WESTON - EPA REGION 6 START-3 Contract

SITE HEALTH AND SAFETY PLAN – Mississippi Canyon Oil Spill, Gulf of Mexico

1. SITE INFORMATION

Prepared by: Samuel Cheek and Brian Mason	**TDD:** TO-0001-10-04-07	**WO:** 20406.012.033.0545.01	**Date Prepared:** 04/29/2010
FPN# N/A		**CERCLA ID# TBD**	
START PTL (See Org Chart) David Bordelon – IC (225) 772-7921 - Cell Ben Latham – IC (972) 213-6618 - Cell	**START FSO (See Org Chart)** Brian Mason (512) 466-2163 – Cell Sam Cheek (972) 977-1579 - Cell	***OSC R1* (See Org Chart)** *Mike McAteer- Venice* (214) 354-9371 (cell)	**Alternate OSCs (See Org Chart)** Gary Moore-Houma (214) 789-1627 (cell) Warren Zehner-Chalmette (214) 789-1585 (cell)
Site Name & Address: Mississippi Canyon Oil Spill; Venice, LA; Chalmette, LA; Houma, LA; and New Orleans, LA			
Site History: On 20 April 2010, a blowout occurred on the drilling rig platform Deepwater Horizon, located approximately 50 miles southeast of Venice, La. The drilling platform was damaged and eventually collapsed into the gulf of Mexico. Damage from the initial blast or from the collapse of the drill rig platform caused the well to begin spilling oil into the gulf of Mexico. Federal officials have decided to burn in-situ areas of oil which may create breathing hazards from the resulting plume of smoke. EPA has tasked START to conduct air monitoring and sampling, soil/sediment sampling, and water sampling to measure/monitor any potential environmental impacts from the oil spill.			
START Scope of Work: **(1)** Mobilize and demobilize to/from the site **(2)** Conduct photograph, logbook, and Response Manager documentation **(3)** Air Sampling and Monitoring **(4)** Water Sampling and Monitoring **(5)** Soil/Sediment Sampling **(6)** Water/shoreline/marsh reconnaissance **(7)** Air reconnaissance **(8)** Odor response air sampling/monitoring teams			

2. SITE HEALTH AND SAFETY PLAN REVIEW AND APPROVAL

	Name	Signature	Date
Reviewed by: PTL/Site Manager	David Bordelon		5/4/2010
Reviewed and Approved by: SO/DSM/CHS	Brian Mason		5/3/2010
Reviewed and Approved by: PTL/Scope of Work Leader	David Crow		5/4/2010

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3. TRAINING REQUIREMENTS (Attach Personnel's EHS Track Training/Medical Summary Page)

☒	40-Hour HAZWOPER -	☒ Required for ALL personnel	☐ Required for FSO/PTL only
☒	8-Hour Annual Refresher-	☒ Required for ALL personnel	☐ Required for FSO/PTL only
☒	Blood Borne Pathogens	☐ Required for ALL personnel	☒ Required for team FSOs (minimum 1 per team)
☒	CPR -	☐ Required for ALL personnel	☒ Required for team FSOs (minimum 1 per team)
☒	First Aid-	☐ Required for ALL personnel	☒ Required for team FSOs (minimum 1 per team)
☒	SHSC/FSO Training -	☐ Required for ALL personnel	☒ Required for team FSOs (minimum 1 per team)
☐	10-Hr Construction Safety -	☐ Required for ALL personnel	☐ Required for FSO/PTL only
☐	30-Hr Construction Safety-	☐ Required for ALL personnel	☐ Required for FSO/PTL only
☐	Confined Space Training-	☐ Required for ALL personnel	☐ Required for FSO/PTL only
☐	Competent Person Fall Prevention and Protection-	☐ Required for ALL personnel	☐ Required for FSO only
☐	Competent Person Trenching and Excavation-	☐ Required for ALL personnel	☐ Required for FSO/PTL only
☒	Function Specific Dangerous Goods Shipping-	☐ Required for ALL personnel	☒ Required for FSO/PTL only
☒	Site-Specific Training, Specify: __Site HAZCOM___ -	☒ Required for ALL personnel	☐ Required for FSO/PTL only
☐	Site-Specific Training, Specify: _____ -	☐ Required for ALL personnel	☐ Required for FSO/PTL only
☐	Site-Specific Training, Specify: _____ -	☐ Required for ALL personnel	☐ Required for FSO/PTL only
☐	Other: _____ -	☐ Required for ALL personnel	☐ Required for FSO/PTL only

4. MEDICAL SURVEILLANCE REQUIREMENTS (Attach Personnel's EHS Track Training/Medical Summary Page)

☒ Baseline/annual physical examination with physician clearance.

-☒ Required for ALL personnel ☐ Required for FSO/PTL only

☒ Two-Year DOT physical examination with physician certification (DOT card); (CMV and CDL drivers only)

☒ Annual Fit Test

☒Qualitative Fit Test- ☒ Required for personnel wearing Level B/C PPE ☐ Required for FSO/PTL only

☐Quantitative Fit Test- ☐ Required for ALL personnel ☐ Required for FSO/PTL only

☒ EPA periodic drug screening - ☐ Required for ALL personnel ☒ Required for CRT members only

☐ Site-specific medical monitoring protocol, Specify: _____

☐ Required for ALL personnel ☐ Required for FSO/PTL only

☐ Asbestos worker medical exam and physician clearance

☐ Required for ALL personnel ☐ Required for FSO/PTL only

5. SITE SECURITY ASSESSMENT

SITE SECURITY ASSESSMENT FORM
Site Description
• Client: USEPA Region 6 • Site Name: Mississippi Canyon Oil Spill, Gulf of Mexico • Address, City, & State: Venice, LA; Houma, LA; Chalmette, LA; Grand Isle, LA; Cocodrie, LA • Project Start Date & Estimated Completion Date: Start: 4/22/2010; Estimated Completion: 8/31/2010 – TBD
Communication with SITE Point of Contact (POC)
• Site POC Name and Contact Information: TBD • Date Contacted: TBD • Site Setting: Commercial, Industrial, Residential, Other: Commercial with residential properties adjacent to the property • Conversation Details: TBD
Threat Indicators
• http://www.spotcrime.com – Website that allows you to search by state, city, and plug in address. • List the number of arrests, assaults, burglary, robbery, shootings, and theft in your general area: AR - 0 AS - 0 BG - 0 ROB - 0 SHT - 0 TFT - 0 • Other relevant details: No statics where found for Venice, Chalmette, Grand Isle, and Cocodrie; but nearby areas (New Orleans) would indicate area of high crime for shootings, theft, burglary, and assault. Statistics found for Houma show the same elevated statistics of burglary, theft and assault. See attached www.spotcrime print-outs.
Security Countermeasures
• Will conduct field work during daylight hours: ☒ YES ☐ NO • Will conduct field work during night time hours: ☒ YES ☐ NO • Buddy System at ALL times: ☒ YES ☐ NO If no, why? • Routine phone check-ins with PM or PC SO: ☒ YES ☐ NO • Badge/Weston identification required at all times: ☒ YES ☐ NO • Site fenced/secure: ☐ YES – Site should be in a secure location ☒ NO – All field sites will not be fenced/secured • Site security guards/hired protection: ☒ YES – a security guard will be hired for field office locations ☐ NO • Other:
Closest Police Station / Emergency Services
• Police station location and phone number: Venice, LA; Houma, LA; Chalmette (N.O.), LA; Grand Isle, LA; Cocodrie, LA • Did you contact the police station: ☒ YES (Required for High Risk) ☐ NO • If so, conversation details: Police Station locations are attached, Site FSO should contact Police stations
Approval
Security Risk Level: ☐ H ☒ M ☐ L PTL/Site Manager Name: David Bordelon Signature: PM Name: David Crow Signature: Safety Officer Name: Brian Mason Signature: Elevated to Division Safety Manager: ☒ YES ☐ NO: If no, why not?

