATHER**

### **General Information**

Inclement weather can be encountered on any trip and in any part of the world. Hazards related to inclement weather in Panama can be anything from heat stress, wetness, to more direct weather hazards such as storms and floods. Virtually every task can be affected by inclement weather. Hot weather (ambient temperatures over 70°F), rain, flooding and lightning are examples of inclement weather that may be hazardous or add risk to work activities. Heat stress is covered under separate hazard analyses.

### **Recognition and Risk Assessment**

Heat, rain, flooding and lightning are natural phenomena that complicate work activities, and add or increase risk. The potential for physical hazards must be considered for tasks that expose personnel to inclement weather. Seasonal considerations must be made during project planning. Site assessment trips may require a visit during the rainy season to collect data and information specific to rainy season conditions. Construction projects should not be planned during the local rainy season, as it will be likely that work will be severely hindered by the weather. In any season, proper research into the local climate and predicted weather of the location to be visited should be conducted, and plans should be made according to the likelihood of encountering inclement weather.

INFORM workers when weather conditions exist or are predicted that may pose an increased risk daily, or as conditions arise. Each worker must evaluate the risk associated with his or her work and be actively alert to these hazards. All personnel should be alert to changing weather conditions. Any site worker may stop work if safety procedures are not followed or the risk is too great.

Hot, dry weather increases risk of soil drying, erosion, and dust dispersion. Hot weather will increase pressure on, and the rate of volatilization of contents in closed containers such as gasoline and solvent containers, thereby potentially increasing the risk of exposure to toxic, flammable, or explosive atmospheres. Such containers shall be kept in shady, cool and dry locations, but not inside living quarters.

Rain and wet conditions increase slipping and tripping hazards, braking distances of vehicles, and the potential for slippage and handling difficulties for tools and heavy equipment. Rain fills holes, obscures trip and fall hazards, and increases risk of electrical shock when working with electrical equipment. Changes in soil conditions caused by rain can impact trenching and excavating activities, creating the potential for quicksand formation, wall collapse, and cave-in. Vehicles become stuck in mud, and tools and personnel can slip on wet surfaces. Rain and wet conditions may decrease visibility. In some areas, heavy rain can produce flooding and flash flooding. If the work area is located along a mountainous stream or wash, ask the local partners about the frequency of the area flooding during storms. Flash floods can occur even in dry washes, and rain only needs to be falling upstream of the worksite – not necessarily at the worksite. Any team member can halt work and evacuate the work area if the threat of flash flooding becomes apparent.

Lightning represents a hazard of electrical shock that is increased when working in flat open spaces, elevated work places, or near tall structures or equipment. Lightning can cause grass and forest fires. Snow and ice increase the risk of accidents such as slipping when walking, climbing steps and ladders, or working at elevation, and the risk of accidents when driving vehicles or operating heavy equipment.

### **Protection Programs**

PPE must be stored in a dry location, out of the sun, and maintained in proper working order. Stairs, ladders, elevated workplaces, and scaffold platforms must be kept free of mud, ice, and snow. Using a walking stick or probe to test footing ahead of persons walking where there is standing water, to protect the walker against stepping into potholes or onto puncture hazards, or other potential structurally unsound surfaces.

When puddles may obscure potholes, puncture hazards, or buried containers, or other potential structurally unsound surfaces walk the work area or intended travel way prior to using vehicles or equipment in off-road work.

Prior to working in areas or beginning projects during times when there is an increased likelihood of lightning or the potential for lightning striking personnel, steps must be taken to predict the occurrence of lightning strikes, including:

- Check with local project partners to determine if there is any pattern or noted conditions that predict lightning or if there are structures that are prone to lightning strikes.
- Monitor weather reports.
- Noting weather changes and conditions that produce lightning.
- Stop work in open areas, around drill rigs or other structures that may attract lightning, on or in water and in elevated work places when lightning strikes are sighted or thunder is heard near a work site.
- Ensuring all personnel are provided with safe areas of refuge. Keep personnel from standing in open areas, under lone trees, or under drill rigs.

## TH 03 HEAT STRESS

### General Information

Personnel performing tasks in high temperature environments including during hot weather, near radiant heat sources, in high humidity, in contact with hot objects, while wearing protective clothing or equipment or tasks requiring strenuous activity have a high potential for inducing heat stress. Heat stress is a factor for while working in tropical climates, working in full sun or in closed spaces. Examples of physical reactions to excessive heat may be mild such as fatigue, irritability, anxiety and decreased concentration or dexterity or they could be as severe as brain damage or fatality.

### Procedure

In the planning stages of a project, the potential for heat stress must be considered as a physical hazard in the site-specific Health and Safety Plan.

The HSO must inform the team members with regards to the symptoms and hazards of heat stress. All site team members must be aware of the symptoms in both themselves and their fellow team mates.

Susceptibility to Heat stress is affected by several interacting factors including, but not limited to, age, obesity, physical condition, substance abuse, personal protective equipment worn, and environmental conditions (temperature, shade, and humidity). The site personnel must be aware of the signs and symptoms of heat stress and take adequate rest breaks and proper aid as necessary.

The best approach is preventive heat stress management. Team members drink about 16 ounces of water before beginning work, and continue to hydrate throughout the day and after the work day is over. One-half to one quart of liquid per hour in high heat conditions is advised. The body's normal thirst mechanism is not sensitive enough to ensure body fluid replacement; therefore, pre- and post-work fluid intake is necessary. Under heavy work and heat conditions, the body may lose up to 2 gallons of fluids per day. In order to prevent heat stress symptoms, the individual must ensure replacement of this moisture.

Bottled or otherwise safe drinking water should be stored in a cool location known to team members. Provide a shaded area for rest breaks. Discourage the intake of caffeinated drinks during work hours. Monitor for signs of heat stress.

Team members should maintain a balanced diet including lightly salted foods to maintain electrolyte balance. If utilizing commercial electrolyte mixes, double the amount of water called for in the package directions. Indications are that "full-strength" preparations taken under high heat stress conditions may actually decrease the body's electrolytes.

Acclimate team members to site work conditions by slowly increasing workloads, i.e., do not begin work activities with extremely demanding tasks. In extremely hot weather, conduct field activities in the early morning and evening.

Adequate shelter should be made available to protect personnel against heat and direct sunlight, which can decrease physical efficiency and increase the probability of heat stress.

Good hygienic standards must be maintained by frequent showering and changes of clothing. Clothing should be permitted to dry during rest periods. Persons who notice skin problems should immediately consult medical personnel.

## **Common Heat Stress Disorders and Treatment**

Heat Rash, also known as prickly heat may occur in hot, humid environments where sweat is not easily removed from skin surfaces by evaporation. It is aggravated by chafing clothes. It can be severe enough to impede a team member's ability to perform work tasks or to tolerate heat and can be extremely uncomfortable making sleep difficult. It can also be complicated by infection.

*Symptoms* include mild red rash, especially in areas of the body that come into contact with clothing or protective gear.

*Treatment* consists of providing body powder to help absorb moisture and decrease chafing. Heat rash can be prevented by resting in a cool place allowing skin to dry.

Heat Cramps are caused by inadequate electrolyte intake or when large amounts of water are consumed without replacing the body's salt loss causing the blood to thin to the point where it seeps into active muscle tissue.

*Symptoms* include acute painful spasms of voluntary muscles, particularly in the abdomen and extremities or in tired muscles, those being used for working. Cramps may occur during or after working hours.

*Treatment* consists of taking liquids by mouth or saline solution intravenously for quicker relief if medically determined to be required. Move the victim to a cool area and loosen clothing. Lightly salted water or sports drinks diluted with water are best.

Heat Exhaustion results from loss of fluid through sweating, not drinking enough fluids or not taking in enough salt. It is less dangerous than heat stroke but must be treated.

*Symptoms* include profuse sweating and extreme weakness, fatigue, giddiness, nausea or headache. The skin is pale or flushed, clammy and moist and body temperature is normal or slightly elevated. The victim's pulse is weak and rapid and breathing is shallow. A headache, vomiting and dizziness may also occur.

*Treatment* consists of moving the victim to a cool place, air conditioned if possible, and give an electrolyte solution or water, 1 to 2 cups immediately and again every 20 minutes. They should rest with head lower than the feet to prevent shock and consult a physician, especially in severe cases.

Heat Stroke is the most serious reaction to heat stress and is caused by a failure of the body's core temperature regulation mechanism. Sweating stops and the body can no longer rid itself of excess heat. The body's temperature rises so high that brain damage or death can result if the person is not cooled quickly.

*Symptoms* include red, mottled or bluish, hot, dry skin, nausea, dizziness, confusion, extremely high body temperature (106°F or higher), rapid breathing, rapid pulse, convulsions, unconsciousness or coma. A decreased interest in drinking fluids may occur.

*Treatment* – Remove the victim from the source of heat and cool quickly. Soak the victim in cool (not cold) water, soak his or her clothing or sponge the body with cool water to bring body temperature below 102°F, fan vigorously. Do not give the victim coffee, tea or alcoholic beverages. Prompt first aid cooling can prevent permanent injury to the brain and other vital organs. Obtain immediate medical help.

## **TH 05 FOOT CARE**

### **General**

Safety-toe footwear will be required when conducting construction activities. For site assessments and other work where the risk of injury to the foot is low, sturdy hiking boots are required. The HSO will be responsible for communicating the footwear requirement to the project team.

Under both hot and cold stress conditions, feet that become wet and are allowed to remain wet can lead to serious problems. Wet feet can create an environment for the growth of microorganisms, which may produce infections such as athlete's foot or yellow, crumbly, thick toenails (toenail fungus). Symptoms include swelling, tingling, itching, and severe pain. These may be followed by more severe symptoms including blistering, death of skin tissue, and ulceration.

### **Procedure**

#### *Recognition and Risk Assessment*

The potential for wet feet must be considered as a physical hazard during the planning stages of the project. Risk assessment can be accomplished in part in the development stages of a project by listing in the Health and Safety Plan (HASP), the most likely task where wet feet may occur. These tasks could include wading in streams, or working during rainy conditions. The HSO must make decisions on the proper safety procedures and recommend them during the tailgate safety meetings. The HSO should also remind his or her team members to bring appropriate footwear with them on the trip.

#### *Prevention and Protection Program*

Prevention methods are required when work is performed in wet conditions or when conditions result in sweating, causing the feet to become and remain wet.

- Keep your feet clean and dry.
- Use foot talc or powders and sprays specifically designed for wet feet problems.
- Change your shoes and socks often to help get rid of wet feet problems.
- Rotate your shoes (especially athletic or walking shoes) on a regular basis to help you treat wet feet.
- Change removable insoles frequently so they can dry out.
- If it is warm, wear sandals during leisure time to let your feet dry out.
- Do not wear 100% cotton socks. Wear socks that specifically provide cool comfort – such as socks made with synthetic or silk fibers – to keep feet ventilated and help treat wet feet.

### General Information

Improper lifting can result in cuts, pinches, crushing, and serious injury to back, abdomen, arm and leg muscles, and joints. Even relatively light objects, lifted improperly, can contribute to injury.

Splinters, slivers, and sharp edges on objects to be lifted can result in cuts. Heavy objects can pinch or crush fingers, toes, arms, and legs between the object and nearby objects (e.g., walls, tables, counters, or railings).

Muscle and joint injuries occur when objects to be lifted are too heavy or awkward, are lifted improperly, or in areas where access is restricted.

Nerve and Joint damage can result from lifting tasks which are awkward and repetitive, even if involving only light objects.

### Procedure

The need for manual lifting must be identified as a physical hazard when project tasks specifically require manual handling or use of heavy equipment, and the following safe lifting techniques must be instituted.

Before lifting or carrying a heavy object, consider the following:

- Weight of object. Unless involved in weight training, recommended safe lifting weights for an average man or woman are 50 and 35 pounds, respectively. Test the weight by lifting one of the corners. If it is too heavy or an awkward shape, stop and get help.
- Contact hazards. Check each object before lifting for presence of splinters, slivers, sharp edges or parts, cracks and loose joints, and signs of biological hazards such as spiders and scorpions.
- Area in which lifting is to be done. Check for pinch points such as other objects close by and ensure there is room for safe lifting.
- Size and shape of object. Large and oddly shaped objects are more difficult to lift, even within safe weight limits, due to imbalanced center of gravity. Lifting a large object may result in the object blocking your view
- Distance you will have to carry the load
- Route to be travelled. Check walking and working surfaces for slip and trip hazards, note ramps, changes in level of elevation, and ladders or stairways that need to be negotiated.
- Breaking the load down into smaller parts
- Wearing gloves to get a better grip and protect your hands
- Avoid contact with, or cover cracks or loose joints to reduce hazards of pinching.
- Avoid reaching as you lift.
- Keep objects close to the body.
- Know your lifting limitations, and get help if uncertain that you can lift safely.

To lift square or rectangular objects:

- Set feet firmly, placing one foot alongside the load and the other slightly behind the load.
- Bend your knees. Bending your knees is the single most important thing you can do when you lift moderate to heavy objects. Squat down like a weightlifter, bend your knees, keep your back in its natural arch, and let your legs do the lifting. Your leg muscles are much more powerful than the smaller muscles in your back.

- Tighten your stomach muscles. Tight abdominal muscles increase intra-abdominal pressure and help to support the back.
- Grasp one of the top corners away from the body and the opposite bottom corner closest to the body.
- Tilt the object slightly away from the body, tilt forward at the hips, keep the back straight and tuck in the chin.
- Straighten the legs, keeping the spine straight, pull the object into the body and stand up slowly and evenly without jerking or twisting. Keep your head up, and look straight ahead.
- If turning or change of direction is required, turn with feet without twisting the torso and step in the direction of travel
- To set an object down, reverse the sequence, and plan your release. Once the load is where you want it, release your grip. Never release your grip until the load is secure. Keep the load close.

For odd-shaped objects, the only modification needed should be hand-hold position. When two or more persons are lifting, have a plan and a set of signals so lifting occurs simultaneously.

Do not carry objects in a manner which obstructs vision in the line of travel.

Carrying the load:

- Your nose and your toes should always be pointing in the same direction. Any sudden twisting can result in taking out your back.
- Rest if you fatigue. Set the load down and rest for a few minutes.

Using trolleys and lifting aids:

- Push rather than pull. It is easier and safer to push than to pull. You can use your body weight to assist when pushing.
- Keep close to the load and lock your arms. Try not to lean over, and keep your back in its natural arches.
- Use both hands. Carts are easier to push and control using both hands.
- Use tie-downs, if necessary, to secure the load.

### Manual Handling of Heavy Objects

Manual maneuvering or handling of heavy objects without actually lifting is often required. Manual handling of heavy objects, even when not actually lifting, can pose the same hazards as lifting including cuts, pinches, bruises, crushing, muscle and joint strain, and contact with biological hazards.

Mechanical equipment or assistance such as dollies, carts, come-alongs or rollers are to be used whenever possible. Mechanical assistance must be of proper size, have wheels sized for the terrain, and be designed to prevent pinching or undue stress on wrists. Objects to be moved must be secured to prevent falling and properly balanced to prevent tipping.

The minimum protection for manual handling is heavy cotton or leather gloves, and reinforced-toe boots.

Properly trained personnel may roll heavy objects with a round. Rolling must be controlled by chutes, tag-lines, or other means of limiting acceleration. Use of the legs for pushing and tag-line control of rolled objects must be stressed.

Flat, square, or rectangular objects are most easily handled using make-shift rollers or skids to break the friction with the resting surface and pushing, using the legs.

## **TH 09 ROUGH TERRAIN**

### **General**

Physical hazards associated with rough terrain include vehicle accidents, falling, slipping, and tripping. Falling is a potential hazard when working near mountain cliffs or steep inclines. Steep surfaces covered with heavy vegetation and undergrowth create tripping hazards. Heavy or downed vegetation can hide holes or breaks in the terrain, which increased risk of falls or vehicle accidents.

### *Recognition and Risk Assessment*

Rough terrain complicates work activities and adds to or increases the risk. In the planning stages of a project, rough terrain must be considered as a physical hazard. Risk assessment is usually accomplished from site history information (i.e., site topography) and onsite by the HSO.

### *Hazard Prevention and Protection Programs*

The site crew should be alert and observe terrain while walking to minimize slips and falls. Boots that are ankle high or higher should be worn to provide additional support and stability. Vehicle drivers and passengers should wear seatbelts at all times. Fall protection is required when there is a potential for falls.

Personnel should maintain a high level of physical conditioning due to increased body stress and exertion. Personnel should be aware of potential hazards and ensure the availability of first aid supplies and knowledge of the location of the nearest medical assistance.