6. TASKS/DURATION (Fill in as appropriate)

	Tasks	Duration (Hours/Days)	PPE Level
☒	Mobilization and demobilization	**Task #1**	**D**
☐	Perimeter Recon	**N/A**	**A / B / C / D**
☒	Logbook Documentation	**Task #2,3,4,5, 6, 7, and 8**	**D**
☒	Photo Documentation	**Task #2,3,4,5, 6, 7, and 8**	**D**
☒	Response Manager / Data Management	**Task #2,3,4,5, 6, 7, and 8**	**D**
☒	Decontamination – Dry only	**Task #3,4,5,6,7, and 8**	**D**
☒	Air Monitoring	**Task #3,4,5, 6, 7, and 8**	**D**
☒	Air Sampling	**Task#3 and 8**	**D**
☒	Soil/Sediment Sampling	**Task# 5**	**D**
☒	Water/Liquid Sampling	**Task#4**	**D**
☐	Drum Sampling	**N/A**	**A / B / C / D**
☐	AST/UST/Large Container Sampling	**N/A**	**A / B / C / D**
☒	Boat Operations	**Task #4 and 6**	**D**
☒	Helicopter/Air Operations	**Task #7**	**D**
☐			**A / B / C / D**
☐			**A / B / C / D**
☐			**A / B / C / D**
☐			**A / B / C / D**

7. PHYSICAL HAZARDS

☒ *Buddy System* – The buddy or line of sight system is mandatory for all site personnel.

☒ *Heat Stress* – The FSO shall generally be guided by the Weston OP in determining work/rest periods. Fluids shall be available at all times and encouraged during rest periods.

☐ *Cold Stress* – The FSO shall generally be guided by the Weston OP in determining work/rest periods. Workers shall be provided with adequate warm clothing, rest opportunities and exposure protection. Warm and/or sweet fluids shall also be provided during rest periods.

☒ *Precipitation/Inclement Weather* – Personnel should be aware of lightning, the increased risk of slips and falls on wet surfaces, and exposure effects caused by wet clothing. Personnel should dress appropriately.

☒ *Lighting* – Fixed or portable lighting shall be maintained for dark areas or work after sunset to ensure that sufficient illumination is provided.

☒ *Work Near Water* – All personnel working in boats, on docks or generally within 10 feet of water deeper than 3 feet shall wear approved personal flotation devices (PFDs) or work vests and wading boots as appropriate.

☒ *High Noise Levels* – Hearing protection shall be used in high noise areas (exceeding 85 dBA – generally where noise levels require personnel to raise their voices to be heard) as designated by the FSO.

☒ *Electrical Hazards* – Electrical hazards should be identified on the site work zone map and marked out as appropriate. All electrical equipment should be used with a ground fault circuit interrupter (GFCI).

☒ *Trip Hazards* – Open manholes, pits, trenches or similar hazards should be noted on the site map and should be marked off on site as appropriate.

☒ *Helicopter/Airplane Operations* – Pilots shall provide safety briefings for all passengers.

☒ *Terrain (Slips, Trips and Falls)* – All personnel will exercise due caution when walking through areas of uneven terrain and undergrowth to ensure proper footing.

☐ *Underground/Overhead Utilities* – All underground utilities must be marked out prior to conducting intrusive activities. At least 15 feet of distance must be maintained with overhead utilities.

☐ *Confined Spaces* – Confined spaces will not be normally entered by response personnel. If a confined space is to be entered, a specific confined space entry work permit will be developed for that operation.

☒ *Boat Operations*: All boats must have a marine radio/communications with the USCG and a satellite phone for emergencies. Each team will receive a safety briefing from the boat captain and wear PFDs at all times while on the water. The boats shall also have a first aid kit and fire extinguisher on board. A separate float plan will be filled out for each boat team. No boating operations are allowed during inclement weather.

☒ *Motor Vehicles* – Drivers shall maintain a safe speed at all times and shall not be allowed to operate vehicles in a reckless manner. Seat belts will be worn. In backing situations where the rear of the vehicle cannot be clearly seen, one person shall act as a ground guide to assist the driver. In situations where ground clearance and soil conditions are not known, one person shall dismount and act as a guide. (*Also See Next Page*)

Vehicle Use Assessment and Selection
Driving is one of the most hazardous and frequent activities for WESTON Employees. The most appropriate type vehicle(s) authorized for use on this project is/are: *1. EPA Mobile Command Post(CMV required)* *2. Rental SUV* *3. Rental Pickup* *4. Rental Car* **Note: Subcontractors can NOT drive Weston rented vehicles.**
The following Project Team Member's qualifications and experience in driving these types of vehicles was evaluated and found to be acceptable (indicate vehicle type(s) number next to employee name). Team Member's driving vehicles or pulling trailers in which the GVWR or GCWR START exceed 10,001 lbs are required to be CMV certified, vehicle that have a GVWR or GCWR of 26,001 or greater the driver must be CDL qualified. CMV and CDL drivers must follow FMSCA rules and regulations, including filling out driver log daily when operating a CMV/CDL, Carry DOT medical clearance card, stay within Hours limits for Driving(11 hrs total driving for a day, not to exceed 60 working hrs during 7 day period or 70 working hours during a 8 day period) if hours are exceed a mandatory rest period of 32 hr is required before operation of a CMV/CDL vehicle. DOT physical clearance card that every 2 years. *1.* All START 3 personnel unless they are uncomfortable operating the type of vehicle *(2,3,4)* *2.* CDL/CMV qualified drivers(1)
The project site was evaluated and a ***Traffic Control Plan*** ☐ *is required* ☒ *is not required.* *If required, the* ***Traffic Control Plan*** *can be found in Attachment A.*

8. BIOLOGICAL HAZARDS

☒ *Insect Stings* – Hornet, wasp or bee stings, mosquito. Personnel should avoid the nesting areas of these insects. Personnel who are allergic to these insects should carry bee sting kits. Personnel may find repellants containing DEET effective in keeping these insects away.

☒ *Poisonous Spiders* – Black widow or brown recluse. Wear gloves when working in areas where these spiders may be present. If bitten, seek medical attention immediately.

☒ *Ticks* – Personnel should wear Tyvek when working in wooded areas as a precaution. Barring this, personnel should wear light colored clothing and tuck pants into socks. Personnel should also wear a repellant containing DEET. Personnel should use the buddy system and perform a tick check after exiting wooded areas. Suspected bites should be reported immediately.

☒ *Animal Bites* – Personnel should use extreme caution when in contact with strange animals. If bitten, seek medical attention immediately.

☒ *Snake Bites* – Personnel should use extreme caution when working in areas known to be inhabited by snakes. Snake leggings or chaps should be worn as a precaution. If bitten, seek medical attention immediately.

☒ *Poisonous Plants* – Personnel should use caution when working in wooded areas. Tyvek suits may be worn as a precaution. All personnel should wear Ivy Block.

☐ *Etiological Hazards* – Personnel should use caution when working in areas that may contain etiological hazards. Tyvek suits and gloves may be worn as a precaution. All personnel should frequently wash their hands.

9. RADIOLOGICAL HAZARDS

☐ *Ionizing Radiation* – Any encounter with ionizing radiation requires the support from a Certified Health Physicist (CHP). All START personnel must wear a personal dosimeter which should consist of a TLD and/or Self-Reading Dosimeter (SRD).

☐ *Non-Ionizing Radiation* – To the extent possible personnel should maintain a minimum distance of 30 feet from devices emitting radio or microwaves.

☒ *UV Light Exposure* – Personnel should dress so as to cover as much exposed skin as possible. Personnel should use a sunscreen with a protection factor (PF) of 15 or greater and should wear tinted safety glasses.