## **TH 10 HOUSEKEEPING**

### **General Information**

Hazards associated with poor housekeeping include slips, trips, falls, punctures, cuts, and fires.

### **Procedure**

Poor housekeeping can be prevented by following the steps described below:

1. Designate and plan a materials storage area.
2. Accumulation of flammable and combustible liquids on floors, walls, and other areas, is prohibited. All spills of flammable and combustible liquids must be cleaned up immediately. Combustible waste such as soiled rags and paper is to be stored in a safe place (such as a covered metal container) until disposal.
3. All stairways, passageways, and access-ways shall be kept clean and free of obstructions at all times.
4. Loose or light material should not be left on roofs or surfaces that are not enclosed, unless safely secured.
5. Tools, materials, extension cords, hoses, or debris are to be used, disposed of, and stored so as not to cause a tripping or other hazard.
6. Tools, materials, and equipment subject to displacement or falling should be adequately secured.
7. Empty bags that contained cement or other dust-producing materials should be kept in tight containers until disposal.
8. Protruding nails in scrap boards, planks, and timbers should be removed, hammered in, or bent over flush with the wood, unless placed in containers or trucks for removal.
9. Form and scrap lumber and debris should be cleared from work areas, passageways, and stairs in and around building storage yards and other structures.
10. All storage and construction sites should be kept free of the accumulation of combustible materials.
11. All materials should be maintained in neat stockpiles for ease of access. Aisles and walkways should be kept clear of loose materials and tools.
12. Trash, brush, long grass, or other combustible material must be kept away from flammable and combustible materials.

## TH 11 STRUCTURAL HAZARDS

### General Information

Structural integrity hazards include those hazards associated with deteriorated conditions of containers (such as drums or tanks) and buildings (including appliances such as both fixed and portable ladders), scaffolding, and excavations or trenches. The failure of structures can cause significant injury or death to personnel. Related hazards include inclement weather, ladders, scaffolding, and excavating/trenching.

### Procedure

#### Recognition and Risk Assessment

In the planning stages of the project, the potential for injury due to structural integrity must be considered as a physical hazard in the site-specific Health and Safety Plan (SSHASP). Risk assessment can be accomplished in the development stages of a project by listing in the SSHASP the most likely hazards which may occur associated with structural integrity. The project HSO must make decisions on the proper safety procedures and recommend them to the project manager. Each worker must evaluate the risk associated with his or her work and be actively alert to these hazards. Any site worker may stop work if safety procedures are not followed or the risk is too great. Since only site specific conditions are relevant, attention must be given to having appropriate, trained and experienced personnel (a professional member) as a required part of both the assessment and implementation team.

#### Protocols

Prior to entering any building, an assessment of structural integrity must be made (this should first commence in the assessment stage and be addressed in assessment reporting). Buildings on inactive sites or facilities, unused buildings, and buildings which are to be demolished require special attention. This assessment must ensure, through observation and experience, that entering and/or task activities will not expose personnel to unusual risk of falling debris, loose materials that could be dislodged by touching or walking nearby, or walking on surfaces that cannot bear the weight of personnel or materials.

Prior to demolition operations, 29 CFR 1926 Subpart T, which requires that an engineering survey be made and put in writing by a competent person should be consulted for guidance.

The structure must be assessed to determine the condition of the framing, floors, and walls, and the possibility of any unplanned collapse of any portion of the structure. Any adjacent structures where employees may be exposed must also be inspected.

Floors, stairs, and fixed ladders must be similarly assessed in buildings with several levels.

INFORM: occupants and workers about structural integrity:

- Signs indicating the lack of structural integrity including loose, hanging, or sagging materials, water stains on floors where there is uncertainty as to the underlying support, loose handrails, protruding nails and fasteners, cracked concrete, masonry, or plaster, and evidence of structural failure, such as debris.

CONTROLS: Personnel should wear appropriate personal protective equipment (PPE) such as hard hats, safety shoes, safety glasses, and gloves in all structures to minimize hazards. If there is doubt of the structural integrity of buildings, entry should be delayed until a competent person can make the assessment. Documentation of all assessments of structural hazards must be completed contemporaneously with the activities.

The project HSO must also recognize that structural hazards may change as the work progresses. The potential for such hazards, and appropriate protective measures must be evaluated at least on a daily basis or at the beginning of each work shift.

The SSHSO shall contain details of expected protective measures specific to the project activities based on the site assessment phase and subsequent implementation planning and design.

RELATED TOPICS that should be considered and that may need to be integrated into the SSHASP relative to structural hazards include: inclement weather, cranes and lifting equipment, aerial lifts and manlifts, ladders, scaffolding, excavation/trenching, confined space entry, eye and face protection, head protection, foot protections, biological hazards, falling objects and engulfment, etc.

## TH 12 REMOTE AREAS

### General Information

A Remote area is any area that requires a significant amount of travel to get to a village and/or a medical clinic. No EWB personnel shall be in remote areas alone. Some means of communicating shall be available to people working remotely. EWB personnel shall be aware of when their radios are out of range with other volunteers, and a relay system should be set up to ensure contact with the HSO at all times. Teams working remotely from the rest of the project team should walk to where they are within radio range of other group members and check in periodically. Working in a remote area magnifies the risk of any health or injury due to the difficulties of getting help. Biological risks, heat and cold stress, rough terrain, slips trips and falls, and inclement weather are all hazards related to remote areas.

### Procedure

Particular precautions should be taken to prevent the following exposures when working in remote areas.

- Irritant and toxic plants such as poison ivy and thorny plants that may cause allergic reactions.  
Wear long-sleeved clothing and slacks to minimize contact with irritant and toxic plants and to protect against insect bites. Carry Benadryl and if appropriate other first aid supplies for personnel with known allergic reactions
- Surfaces covered with heavy vegetation and undergrowth that present tripping and falling hazards due to holes or depressions that are not easily visible.  
Be alert and observe terrain while walking to minimize slips and falls. Wear ankle-high (or higher) boots for increased traction, support, and stability.
- Back strain due to carrying materials or equipment.  
Use proper lifting techniques to prevent back strain.
- Native wildlife such as rodents, ticks, spiders, scorpions, and snakes that can present the possibility of bites and associated reactions and diseases  
Avoid wildlife when possible. In case of an animal bite, perform first aid and seek medical attention immediately.  
Wear long-sleeved clothing and slacks to minimize contact with irritant and toxic plants and to protect against insect bites. Carry Benadryl and if appropriate other first aid supplies for personnel with known allergic reactions  
Perform a tick check after leaving a wooded or vegetated area.
- Structurally unsound buildings that pose overhead hazards.  
Avoid buildings that are not structurally sound.
- Heat/cold stress  
Implement heat and/or cold stress management techniques such as shifting work hours, fluid intake, and monitoring employees, especially high-risk workers.
- AT ALL TIMES:  
Make sure that the project HSO and project manager know your location and estimated return time.  
Maintain an adequate and fully stocked first aid kit.  
Maintain communications capability. Carry a radio, and check in periodically with the other team members.  
Maintain adequate supplies of drinking water and food.  
Keep a current map of the work area, if available.

## **TH 13 WORKING OVER OR NEAR WATER**

### **General Information**

Working over or near water can present and magnify hazards in the form of drowning, working at elevation, electrocution, inclement weather and cold stress.

### **Procedure**

There will be no horseplay or other unsafe acts that could cause injury to personnel while working over or near water.

Safety nets must be provided when workplaces are more than 25 feet above the ground or water surface, or other surfaces where the use of ladders, scaffolds, catch platforms, temporary floors, safety lines, or safety belts are impractical. If such conditions are expected, contact the H&S committee for support in the use of safety nets.

Watercraft will only be operated by trained personnel or competent in-country partners. Personnel are discouraged from jumping to or from any craft which is not secured, and from jumping between craft when a gangplank should be used. Fall protection should be provided when working over or near water where there is a potential for falling or slipping into the water.

USCG-approved personal flotation devices PFDs shall be available to persons working over or near water, and worn when the risk of drowning is present. PFDs should be designed to float unconscious or helpless persons face up. Prior to and after each use, PFDs and life preservers shall be inspected for defects which would alter their strength or buoyancy (e.g., rips, tears, holes). All defective units shall be removed from the site and replaced. Defective units will not be used.

Working where there is a clear potential for drowning should be avoided wherever possible. If it cannot be avoided, personnel must wear personal flotation devices (PFDs) or buoyant work vests. PFDs should be designed to float unconscious or helpless persons face up. The vests should be inspected before each use, and if damaged taken out of circulation. Lifesaving ring(s) shall also be available at the spacing of every 200 feet. Precautions should be taken to prevent falling from the work platform in the form of railings and toe boards. Personnel should tie off to a safety line. In areas subject to tidal flow or rising water levels, the HSO will monitor the water level to ensure that employees will not be trapped in a work area by the water.

USCG-approved life rings (rope attachment not required) and ring buoys (rope attachment required) should have attached at least 90 feet of 3/8-inch solid braid polypropylene rope or equal. The life rings or ring buoys shall be readily available for emergency rescue operations. Distance between ring buoys shall not exceed 200 feet. One ring buoy or life ring shall be provided on each lifesaving skiff.

At least one lifesaving skiff shall be immediately available at locations where employees are working over or adjacent to water. Personnel trained in launching and operating the skiff shall be readily available during working hours. Skiffs shall be kept afloat or ready for instant launching. At a minimum, skiffs shall be equipped as follows:

- Four oars (two if the skiff is motor powered).
- Oarlocks attached to gunwales or the oars.
- One ball-pointed boat hook. One ring buoy with 90 feet of 3/8-inch solid braid polypropylene rope or equivalent line attached.

- PFDs equaling the skiff rating for the maximum number of personnel allowed on board.
- First aid kit.

The maximum number of passengers and weight that can safely be transported shall be posted on all launches, motorboats, and skiffs. This number shall not be exceeded and in no case shall the number of passengers (including crew) exceed the number of PFDs aboard. Outboard motors and skiffs shall meet the minimum flotation requirements of the USCG. A certification tag affixed to the hull is satisfactory evidence of compliance. An efficient whistle or signal device shall be provided on all powered vessels to give signals required by the navigation rules applicable to the waters on which the vessel is operated.

## TH 14 TRAFFIC AND VEHICLES

### General

Traffic presents hazards in two ways: 1) when site workers are working close to roadways, the potential exists to be hit by oncoming traffic, and 2) driving to, from, and on the site poses a potential accident hazard.

### Procedure

Risk assessment can be accomplished in the development stages of a project by listing in the Health and Safety Plan the most likely traffic hazards that may occur. The HSO must make decisions on the proper safety procedures and recommend them to the Site manager.

Roadway workers should be aware of their location in reference to roadways and avoid working close to traffic. Workers near roadways must wear reflective vests.

The following guidance should be used in planning work that will be adjacent to or within roadways. In all cases, the local police department or transportation department must be consulted in order to comply with applicable requirements.

When open highway conditions prevail on approach to the work site, advance warning signs should be placed approximately 1500 feet in advance of the condition to which they are calling attention. Where a series of advance warning signs are used, the warning signs nearest the work site should be placed approximately 500 feet from the point of restriction, with additional signs at 500- to 1000-foot intervals. On expressway and limited access facilities, the advance warning distance should be increased to one-half mile or more; on city streets, where more restrictive conditions generally prevail, advanced warning should appear on the approach to the work area. Signs in the immediate vicinity of the work may be placed at closer spacing.

Flag persons may be required to control the speed of nearby traffic. Lights should be provided to mark flag person stations and barricading at night. Barricading is extended to the point where it is visible to approaching traffic.

Drivers will be licensed, regardless of whether they are operating on or off public highways. Drivers shall be familiar with laws governing traffic in localities in which they will operate. All traffic rules and regulations, and all traffic control signs and devices should be obeyed. All operators are required to stay within posted speed limits at all times.

Drivers are required to make a daily inspection of their vehicles. The check should include steering, brakes, mirrors, lights, horn, tires, and windshield wipers. Drivers should be required to report all defects, and repairs should be made promptly.

Off-highway operation may require extra precautions to prevent shifting of load when crossing rough terrain.

Trucks should be backed under the direction of a signal person if the operator does not have a clear view of the area to the rear of the vehicle.

Operators should immediately report any damage or failure of parts and accessories to the HSO. It is advantageous to have road flares, fire extinguishers, and other safety equipment on the vehicle at all times.

Passengers are required to ride within the space provided, never on running boards, fenders, bumpers, or atop cabs. Personnel are not allowed to ride on the outside or back (such as in the bed of a pickup truck) of vehicles.

Materials loaded should be within the safe weight limit for the truck, and should not project beyond the truck body. While being loaded, truck wheels should be properly blocked. Trucks operated on public highways should conform to weight and clearance limitations of bridges, power lines, overhead structures, and other restrictions.

Vehicles should not be fuelled from open cans or by other makeshift methods, as there is great danger of flash fire from hot engines.

Engines should be shut off while fuelling.

## TH 16 WORKING AT ELEVATION/FALL PROTECTION

### General

Requirements listed in this procedure are general requirements for ensuring safe elevated work. Should use of these guidelines be impractical or *create a greater hazard*, then assess the task and conditions to select alternative hazard control measures. The HSO must approve alternative fall control measures prior to beginning work. Other Task Hazards that are related to Working at Elevation are Ladders,

This procedure does not apply to emergency response activities such as emergency rescue where compliance is not feasible or increases the overall hazard associated with the response.

### Procedure

Work performed at elevation where there is a risk of injury due to falls, will be performed in accordance with the following general guidelines;

1. Where appropriate, equipment required to safely work at elevation shall be procured prior to travel, and personnel will be trained in the use of the equipment.
2. Permanent working platforms shall be mitigated by the installation of guardrails, walls or other barriers.
3. Exposure to fall hazards shall be managed by reducing the number of workers exposed, relocating equipment/work area, and by choice of appropriate equipment such as hoisting, scaffolding, ladders, etc.
4. Equipment (ladders, body harnesses, lanyards, etc.) shall be visually inspected by trained workers or the HSO prior to each use. Defective equipment shall be tagged and immediately removed from service. The Project Manager shall be notified so that replacement equipment can be procured where necessary.

*Should the use of scaffolds or stationary work platforms be deemed necessary, a Health and Safety professional shall be contacted prior to travel.*

The structural integrity of any roof where work is to be performed shall be inspected by a qualified person in concert with the HSO prior to allowing the workers to access the roof.

Workers performing inspection or investigation activities on low-pitched roofs with a ground- to-cave height greater than 6 feet shall be protected from falling at unprotected sides or edges by maintaining a minimum distance of 6 feet from the edge. Workers within 6 feet of an unprotected edge shall be protected by using a body belt and restraining line or a body harness with lanyard and/or lifeline.

NOTE: A body belt shall not be used as a fall arresting device. Body belts may be used in conjunction with a restraint line to prevent a worker from being exposed to a fall hazard.

Workers on a roof 6 feet or more from the ground to eaves and with a pitch of greater than three in twelve without a parapet (roof edge wall) shall be protected by the use of personal fall protection consisting of a body harness and lanyard or lifeline.

Workers accessing elevated structures (i.e., radio towers, meteorological towers, and water towers) shall be provided with and use fall protection equipment at all times while on these structures.

A safety harness with appropriate lanyard and/or lifeline shall be used where workers are subject to a fall of 4 feet or greater unless otherwise allowed (i.e., roof work and construction activities must be protected at 6 feet or above and work from incomplete scaffolds must be protected at 10 feet or above). A safety belt may be used as a fall restraint device (i.e., a safety belt with a restraint line may be used to prevent a

worker from reaching the edge of a platform or roof; a safety harness with lanyard and/or lifeline shall be used if the worker could fall over the edge).

Body belts (safety belts) may only be used in conjunction with a restraint line to prevent a worker from reaching the edge of a roof/elevated platform. Body belts shall not be used as part of a fall arrest system.

The harness, lanyard, and lifeline assembly shall be installed to prevent a worker from free falling for more than 6 feet or striking a lower surface or object before the fall is arrested. This is especially important when utilizing shock-absorbers which can elongate as much as 3-1/2 feet during the shock-absorption process.

Personal fall protection equipment (harnesses, lanyard, lifelines, etc.) subjected to an arresting fall or a shock load shall not be reused.

Fall arrest systems shall be tested as complete systems. Only components that are fully compatible with one another shall be used together.

Anchorage used for attachment of personal fall arrest equipment shall be capable of supporting at least 5,000 pounds per worker attached. Anchorage for suspended platforms (i.e. two point suspended scaffold) shall be independent of any anchorage being used to support or suspend the platform from which work is being performed. Anchorage points for positioning devices which automatically limit free fall distances to 2 feet or less shall be capable of supporting at least twice the potential impact load of a worker's fall or 3000 pounds, whichever is greater.

## **Definitions/Acronyms**

*Anchorage Point:* A secure point of attachment for lifelines, lanyards, or deceleration devices. Anchorage shall be capable of supporting at least 5000 pounds per worker attached (3000 pounds if positioning devices are used which automatically limit free fall distance to 2 feet or less), or shall be designed, installed, and used as part of a complete personal fall arrest system which maintains a safety factor of at least 2, under the supervision of a qualified person.

*Body Belt (safety belt):* A strap with means for securing it around the waist or body and for attaching it to a restraint line. Body belts shall not be used as part of a fall arrest system.

*Body Harness:* A design of straps secured to the worker in a manner so as to distribute the arresting forces over the thighs, shoulders and pelvis with provisions for attaching a lanyard, lifeline, or deceleration device.

*Deceleration Device:* Any mechanism, such as a rope grab, rip-stitch lanyard, specially-woven lanyard, tearing or deforming lanyards, automatic self-retracting lifelines/lanyards, etc., which serves to dissipate a substantial amount of energy during a fall arrest, or otherwise limit the energy imposed on a worker during fall arrest.

*Fall Restraint:* Systems, fixtures, and/or devices that limit the motion of workers to prevent falling from elevated work areas.

*Guardrail System:* A vertical barrier, normally consisting of, but not limited to, an assembly of top rails, mid-rails, toe boards, and posts, erected to prevent personnel from falling to a lower level.

*Lanyards:* A minimum of one-half inch diameter nylon or equivalent rope fastened to a safety belt or harness with a snap or shock absorber on the free end a maximum length to provide protection against a fall of no greater than 6 feet and capable of supporting a minimum of 5000 pounds.

*Lifeline:* A flexible line for connection to an anchorage (fixed support) at one end to hang vertically, or to stretch horizontally between two anchorage points, that serves as a means of connecting other components of the fall protection system. Vertical lifelines shall be capable of supporting a minimum of 5000 pounds.

*Parapet:* A low wall at the edge of a roof or balcony. Parapet must be a minimum of 39 inches in height and capable of withstanding a load of at least 200 pounds applied in any direction at any point on the wall to be considered as adequate fall protection.

*Positioning Device System:* A body belt or body harness system rigged such that an employee cannot fall more than 2 feet, and is secured to an anchorage capable of supporting at least twice the potential impact load of an employee's fall or 3,000 pounds, whichever is greater.

*Restraint Line:* A line from an anchorage or between anchorage to which a worker is secured in such a way as to prevent the worker from walking or falling off an elevated work surface.

*Rope Grab:* A deceleration device, which travels on a lifeline and automatically, by friction, engages the lifeline and locks so as to arrest the fall of an employee. A rope grab usually employs the principle of inertial locking, cam/level locking, or both.

*Safety Monitoring System:* A safety system in which a qualified person monitors the safety of all workers on an elevated work surface, and warns them when it appears to the monitor that they are unaware of the hazard or are acting in an unsafe manner. The qualified person shall be on the same elevated surface and/or within visual sighting distance of the workers, and must be close enough to verbally communicate with the workers.

*Scaffold:* Any temporary elevated platform and its supporting structure used for supporting workers/material.

*Self-retracting lifeline/lanyard:* A deceleration device containing a drum-wound line which can be slowly extracted from, or retracted onto, the drum under slight tension during normal employee movement, and which, after onset of a fall, automatically locks the drum and arrests the fall.

*Snap hook:* A connector comprised of a hook-shaped member with a normally closed keeper, or similar arrangement, which may be opened to permit the hook to receive an object and, when released, automatically closes to retain the object. Snap hooks shall be the locking type with a self-closing, self-locking keeper which remains closed and locked until unlocked and pressed open for connection or disconnection.

*Warning lines:* A rope, wire, or chain, and supporting stanchions erected on low pitched roofs/work platforms to warn workers that they are approaching an unprotected roof side or edge, and which designates an area in which work may take place without the use of guardrail, body belt, or safety net systems.

## TH 17 LADDERS

### General Information

Ladders used on EWB projects are likely to be procured or borrowed while in the region where the project is being implemented. These ladders are not likely to conform to any US standard. However, any ladder used shall be inspected prior to use and unsafe ladders will not be used.

Portable Ladders must be examined for defects prior to use. Examination shall include, but not be limited to the following items. Where deficiencies are found, repairs shall be made prior to use. If repairs can not be made a new ladder shall be procured.

1. Joints between steps or rungs are tight.
2. Hardware and fittings are secure, and rivets are not sheared.
3. Rungs are not loose, cracked, bent, or dented, are free of splinters or splinters, and are treated to prevent slipping.
4. Side rails are not cracked, bent, or dented and are free of splinters.
5. Safety feet are in good condition, or the bottom of the ladder is in otherwise safe condition.
6. Rope on extension ladders is in good condition.
7. Metal bearings (e.g., locks, wheels, pulleys) are lubricated.

Ladders must be set on a flat, dry, firm surface with both handrails in contact with an upper support which is sufficiently strong and rigid.

Straight ladders must have secure footing provided by a combination of safety feet, top of ladder tie-offs and mud sills, or a person holding the ladder to prevent slipping.

When middle or top sections of sectional ladders are used as bottom sections, they must have safety feet.

The ratio of the distance to the foot of a ladder from the base of the vertical plane to the height of the vertical plane when the ladder rests on the top of the vertical plane shall be no more than 1:4 and no less than 1:3 (e.g., 1 foot out from a wall for every 4 feet up the wall to the point where the ladder rests against the wall).

The handrails of a straight ladder must extend at least 36 inches above the landing.

Straight ladders may not be lashed together to make sectional ladders.

Metal ladders must not be used near electrical conductors.

Workers must use both hands, and must face the ladder when ascending and descending.

No more than one person may use a straight portable ladder at a time.

Standing on the top rung/step or above the manufacture's safe indication is prohibited.

Ladders should be positioned so workers do not have to lean more than half of their body beyond (outside of) either handrail.

The area around and under the ladder shall be clean and free of any debris that a person could fall upon.

Ladders must not be placed in front of doors that open toward the ladder unless the door is locked and the person(s) using the ladder has the key, the door is blocked open and other persons are warned of the presence of the ladder, or a guard is posted at the door.

Ladders must be stored in a manner not to damage or stress the ladder. Ideally, ladders should be hung from a side rail in an area where sunlight or extremes in temperature or humidity will not affect them.

Ladders must never be used as scaffolding, storage racks, or shelves.

*Fixed Ladders* shall be inspected before use according to steps 1-5 above.

## TH 18 SHORING AND TRENCHING (EXCAVATIONS)

### General Information

This procedure identifies the basic requirements for the protection of personnel working in and around excavations and trenches, including identification of hazards, classification of soils, protective systems, and inspections. Trenching and excavation work will be done in substantial conformance with this procedure, and with 29 Code of Federal Regulations (CFR), Subpart P (Excavations).

Excavation and trenching activities are intrinsically dangerous and result in a high incidence of injury and death even in the US. As a general rule, EWB personnel should not be directly involved in excavation and trenching activities. If excavation and trenching activities are required for the project, their nature and extent must be identified as soon as possible, including during the assessment phase. Such project elements should be highlighted to EWB Project Managers, EWB Health and Safety personnel, and the professional advisor.

Inadequate planning and preparation for shoring and trenching are appropriate justification to postpone or terminate a project. It should be recognized that the likely absence of well trained and equipped emergency and rescue personnel to respond to the entrapment of personnel raised the likelihood that an incident could be fatal. For these reasons, such activities warrant particular attention.

### Procedure

Any shoring trenching and excavation activities, including details of the health and safety plan elements, must be described in the final project presentation to the TAC.

The responsibilities of the personnel involved in any trenching and excavation work are:

- **Project HSO:** Responsible for determining whether EWB personnel will be involved in trenching and excavation activities, and, if so, identifying and checking the qualifications of the competent person whom they designate for excavation or trenching activities at their project site.
- **Competent Person:** For the purpose of this procedure, the competent person is one who is capable of identifying existing and predictable hazards in the surroundings, or working conditions which are unsanitary, hazardous or dangerous to employees and who has authorization to take prompt corrective actions to eliminate them. The competent person in excavations must have knowledge of regulatory requirements (to be generally adhered to even though located outside of US) and the necessary technical skills (e.g., soils classification, use of protective systems) to implement this operating practice and address any necessary concerns or requirements. The competent person must be an EWB professional member with expertise and experience in geotechnical engineering and earthwork related construction.

The competent person may be the project HSO or other EWB site person. The competent person must be identified in writing and understand the role and responsibilities of the competent person. Their credentials must be approved in advance by the EWB national office (Health and Safety personnel).

### CONTROLS

Prior to and during any excavation activity the project HSO and the Competent Person must evaluate the site for known or potential hazards. Potential hazards affecting trench safety can include the following:

- Excess water from rainfall, snow melt or frozen soils, temperature extremes affecting soil moisture content.
- Previous excavation area (requires Type C soils classification).

- Depth of excavation (influences soil stability by increased weight. Average soils weigh approximately 110 pounds per cubic foot).
- Surcharge loads (e.g., evaluate location of buildings, spoils piles, poles, pavement, tanks, other structural objects).
- Location of personnel and equipment.
- Vibration by equipment, traffic, railroads, explosives, etc.
- Undermining of structures.
- Duration of exposure (limit the time-frame of the excavation to the minimum possible).

Prior to excavation or trenching, any utilities in the area must be located. The known or estimated location of utilities should be marked or staked for identification purposes. Workers and equipment operators must also be aware of overhead utilities.

When excavation operations approach the estimated location of underground installations, the exact location is to be determined by safe and acceptable means. The stability of adjacent structures is to be assured in any event (whether persons will enter an excavation or not).

All surface encumbrances that are located to create a hazard to employees shall be removed or supported, as necessary. Structures near the excavation shall be underpinned or provided with a support system to prevent collapse.

***BEFORE ENTERING THE TRENCH:*** A checklist or site-specific form will be developed by the competent person; and completed by the competent person each day and as needed throughout the duration of the work. The project HSO and competent person shall ensure that monitoring and inspections are performed periodically to verify compliance.

The competent person shall classify the type of soil using at least one visual and one manual test in accordance with 29 CFR 1926 Subpart P, Appendix A. The tests shall be documented, including the date(s) of the tests, type of tests, any instrumentation used for testing, location of the excavation tested, the results of the tests and type of soil (A, B, C, or stable rock) indicated by the test, and the name of the person performing the tests.

Soil analysis and testing is not necessary if the excavation will be sloped to an angle of one and one half horizontal to one vertical (1-1 1/2H:1 V) and/or protective systems will be employed which follow the regulatory criteria for Type C soils. A default classification as Type C soils must be made in this event.

The competent person must test the atmosphere in any excavation greater than four (4) feet in depth where the potential exists for a known or potential hazardous atmosphere (e.g., landfills, spills, oxygen deficient environments) before personnel are allowed to enter the excavation. Emergency rescue equipment shall be provided and will be readily available, properly functioning, and attended by qualified personnel when hazardous atmospheric conditions exist or may develop. The competent person or the project HSO will determine whether an excavation less than 4 feet deep requires monitoring.

***WHILE THE EXCAVATION IS OPEN*** underground installations shall be protected, supported or removed as necessary to safeguard employees.

A barricade or other suitable warning system shall be used to alert the public, workers, equipment and vehicle operators of an excavation's location if the edge of the excavation is not readily apparent. If the edge of an excavation is adjacent to a public roadway or an area of high volume site traffic it shall have a

suitable barricade installed along the exposed side of the route. Appropriate barricades shall not interfere with placing overburden a safe distance from the excavation.

Workers at the edge of the excavation must be minimized. Based upon the hazard evaluation, fall protection in the form of harnesses and lifelines, may be required if workers must observe activities at the edge of an excavation greater than 6 feet deep.

Lighting for excavations and barricades during nighttime or low visibility situations must be considered.

All shafts, pits, wells, etc., where no work is being performed shall be covered with material of sufficient strength to support foreseeable loads, or shall have protection installed around the perimeter, or shall be backfilled.

Walkways and bridges with guardrail systems shall be provided where people or equipment are required or permitted to cross over excavations.

Personnel in or near excavations or trenches shall not be permitted to work in the immediate vicinity of excavation equipment nor to work under loads handled by such equipment. Workers shall not be allowed to work above other personnel in the excavation unless the lower workers are adequately protected.

Workers shall not be allowed to work in excavations where water has accumulated or is accumulating unless adequate precautions have been taken. Diversion ditches, dikes, or other means shall be used to prevent surface water from entering an excavation and to provide drainage to the adjacent area. Pumps, if used to control water accumulation, must be monitored continuously.

Only authorized personnel are allowed within excavations. The number of workers within an excavation must be maintained to the minimum necessary. Any necessity for EWB personnel to enter excavations is prohibited unless approved in advance by national EWB staff (Health and Safety personnel) based on detailed prior planning.

A ladder, stairway, ramp or other means of exiting excavations 4 feet-deep or more will be provided for employees within 25 feet of lateral travel of any location within the excavations. Ramps used for employee access or egress must be sloped to allow the employee to walk in an upright manner without assistance. Ramps for equipment access or egress must be designed by a registered US Professional Engineer (P.E.).

Spoils and other materials are to be placed at sufficient distance from the edge of the excavation to prevent excessive loading on the face of the excavation. In no event is any material to be placed closer than two (2) feet from the edge.

Personnel will be evacuated from any excavation when the walls show signs of distress and personnel are potentially impacted.

### Protective Support Systems

Persons in an excavation shall be protected from cave-ins by an adequate protective system designed in accordance with the following. Exceptions to the requirement for employee protective systems include; excavations entirely in stable rock and excavations which are less than 5 feet deep and examination by the competent person provides no indication of a potential cave-in. Protective system options include:

- Proper sloping or benching of the sides of the excavation. Follow specific requirements of 29 CFR 1926 Subpart P, specifically 1926.652.

- Supporting the sides of the excavation with a properly designed and installed shoring or shielding system (e.g., hydraulic shoring, trench jacks, air shores, or trench boxes/shields).

Follow specific requirements of 29 CFR 1926 Subpart P, specifically 1926.652.

Protective systems outlined within the OSHA standard are minimum requirements. In the event soil conditions change, reinspect the system. Additional cut backs on the slope angle may be necessary based upon conditions encountered.

No protective system is necessary when the competent person has determined that the excavation is made entirely in stable rock or that the excavation is less than 5 ft in depth and there is no indication of a potential cave-in.

Protective support systems for use in excavations greater than 20 feet in depth must be designed by a Registered US Professional Engineer.

### INSPECTIONS

The competent person must inspect the excavation and the adjacent area frequently for possible cave-ins, for failure of protective systems and equipment, for hazardous atmospheres, or for other hazardous conditions. Inspections are also required after any occurrence that could increase the potential hazard to employees. Natural events, such as rain, or man-made events, such as blasting, are examples. All inspections shall be documented.

During inspections, danger signs that should be evaluated can include the following:

- Bulges in the side walls.
- Cracks running parallel to the excavation edge.
- Material sloughing into the excavation.
- Exposed utilities.
- Loose chunks of the excavation edge or lip breaking up.
- Rocks, or refuse from earlier work or any other material that could fall from the excavation walls.
- Undermined structures, poles, or trees.
- Water seepage.
- Spoils piles or other materials too close to the excavation edge.

### IN CASE OF EMERGENCY:

The site specific Health and Safety Plan must indicate names and phone numbers for any potentially affected utility (e.g., phone, gas, electric, pipelines, public works, etc.).

If a utility is damaged due to the excavation operation, and damage has occurred, operations are to cease. Personnel are to relocate to a safe location until the hazard has been resolved. The owner of the utility and any other necessary emergency resources are to be contacted immediately.

In the event of a trench failure with subsequent personnel entrapment the following procedures should be followed:

- Immediately contact the local rescue agency listed in the Health and Safety Plan. Give the agency the exact location, number of victims, trench measurements and any special hazards encountered.
- Keep all life-support and de-watering systems operating.
- Clear workers away from the excavation.
- Shut down any heavy equipment nearby.

- Be prepared to meet and brief rescue personnel.
- Never attempt to dig out victims with heavy equipment.