10. CHEMICAL HAZARDS TO PERSONNEL

The following chemicals are known to be at this site: *Source: Weston April 2010 Report; TDD No. 0001-10-04-07*

Chemical Contaminants of Concern		**Chemicals/Materials brought on-site**	
Chemical Name	Quantity/Concentration/ PEL/ IDLH	Chemical Name	Quantity
Benzene	Unknown quantity: PEL 1ppm; IDLH 500 ppm	ABC Fire Extinguisher	10 lb or 20 lb per vehicle
Sweet Crude Oil	Unknown	Hydrochloric Acid(VOC preservative)	< 1 liter
Metals	Unknown	Nitric Acid (Metals preservative)	< 1 liter
TPH (GRO, DRO, AND ORO)	Unknown	4 gas calibration Gas: (zero air, isobutylene, methane, Combo gas)	20 liter and 57 liter canisters
Volatile Organic Compounds	Unknown	Liquinox	< 1 liter
Semi-Viotaile VOCs	Unknown	OIL SPILL DISPERSANT(COREXIT(R) EC9527A and EC 9500A)	Unknown used by Federal agencies/USCG
(Air) Resp. Particulates	Unknown	Hexane (REL – 50 ppm) to clean PUF samplers	1 Liter
OIL SPILL DISPERSANT(COREXIT(R) EC9527A and EC 9500A)	Unknown used by Federal agencies/USCG		

Web Links

1. NIOSH Pocket Guide (Electronic Version) - http://www.cdc.gov/niosh/npg/npgname-a.html
2. Vermont SIRI MSDS Collection - http://hazard.com/msds/

HEALTH AND SAFETY EVALUATION			
WESTON FLDs - Maintained on FSO's/PTL's Computer			
Physical Hazard Condition	**Physical Hazard**	**Attach OP**	**WESTON OP Titles**
Loud noise	Hearing loss/disruption of communication	☒	Section 7.0 - ECH&S Program Manual Occupational Noise & HC Progr
Inclement weather	Rain/humidity/cold/ice/snow/lightning	☒	FLD02 - Inclement Weather
Steam heat stress	Burns/displaced oxygen/wet working surfaces	☐	FLD03 - Hot Process – Steam
Heat stress	Burns/hot surfaces/low pressure steam	☐	FLD04 - Hot Process - LT3
Ambient heat stress	Heat rash/cramps/exhaustion/heat stroke	☒	FLD05 - Heat Stress Prevention/Monitoring
Cold stress	Hypothermia/frostbite	☐	FLD06 - Cold Stress
Cold/wet	Trench/paddy/immersion foot/edema	☒	FLD02 - Inclement Weather
Confined spaces	Falls/burns/drowning/engulfment/electrocution	☐	FLD08 - Confined Space Entry
Industrial Trucks	Fork Lift Truck Safety	☐	FLD09 – Powered Industrial Trucks
Improper lifting	Back strain/abdomen/arm/leg muscle/joint injury	☒	FLD10 - Manual Lifting/Handling Heavy Objects
Uneven surfaces	Vehicle accidents/slips/trips/falls	☒	FLD11 - Rough Terrain
Poor housekeeping	Slips/trips/falls/punctures/cuts/fires	☒	FLD12 – Housekeeping
Structural integrity	Crushing/overhead hazards/compromised floors	☐	FLD13 - Structural Integrity
Hostile persons	Bodily injury	☒	FLD14 - Site Security
Improper cylinder. handling	Mechanical injury/fire/explosion/suffocation	☐	FLD16 - Pressure Systems - Compressed Gases
Water hazards	Poor visibility/entanglement/drowning/cold stress	☐	FLD17 – Diving
Water hazards	Drowning/heat/cold stress/hypothermia/falls	☒	FLD18 - Operation and Use of Boats
Water hazards	Drowning/frostbite/hypothermia/falls/electrocution	☒	FLD19 - Working Over Water
Vehicle hazards	Struck by vehicle/collision	☒	FLD20 – Traffic
Explosions	Explosion/fire/thermal burns	☐	FLD21 – Explosives
Moving mechanical parts	Crushing/pinch points/overhead hazards/electrocution	☐	FLD22 – Earth Moving Equipment
Moving mech. parts	Overhead hazards/electrocution	☐	FLD23 – Cranes, Rigging, and Slings
Working at elevation	Overhead hazards/falls/electrocution	☐	FLD24 - Aerial Lifts/Man lifts
Working at elevation	Overhead hazards/falls/electrocution	☐	FLD25 - Working at Elevation
Working at elevation	Overhead hazards/falls/electrocution/slips	☐	FLD26 – Ladders
Working at elevation	Slips/trips/falls/overhead hazards	☐	FLD27 – Scaffolding
Trench cave-in	Crushing/falling/overhead hazards/suffocation	☐	FLD28 - Excavating/Trenching
Physiochemical	Explosions/fires from oxidizing, flam./corr. Material	☒	FLD30 - Hazardous Materials Use/Storage
Physiochemical	Fire and explosion	☐	FLD31 - Fire Prevention/Response Plan Required
Physiochemical	Fire	☒	FLD32 - Fire Extinguishers Required
Structural integrity	Overhead/electrocution/slips/trips/falls/fire	☐	FLD33 – Demolition
Electrical	Electrocution/shock/thermal burns	☐	FLD34 – Utilities
Electrical	Electrocution/shock/thermal burns	☐	FLD35 - Electrical Safety
Burns/fires	Heat stress/fires/burns	☐	FLD36 - Welding/Cutting/Brazing/Radiography
Impact/thermal	Thermal burns/high pressure impaction/heat stress	☐	FLD37 - Pressure Washers/Sand Blasting
Impaction/electrical	Smashing body parts/pinching/cuts/electrocution	☒	FLD38 - Hand and Power Tools
Poor visibility	Slips/trips/falls	☒	FLD39 – Illumination
Fire/explosion	Burns/impaction	☐	FLD40 - Storage Tank Removal/Decommissioning
Communications	Disruption of communications	☒	FLD41 - Std. Hand/Emergency Signals
Energy/release	Unexpected release of energy	☐	FLD42 - Lockout/Tag-out
Biological Hazards	Biological Hazards at site	☒	FLD43 - Biological Hazards
Biological Hazards/BBP	Biological Hazards/BBP at site/First Aid Providers	☒	FLD44 - Biological Hazards – Bloodborne Pathogens Exposure Control Plan – First Aid Providers
Infectious Waste	Infectious Waste at site/BBP/ at site/Infectious Waste	☐	FLD45 – Biological Hazards – Bloodborne Pathogens Exposure Contro Plan – Work With Infectious Waste
Lead Contaminated sites	Lead poisoning	☐	FLD46 - Control of Exposure to Lead
Puncture/cuts	Cuts/ dismemberment/gouges	☐	FLD47 - Clearing, Grubbing and Logging Operations

Physical Hazard Condition	Physical Hazard	Attach OP	WESTON OP Titles
Not applicable	Not applicable	☒	FLD48 – Federal, State, Local Regulatory Agency Inspections
Not applicable	Exposure to hazardous materials/waste	☒	FLD49 – Safe Storage of Samples
Cadmium	Exposure Control	☐	FLD50 – Cadmium Exposure Control Plan
Process Safety Procedure	Safety Procedure	☐	FLD51 – Process Safety Procedure
Asbestos	Asbestos Exposure	☐	FLD52 – Asbestos Exposure Control Plan
Hexavalent Chromium	Exposure Control Plan	☐	FLD53 – Hexavalent Chromium Exposure Control Plan
Benzene	Exposure Control Plan	☒	FLD54 - Benzene Exposure Control Plan
Hydrofluoric acid	Working with HF	☐	FLD55 – Working with Hydrofluoric Acid
Moving drill rig parts	Crushing/pinch points/overhead hazards/electrocution	☐	FLD56 – Drilling Safety
Vehicles/driving	Accidents,/fatigue/cell phone use	☒	FLD 57 – Motor Vehicle Safety
Improper material handling	Back injury/crushing from load shifts/equipment/tools	☐	FLD 58 – Drum Handling Operations
COC decontamination	COCs/slip,trip, and falls/waste generation/environmental compliance/PPE	☒	FLD59 – Decontamination
Drilling hazards	Electrocution/overhead hazards/pinch points	☐	Environmental Remediation Drilling Safety Guideline – 2005
Fatigue	Long work hours	☒	FLD60 – Employee Duty Schedule
Benzene/Gasoline	Benzene exposure	☒	FLD61 – Gasoline Contaminant Exposure
AED Program Guidelines	AED Program Guidelines	☐	FLD62 - AED Program Guidelines

11. TASK-BY-TASK ASSESSMENTS

Task-By-Task Assessment (COMPLETE ONE SHEET FOR EACH TASK)
TASK DESCRIPTION
Task #1: Mobilization and demobilization of personnel, equipment, and project related resources.
EQUIPMENT REQUIRED/USED **(Be specific, e.g., hand tools, heavy equipment, instruments, PPE)**
Weston owned and rental SUVs/Trucks; Vendor equipment delivers; Loading of sampling equipment, tools, etc….; EPA Mobile Command Post
POTENTIAL HAZARDS/RISKS
Chemical
☐ Hazard Present Risk Level: ☐ H ☐ M ☐ L What justifies risk level? N/A
Physical
☒ Hazard Present Risk Level: ☐ H ☒ M ☐ L What justifies risk level? Proper lifting procedures, driving hazards, no cell phone use while driving, worker fatigue, traffic, and slips/trips/falls.
Biological
☐ Hazard Present Risk Level: ☐ H ☐ M ☐ L What justifies risk level?
RADIOLOGICAL
☐ Hazard Present Risk Level: ☐ H ☐ M ☐ L What justifies risk level?
LEVELS OF PROTECTION/JUSTIFICATION
Level D PPE
SAFETY PROCEDURES REQUIRED AND/OR FIELD OPS UTILIZED
FLDs – 10, 11, 41, 57, 60