*Records Reports Notifications:*

The following records shall be maintained in the project files:

- Excavation inspection records.
- Soil classification test records.
- Evaluations of need to stabilize adjacent structures.
- Structural ramp designs.
- Approved tabulated data used for protective systems.
- Protective system designed by a P.E.

## TH 19 HAZARDOUS MATERIALS USE AND STORAGE

### General

The use of hazardous materials on a typical EWB project is generally limited to paints, adhesives, solvents, insecticides, alkalines, and chlorine in powder or liquid form.

### Procedure

#### Flammables

Flammable liquids shall be stored in approved containers and in a cool place out of the direct sun, 25 feet from any ignition sources.

Fuels shall be separated from oxidizers, and corrosives including chlorine

Grounding and bonding procedures shall be used for transfer of flammable liquids from one container to another.

Solvents for PVC pipe gluing are an example of a flammable substance.

#### Cylinders

Pressurized gas cylinders should not be used on any EWB projects

#### Oxidizers

Must be stored separately from flammables. Smoking is not permitted in an area where chemicals are stored. Chlorine is an example of an oxidizer.

#### Alkalines

Alkali materials such as cement should be kept dry at all times. Alkali materials should also be kept apart from organic solvents and acids. Proper storage of cement in a dry place will also help to maintain the quality of the cement itself, as it will lose strength when stored in wet locations.

Cement also poses a hazard during use. Cement dust will become airborne during the mixing process to form concrete. The dust will pose a health risk to workers in the vicinity in the form of eye, skin, nose, and throat irritation; coughing, breathing difficulty and can cause more serious respiratory problems. Acute exposures can cause burns to eyes, skin, nose and throat. Safety glasses and a dust mask are required to be worn by personnel mixing concrete. Any unnecessary personnel shall be removed from the area when there is a risk of exposure to cement dust.

## TH 23 HAND AND POWER HAND TOOLS

### General Information

Hand and sometimes power hand tools will be the most common implements used on EWB projects. Improper selection and/or use of tools can increase the likelihood of injury and damage to property. A general premise to follow is to select (and have available on site) the right tool for the job and then use it correctly. Related work activities to be considered include: noise protection, inclement weather, confined space entry, hot work, lifting and handling of heavy objects, housekeeping, heavy equipment operations, utilities, and electrical safety.

### Procedure

#### DO:

- Obtain training and practice in working with the tools that will be utilized onsite.
- Keep all hand tools will be in good repair and use only for the purposes for which they were designed.
- Keep guards in place during operation on all power tools designed to accommodate them. This includes contractor supplied equipment. Guards and safety devices must remain in place on power tools unless removed according to manufacturer's instruction for maintenance by a competent person and must be replaced before use. Belts, gears, shafts, drums, flywheels, chains or other rotating, reciprocating, or moving parts exposed to worker contact, or representing other hazards, must be guarded.
- Use proper PPE when operating power tools or hand tools that may produce projectiles, cuts or abrasions, dusts, fume, mists, or light, or which pose a risk of harm to arms, legs, or feet if dropped.
- Inspect and test power tools and determine that they are safe for operation prior to use. Continued periodic inspections will be made to ensure safe operating condition and proper maintenance.
- Ensure that electric powered tools shall be double-insulated or grounded in general accordance with 29 CFR 1926.404.
- Ensure that rotating or reciprocating portable power tools have a constant pressure switch that will shut off the power when the tool is released by the operator. A portable power tool may have a lock-on control provided turn-off can be accomplished by a single motion of the same finger or fingers that turned it on.
- Hydraulic fluid used in powered tools will retain its operating characteristics at the most extreme temperatures to which it will be exposed.
- Use nonconducting hoses having adequate strength for the normal operating pressures for all hydraulic or pneumatic tools that are used on or around energized lines or equipment should have.
- Ensure that extension cords:
  - Should meet Underwriter's Laboratory (UL) or other rating criteria according to OSHA.
  - Use will be limited to essential tasks.
  - Should be tested for continuity before each use and should be connected to grounded outlets, or ground fault current interrupters must be used.
  - Must be inspected daily for loose insulation, broken or missing plugs, bared wires, or other hazards.
  - Grounding of outlets used for portable tools should be confirmed before use.
  - Must not be allowed to become tripping or slipping hazards.
  - Must not be used for lifting or tying off, and shall be disconnected by pulling on the plug.

DO NOT:

- Issue or use unsafe hand tools. Wrenches with sprung jaws, where slippage could occur, shovels and hammers with loose handles, and wooden handled tools with cracks or splinters are examples of unsafe hand tools.
- Keep in service tools having defects that will impair their strength or render them unsafe.
- Throw or drop tools or materials from one location to another, or from one person to another.
- Use sparking tools in locations where sources of ignition may cause a fire or explosion.
- Exceed manufacturer's safe operating pressures for hydraulic hoses, valves, pipes, filters, and other fittings.
- Wear loose and frayed clothing, dangling jewelry, rings, chains, and wrist watches while working with any power tool or machine. Long hair will be tied back or otherwise secured. Appropriate PPE must be worn, such as face and eye protection, head protection, hearing protection, protection from abrasion (such as gloves and long sleeved shirts/trousers), foot protection, etc.

## TH 24 HAND AND EMERGENCY SIGNALS

### General Information

Hand and emergency signals will be required when the ability to vocally communicate is lost. The likelihood of needing emergency signals is likely to be slim but may be necessary in the event of a storm, natural disaster, or security situation. Hand signals are more commonly needed when other sounds drown out the voice, or if persons communicating are out of vocal distance, but have visual contact.

### Hand Signals

SIGNAL	MEANING
Hands on top of head	Need assistance
Grip partners' wrist or place both hands around partners' arm	Leave area immediately
Thumbs up	OK; I'm all right
Thumbs down	No; Negative
Hand gripping throat	cannot breath, out of air
Pointed finger on extended arm	Look in that direction
Wave hands over head from side to side	Attention; Stand-by for next signal
Swing hand from direction of person receiving signal to directly overhead and through in circle	Come here
Clenched fist of extended arm	Stop Motion
Draw index finger across front of throat	Shut off engine; cut off power

### Emergency Signals

SIGNAL	MEANING
One long sound of emergency alarm signal	Emergency situation, face safety watch and watch or listen for directions
Pause; followed by a number of short sounds, 1, 2, 3 or 4	Evacuate to the pre-designated emergency meeting place indicated by the number of sounds

## TH 26 BIOLOGICAL HAZARDS

### General Information

Team members may encounter biological hazards that include: animals, insects, molds and fungus, plants and etiological agents (infectious diseases).

### Procedure

The HSO will be responsible for researching and relating to team members information regarding the biological hazards that are likely to be encountered in the region of travel. The HSO shall provide current information including any recent advisories posted by the Center For Disease Control (CDC). Current information can be found on the CDC's travel website: <http://wwwn.cdc.gov/travel/default.aspx>

Some team members may be sensitive to certain hazards because of allergies or other reasons. Any known allergies should be reported to the HSO prior to travel and any appropriate and addition first aid supplies must be carried to the site, and be used by trained personnel.

The following is a list of commonly encountered biological hazards. In addition to this sheet, the HSO must attach the detailed hazard descriptions that can be found on the CDC's website, for the location of travel, including any recent or emerging health risks. It is highly recommended that each team member visit a travel clinic before travelling.

### Bloodborne Pathogens

During the administration of first aid, personnel can be exposed to blood or blood-containing fluids infected with Bloodborne Pathogens. Bloodborne pathogens are pathogenic microorganisms that may be present in human blood and may cause disease in humans. These pathogens include, but are not limited to, Hepatitis B Virus (HBV) and Human Immunodeficiency Virus (HIV).

Anyone administering first aid must take the "universal precaution" of assuming that any blood-containing fluid, person bleeding, or equipment contaminated with blood are infected with both viruses. Protection involves use of personal protection such as gloves, gowns, eye shields, surgical masks, one-way valve rescue breather devices. It also involves training, disinfectants, and decontamination.

### Endemic Biological Hazards

An important part of health and safety planning and protection includes identifying and understanding local flora and fauna. Animals, insects, molds and fungus, and poisonous plants vary from site to site, and their likelihood of causing harm also varies. Risk assessment and protection protocol determinations include knowing the how, where and what of hazardous types of plants, animals, insects, or molds and fungus.

**Biological Agents:** A source of biological hazard for EWB workers is poor sanitation. Waterborne and foodborne diseases can be a problem if adequate precautions are not taken. Examples of waterborne diseases are cholera, typhoid fever, viral hepatitis, salmonellosis, bacillary dysentery, and amoebic dysentery. In some locations, it may be necessary to transport water and food to the site. The food and water must be handled properly and come from an uncontaminated source.

The response team must also avoid creating any sanitation problems by making sure that properly designed lavatory facilities are available at the work site

Tetanus is another form of biological hazard encountered on hazardous materials sites. Workers must be careful to avoid puncture hazards, wear appropriate protective clothing, and have current tetanus inoculations.

**Animals** represent hazards because of their poisons or venoms, size and aggressiveness, diseases transmitted, or the insects they may carry.

Poisonous snakes are common around the world. The major variables are the likelihood of encounter and the type of snake likely to be encountered. Encounters with snakes may be caused reaching into holes, or just walking through high grass and other dense vegetation, swampy areas, or on rocks.

Key factors to working safely include being alert, using care when reaching into, around, or moving objects, and being familiar with the habits and habitats of snakes in the vicinity of a work site.

A snake bite warrants medical attention after administration of proper first aid procedures. Many villages where EWB works will have several dogs that are kept hanging around the village. They are usually semi-domesticated, but they should not be mistaken as the sort of pets that are typically encountered in the US. They can become pack oriented, aggressive, and represent serious risk of harm to unprotected workers.

Rabies varies from area to area as do the animals most likely to be rabid. Rabies is a viral infection most often transmitted by bites of animals infected with the virus. Skunks, raccoons, foxes, and bats are wild animals most frequently found to be infected with rabies; however, any warm blooded animal can be infected. Squirrels, groundhogs, horses, cattle, and rabbits have been tested positive for rabies. Dogs and cats are frequently rabies-infected if not immunized.

Rabies infection is not always apparent. Signs to look for in wild animals are over aggressiveness or passivity. Spotting animals which are normally nocturnal (active at night) during the day and being able to approach them would be an example of unusual behavior. Finding a bat alive and on the ground is abnormal. The best precaution, however, is to observe wild animals from a safe distance, even if they are injured. Avoid dogs and cats that you do not know.

If bitten by an animal you suspect is infected with rabies, immediately wash the bite area with soap and water, then disinfect with 70% alcohol and seek medical attention for follow-up. Contact the local authorities as soon as possible. If feasible, try to keep the animal under surveillance so that the local authorities will be able to capture it. Avoid being bitten again or contacting the mouth or any saliva of the animal.

Rabies is preventable, even after being bitten if treatment is begun soon enough. Getting prompt medical attention and confirming the rabies infection of an animal are very important. *Rabies is not curable once symptoms or signs of rabies appear.*

Hantavirus is associated with rodents, especially the deer mouse (*Peromyscus maniculans*) as a primary reservoir host. Hantavirus has resulted in numerous deaths in the southwestern U.S. The CDC is concerned that the virus may have been distributed over a larger geographic area than originally suspected. The Hantavirus can be transmitted by infected rodents through their saliva, urine, and feces. Human infection may occur when infected wastes are inhaled as a result of aerosols produced directly from the animals. They also may come from dried materials introduced into broken skin or onto mucous membranes. Infections in humans occur most in adults and are associated with activities that provide contact with infected rodents in rural/semirural areas.

Hantavirus symptoms begin with one or more flu-like symptoms (i.e., fever, muscle aches, headache, and/or cough) and progresses rapidly to severe lung disease. Early diagnosis and treatment are vital. Personnel involved in work areas where rodents and the presence of the Hantavirus are known or suspected will need to take personal protective measures and to develop an expanded site safety plan.

For workers and facilities in rural/semirural areas the following risk-reduction strategies are appropriate:

- Eliminate rodents and reduce availability of food sources and nesting sites used by rodents.
- Store trash/garbage in rodent-proof metal or thick plastic containers with tight lids.
- Cut all grass/underbrush in proximity to buildings.
- Prevent rodents from entering buildings (e.g., use steel wool, screen, etc., to eliminate openings).

**Insects** spread many diseases including those borne by *ticks*: Rocky Mountain Spotted Fever, Lyme Disease; *fleas*: Plague; and *mosquitoes*: Malaria, Yellow Fever, Dengue West Nile Virus and Arboviral Encephalitides. It is important to note that animals may be hosts for insects which may spread diseases. Ticks carrying Lyme disease and Rocky Mountain spotted fever are found on grass, but may be carried on animals. Bubonic plague, which has emerged in parts of Colorado, New Mexico, and Arizona, is associated with fleas found on prairie dogs.

A sensitivity reaction is one of the more dangerous and acute effects of insect bites or stings. It is the most common cause of fatalities from bites, particularly from bees, wasps, and spiders. Anaphylactic shock due to stings can lead to severe reactions in the circulatory, respiratory, and central nervous system. This can also result in death.

Team members travelling to the work site must be questioned regarding their known allergic reaction to insect bites. Anyone knowingly allergic should be required to know how to use and carry two response kits. First aid providers must be instructed on how to use the kit also. The kit must be inspected to ensure it is current. Benadryl or similar antihistamine should be brought to the site along with the medical supplies. Benadryl can slow allergic reactions, and keep any resulting swelling manageable until more sophisticated remedies can be accessed.

Administer first aid and observe persons reporting stings for signs of allergic reaction, such as unusual swelling, nausea, dizziness, and shock. At the first sign of these symptoms, take the individual to a medical facility for attention.

Lyme Disease is a bacterial infection transmitted by the bite of a deer tick. It is prevalent across the U.S. and other countries. Not all ticks transmit Lyme Disease. Ticks must be attached for several hours before Lyme Disease can be transmitted. Being bitten by a tick does not mean you will get Lyme Disease.

To protect against Lyme disease wear light-colored, tight-knit clothing. Wear long-sleeved shirts and long pants with pant legs into shoes or boots. Wear a hat and use insect repellent containing DEET (follow manufacturer's instructions for use). Check yourself daily for ticks after being in grassy, wooded areas.

If bitten remove the tick immediately with fine-tipped tweezers. Grasp the tick as close to the skin as possible. Pull gently but firmly without twisting or crushing the tick. Wash your hands and dab the bite with an antiseptic. Save the tick in a jar in some alcohol. Label the jar with the date of the bite, the area where you picked up the tick, and the spot on your body where you were bitten. Monitor the bite for any signs of infection or rash. If the victim becomes ill while still in country on the project, and must go to a medical facility, bring the tick along. If the victim does not become ill before leaving the country, destroy the tick, but complete an notice of incident form and document the information on the form.

Early Signs are expanding skin rash, flu-like symptoms during summer or early fall that include chills, fever, headache, swollen lymph nodes, stiff neck, aching joints, and muscles, fatigue. Later signs include nervous system problems, heart problems, arthritis, especially in knees.

Malaria can only be avoided by not being bitten by mosquitoes. Preventative measures are the most important line of defence. Use of insecticide containing DEET and mosquito nets are highly recommended. Anti-Malarial medications will prevent the continued development of malaria parasites in the blood. Medications shall be procured and the course started before entering the region, according to a doctor's instruction. Different strains of malaria are prevalent in different parts of the world and it is imperative to procure the appropriate medication for the region of travel.

**Plants:** Toxic effects from plants are generally caused by ingestion of nuts, fruits, or leaves. Personnel should also be concerned with plants like poison ivy, poison oak, and poison sumac, which produce adverse effects from direct contact. The usual effect is dermatitis or inflammation of the skin. The protective clothing and decontamination procedures used for chemicals also reduce the exposure risk from the plant toxins. Risk can be reduced by cleaning the skin thoroughly with soap and water after contact.

**Hepatitis B Virus:** The term hepatitis simply means an inflammation of the liver. This condition can be caused by a wide variety of agents including medications, alcohol, toxic or poisonous substances, and infectious agents such as viruses. Hepatitis B, formerly known as "serum" hepatitis, is the only form of viral hepatitis that poses a significant occupational threat in the health care environment.

Symptoms: HBV is a disease that causes liver damage, the severity of which can range from mild or even unapparent to severe or fatal. Of the infected individuals, 6-10% will become HBV carriers. Carriers are at risk of developing chronic liver disease, including active hepatitis, cirrhosis and primary liver cancer. Carriers are also infectious to others (USHHS and NIOSH, 1989).