11. TASK-BY-TASK ASSESSMENTS (Continued)

Task-By-Task Assessment (COMPLETE ONE SHEET FOR EACH TASK)
TASK DESCRIPTION
Task #2: Conduct photograph, logbook, and Response Manager documentation
EQUIPMENT REQUIRED/USED **(Be specific, e.g., hand tools, heavy equipment, instruments, PPE)**
Logbook; computer; digital camera; pens; GPS units, rain gear, CGI/PID (multiRae) or PID (MiniRae), 1st Aid Kit, BBP kit, fire extinguisher, bug spray, safety vests, cell phones, Type II PFD for boat operations, snake leggings (required when walking in grass/vegetation taller than employee's knees); gloves (nitrile and leather), rubber boot, steel toe boots, safety glasses, sun glasses, and PDR/DataRam/EBAM.
POTENTIAL HAZARDS/RISKS
Chemical
☒ Hazard Present Risk Level: ☐ H ☐ M ☒ L What justifies risk level? Crude oil, benzene, and other crude oil related compounds are the main chemicals of concerns. All field teams shall use a PID to screen for VOCs. **PID/VOCs Action level:** 10 units detected in the breathing zone on the PID. • The crew should immediately pull a benzene colorimetric tube. If the benzene tube reads 0.5 ppm or greater, immediately evacuate the area and contact the SO (Brian Mason/Sam Cheek) and/or your project supervisor (see emergency contact list in HASP, vehicle, and EPA Command Posts). If the benzene tube does not record any readings, work may continue tin Level D PPE. **PID/VOCs Action Level**: 10 units sustained in the breathing zone for 10 minutes • The crew should immediately evacuate the area and contact the SO (Brian Mason/Sam Cheek) and/or your project supervisor (see emergency contact list in HASP, vehicle, and EPA Command Posts). The SO will discuss and review the situation with the field crew and corporate H&S. It may be determined that analytical air samples (passive VOC badges, active pumps with charcoal tubes, and/or summa canisters) may be collected. **Dust/EBAM/DataRam/PDR Action level:** 1.5 mg/m3 - Level D PPE if particulate concentrations are less than 1.5 mg/m3; level C PPE if above 1.5 mg/m3. **Additional Action levels**: H2S 5 ppm; carbon monoxide: 18 ppm; oxygen: 19.5% to 23.5%; %LEL: <10 % LEL. **The field team shall immediately contact the project SO and group supervisor if ANY action levels are exceeded/detected.**
Physical
☒ Hazard Present Risk Level: ☐ H ☐ M ☒ L What justifies risk level? Slips/trips/falls, rough terrain, ergonomics, driving, heat stress, inclement weather, and worker fatigue.
Biological
☒ Hazard Present Risk Level: ☐ H ☐ M ☐ L What justifies risk level? Plants, snakes, insects, and animals may be present in the field. Snake leggings (required when walking in grass/vegetation taller than employee's knees) will be worn as needed. Bug spray (deet) and mosquito/bug nets will be provided and worn as needed.

RADIOLOGICAL
☒ Hazard Present Risk Level: ☐ H ☐ M ☒ L What justifies risk level? Proper clothing (long sleeves, pants, boots, etc..) and sunscreen shall be worn.
LEVELS OF PROTECTION/JUSTIFICATION
Level D+ - hard hats, safety boots/appropriate shoes, long pants/sleeves, eye protection, high visible safety vest, hearing protection required at all times in areas exceeding 85 dba (Rule of thumb: if you can't carry on a normal conversation at arms distance, you need hearing protection), Type II PFDs required for all boating/water operations.
SAFETY PROCEDURES REQUIRED AND/OR FIELD OPS UTILIZED
FLD – 11, 18, 57, and 60

11. TASK-BY-TASK ASSESSMENTS (Continued)

Task-By-Task Assessment
(COMPLETE ONE SHEET FOR EACH TASK)

TASK DESCRIPTION

Task #3: START 3 personnel will collect air samples and conduct real-time air monitoring from predetermined locations as directed by the EPA under ESF-10 (both land and water).

EQUIPMENT REQUIRED/USED

(Be specific, e.g., hand tools, heavy equipment, instruments, PPE)

Logbook; computer; digital camera; pens; GPS units, rain gear, CGI/PID (MultiRae/AreaRae), PID (MiniRae), 1st Aid Kit, BBP kit, fire extinguisher, bug spray, safety vests, sampling jars, ziplock bags, cell phones, Type II PFD for boat operations, snake leggings (required when walking in grass/vegetation taller than employee's knees; gloves(nitrile and leather), rubber boots, steel toe boots, safety glasses, head lamps, PDR (dust), DataRam (Dust), EBAM (Dust), PQ 200 (Dust), summa canisters (VOCs), tedlar bags, PUF samplers (SVOCs), passive VOC badges, SKC samples and sampling trains/media.

POTENTIAL HAZARDS/RISKS

Chemical

☒ Hazard Present Risk Level: ☐ H ☐ M ☒ L

What justifies risk level? Crude oil, benzene, and other crude oil related compounds are the main chemicals of concerns. All field teams shall use a PID to screen for VOCs.

PID/VOCs Action level: 10 units detected in the breathing zone on the PID.

- The crew should immediately pull a benzene colorimetric tube. If the benzene tube reads 0.5 ppm or greater, immediately evacuate the area and contact the SO (Brian Mason/Sam Cheek) and/or your project supervisor (see emergency contact list in HASP, vehicle, and EPA Command Posts). If the benzene tube does not record any readings, work may continue tin Level D PPE.

PID/VOCs Action Level: 10 units sustained in the breathing zone for 10 minutes

- The crew should immediately evacuate the area and contact the SO (Brian Mason/Sam Cheek) and/or your project supervisor (see emergency contact list in HASP, vehicle, and EPA Command Posts). The SO will discuss and review the situation with the field crew and corporate H&S. It may be determined that analytical air samples (passive VOC badges, active pumps with charcoal tubes, and/or summa canisters) may be collected.

Dust/EBAM/DataRam/PDR Action level: 1.5 mg/m3 - Level D PPE if particulate concentrations are less than 1.5 mg/m3; level C PPE if above 1.5 mg/m3.

Additional Action levels: H2S 5 ppm; carbon monoxide: 18 ppm; oxygen: 19.5% to 23.5%; %LEL: <10 % LEL.

The field team shall immediately contact the project SO and group supervisor if ANY action levels are exceeded/detected.

Physical

☒ Hazard Present Risk Level: ☐ H ☒ M ☐ L

What justifies risk level? Slips/trips/falls on land as well as in the boat, rough terrain, ergonomics, pinch points, tools, noise (air boats), heat stress, inclement weather, wet feet, worker fatigue, and driving.

Biological

☒ Hazard Present Risk Level: ☐ H ☐ M ☒ L

What justifies risk level? Plants, snakes, insects, and animals may be present in the field. Snake leggings (required when walking in grass/vegetation taller than employee's knees) will be worn as needed. Bug spray (deet) and mosquito/bug nets will be provided and worn as needed.

RADIOLOGICAL
☒ Hazard Present Risk Level: ☐ H ☐ M ☒ L What justifies risk level? UV/sunlight – personnel shall wear long sleeves and sun block as needed.
LEVELS OF PROTECTION/JUSTIFICATION
Level D+ - hard hats, safety boots/appropriate shoes, long pants/sleeves, eye protection, high visible safety vest, hearing protection required at all times in areas exceeding 85 dba (Rule of thumb: if you can't carry on a normal conversation at arms distance, you need hearing protection), Type II PFDs required for all boating/water operations.
SAFETY PROCEDURES REQUIRED AND/OR FIELD OPS UTILIZED
FLDs: 2, 5, 10, 11, 12, 14, 18, 20, 24, 30, 32, 38, 41, 43, 44, 48, 49, 57, 59, 60

11. TASK-BY-TASK ASSESSMENTS (Continued)

Task-By-Task Assessment
(COMPLETE ONE SHEET FOR EACH TASK)

TASK DESCRIPTION

Task #4: START 3 personnel will collect water samples from predetermined locations as directed by the EPA under ESF-10 (both land and water). All boats must have a marine radio and communications with the USCG. Each team will receive a safety briefing from the boat captain and wear PFDs at all times while on the water. The boats shall also have a first aid kit and fire extinguisher on board. A float plan must be filled out each day for each boat team.