Sources of Infection: The Hepatitis B virus has been isolated from various body fluids including blood, semen, vaginal secretions, breast milk, saliva, and serous fluid. Within the health care setting, however, Hepatitis B is thought to be transmitted primarily by percutaneous or permucosal blood through needle sticks or the splashing of blood or blood-tinged body fluids into the eyes or mouth.

Risk: There is a direct relationship between the likelihood of occupational Hepatitis B infection and the frequency of blood contact. Health care professionals (surgeons, operating room-staff; pathologists, and emergency room personnel) exhibit a high incidence of exposure to Hepatitis B infection. The frequency of blood contact determines the level of risk.

Protective measures against Hepatitis B infection include good hand washing practices, caution, and proper technique in the handling of the following potentially contaminated items: needles, sharps, supplies, and instruments. Excellent protective treatment for, or prevention of, this disease is afforded by both Hepatitis B immune globulin (HBIG) and by Hepatitis B vaccine. Either or both of these should be given as soon as possible after any documented exposure to blood (Johnson and Johnson, 1992).

**Acquired Immunodeficiency Virus:** Acquired Immunodeficiency Syndrome or AIDS is a severe viral disease. AIDS severely affects the immune system and is characterized by a multitude of opportunistic infections. The AIDS virus is typical of most viruses. It cannot survive for any appreciable amount of time outside its human host. Its presence in the general environment is extremely unlikely and is limited to body secretions, primarily blood and semen. HIV is very susceptible to a large number of common household disinfectants since it is an unstable virus.

Risk - There is a common misconception that health care workers are at high risk for acquiring HIV infection through occupational exposure. Studies confirm the fact that this supposed risk is less than one percent. Of the thousands of health care workers in the U.S. and other parts of the world who have been exposed to HIV through patient contact, very few have developed subsequent infection. AIDS is a concern of immense proportion to the health care community. However, from an occupational health point of view there is little reason for undue concern regarding this virus.

Simple use of good personal hygiene, common sense, and the barrier techniques which are discussed in this operating practice will help to prevent health care workers from contracting HIV infection or any other serious illness in the workplace (Johnson and Johnson, 1992).

## TH 27 HAZARDOUS MATERIALS

### HAZARDOUS MATERIALS

F flammable (flammable or combustible liquids will burn, e.g., gasoline)

A and

C corrosive (damages living tissue, e.g., skin burns caused by hydrochloric acid)

T toxic (harms living organisms, e.g., cancer caused by benzene)

O or

R reactive (uncontrolled chemical reaction with increases in temperature, pressure, or gas evolution, e.g., hydroxylamine)

### General

Exposures to hazardous (flammable, corrosive, toxic, or reactive) chemicals can potentially occur from materials purchased for use on a project (e.g., paints or pesticides), those found on-site (e.g., lead-based paints or asbestos), or those created during a project (e.g., phosgene created when welding is conducted in the presence of chlorinated hydrocarbons). Careful attention to project planning, site assessment, and protection of team members and partners can minimize the risk of exposures to hazardous materials.

Chemicals may enter the body through ingestion (swallowing), inhalation, skin absorption, or injection (such as a needle stick or puncture wound). Good industrial hygiene<sup>1</sup> practice dictates a “hierarchy of controls” to minimize exposures (decreasing levels of efficacy):

- Control at the source
  - Substitution
  - Mechanize the process
  - Isolate/enclose the process
- Control along the path of exposure
  - Local exhaust ventilation
  - General ventilation
  - Housekeeping
- Control at the worker
  - Worker education
  - Enclose the worker

Industrial hygiene is the science and art of anticipation, recognition, evaluation, and control of environmental factors arising in or from the workplace that may result in injury, illness, impairment, or affect the well-being of workers and members of the community.

- Personal protective equipment (PPE)
  - Respirators, gloves, chemical protective clothing, eye and face protection
- Clean lunch / break room
- Locker and change room
- Lavatories
- Clean change of clothing
- Emergency eyewash and shower

Control at the source is more effective than the other two methods (along the path, at the worker) because it eliminates or reduces any hazard, rather than just placing a barrier between the worker and the hazard.

Obviously, some of these controls make more sense in a traditional work place than on an EWB project site. For example, it's going to be much easier to substitute a safer chemical (e.g., a leadfree, water-based paint) than to mechanize a process or to enclose a team member working on a task. However, by paying close attention to the project design, the site assessment, and site factors, by educating ourselves on hazardous chemicals, and by consulting experts when needed, we can all work together to minimize exposure of EWB team members and partners to hazardous materials.

## **Project planning**

The initial application to EWB describing the goals and objectives and the specific methods and materials of your project should provide as much detail as possible. You should list **all** the products that you anticipate using in the project, including but not limited to paints, adhesives, solvents, pesticides, acids, bases, chlorine, and cement. You may not yet know all the chemicals projects you'll be using, but by including all the activities you plan to conduct, it will be easier for the project reviewers to anticipate other kinds of chemical products which may be needed. Provide as much detail as possible on the PROJECT APPLICATION PAPERWORK.

Extremely hazardous materials (including, but not limited to, cyanides, explosives, pyrophoric, or peroxide-forming chemicals) should NOT be used on any EWB project. Use of any extremely hazardous materials must be approved by the EWB Health & Safety Committee.

## **Site Assessment**

One of the goals of your site assessment trip will be to learn as much as possible about the existing condition of the site, including the presence of any hazardous materials or dangerous conditions. These should be noted on your site assessment report. Also, if you encounter any materials which may pose a hazard, you'll need to talk with your advisor about ways to avoid contact. For example, any hazardous materials stored at the site should be moved away from the area in which you'll be working. If you anticipate welding on any painted surfaces which could contain lead-based paint, or conducting renovation, remodeling, or repair on any surfaces which may contain asbestos, it may be appropriate to take representative samples for laboratory analysis.<sup>2</sup>

## **Protection of Team Members and Partners**

A variety of methods will be needed to ensure that team members and partners are appropriately protected from hazards which may be discovered on-site. Planning and assessment can minimize, but not eliminate hazards. It will be necessary to remain alert at all times, whether conducting official project activities, or relaxing with your team members. Appropriate methods of protecting yourself from injury or illness may include personal protective equipment, avoiding hazards, and being sure that food and water are safe to consume. The general guidelines and information on hazardous materials which follow are designed to increase your awareness of potential hazards. If you become aware of additional hazards during your trip, please communicate this information to the EWB Health & Safety Committee so that we can incorporate it into future guidance.

Some of the chemicals which may be purchased for an EWB project or which may be encountered on the site of an EWB project are toxic. EWB team members who may have potential exposure to these chemicals must receive special training prior to conducting field activities involving:

- Pesticides
- Lead
- Asbestos
- Silica

<sup>2</sup>Appropriate protective equipment should be worn by persons taking any samples. Samples should be sealed and labeled for future analysis. Bulk samples of solvents, liquid paints, pesticides, etc., should NOT be returned to the United States for analysis, as doing so may violate international transportation laws.

### **General Guidelines for Handling Hazardous Materials**

1. Obtain a manufacturer's Material Safety Data Sheet (MSDS) for each product that you'll be using (possibly available on the Web). Become familiar with the contents and any safety procedures recommended by the manufacturer. The project Health & Safety Office (HSO) should carry a copy of the MSDS, and communicate important aspects to other team members during safety meetings.
2. Buy the smallest quantity of product required for the project. It may be "cheaper by the dozen," but excess chemicals create storage and disposal problems. Don't purchase a chemical until you have a plan for disposing or donating the excess to a responsible group.
3. If the MSDS or product label indicates any hazardous (flammable, corrosive, toxic or reactive) materials, consider the possibility of substituting products or processes:
  - a. Water-based paints, glues, or cleaners for solvent-based products
  - b. Lead-free, cadmium-free for leaded paints or pigments, etc.
  - c. Silica-free abrasive blasting materials (note: some countries prohibit the use of silica sand for abrasive blasting)
  - d. Non-asbestos insulating materials for asbestos-containing materials (ACM)
  - e. Slurry, pelletized, or waxy materials instead of dry dusts or powders
  - f. Painting with a brush rather than spray painting
4. Many operations can be made safer by handling materials in wet form rather than dry.
5. Try to work with the wind at your back to minimize inhalation of dusts, aerosols, etc. If you're working indoors with materials which are dusty or volatile, try to keep the doors and windows open.
6. Don't ever work alone, but limit the number of people who may have potential exposure to chemicals. Make sure that the area is labeled so that people won't enter unaware of potential hazards.
7. All containers must be properly labeled with contents. Try to avoid pouring chemicals from a large container into a small container, which must then be labeled and disposed. NEVER put chemicals into a container which is meant for storing or serving food.
8. Use of goggles, gloves, and aprons can reduce the risk of spilling or splashing chemicals on to skin or eyes. Contaminated clothing should be changed as soon as possible.
9. If a product comes into contact with skin or eyes, rinse immediately with clean water. An eyewash station (portable versions are available) with fresh, clean water must be available whenever corrosive chemicals (potential to injure the eyes) are in use. Eyes should be flushed for at least 15 minutes (which means that the eye wash station must contain sufficient water supply).
10. Choose gloves carefully, as various glove materials can protect against different chemicals. No one glove material can provide protection against all chemicals. For example, a nitrile glove is good protection against isopropanol, but is not a good choice for many of the degreasing solvents. PVA (polyvinyl alcohol) provides excellent chemical resistance to aromatic and chlorinated solvents, but cannot be used in water or water-based solutions. Surgical gloves are very thin to allow for sensitive touch, but are not designed for chemical resistance. Gloves should be replaced after one use, or at the first sign of deterioration, damage, or after immersion in liquid chemicals, whichever comes first. Latex gloves may cause contact dermatitis. Users in hot and humid climates should be careful to keep their hands clean and dry to reduce the risk of skin problems.
11. Respiratory protective equipment comes in two basic categories: air supplying, and air purifying. Air-supplying respirators may provide clean breathing air from an air compressor, a remote air tank, or a tank carried by the workers (similar to but NOT the same as underwater SCBA). Airsupplying respirators are the only safe respiratory protection when people are exposed to highly contaminated and/or oxygen-

deficient atmospheres. **Use of air-supplying respiratory protection requires special training, and should NOT be used on any EWB project without special arrangements with the EWB Health & Safety Committee.**

12. Air-purifying respirators remove contaminants from contaminated air by filters (dusts and other aerosols) and/or cartridges (gases and/or vapors). In a negative-pressure respirator, the air is pulled through the filter / cartridge by the breathing effort of the wearer. In a powered air-purifying respirator (PAPR), the air is supplied to the face piece of the respirator by a small motor and fan.

A positive-pressure respirator provides greater protection to the wearer than a negative-pressure respirator. (Users of PAPR may have glasses and/or facial hair.) A full-face respirator provides more protection than a half-mask respirator. **Air-purifying respirators do NOT supply oxygen, and should not be worn in oxygen-deficient or highly contaminated atmospheres. Team members who will be wearing any respiratory protective equipment other than a disposable respirator should receive training prior to travel for the EWB project.**

13. A respiratory protection program should be in place whenever a team will be relying on respiratory protective equipment. Provisions must be in place for training, selection (NIOSH approved respirators), use, inspection and repair, cleaning, storage, and medical evaluation of users. Keep in mind that any use of respiratory protective equipment places an additional strain on the user, particularly in hot and humid climates.

14. NEVER smoke, or allow others to do so, around hazardous materials. Keep ignition sources far away from flammable / combustible materials.

15. Wash hands and face before eating, drinking, or smoking. NOTE: It is strongly recommended that you NOT smoke while on an EWB project.

### **General Guidelines for Housekeeping**

1. Keep all surfaces clean and free of chemicals (dusts or liquids). Avoid dry sweeping, dry dusting, and the use of compressed air to clean surfaces. Whenever possible, wet wipe or mop surfaces.

Wet wiping using the three-bucket method (NJ Department of Health and Senior Services)
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Prepare:

- 2 buckets with clean water
- Empty bucket for dirty cleaning solution
- Container of cleaning solution

Pour cleaning solution onto clean cloth and wring excess into empty bucket. Wipe the dirty surface with the wet cloth. Pour additional cleaning solution on the cloth as needed, and wipe all surfaces to be cleaned, discarding cloths as they become dirty. To rinse, dip a clean cloth into the first rinse bucket and wring out. Wipe the work surface. Rinse the cloth in the first bucket, wring out, then repeat in the second bucket. Continue until all surfaces are rinsed. Change rinse water as needed.

Wet mopping using the three-bucket method (NJ Department of Health and Senior Services)
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Assemble

- Bucket of cleaning solution
- Mop and bucket for dirty rinse
- Bucket for clean rinse

Dip mop into cleaning solution, then wring excess solution into the mop bucket. Mop small areas until mop is dry. Slosh mop in clean rinse bucket and wring into mop bucket. Continue until area is clean. Follow the same procedure to rinse, except that the bucket of cleaning solution is exchanged for a second rinse bucket. Change rinse water as needed.

## General Guidelines for Spill Clean Up

1. Whenever hazardous chemicals will be used, you must determine in advance:
  - a. To whom spills will be reported, and who will be responsible for spill clean up (e.g., team members involved in the spill, a spill clean-up team, a contractor)
  - b. How spills will be contained, and how team members will be decontaminated
  - c. What equipment will be used, and which team members will be trained in its use
  - d. What personal protective equipment will be needed
  - e. The criteria for determining that the area is “clean”
  - f. Disposal procedures (local or national requirements, good environmental practice)
  - g. Medical surveillance of team members who have been exposed
2. Have a spill clean-up kit available whenever hazardous liquid products are used, and know how to use it.
3. Know where any used spill clean-up kit will be disposed.

## General Guidelines for Storing Hazardous Materials

Storage of incompatible chemicals together can result in fire, explosion, or in a chemical reaction which generates toxic materials. The most likely of these is the storage of acids (especially oxidizing acids) with flammable solvents. Contact of a concentrated oxidizing acid with a flammable solvent may result in a fire or an explosion.

The following material has been adapted from Ernest Orlando Lawrence Berkeley National Laboratory, Environment, Health, & Safety Division, *Chemical Hygiene and Safety Plan: Chemical Storage Guidelines* (available at <http://www.lbl.gov/ehs/chsp/html/storage.shtml>). If you will be using hazardous chemicals on-site, it is your responsibility to thoroughly research the material safety data sheets (MSDS) for these specific chemicals, and to determine the safe storage procedures for those chemicals. NEVER mix chemicals or chemical waste without specific instructions to do so from a person knowledgeable in chemical hazards.

1. Proper storage is required to avoid accidentally mixing incompatible chemicals. Chemicals must be sorted into hazard classes for storage. Store incompatible chemicals separately. Avoid mixing incompatible waste materials.
2. Hazardous chemicals must be stored in locked cabinets and/or storage rooms. The cabinet and/or room should be labeled.
3. When flammable liquids are in use, appropriate fire extinguishers must be available within the immediate area (but not inside the locked storage area).
4. In general, chemicals should be separated according to the following categories (see incompatibility chart below):
  - Solvents, which include flammable/combustible liquids and halogenated hydrocarbons (e.g., acetone, benzene, ethers, alcohols)
  - Inorganic mineral acids (e.g., nitric, sulfuric, hydrochloric, and perchloric acids).
  - Bases (e.g., sodium hydroxide, ammonium hydroxide)
  - Poisons
  - Explosives or unstable reactives, such as picric acid, should NOT be used on EWB projects.
5. Ensure that caps and lids on all chemical containers are tightly closed to prevent evaporation of contents. Store all hazardous liquid chemicals in drip trays that are chemically resistant.
6. Label all containers to which hazardous materials are transferred with the identity of the substance and its hazards. Be aware that different container materials have varying resistances to different chemicals.
7. Limit the amount of chemicals stored to the minimum required.

8. Avoid exposure of chemicals to heat or direct sunlight. This may lead to the deterioration of storage containers as well as the degradation of the chemicals.

9. Flammable liquids in excess of 25 gallons (95 liters) must be stored in approved flammable liquid storage containers. Store all flammables away from oxidizing acids and oxidizers.

Keep away from any source of ignition: heat, sparks, or open flames.

10. Acids must be segregated from reactive metals such as sodium, potassium, magnesium, etc.; from flammables and combustible materials; from chemicals which could generate toxic or flammable gases upon contact, such as sodium cyanide, iron sulfide, calcium carbide, etc.; and from bases. Inorganic and organic acids must be separated.

11. Bases must be segregated from acids, metals, explosives, organic peroxides and easily ignitable materials.

The following incompatibility matrix contains examples of incompatible chemicals. It is not exhaustive; it is your responsibility to research the chemicals that you will be using on your EWB project.