EQUIPMENT REQUIRED/USED

(Be specific, e.g., hand tools, heavy equipment, instruments, PPE)

Logbook; computer; digital camera; pens; GPS units, rain gear, CGI/PID (multiRae), PID (MiniRae), 1st Aid Kit, BBP kit, fire extinguisher, bug spray, safety vests, sampling jars, ziplock bags, cell phones, Type II PFD for boat operations, snake leggings (required when walking in grass/vegetation taller than employee's knees; gloves(nitrile and leather), rubber boots, waders, safety glasses, PDR (dust)

POTENTIAL HAZARDS/RISKS

Chemical

☒ Hazard Present Risk Level: ☐ H ☐ M ☒ L

What justifies risk level? Crude oil, benzene, and other crude oil related compounds are the main chemicals of concerns. All field teams shall use a PID to screen for VOCs.

PID/VOCs Action level: 10 units detected in the breathing zone on the PID.

- The crew should immediately pull a benzene colorimetric tube. If the benzene tube reads 0.5 ppm or greater, immediately evacuate the area and contact the SO (Brian Mason/Sam Cheek) and/or your project supervisor (see emergency contact list in HASP, vehicle, and EPA Command Posts). If the benzene tube does not record any readings, work may continue tin Level D PPE.

PID/VOCs Action Level: 10 units sustained in the breathing zone for 10 minutes

- The crew should immediately evacuate the area and contact the SO (Brian Mason/Sam Cheek) and/or your project supervisor (see emergency contact list in HASP, vehicle, and EPA Command Posts). The SO will discuss and review the situation with the field crew and corporate H&S. It may be determined that analytical air samples (passive VOC badges, active pumps with charcoal tubes, and/or summa canisters) may be collected.

Dust/EBAM/DataRam/PDR Action level: 1.5 mg/m3 - Level D PPE if particulate concentrations are less than 1.5 mg/m3; level C PPE if above 1.5 mg/m3.

Additional Action levels: H2S 5 ppm; carbon monoxide: 18 ppm; oxygen: 19.5% to 23.5%; %LEL: <10 % LEL.

The field team shall immediately contact the project SO and group supervisor if ANY action levels are exceeded/detected.

Physical

☒ Hazard Present Risk Level: ☐ H ☐ M ☒ L

What justifies risk level? Slips/trips/falls on land as well as in the boat, rough terrain, ergonomics, pinch points, power tools, noise (air boats), heat stress, inclement weather, wet feet, worker fatigue, and driving. All boats must have a marine radio and communications with the USCG. Each team will receive a safety briefing from the boat captain and PFDs at all times while on the water. The boats shall also have a first aid kit and fire extinguisher on boat. A float plan must be filled out each day for each boat team.

Biological

☒ Hazard Present Risk Level: ☐ H ☐ M ☒ L

What justifies risk level? Plants, snakes, insects, and animals may be present in the field. Snake leggings (required when walking in grass/vegetation taller than employee's knees) will be worn as needed. Bug spray (deet) and mosquito/bug nets will be provided and worn as needed.

RADIOLOGICAL
☒ Hazard Present Risk Level: ☐ H ☐ M ☒ L What justifies risk level? UV/sunlight – personnel shall wear long sleeves and sun block as needed.
LEVELS OF PROTECTION/JUSTIFICATION
Level D+ - hard hats, safety boots/appropriate shoes, long pants/sleeves, eye protection, high visible safety vest, hearing protection required at all times in areas exceeding 85 dba (Rule of thumb: if you can't carry on a normal conversation at arms distance, you need hearing protection), Type II PFDs required for all boating/water operations.
SAFETY PROCEDURES REQUIRED AND/OR FIELD OPS UTILIZED
FLDs: 2, 5, 10, 11, 12, 14, 18, 20, 24, 30, 32, 38, 41, 43, 44, 48, 49, 57, 59, 60

11. TASK-BY-TASK ASSESSMENTS (Continued)

Task-By-Task Assessment (COMPLETE ONE SHEET FOR EACH TASK)
TASK DESCRIPTION
Task #5: START 3 personnel will collect soil/sediment samples from predetermined locations as directed by the EPA under ESF-10 (both land and water).
EQUIPMENT REQUIRED/USED **(Be specific, e.g., hand tools, heavy equipment, instruments, PPE)**
Logbook; computer; digital camera; pens; GPS units, rain gear, CGI/PID (multiRae), 1st Aid Kit, BBP kit, fire extinguisher, bug spray, safety vests, plastic scoops/trowels, sediment sampling devices, sampling jars, ziplock bags, cell phones, Type II PFD for boat operations, snake leggings (required when walking in grass/vegetation taller than employee's knees; gloves(nitrile and leather), rubber boots, waders, steel toe boots, safety glasses, PDR (dust)
POTENTIAL HAZARDS/RISKS
Chemical
☒ Hazard Present Risk Level: ☐ H ☐ M ☒ L **PID/VOCs Action level:** 10 units detected in the breathing zone on the PID. • The crew should immediately pull a benzene colorimetric tube. If the benzene tube reads 0.5 ppm or greater, immediately evacuate the area and contact the SO (Brian Mason/Sam Cheek) and/or your project supervisor (see emergency contact list in HASP, vehicle, and EPA Command Posts). If the benzene tube does not record any readings, work may continue tin Level D PPE. **PID/VOCs Action Level**: 10 units sustained in the breathing zone for 10 minutes • The crew should immediately evacuate the area and contact the SO (Brian Mason/Sam Cheek) and/or your project supervisor (see emergency contact list in HASP, vehicle, and EPA Command Posts). The SO will discuss and review the situation with the field crew and corporate H&S. It may be determined that analytical air samples (passive VOC badges, active pumps with charcoal tubes, and/or summa canisters) may be collected. **Dust/EBAM/DataRam/PDR Action level:** 1.5 mg/m3 on PDR; Level D PPE if particulate concentrations are less than 1.5 mg/m3; level C PPE if above 1.5 mg/m3. **Additional Action levels**: H2S 5 ppm; carbon monoxide: 18 ppm; oxygen: 19.5% to 23.5%; %LEL: <10 % LEL. **The field team shall immediately contact the project SO and group supervisor if ANY action levels are exceeded/detected.**
Physical
☒ Hazard Present Risk Level: ☐ H ☐ M ☒ L What justifies risk level? Slips/trips/falls on land as well as in the boat, rough terrain, ergonomics, pinch points, power tools, noise (air boats), heat stress, inclement weather, wet feet, worker fatigue, and driving.
Biological
☒ Hazard Present Risk Level: ☐ H ☐ M ☒ L What justifies risk level? Plants, snakes, insects, and animals may be present in the field. Snake leggings (required when walking in grass/vegetation taller than employee's knees) will be worn as needed. Bug spray (deet) and mosquito/bug nets will be provided and worn as needed.
RADIOLOGICAL
☒ Hazard Present Risk Level: ☐ H ☐ M ☒ L What justifies risk level? UV/sunlight – personnel shall wear long sleeves and sun block as needed.

LEVELS OF PROTECTION/JUSTIFICATION
Level D+ - hard hats, safety boots/appropriate shoes, long pants/sleeves, eye protection, high visible safety vest, hearing protection required at all times in areas exceeding 85 dba (Rule of thumb: if you can't carry on a normal conversation at arms distance, you need hearing protection), Type II PFDs required for all boating/water operations.
SAFETY PROCEDURES REQUIRED AND/OR FIELD OPS UTILIZED
FLDs: 2, 5, 10, 11, 12, 14, 18, 20, 24, 30, 32, 38, 41, 43, 44, 48, 49, 57, 59, 60

11. TASK-BY-TASK ASSESSMENTS (Continued)

Task-By-Task Assessment (COMPLETE ONE SHEET FOR EACH TASK)
TASK DESCRIPTION
Task #6: START 3 personnel will conduct water, shoreline, marsh, and bay reconnaissance as directed by the EPA under ESF-10 (both land and water).
EQUIPMENT REQUIRED/USED **(Be specific, e.g., hand tools, heavy equipment, instruments, PPE)**
Logbook; computer; digital camera; pens; GPS units, rain gear, CGI/PID (multiRae), 1st Aid Kit, BBP kit, fire extinguisher, bug spray, safety vests, cell phones, Type II PFD for boat operations, snake leggings (required when walking in grass/vegetation taller than employee's knees; gloves(nitrile and leather), rubber boots, steel toe boots, safety glasses, PDR (dust)
POTENTIAL HAZARDS/RISKS
Chemical
☒ Hazard Present Risk Level: ☐ H ☐ M ☒ L **PID/VOCs Action level:** 10 units detected in the breathing zone on the PID. • The crew should immediately pull a benzene colorimetric tube. If the benzene tube reads 0.5 ppm or greater, immediately evacuate the area and contact the SO (Brian Mason/Sam Cheek) and/or your project supervisor (see emergency contact list in HASP, vehicle, and EPA Command Posts). If the benzene tube does not record any readings, work may continue tin Level D PPE. **PID/VOCs Action Level**: 10 units sustained in the breathing zone for 10 minutes • The crew should immediately evacuate the area and contact the SO (Brian Mason/Sam Cheek) and/or your project supervisor (see emergency contact list in HASP, vehicle, and EPA Command Posts). The SO will discuss and review the situation with the field crew and corporate H&S. It may be determined that analytical air samples (passive VOC badges, active pumps with charcoal tubes, and/or summa canisters) may be collected. **Dust/EBAM/DataRam/PDR Action level:** 1.5 mg/m3 on PDR; Level D PPE if particulate concentrations are less than 1.5 mg/m3; level C PPE if above 1.5 mg/m3. **Additional Action levels**: H2S 5 ppm; carbon monoxide: 18 ppm; oxygen: 19.5% to 23.5%; %LEL: <10 % LEL. **The field team shall immediately contact the project SO and group supervisor if ANY action levels are exceeded/detected.**
Physical
☒ Hazard Present Risk Level: ☐ H ☐ M ☒ L What justifies risk level? Slips/trips/falls on land as well as in the boat, rough terrain, ergonomics, pinch points, power tools, noise (air boats), heat stress, inclement weather, wet feet, worker fatigue, and driving.
Biological
☒ Hazard Present Risk Level: ☐ H ☐ M ☒ L What justifies risk level? Plants, snakes, insects, and animals may be present in the field. Snake leggings (required when walking in grass/vegetation taller than employee's knees) will be worn as needed. Bug spray (deet) and mosquito/bug nets will be provided and worn as needed.
RADIOLOGICAL
☒ Hazard Present Risk Level: ☐ H ☐ M ☒ L What justifies risk level? UV/sunlight – personnel shall wear long sleeves and sun block as needed.

LEVELS OF PROTECTION/JUSTIFICATION
Level D+ - hard hats, safety boots/appropriate shoes, long pants/sleeves, eye protection, high visible safety vest, hearing protection required at all times in areas exceeding 85 dba (Rule of thumb: if you can't carry on a normal conversation at arms distance, you need hearing protection), Type II PFDs required for all boating/water operations.
SAFETY PROCEDURES REQUIRED AND/OR FIELD OPS UTILIZED
FLDs: 2, 5, 10, 11, 12, 14, 18, 20, 24, 30, 32, 38, 41, 43, 44, 48, 49, 57, 59, 60

11. TASK-BY-TASK ASSESSMENTS (Continued)

Task-By-Task Assessment (COMPLETE ONE SHEET FOR EACH TASK)
TASK DESCRIPTION
Task #7: START 3 personnel will conduct air reconnaissance as directed by the EPA under ESF-10 (both land and water).
EQUIPMENT REQUIRED/USED **(Be specific, e.g., hand tools, heavy equipment, instruments, PPE)**
Logbook; computer; digital camera; pens; GPS units, rain gear, CGI/PID (multiRae), 1st Aid Kit, BBP kit, fire extinguisher, bug spray, safety vests, cell phones, Type II PFD for boat operations, snake leggings (required when walking in grass/vegetation taller than employee's knees; gloves(nitrile and leather), rubber boots, steel toe boots, safety glasses, PDR (dust)
POTENTIAL HAZARDS/RISKS
Chemical
☒ Hazard Present Risk Level: ☐ H ☐ M ☒ L **PID/VOCs Action level:** 10 units detected in the breathing zone on the PID. • The crew should immediately pull a benzene colorimetric tube. If the benzene tube reads 0.5 ppm or greater, immediately evacuate the area and contact the SO (Brian Mason/Sam Cheek) and/or your project supervisor (see emergency contact list in HASP, vehicle, and EPA Command Posts). If the benzene tube does not record any readings, work may continue tin Level D PPE. **PID/VOCs Action Level**: 10 units sustained in the breathing zone for 10 minutes • The crew should immediately evacuate the area and contact the SO (Brian Mason/Sam Cheek) and/or your project supervisor (see emergency contact list in HASP, vehicle, and EPA Command Posts). The SO will discuss and review the situation with the field crew and corporate H&S. It may be determined that analytical air samples (passive VOC badges, active pumps with charcoal tubes, and/or summa canisters) may be collected. **Dust/EBAM/DataRam/PDR Action level:** 1.5 mg/m3 on PDR; Level D PPE if particulate concentrations are less than 1.5 mg/m3; level C PPE if above 1.5 mg/m3. **Additional Action levels**: H2S 5 ppm; carbon monoxide: 18 ppm; oxygen: 19.5% to 23.5%; %LEL: <10 % LEL. **The field team shall immediately contact the project SO and group supervisor if ANY action levels are exceeded/detected.**
Physical
☒ Hazard Present Risk Level: ☐ H ☐ M ☒ L What justifies risk level? Slips/trips/falls on land as well as in the boat, rough terrain, ergonomics, pinch points, power tools, noise (air boats), heat stress, inclement weather, wet feet, worker fatigue, and driving.
Biological
☒ Hazard Present Risk Level: ☐ H ☐ M ☒ L What justifies risk level? Plants, snakes, insects, and animals may be present in the field. Snake leggings (required when walking in grass/vegetation taller than employee's knees) will be worn as needed. Bug spray (deet) and mosquito/bug nets will be provided and worn as needed.
RADIOLOGICAL
☒ Hazard Present Risk Level: ☐ H ☐ M ☒ L What justifies risk level? UV/sunlight – personnel shall wear long sleeves and sun block as needed.

LEVELS OF PROTECTION/JUSTIFICATION
Level D+ - hard hats, safety boots/appropriate shoes, long pants/sleeves, eye protection, high visible safety vest, hearing protection required at all times in areas exceeding 85 dba (Rule of thumb: if you can't carry on a normal conversation at arms distance, you need hearing protection), Type II PFDs required for all boating/water operations.
SAFETY PROCEDURES REQUIRED AND/OR FIELD OPS UTILIZED
FLDs: 2, 5, 10, 11, 12, 14, 18, 20, 24, 30, 32, 38, 41, 43, 44, 48, 49, 57, 59, 60

11. TASK-BY-TASK ASSESSMENTS (Continued)

Task-By-Task Assessment
(COMPLETE ONE SHEET FOR EACH TASK)

TASK DESCRIPTION

Task #8: START 3 personnel will air sampling and monitoring in response to odor complaints as directed by the EPA under ESF-10 (both land and water).

EQUIPMENT REQUIRED/USED

(Be specific, e.g., hand tools, heavy equipment, instruments, PPE)

Logbook; computer; digital camera; pens; GPS units, rain gear, CGI/PID (MultiRae/AreaRae), PID (MiniRae), 1st Aid Kit, BBP kit, fire extinguisher, bug spray, safety vests, sampling jars, ziplock bags, cell phones, Type II PFD for boat operations, snake leggings (required when walking in grass/vegetation taller than employee's knees; gloves(nitrile and leather), rubber boots, steel toe boots, safety glasses, head lamps, PDR (dust), DataRam (Dust), EBAM (Dust), PQ 200 (Dust), summa canisters (VOCs), tedlar bags, PUF samplers (SVOCs), passive VOC badges, SKC samples and sampling trains/media.

POTENTIAL HAZARDS/RISKS

Chemical

☒ Hazard Present Risk Level: ☐ H ☐ M ☒ L

PID/VOCs Action level: 10 units detected in the breathing zone on the PID.

- The crew should immediately pull a benzene colorimetric tube. If the benzene tube reads 0.5 ppm or greater, immediately evacuate the area and contact the SO (Brian Mason/Sam Cheek) and/or your project supervisor (see emergency contact list in HASP, vehicle, and EPA Command Posts). If the benzene tube does not record any readings, work may continue tin Level D PPE.