### Chemical Incompatibility Matrix

	Acids, Inorganic	Acids, Oxidizing	Acids, Organic	Alkalis (Bases)	Oxidizers	Poisons, inorganic	Poisons, organic	Water reactives	Organic solvents
Acids, Inorganic			X	X		X	X	X	X
Acids, Oxidizing			X	X		X	X	X	X
Acids, Organic	X	X		X	X	X	X	X	
Alkalis (Bases)	X	X	X				X	X	X
Oxidizers			X				X	X	X
Poisons, inorganic	X	X	X				X	X	X
Poisons, organic	X	X	X	X	X	X			
Water reactives	X	X	X	X	X	X			
Organic solvents	X	X		X	X	X			

X = Not compatible – do not store together

### General Guidelines for Disposing of Hazardous Materials

1. Know the country regulations for disposing of hazardous materials.
2. Consider neutralizing or stabilizing chemical products prior to disposal.
3. Consider options to disposal, such as donating leftover chemical products to another group which will use the chemical properly. Do NOT mix waste products together without specific instructions from a person knowledgeable in chemical hazards.
4. Purchase the smallest quantity possible, and be sure to label all containers properly.

### Additional Information on Selected Toxic Materials

This information is intended as a general guideline to toxic materials which may be encountered on your EWB project. It is your responsibility to research the activities which you will be conducting, determine the chemical products which you may be purchasing or which may be encountered or created on site, and

determine the appropriate protective methods. The EWB Health & Safety Committee is always available to answer your questions and to provide additional information on potential hazards.

Table 1. Potential Hazards and Controls for Selected Toxic Materials. Always obtain and study the product MSDS hazards and precautions!

Toxic Material	Hazard	Controlling Exposures
Paints	Multiple hazards, including toxic solvents (e.g., petroleum distillates), fillers, and/or pigments (e.g., lead, cadmium). Obtain and study the MSDS.	<p>Choose water-based products without lead, cadmium, etc. Apply with brush rather than spraying. Avoid sources of ignition if using paint with flammable / combustible contents. Avoid skin / eye contact. Use in well-ventilated area.</p> <p>The Consumer Product Safety Commission regulates lead in paint and other consumer items; however industrial paints may contain lead under certain conditions. Lead may be found in paints in other countries.</p> <p>Avoid welding on uncharacterized painted surfaces, as fumes (lead, cadmium, etc.) may be generated.</p>
Adhesives	May contain flammable solvents, reactive components, irritants, sensitizers, etc.	<p>Choose water-based product when possible. If ingredients are flammable / combustible, avoid ignition sources, use in well-ventilated area, and have a fire extinguisher available.</p> <p>Use goggles or safety glasses with side shields. Use gloves.</p> <p>Avoid inhalation of vapors; use in well-ventilated area.</p> <p>Avoid eye and skin contact. If eye contact occurs, flush with copious amounts of water and seek medical attention. If skin contact occurs, flush with copious amounts of water and seek medical attention if irritation occurs.</p>
Solvents	According to NIOSH, “millions of U.S. workers are exposed to organic solvents in paints, varnishes, lacquers, adhesives, glues, and degreasing/cleaning agents, etc. Many organic solvents are recognized by NIOSH as carcinogens (e.g., benzene, carbon tetrachloride, trichloroethylene), reproductive hazards (e.g., 2-ethoxyethanol, 2-methoxyethanol, methyl	<p>Choose water-based cleaners and solvents if possible. If not, choose solvent with low vapor pressure, use in well-ventilated area, and avoid inhalation of vapors. Avoid sources of ignition if flammable / combustible solvents. Do not use to wash skin.</p> <p>Avoid welding in the presence of flammable or combustible materials, or chlorinated hydrocarbons.</p>

	chloride), and neurotoxins (e.g., n-hexane, tetrachloroethylene, toluene).” Other health effects can include liver / kidney damage, and skin irritation and drying.	
Asbestos	<p>According to NIOSH, "asbestos" is a generic name given to a fibrous variety of six naturally occurring minerals that have been used for decades in the development of thousands of commercial products, including insulation and fireproofing materials, automotive brakes and textile products, and cement and wallboard materials.</p> <p>The asbestos minerals have a tendency to separate into microscopic-size particles that can remain in the air and are easily inhaled. Persons occupationally exposed to asbestos have developed several types of life-threatening diseases, including lung cancer, mesothelioma, and asbestosis.</p> <p>There are no warning symptoms of asbestos exposure; it has no odor and is not irritating to breathe.</p>	<p>Avoid working with or disturbing asbestos-containing materials (ACM).</p> <p>If you don't know whether a product contains asbestos, it is best to assume that it does (including insulation, panels, transite, etc.) EPA requires special training and licensing for persons involved in removal of ACM and demolition of buildings that contain ACM. While EPA may not have jurisdiction in the country of your EWB project, it is highly recommended that you follow EPA regulations. People who have had this training will know how to enclose processes (including use of glove bags), properly handle wet ACM, and use appropriate personal protective equipment. Any EWB team member who may be exposed to asbestos on an EWB project must have special training prior to the project activities.</p>
Cement	<p>Portland cement is a gray, odorless powder which can cause irritation of the eyes, skin, nose; cough, expectorant; exertional dyspnea (breathing difficulty), wheezing, chronic bronchitis; and dermatitis.</p>	<p>Per the IPSC, gloves and safety goggles should be worn. If skin contact occurs, rinse and then wash skin with water and soap. If eye contact occurs, first rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.</p>

### National Authorities

NIOSH: U.S. National Institute for Occupational Safety and Health, <http://www.cdc.gov/niosh/>  
NIOSH Safety and Health Topic: Chemical Safety. <http://www.cdc.gov/niosh/topics/chemical-safety/>  
NIOSH Pocket Guide to Chemical Hazards: <http://www.cdc.gov/niosh/npg/default.html>  
CDC: U.S. Centers for Disease Prevention and Control, <http://www.cdc.gov/>  
EPA: U.S. Environmental Protection Agency, <http://www.epa.gov/>  
IPCS: International Programme for Chemical Safety, <http://www.who.int/ipcs/en/>  
United Kingdom, Health and Safety Executive, Control of Substances Hazardous to Health, <http://www.hse.gov.>  
Woodworking: <http://www.hse.gov.uk/pubns/wis6.pdf>  
Harm via Eye/Skin Contact: <http://www.hse.gov.uk/pubns/guidance/sseries.htm>

### Additional Information

US Department of Labor, Occupational Health and Safety Administration. November 2006. *Safety and Health Topics: Hazardous and Toxic Substances*. Available at <http://www.osha.gov/SLTC/hazardoustoxicsubstances/index.html> .

New Jersey Department of Health and Senior Services, Division of Epidemiology, Environmental and Occupational Health, Occupational Health Service. October 2000. *Controlling Chemical Exposure: Industrial Hygiene Fact Sheets*. Concise guidance on 16 components of industrial hygiene controls. Available at <http://www.state.nj.us/health/eoh/survweb/ihfs.pdf> .

#### Applicable OSHA Standards

(Note: The occupational safety and health standards enforced by the U.S. Department of Labor, Occupational Safety and Health Administration, are legally applicable only in an employer/employee relationship. These standards do, however, provide minimal guidelines for personal protective equipment in a variety of work sites.)

#### General Industry Standards for Personal Protective Equipment (29 CFR 1910)

- 1910 Subpart G, Occupational health and environment control
  - 1910.94, Ventilation
  - 1910.95, Occupational noise exposure
- 1910 Subpart H, Hazardous materials
  - 1910.120, Hazardous waste operations and emergency response
- 1910 Subpart I, Personal protective equipment
  - 1910.132, General requirements
  - 1910.133, Eye and face protection
  - 1910.134, Respiratory protection
  - 1910.135, Head protection
  - 1910.136, Occupational foot protection
  - 1910.137, Electrical protective devices
  - 1910.138, Hand protection
  - Appendix A, References for further information (Non-mandatory)
  - Appendix B, Non-mandatory compliance guidelines for hazard assessment and personal protective equipment selection
- 1910 Subpart J, General environmental controls
  - 1910.146, Permit-required confined spaces
- 1910 Subpart Q, Welding, cutting, and brazing
  - 1910.252, General requirements
- 1910 Subpart Z, Toxic and hazardous substances

## TH 28 CLEARING, GRUBBING AND LOGGING OPERATIONS

### General Information

This practice covers safety procedures that must be evaluated and utilized for all types of clearing, grubbing and logging activities (i.e., operations associated with the felling and moving of trees, brush and logs), regardless of the magnitude of the project. Such activities may include the need to work in proximity to heavy equipment, or more likely the use of hand tools such as axes and saws, including chain saws.

### Procedure

Training, planning and hazard evaluation are necessary and crucial to any clearing, grubbing and logging operation. *Conditions and tasks beyond the training ability or skill of the employee shall not be conducted.* In general, EWB personnel should be directly involved only in manual felling and clearing. More intense activities requiring heavy equipment will be performed by contractors. Manual felling of trees may include the use of both hand and power tools (chain saw). The project HSO shall identify the necessity of these tasks as part of the project, the required equipment, and then designate the appropriate level of PPE required.

Hazard evaluation must include, but not be limited to; terrain, weather, tree size and lean, tree configuration and condition (e.g., visible dead wood, rotting, fungal growth, lack of new growth, etc.), potential for throwback during felling and proximity to other workers, utilities and equipment.

Only trained personnel shall use powered equipment, such as a chain saw, or heavy equipment. The project HSO must verify that personnel are appropriately trained and prepared to perform necessary tasks prior to and periodically during the work. On the job training may be used, provided the trainer has demonstrated appropriate training in advance.

Project Planning shall include consideration and adherence to the following:

- Tree size limited to less than 12 inches diameter.
- Climbing or elevated platform cuts limited to non-powered hand tools for nuisance limb clearing.
- Felling cuts limited to the Open Face Cut.
- No felling of “Danger Trees” - Danger trees as defined are to be removed by mechanical aid or contractor.
- No felling of “Spring poles” created during felling unless employee specifically qualified to release created tension, otherwise these must be mechanically removed.
- No felling of trees located within 2 tree length distance to hazards such as active roadways, elevated utility lines, buildings, etc.
- No felling on sloping terrain such that safe felling and retreat is compromised.
- Availability and use of trained and experienced heavy equipment operators with task-appropriate equipment.

Environmental Conditions should be monitored and work performed either by contract or self-performance must be stopped and workers moved to safe areas when environmental conditions such as, but not limited to, electrical storms, high winds, heavy rain, fog, or snow, extreme cold, or darkness are imminent.

**Safety Precautions:**

INSPECT all hand tools, power tools, required safety equipment, and supplies before use on each shift. Damaged or missing items must be repaired or replaced before work starts. Inspections shall include:

- Handles/Guards proper and in place.
- Controls operational.
- Impact and driving tools in proper condition.
- Cutting edges sharp and properly shaped.
- All safety devices in place and operational (chain brakes, throttle return springs, etc.).
- Operation and Maintenance manuals available on-site for machines such as chain-saws.

INFORM workers, including contractors, the location and operation of:

- First Aid Kits
- Fire Extinguishers.
- Work Areas: Established and communicated to maintain safe work conditions.
- Signalling Equipment: Hand or audible, discernable above background noise. Air horn suggested.

Personal Protective Equipment requirements shall be considered before travel and may include:

- Hand Protection: Adequate for protection from puncture wounds, cuts, lacerations.
- Leg Protection: Chain saw operators should wear cut-resistant (e.g., ballistic nylon or equivalent) leg protection which covers full length from thigh to the top of the boot for each leg.
- Foot Protection: Water-proof or water repellent, cover and support the ankle. If operating a chain saw, material shall be cut-resistant (e.g., multiple layers of material such as ballistic nylon, kevlar, etc.). Cutresistant material can be intrinsic to the boot construction or as an approved supplemental attachment.
- Head Protection: Hard hats required.
- Hearing Protection: Hearing protection capable of reducing the noise level to less than 85 dBA will be required.
- Eye Protection: Safety glasses required.
- Face Protection: ANSI approved safety glasses and face shield required when operating chipper.
- Face shield (e.g. mesh screen or ANSI clear) required when operating chain saw, unless determined that use of face shield creates greater hazard.

**Chain Saw Use Checklist:**

Chain saws meet requirements of ANSI B 175.1-1991 Safety Requirements for Gasoline Powered Chain Saws	
Select appropriate size and type based upon hazard evaluation and operating procedure.	
Read and understand operation manual for saw in use.	
Ensure appropriate PPE available, inspected and used.	
Ensure chain saw chain is properly sharpened and tensioned on the bar.	
Ensure proper lubrication.	
Ensure proper fuel mixture based upon manufacture’s direction.	
Evaluate hazards as defined and determine retreat path.	
Choose appropriate felling method based upon tree in question and conditions.	
Clear felling area and retreat path.	
Perform felling task as planned and trained.	
Perform limbing and bucking only as necessary and in accordance with hazard evaluation and training.	

Only authorized personnel will operate chain saws.	
Chain saw fuelled minimum 10 feet from open flame or other ignition source.	
Chain saw started minimum 10 feet from fuelling area.	
Chain saw started only on the ground or where otherwise firmly supported. No drop-starting.	
Chain saw shut down or chain brake engaged during retreat after felling or if saw carried further than 50 feet or at anytime terrain or other conditions create worker hazard.	

**Chipper Operations Requirements**

No EWB personnel shall operate a chipper. If a contractor or EWB partner is operating a chipper, oversight shall be provided and the following requirements met:

Read and understand operation manual.	
Ensure appropriate PPE available, inspected and used. Note that PPE includes full-face eye protection (safety glasses and face shield. The use of logger-type mesh screen shields are not acceptable for chipping operations.)	
All chippers equipped with appropriate guards, Chipper access covers or doors are not to be opened until drum or disc is at complete stop.	
Inlet and discharge ports on chippers shall be guarded to prevent contact with the disc, knives, or blower blades.	
Chipper shall be shut down and locked out prior to servicing or maintenance in accordance with manufacturer.	
Chippers shall be chocked to prevent rolling or sliding as necessary.	

**Definitions:**

**Clearing, Grubbing:** operation refers to the removal of stumps, brush and other vegetation by hand or machine.

**Logging Operations:** operations associated with felling and moving trees and logs from the stump to the point of delivery, such as, but not limited to; marking, felling, bucking, limbing, debarking, chipping, yarding, loading, unloading, storing, and transporting machines, equipment and personnel from one site to another.

**Throwback or Crown Shatter:** occurs when either the crown or top of the felled tree or nearby tree snaps off or shatters, hurling branches in various directions. Throwback can also refer to the process when a portion of the felled tree (or portions of other trees contacted during the felling process) causes branches or other pieces of the tree to spring back in directions opposite the felling line.

**Felling:** the act of cutting down trees.

**Spring Pole:** a tree, segment of a tree, limb, or sapling that is under stress or tension due to the pressure or weight of another object.

**Limbing:** to cut the limbs from the tree.

**Bucking:** to cut the felled tree or limbs into smaller pieces.

***Open-Face Cut:*** is the notch cut on the side of the tree on which it is expected to fall. The open-face notch refers to the combination of the top and bottom cuts meeting such that the resulting angle is from 70 to 90 degrees open.

***Backcut or felling cut:*** the final cut in a felling operation, made horizontally on the opposite side from the notch cut (see open-face cut).

***Hinge:*** is the wood fibers left between the notch cut and felling cut. The hinge is left in the felling process to direct the fall, allow the tree to stay on the stump longer and keep the tree from twisting and/or falling in the wrong direction.

***Danger Tree:*** a standing tree that presents worker hazard due to conditions such as, but not limited to, deterioration or physical damage to the root system, trunk, stem or limbs, inappropriate direction or lean of the tree, prominent fork in trunk or double trees, creating potential felling hazard, hung or entangled trees and snags that create unreasonable risk to the feller during manual cuts.

## TH 31 Falling Objects, Punctures, Abrasions, Dust, and Noise (Personal Protective Equipment)

### General Information

The requirement of personal protective equipment (PPE) for the project and for specific project tasks shall be evaluated during project planning, and specified in the site health and safety plan. Any PPE required shall be procured prior to travel. All EWB personnel shall comply with the PPE requirements specified in the health and safety plan. It is recommended that extra PPE be procured and offered to in country partners.