PID/VOCs Action Level: 10 units sustained in the breathing zone for 10 minutes

- The crew should immediately evacuate the area and contact the SO (Brian Mason/Sam Cheek) and/or your project supervisor (see emergency contact list in HASP, vehicle, and EPA Command Posts). The SO will discuss and review the situation with the field crew and corporate H&S. It may be determined that analytical air samples (passive VOC badges, active pumps with charcoal tubes, and/or summa canisters) may be collected.

Dust/EBAM/DataRam/PDR Action level: 1.5 mg/m3 on PDR; Level D PPE if particulate concentrations are less than 1.5 mg/m3; level C PPE if above 1.5 mg/m3.

Additional Action levels: H2S 5 ppm; carbon monoxide: 18 ppm; oxygen: 19.5% to 23.5%; %LEL: <10 % LEL.

The field team shall immediately contact the project SO and group supervisor if ANY action levels are exceeded/detected.

Physical

☒ Hazard Present Risk Level: ☐ H ☒ M ☐ L

What justifies risk level? Slips/trips/falls on land as well as in the boat, rough terrain, ergonomics, pinch points, power tools, noise (air boats), heat stress, inclement weather, wet feet, worker fatigue, and driving.

Biological

☒ Hazard Present Risk Level: ☐ H ☐ M ☒ L

What justifies risk level? Plants, snakes, insects, and animals may be present in the field. Snake leggings (required when walking in grass/vegetation taller than employee's knees) will be worn as needed. Bug spray (deet) and mosquito/bug nets will be provided and worn as needed.

RADIOLOGICAL

☒ Hazard Present Risk Level: ☐ H ☐ M ☒ L

What justifies risk level? UV/sunlight – personnel shall wear long sleeves and sun block as needed.

LEVELS OF PROTECTION/JUSTIFICATION
Level D+ - hard hats, safety boots/appropriate shoes, long pants/sleeves, eye protection, high visible safety vest, hearing protection required at all times in areas exceeding 85 dba (Rule of thumb: if you can't carry on a normal conversation at arms distance, you need hearing protection), Type II PFDs required for all boating/water operations.
SAFETY PROCEDURES REQUIRED AND/OR FIELD OPS UTILIZED
FLDs: 2, 5, 10, 11, 12, 14, 18, 20, 24, 30, 32, 38, 41, 43, 44, 48, 49, 57, 59, 60

12. DAILY SITE SAFETY BRIEFINGS/HAZARD COMMUNICATION (HAZCOM)

- All personnel shall be provided with an initial and daily site safety briefing to communicate the nature, level and degree of hazards expected on site.
    - The daily safety meeting should incorporate but may not be limited to: scope of work; weather conditions; physical, chemical, biological, and radiological hazards; define PPE and doffing/donning procedures and required locations, special precautions (ex. Allergic to bee stings, epi-pen located in the truck), personnel on site and their roles/responsibilities.
- All personnel will also receive briefings when significant changes in site conditions occur and the Health and Safety Plan will be revised accordingly.

13. COMMUNICATIONS

Field office and lodging locations (Cell phone numbers, satellite phone numbers, and POCs are located in the IAP):

Venice, LA		
	Name	Address
Lodging	Yellow Cotton Bayside	40702 Hwy 23 Buras, LA 70041
Lodging & MCP	Lighthouse Lodge	42256 Hwy 23, Venice LA 70091
Lodging	Venice Inn	42660 Hwy 23, Venice LA 70091
Grand Isle, LA		
Lodging	#1	7040 Pamela Blvd Grand Isle, LA 70358
Lodging	#2	304 Pelican Grand Isle, LA 70358
Lodging	#3	3035 Hwy. 1 Grand Isle, LA 70358
MCP	Fire Station	Highway 1 & Chighizola Ln, Grand Isle, LA 70358.
Robert, LA		
Lodging	Residence Inn	101 Park Place Covington, LA 70433
Unified Area Command	Shell Robert Training & Conference Center	23260 Shell Lane Robert, LA 70455
Cocodrie, LA		
Lodging and MCP	Coco Marina	106 Pier 56 Court Chauvin, LA 70344
Lodging and MCP	Camp Caz	29715 W. Hwy 82 Kaplan, LA 70548
Chalmette, LA		
Chalmette CC	SBFH#7	5680 E Judge Perez Dr Violet, LA 70092
Harahan CC	LDEQ Bldg	201 Evans Road Bldg 4 Suite 420 New Orleans, LA 70123
Lodging	Residence Inn Metairie	3 Galleria Blvd Metairie LA 70001
Lodging	TownPlace Suites	5424 Citrus Blvd Harahan, LA 70123

14. CONTINGENCIES & EMERGENCY CONTACTS

CONTINGENCIES		
Emergency Contacts and Phone Numbers		
Agency	**Contact**	**Phone Number**
WorkCare WESTON Medical Director WorkCare WESTON Program Administrator	Dr. Peter Greaney Heather Lind Paula Sandrock	From 6 am to 4:30 pm Pacific Time call 800-455-6155 dial 0 or ext. 475 for Heather Lind or ext 110 for Paula Sandrock to request the on-call clinician.
After-Business Hours Contact (In Case of Emergency Only)	On-call clinician	4:31 p.m. – 5:59 a.m. Pacific Time, all day Saturday, Sunday and Holidays call 800-455-6155 Dial 3 to reach the after-hours answering service. Request that the service connect you with the on-call clinician or the on-call clinician will return your call within 30 minutes.
WESTON Medical Director	Owen B. Douglass, Jr.	610.506.5392 (cell)
WESTON Health & Safety (CORP)	Owen B. Douglass, Jr.	610.506.5392 (cell)
WESTON Health & Safety (SOU-DIV)	Jim Davis	334.319.0380 (cell)
WESTON EPA Region 6 START Health & Safety Officers	Brian Mason Sam Cheek	512.466.2163 (cell) 972.977.1570 (cell)
Fire Department	Chalmette - St. Bernard FD	911
Police Department	Chalmette - St. Bernard PD	911
START H&S Cell Phone	Brian Mason Sam Cheek	512-466-2163 (cell) 972.977.1570 (cell)
START Incident Commander Cell Phone	David Bordelon Ben Latham	225-772-7921 (cell) 972-213-6618 (cell)
EPA OSC Cell Phone – See IAP	Mike McAteer – Venice Warren Zehner - Chalmette	214-354-9371 (cell) 214-789-1585 (cell)
Weston Equipment Store (RES)	Danny Newman	713.301.7702 (cell)
Nearest Telephone – LDEQ Office	Main LDEQ Line	504-736-7701 – Main 504-736-7702 – Fax

MAPQUEST.