### Procedure

PPE is worn to protect personnel from many hazards, including:

- Falling Objects: Hard hats and safety boots with steel toe shall be required if project planning determines that the risk of objects falling on the head or feet is likely to be present. Nearly every task will pose a hazard of objects being dropped on the feet.
- Punctures: Knives or other sharp tools are commonly dropped, the likely landing location being the toes. Steel toed shoes should be worn to protect the feet. Eyes are also susceptible to punctures during many construction related tasks. Safety glasses shall be available and worn during all construction tasks.
- Abrasions:
- Dust: The most common exposure to dust on EWB projects will be cement dust. Cement dust can pose a serious health threat. Dust masks and safety glasses shall be worn when working with cement. Extra safety glasses and dust masks should be offered to in-country partners working with cement dust.
- Noise: Working with or around heavy equipment can pose a noise hazard. When working with heavy equipment is planned, ear plugs shall be available and worn.
- Special Tasks: Some specialized tasks such as working with lead containing materials will require additional training and PPE.

INFORM both workers and in-country partners about the PPE required for each task.

**CONTROLS:** Workers must use ventilation and other methods, such as HEPA vacuums, to keep lead dust from getting airborne. Power tools such as grinders, abrasive wheels, and welding equipment must utilize ventilation systems in order to capture the lead dust. Whenever possible it is preferred to use the lowest energy possible to remove LBP coated areas, so cutting and grinding is better than hot work. After removal, areas must be thoroughly wet wiped prior to re-occupancy as lead exposure often occurs in small children by hand-to-mouth on common surfaces such as floors, soils and window sills.

**RESPIRATORY PROTECTION:** The least protective respirator that OSHA allows for lead work is an N100 halfmask with HEPA filters or an N100 disposable mask. Dust masks are NOT allowed. Powered, air-purifying respirators with hoods, such as the 3M GVP series, provide protection without needing a fit test (beards, glasses are okay).

- NOTE: Medical approval for respirator wearers should be included in physicals.

PPE: Wear disposable (eg. Tyvek) clothing and thicker, protective, disposable gloves.

**PROHIBITED WORK PRACTICES:** These activities create potentially high exposures:

- Dry sweeping, dusting, shoveling or normal vacuuming of lead-containing material.
- Using compressed air to clean surfaces contaminated with lead-containing dust.
- Sanding and scraping large areas of LBP should be avoided, it's easier to demolish.

## **ATTACHMENT J: EMERGENCY CONTACTS**

<b>Emergency Contact Page</b>		
<b>In the event of an emergency, please contact EWB-USA at 303-478-8244 as soon as the situation has stabilized</b>		
		<b>Telephone Number</b>
<b>Road Emergencies/Automobile Accidents</b>		N/A
<b>US Embassy (Clayton, Panama City)</b>	Avenida Demetrio Basilio Lakas, Building No.783	207-7000
(Contact the US embassy if you are the victim of a crime)	(after-hours emergencies)	207-7200
	consular section	207-7030
	fax	207-7278 207-7303
<b>Local Hospitals</b>		
Hospital/Clinic (Changuinola)	Located on Ave. 17 de abril (main st.)	N/A
Peace Corps Hospital (Province of Chiriquí: David)	Clinica Cattan, Frente al antiguo hospital, Obaldia, David, Chiriquí, Republica de Panama	775-7099
Hospital Punta Pacifica (Panama City: San Francisco)	Boulevard Punta Pacifica con Boulevard Punta Darien	507 204 8041 507 204 8000
Clinica Hospital San Fernando (Panama City: Las Sabanas)	3a Via España Final	507 305 6300
Hospital Nacional (Panama City)	Avenida Cuba (entre Calles 38 y 39)	507 207 8100 (main) 507 207 8383
Centro Médico Paitilla (Panama City: Panama 5)	Avenida Balboa y Calle 53	507 265-8800 Ext. 7040
<b>EWB-USA International SOS</b>	Policy Number: 11BCPA000270	011-215-942-8226
<b>NGO - In-country</b>		
Aly Dagang (SIT Academic Director) - Panama City		317-0317 (office) 6673-7448 (cell)
Graciela Quezada (SIT Host Mother) - Panama City		236-3494 (office) 6663-0438 (cell)
Lucia Lasso (ACD Executive Director) - Panama City		223-9170 (office)
Carlos Navarro (SIT Advisor) - Changuinola		758-6091 (office) 6508-2025 (cell)
Hector Sanchez (Chiquiri Rafting) - Boquete		720-1505 (office) 6618-0846 (cell)
Christine Steinkrauss (Boquete Rotary) - Boquete		720-3865 (office) 6481-8325 (cell)
Jerry Wager (Boquete Rotary)		6564-4682 (cell)
Simon and Lavonne Challinor -		6619-0693 (cell)

Sieykin		240-6062 (Chame)	
<b>NGO - USA</b>			
N/A			
<b>EWB-USA</b>			
Emergencies (Catherine Leslie)		011-303-478-8244	
Non-Emergencies (office line)		011-303-772-2723	
<b>EWB - Greater Austin</b>			
Chris Lombardo (Student President)		001-443-454-3207	
Charlotte Gilpin (Professional President)		001-512-680-7309	
Heather Schulman		001-443-254-5929	
<b>Travel Team Contact List</b>			
Name	In-Country Cell Number	Emergency Contact	Contact Number
<b>Tim Ager</b>	512-419-0545	Teri Ager (sister)	011-510-541-2875
<b>Luis Galindo</b>	512-698-5759	Luis Galindo (Dad)	011-512-825-0738
<b>TBD</b>			
<b>TBD</b>			
<b>TBD</b>			
<b>TBD</b>			
<b>TBD</b>			
<b>TBD</b>			
<b>Travel Insurance Contact</b>	N/A (see travelers' individual providers)		
<b>Travel Reservations</b>	Continental Airlines		011-800-231-0856

# ATTACHMENT K: INCIDENT REPORT (Form 612) & ROOT CAUSE ANALYSIS (Form 613)

612 - Incident/Near Miss Report

Rev. 10-2010

<b>Incident/Near Miss Investigation Report</b>	
<p>This report is to be completed for any incident that occurs associated with the project. It is to be filled out by the Site Health and Safety Officer or Project Leader and submitted as soon as possible to EWB-USA chapter relations manager (CRM) for review, although submissions may be accepted from any source. Independent of this report, if injuries requiring more than local first aid or a fatality are experienced, then the Project Leader and/or Site Health and Safety Officer must immediately contact EWB-USA for guidance.</p> <p><b>EWB-USA EMERGENCY TELEPHONE: +1 303 478-8244 – Cathy Leslie or Tracy Beavers</b>  <b>SEVEN CORNERS INSURANCE: U.S., Canada &amp; Caribbean: 1-800-690-6295 (Toll Free)</b>  <b>International: + 800-690-6295</b>  <b>Collect Calls: 0-317-818-2808 (This line is monitored 24 hours a day)</b>  <b>ISOS PHILADELPHIA Alarm Center: +1 215 942 8226 – Membership number #11BCPA000270</b></p>	
<p><b>INCIDENT TYPE (circle one):</b> <b>INCIDENT</b>      <b>NEAR-MISS INCIDENT</b>      Date of Incident:</p>	
<p>Did the incident result in any of the following? Check all that apply:</p> <p><input type="checkbox"/> Fatality  <input type="checkbox"/> Injury that resulted in a lost work/school day  <input type="checkbox"/> Injury that resulted in being assigned a lighter task  <input type="checkbox"/> Illness requiring doctor visit / Evacuation  <input type="checkbox"/> Off-the-job injury  <input type="checkbox"/> Interruption to the project schedule  <input type="checkbox"/> Fire / Local Property Damage  <input type="checkbox"/> Evacuation / Extraction from Country  <input type="checkbox"/> Incarceration / Person in Custody / Unable to Leave Country</p>	
<p>Which of the following occurred? Check all that apply:</p> <p><input type="checkbox"/> Equipment failure, or improper use of equipment  <input type="checkbox"/> Motor vehicle accident  <input type="checkbox"/> First aid administered  <input type="checkbox"/> Medical attention–local clinic  <input type="checkbox"/> Medical attention–hospital  <input type="checkbox"/> Assault / Criminal Activity / Vandalism / Theft  <input type="checkbox"/> Natural Disaster/ National Event      <input type="checkbox"/> Other (Please Explain)</p>	
<p><b>CHAPTER:</b></p>	
<p><b>CHAPTER REGION (CIRCLE ONE):</b> <b>NORTHEAST</b> <b>SOUTHEAST</b> <b>WEST COAST</b> <b>MIDWEST</b> <b>SOUTH-CENRAL</b> <b>MOUNTAIN</b></p>	
Project Name:	Project Phase:
Work Location, Country, Region/Closest Village/GPS coordinates:	
Project Faculty Advisor:	Project Professional Mentor:
Project Health and Safety Officers:	Project Leader:
<p><b>NOTIFICATION</b></p>	
Date EWB-USA notified of incident / near miss: (MM/DD/YYYY)      /      /	
Were the local police notified/police report filed? <input type="checkbox"/> Yes <input type="checkbox"/> No	Name of Officer/Case Number:
Was ISOS Contacted? <input type="checkbox"/> Yes <input type="checkbox"/> No	Was an embassy or consulate contacted? <input type="checkbox"/> Yes <input type="checkbox"/> No (Please indicate country if not U.S.)
Were Emergency Contacts notified? <input type="checkbox"/> Yes <input type="checkbox"/> No	Was anyone evacuated/sent home early? <input type="checkbox"/> Yes <input type="checkbox"/> No
<p><b>GENERAL INFORMATION</b></p>	
Where did incident / near miss occur? (Be as precise as possible):	

ROOT CAUSE ANALYSIS (TO BE COMPLETED BY PROJECT TEAM WORKING TOGETHER WITH H&S COMMITTEE MEMBERS)			
PROJECT NAME:		PROJECT PHASE:	
PROJECT LOCATION:		CHAPTER:	
REGIONAL TAC:		TRIP DATES:	
<b># Root Cause and Contributing Factors: Conclusion (Describe in Detail Why Incident / Near Miss Occurred)</b>			
1			
2			
3			
4			
5			
<b>Root Cause(s) Analysis (RCA):</b>			
1. Lack of skill or knowledge		5. Correct way takes more time and/or requires more effort	
2. Lack of or inadequate operational procedures or work standards		6. Short-cutting standard procedures is positively reinforced or tolerated	
3. Inadequate communication of expectations regarding procedures or work standards		7. Uncontrollable	
4. Inadequate tools or equipment or equipment malfunction/failure			
RCA #	Solution(s): How to Prevent Incident / Near Miss from Recurring	Person Responsible for Implementing Solution	Closure Date
<b>Investigation Team Members</b>			
Name	Indicate Project Team HSO, Project Team Member, EWB H&S Committee member, EWB Staff, other		Date
<b>Results of Solution Verification and Validation</b>			
<b>Reviewed By</b>			
Name	Indicate Project Team HSO, Project Team Member, EWB H&S Committee member, EWB Staff, other		Date

# **ATTACHMENT L: EMERGENCY RESPONSE PLAN (FORM 614)**

## **614 - EMERGENCY RESPONSE PLAN**

The health and safety of our members is a priority for EWB-USA. International field work in general and specifically construction is inherently dangerous and carries additional hazards that may not be mitigated by planning. The Emergency Response Plan is the team's guide for handling both emergent (serious injury or illness that requires medical treatment in country, or safety situations that involve non-EWB-USA personnel) and non-emergent incidents (minor injury or illness) that involve EWB-USA members during EWB-USA trips. This plan consists of the following:

- 1) **Process Flow Instructions** – Detailed instructions for what to do under each step of the process flow for each of the three types of incidents;
- 2) **Process Flow Chart** (Page 6) - Provides the basic outline for the procedures to follow for a each of the three types of incidents – minor injury or illness, serious injury or illness, and safety situations; and
- 3) **Incident Report Form (form 612)** – Form which standardizes the documentation of incidents. Documenting and reporting incidents or near incidents is necessary so that the H&S program can continue to evolve, improve and serve to provide the best protection possible for our volunteers and in-country partners. This form can be found on the Sourcebook Downloads page of the website and should also be included in your HASP.

### **Process Flow Instructions**

The incident response process flow follows the three types of incidents:

- Steps A1 – A6b: Minor injury or illness;
- Steps B1 – B9: Serious injury or illness; and
- Steps C1 – C9: Safety situations.

The Health and Safety Officers (HSOs) will be responsible for determining if the incident is a minor injury/illness or a serious injury/illness. The HSOs will also initiate these response steps, depending on the incident type.

### **MINOR INJURY/ILLNESS**

*Definition: Minor injury or illness is described as an occurrence that is not life-threatening and does not require hospitalization. A minor injury or illness can be treated by the HSO on-site using the team's first aid kit or at a local clinic.*

#### **A1. Health and Safety Officer (HSO) Notified**

The HSO should be notified of the team member who has suffered a minor injury or illness. If the HSO is the team member who has suffered a minor injury or illness, than the second HSO should be notified.

#### **A2. Treat On-Site**

The HSO or other trained person should treat injury or illness on-site using first aid kit or should assist victim in getting to local clinic for medical attention.

#### **A3. Rest and Reduce Activity**

The person who has suffered a minor injury or illness should rest and reduce his/her level of activity until he/she is feeling better.

#### **A4. Prepare Incident Report**

The HSO should complete an incident report for any minor injury or illness and this should be submitted to the EWB-USA chapter relations manager (CRM) immediately upon return to the U.S.

#### **A5. Monitor Condition**

The HSO should continue to check-in with the affected team member and monitor his/her condition.

#### **A6a. Closeout Incident with National Office**

When the incident has been resolved in its entirety, the HSO should send a close-out e-mail to chapter relations manager (CRM) to let the national office know that no further action is necessary.

#### **A6b. Condition Worsens**

If his/her conditions worsens to a major injury or illness, the HSO should be contacted immediately and should follow the process flow for Step B – Serious Injury or Illness.

### **SERIOUS INJURY/ILLNESS**

*Definition: Serious injury or illness is described as an incident that may or may not be life threatening, but requires hospitalization or evacuation.*

#### **B1. Health and Safety Officer (HSO) Notified**

The HSO should be notified of the team member who has suffered a serious injury or illness. If the HSO is the team member who has suffered a serious injury or illness, then the second HSO should be notified.

#### **B2. Stabilize Victim**

The HSO should stabilize the victim.

#### **B3. Transport Victim to Medical Facility**

The HSO should determine the best way to transport the victim to a medical facility based on the type and seriousness of injury or illness. *Please note: Seven Corners does not assist with finding a local ambulance or emergency transport, but you should maintain receipts so that you can seek reimbursement from Seven Corners.*

#### **B4. Contact Seven Corners Insurance or Contact University/College Travel Insurance (for student members who do not have Seven Corners Insurance)**

Another team member should contact Seven Corners Insurance as soon as possible, but within 48 hours of the incident, to inform them of the situation. If the injury seems life threatening, call Seven Corners so that they can be prepared to start evacuation procedures should final medical analysis require evacuation

**U.S., Canada & Caribbean:** 1-800-690-6295 (Toll Free)

**International:** \* [Toll Free Country Access Codes](#) + 800-690-6295

**Collect Calls:** 0-317-818-2808 (This line is monitored 24 hours a day)

When contacting Seven Corners, please have your ID card on hand so you can supply the following:

1. Your full name as it appears on the card
2. Your policy Certificate #
3. Date of Birth

*Please Note: In medical emergency and/or medical evacuation situations, no cash/credit card should have to change hands. Once you/your team calls Seven Corners' 24/7 number, a call from the insurance company to the evacuation service/hospital should suffice to ensure that payment is guaranteed. All claims will be settled directly by Seven Corners. EWB-USA is not responsible for claim settlement.*

For students who are covered by their university/college travel insurance and who do not have Seven Corners insurance, you should follow the procedures provided to you by your university/college and insurance company you are covered by.

#### **B5. Call EWB-USA Emergency Phone**

Contact the EWB-USA emergency phone: [+1 303 478-8244](tel:+13034788244) to report the situation. The EWB-USA national office will notify the victim's emergency contact listed on the 606 – Emergency Contact Page.

#### **B6a. Hospitalize**

If recommended by the physician, admit the victim to a hospital. Contact Seven Corners to determine if hospital is within Seven Corner's network, in which case Seven Corners will arrange payment directly with the hospital upon patient's discharge from the facility.

#### **B6b. Emergency Medical Evacuation**

If medical evacuation is recommended by the attending physician, contact Seven Corners to make evacuation arrangements for the associated expenses. It is important to remember that evacuation travel (and related) charges which have not been approved and arranged by Seven Corners will not be eligible for insurance benefits.

If Seven Corners does not provide adequate assistance, contact International SOS.

**ISOS PHILADELPHIA Alarm Center:** [+1 215 942 8226](tel:+12159428226)

**Membership number:** #11BCPA000270

#### **B6c. Release and Monitor**

If recommended by the physician, victim can be released from hospital. HSO should work with victim to fill any prescriptions, follow any medical advice and should monitor the victim in case condition worsens. All receipts should be retained for reimbursement from Seven Corners.

#### **B7. Prepare Incident Report**

The HSO should complete an incident report for any serious injury or illness and this should be submitted to the EWB-USA chapter relations manager (CRM) immediately upon return to the U.S.

#### **B8. Updates to EWB-USA National Office**

After hospitalization, evacuation or release, contact the EWB-USA emergency phone to provide updates on the victim's condition. The EWB-USA national office staff will then notify the victim's emergency contact.

#### **B9. Closeout Incident with National Office**

When the incident has been resolved in its entirety, the HSO should send a close-out e-mail to chapter relations manager (CRM) to let the national office know that no further action is necessary.

### **SAFETY SITUATION**

*Definition: Any event which poses a threat to team members, including natural disasters, political insurrection, kidnap, ransom, or other life-threatening criminal activity.*

### **C1. Gather Team Members and Seek a Safe Location**

If the HSO is not aware of the safety situation, she/he should be notified. Meet at established emergency meeting point. Stay together as a group and seek safety.

### **C2a. Natural Disaster - Contact International SOS, U.S. Embassy**

In the case of a natural disaster such as a flood or earthquake, contact International SOS. Insurance from Seven Corners applies only if a member of your team has a medical emergency. You may also contact the U.S. Embassy for information and possible assistance.

**ISOS PHILADELPHIA Alarm Center:** +1 215 942 8226  
**Membership number:** #11BCPA000270

### **C2b. Political or Military Events – Contact Seven Corners or College Travel Insurance (for student members who do not have Seven Corners Insurance) and U.S Embassy**

In the case of political or military events and there is a formal recommendation for you to leave the country, contact Seven Corners for assistance with evacuation to the nearest place of safety. If you are covered by your university's travel insurance, please follow those procedures. You may also contact the U.S. Embassy for information and possible assistance.

**U.S., Canada & Caribbean:** 1-800-690-6295 (Toll Free)  
**International:**\* [Toll Free Country Access Codes](#) + 800-690-6295  
**Collect Calls:** 0-317-818-2808 (This line is monitored 24 hours a day)

When contacting Seven Corners, please have your ID card on hand so you can supply the following:

4. Your full name as it appears on the card
5. Your policy Certificate #
6. Date of Birth

### **C2c. Kidnap or Ransom – Contact EWB-USA Emergency Phone**

In a case of kidnap or ransom, contact EWB-USA Emergency Phone immediately and wait for instructions. +1 303 478-8244

### **C3. Assess Injuries and Seek Medical Attention**

If any team member has been injured and requires medical attention, begin the process flow starting with Step B1.

If injuries, go to Step B1. If no injuries:

### **C4. Contact EWB-USA Emergency Phone**

If you have not done so already, contact the EWB-USA emergency phone: +1 303 478-8244 to report the safety situation.

Internet access and cell phone reception are still sometimes intact, even when landlines are not. Satellite phones are generally the best option. If telephone access is limited, EWB-USA can keep emergency contacts informed.

### **C5. Contact U.S. Check-In Contact**

Contact the person designated as the U.S. Check-in contact on the 606 – Emergency Contact Information form and inform them of the situation.

**C6. Prepare Incident Report**

The HSO should complete an incident report for the crisis and this should be submitted to the EWB-USA Chapter Relations Manager immediately upon return to the U.S.

**C7. Monitor Local News, Travel Information, and US Embassy Updates**

If any team members have access to radio, television and/or internet, they should continue to monitor the local news and any travel information. Update all team members. The U.S. Embassy may also be in contact with your team to provide updates. The U.S. Embassy will use the contact information you provided when you registered before traveling.

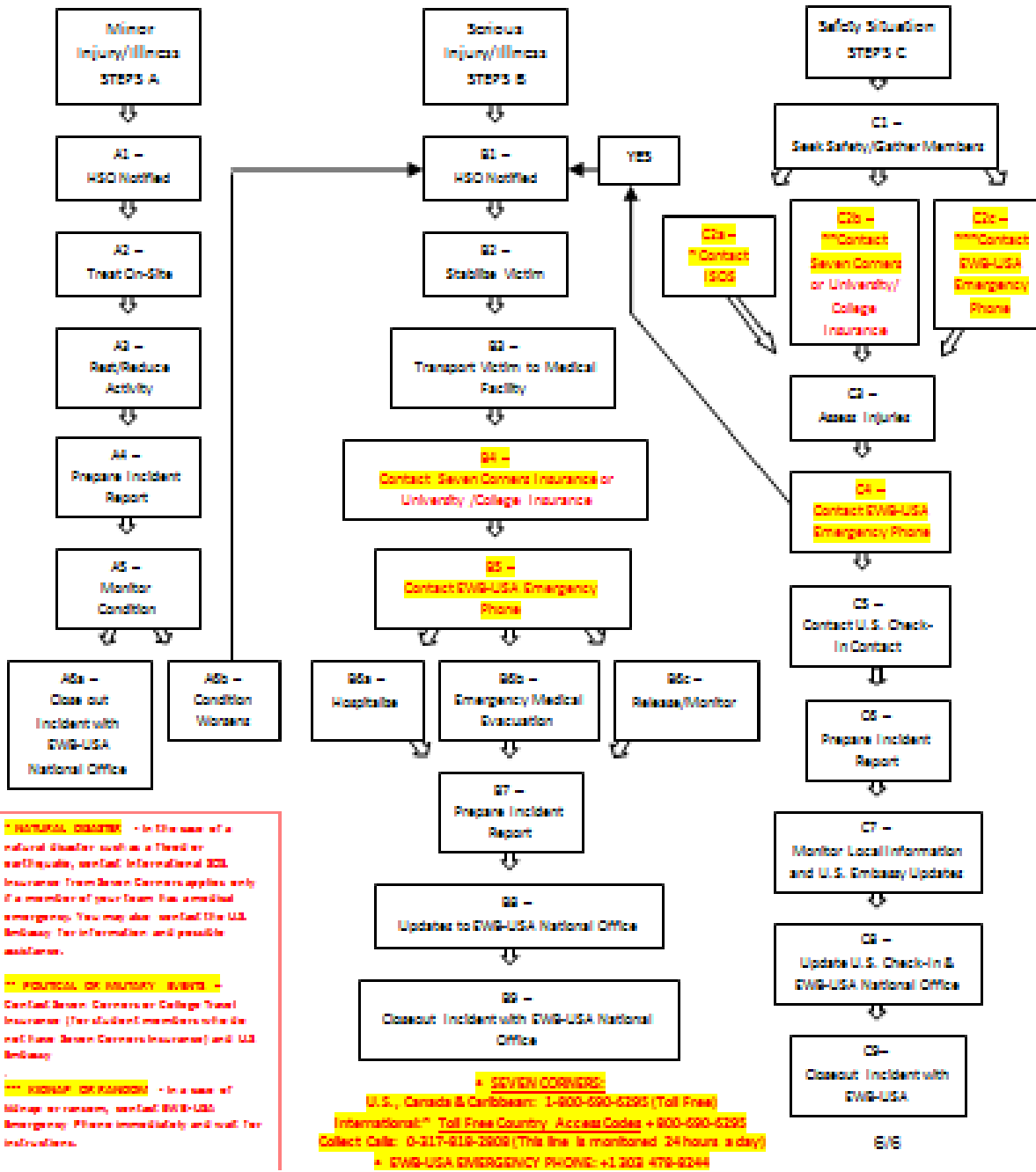
**C8. Provide Daily Updates to EWB-USA Emergency Phone and to US Check-In Contact**

While team members remain in-country, provide daily updates to the U.S. Check-In and EWB-USA emergency phone (Cathy Leslie)

**C9. Closeout Incident with National Office**

When the incident has been resolved in its entirety, the HSO should send a close-out e-mail to chapter relations manager (CRM) to let the national office know that no further action is necessary.

**Process Flow Chart**



# ATTACHMENT M: PANAMA TRAVEL SECURITY



Travel Security Online



## Panama | Country Report

7 Apr 2011

[Latest developments](#)

[Risk summary](#)

[Ratings](#)

[Travel](#)

 **Panama**

 **Colón**

 **Darién**

### TRAVEL RISK

Business travellers face LOW travel risks, with occasional exposure to street crime. However, crime has risen in recent years, particularly in Colón, where both petty and violent crime present significant risks. Muggings and theft from vehicles are common, and foreign visitors are often targeted because of their relative wealth. Visitors are advised not to walk around Colón at any time and to visit the city during the day only. Travellers should avoid the Darién region because of the increased risk of kidnapping or violent crime by Colombian guerrillas and drug-trafficking groups. Elsewhere, the risk from kidnapping is negligible.

[Travel security guide](#)

[Travel security](#)

### CRIME

Crime in Panama City, Colón and other major cities is moderate, though rates have increased slightly in recent years. Opportunistic crime is reported most commonly, though incidents of armed robbery and rape have risen. Several incidents of carjacking have been reported, particularly on the road from Tocumen International Airport (PTY) into Panama City. While these crimes are generally random in nature, tourist buses and luxury vehicles tend to attract attention and should be avoided. Travellers should use pre-arranged transportation or a transfer arranged through their hotel. Incidents of drug violence have increased, though foreign visitors are not specifically affected.

## KIDNAPPING

The majority of kidnaps target local business people, though anyone with perceived wealth is vulnerable. However, express kidnapping has become more common in Panama City, Colón and other metropolitan areas in recent years. Victims of such abductions are usually seized for a limited period of time and forced to withdraw funds using their bank and credit cards.

## SOCIAL UNREST

Political protests and demonstrations occur occasionally in Panama City, especially around Panama University and the principal road known as the Transistmica. Many of the demonstrations are concerned with domestic issues, though small groups sporadically stage anti-US demonstrations. These protests are usually non-violent, though have occasionally become tumultuous and even caused injuries to passers-by. Panama is not significantly affected by strikes or labour action.

## TERRORISM

Terrorism is not a significant risk, except in areas near the border with Colombia, where guerrilla incursions are common. An attack by international terrorist organisations against the Panama Canal – or their use of the country's maritime facilities to carry out an attack against US or other foreign interests – remains a low but credible risk.

## CONFLICT

There are no known threats of conflict involving Panama and neighbouring Central American states.

## POLITICAL SITUATION

Panama has a long history of military rule and intervention by the armed forces in political matters. Since the 1990s, however, there has been a significantly reduced risk of military coups, accompanied by a return to political stability. After the US invasion of 1989, the military was dissolved and replaced by a national police service which is formally removed from involvement in governmental decisions. Panama's democratic institutions are stable and there are no significant organisations or groups threatening the state.

The country is a democratic republic in which the president acts as both head of state and head of government. The executive branch consists of a president and two vice-presidents, while the legislative branch comprises a 78-member unicameral National Assembly. The constitution was amended in 2004, so that starting with the 2009 national elections, the executive branch will have only one vice-president and the seats in the National Assembly will be reduced to 71.

The May 2009 elections saw Ricardo Martinelli of the Democratic Change (CD) party beat Balbina Herrera of the Party of the Democratic Revolution (PRD) for the position of president. The Alliance for Change (APC) coalition, headed by Martinelli, won most seats in the National Assembly.

## RULE OF LAW

In principle, the government has control over the entire territory of the country. In the Darien Gap border area with Colombia, however, there is a significant presence of Colombian guerrillas who cross the frontier and use Panama as a sanctuary. The Panamanian government only has a token presence in this area.

The structural weakness of the national police and the judiciary also affects the effectiveness of government control. Even though the country is secular, it is at times influenced by the Catholic

Church. Government decisions are often steered by powerful businessmen – the so-called ‘oligarchs’ from well-connected families. Freedom of association and assembly are guaranteed by the constitution. Nevertheless, under President Moscoso (1999-2004), laws limiting the freedom of press and other media were introduced.

## **CORRUPTION**

Corruption levels are high in Panama, as in other countries in the region. One of the main challenges the country faces is the breadth of corruption among public authorities, including the judiciary, political parties, the police and law-enforcement bodies. This has undermined the whole structure of government and affected the effective functioning of various offices. It also acts as a considerable hurdle to the democratisation process. The national budget that is openly discussed in Congress is affected by corruption at the time of implementation. Corruption generally does not impact business travellers.

## **NATURAL DISASTERS**

Panama is historically prone to earthquakes. Occasional flooding and landslides occur in rural areas and some city streets become temporarily impassable due to flooding during the rainy season (normally April to December).

## **BUSINESSWOMEN**

North American business practices heavily influence the business environment; women are well represented in many professions. Local businesswomen tend to dress smartly in a North American style.

Business-class hotels in Panama City are generally safe for businesswomen.

Risk zones

## **RISK ZONES**

### **Darien: HIGH**

Travellers should avoid the Darien region along the Colombian border. Drug smugglers and terrorists groups frequent the region and there have been cases of kidnapping and extortion on the roads.

### **Colon: MEDIUM**

Travellers should avoid travelling throughout the city after dark. Violent crime related to illegal drug use has resulted in a rising crime rate. The hotel district has seen a rise in robberies and muggings against tourists. Travellers should avoid low income areas like Balboa Avenue. Personnel should follow common sense security precautions and avoid any poorly lit or isolated areas.

Country travel guide

Arrival

## **METHOD OF ARRIVAL**

### **By air**

Tocumen International Airport (PTY, formerly known as Omar Torrijos) in Panama City is the main point of entry. The national carrier Compañía Panameña de Aviación (COPA) flies to several international destinations.

Security at PTY is adequate, but security at domestic airports tends to be lax. Theft of luggage is a problem at the airport; travellers should remain alert especially at the baggage reclaim carousel.

Airlines have variable security standards. You may wish to consult the European Commission's [website](#) for a list of [airlines](#) banned within the EU and the US Federal Aviation Administration's [website](#) for a database of aviation accidents and statistics.

### **By land**

An alternative means of reaching Panama is to drive overland from Costa Rica. There are three border crossings; the main one is at Paso Canoas on the Panamerican highway (Panamericana). The journey from the border to Panama City takes approximately ten hours. Overland travel to and from Colombia is impossible.

## **IMMIGRATION REQUIREMENTS AND PROCEDURES**

### **Entry and Departure Requirements**

	<b>Passport Required?</b>	<b>Visa Required?</b>	<b>Return Ticket Required?</b>
British	Yes	No	Yes
Australian	Yes	No/1	Yes
Canadian	Yes	No/1	Yes
USA	Yes	No/1	Yes
Other EU	Yes	No/2	Yes

### **Passport Note**

Many nationals requiring visas also require authorization from the Immigration Authorities in Panama before entry.

### **Passports**

Passport valid for a minimum of six months required by all nationals referred to in the chart above.

### **Visas**

Not required by all nationals referred to in the chart above for stays of up to 90 days except:

1. nationals of Australia, Canada and USA who will be issued a tourist card in lieu of a visa for stays of up to 30 days (extendable to 90 days at the discretion of the immigration authorities);
2. nationals of Bulgaria and Romania who *do* require a visa.

**Note:** Nationals not referred to in the chart above are advised to contact the embassy to check visa requirements (see *Contact Addresses*).

### **Visa Note**

#### **Types of Visa and Cost**

*Tourist:* £30. *Tourist card:* Prices vary, depending on nationality and also on where the tourist card is obtained from (eg prior to departure, on the flight or upon arrival at the airport). Some nationals can obtain the tourist card free of charge (including nationals of the USA). Enquire at the consulate for details.

### **Validity**

Visas and tourist cards are valid within a three-month period from the date of issue and allow stays for up to 30 days (extendable to 90 days at discretion of immigration authorities).

**Applications to:**

Consulate (or consular section at embassy); see *Contact Addresses*. A tourist card can be issued either by the travel agent *or* on the flight *or* at the airport.

**Working Days Required**

Normally 24 hours if no authorisation is needed; up to 40 days if authorisation (which depends on nationality) is needed.

**DEPARTURE TAX**

Departure tax of \$40 (payable in cash) is often included in the air fare.

**Embassies and consulates**

**Embassy of United States**

Building 783, Demetrio Basilio Lakas Avenue, Clayton

Panama City

Panama

Phone: +507 2077000

Fax: +507 3175568

Email: [panamaweb@state.gov](mailto:panamaweb@state.gov)

Website: <http://panama.usembassy.gov/>

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