Trip to 26851 Highway 23

Port Sulphur, LA 70083-2509
29.78 miles - about 43 minutes

Notes

Plaquemines Medical Center
26851 Highway 23, Port Sulphur, LA -
(504) 564-3346

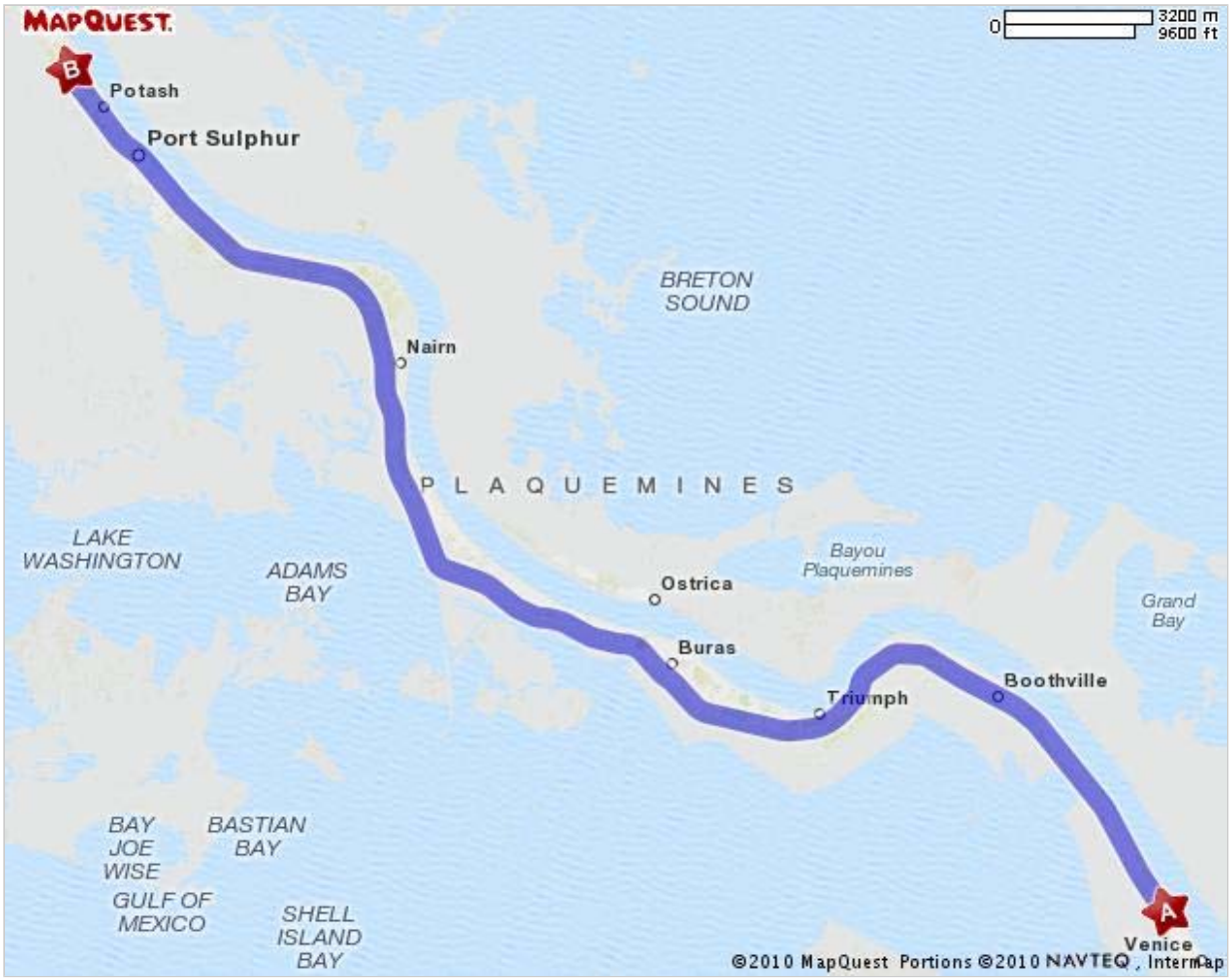
42256 Highway 23, Venice, LA 70091-4104

START	1. Start out going **SOUTH** on **LA-23 S** toward **MARATHON LN**.	go 0.1 mi
NORTH 23	2. Make a **U-TURN** at **MARATHON LN** onto **LA-23 N**.	go 29.6 mi
END	3. **26851 HIGHWAY 23**.	go 0.0 mi

26851 Highway 23, Port Sulphur, LA 70083-2509

Total Travel Estimate : 29.78 miles - about 43 minutes

Route Map Hide



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MAPQUEST.

Trip to 1415 Tulane Ave

New Orleans, LA 70112-2600
13.39 miles - about 27 minutes

Notes

Tulane Medical Center
1415 Tulane Avenue, New Orleans, LA -
(504) 988-5800

5680 E Judge Perez Dr, Violet, LA 70092-2938

START	1. Start out going **SOUTHEAST** on **E JUDGE PEREZ DR / LA-39 S** toward **LICCIARDI DR**.	go 0.2 mi
NORTH 39	2. Make a **U-TURN** at **OAK DR** onto **LA-39 N**.	go 9.6 mi
	3. Turn **LEFT** onto **POLAND AVE**.	go 0.4 mi
	4. Turn **RIGHT** onto **ST CLAUDE AVE / LA-46 W**. Continue to follow **ST CLAUDE AVE**.	go 1.8 mi

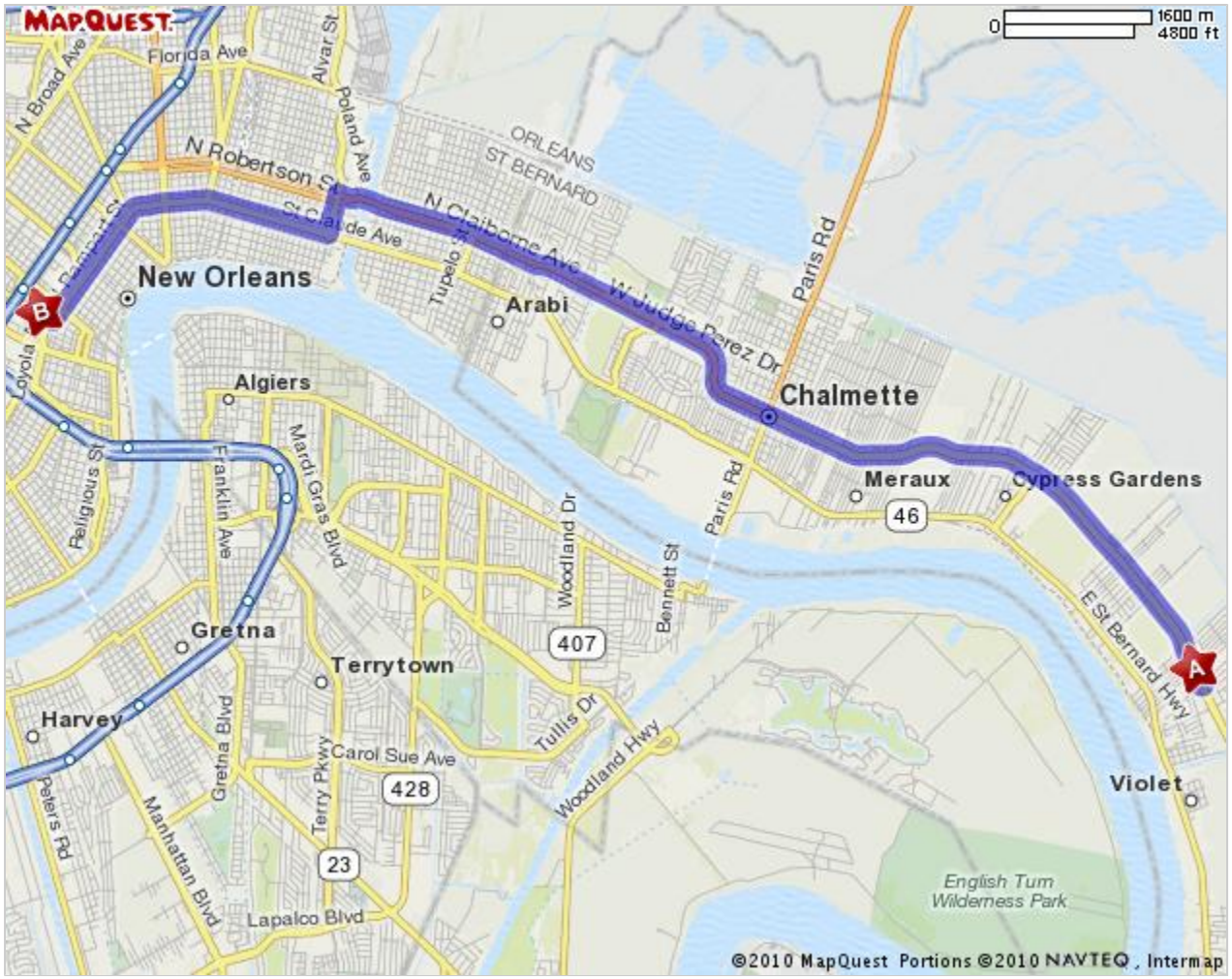
	5. Turn **SLIGHT LEFT** onto **MCSHANE PL**.	go 0.1 mi
	6. **MCSHANE PL** becomes **N RAMPART ST**.	go 1.1 mi
	7. Turn **RIGHT** onto **COMMON ST / TULANE AVE**. Continue to follow **TULANE AVE**.	go 0.2 mi
END	8. **1415 TULANE AVE** is on the **RIGHT**.	go 0.0 mi

B

1415 Tulane Ave, New Orleans, LA 70112-2600

Total Travel Estimate : 13.39 miles - about 27 minutes

Route Map Hide



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MAPQUEST.

Trip to Highway 1 & Chighizola Ln

Grand Isle, LA 70358
36.54 miles - about 54 minutes

Notes

Lady of the Sea General Hospital
200 West 134th Place
Cut Off, LA 70345-4143
(985) 325-8585

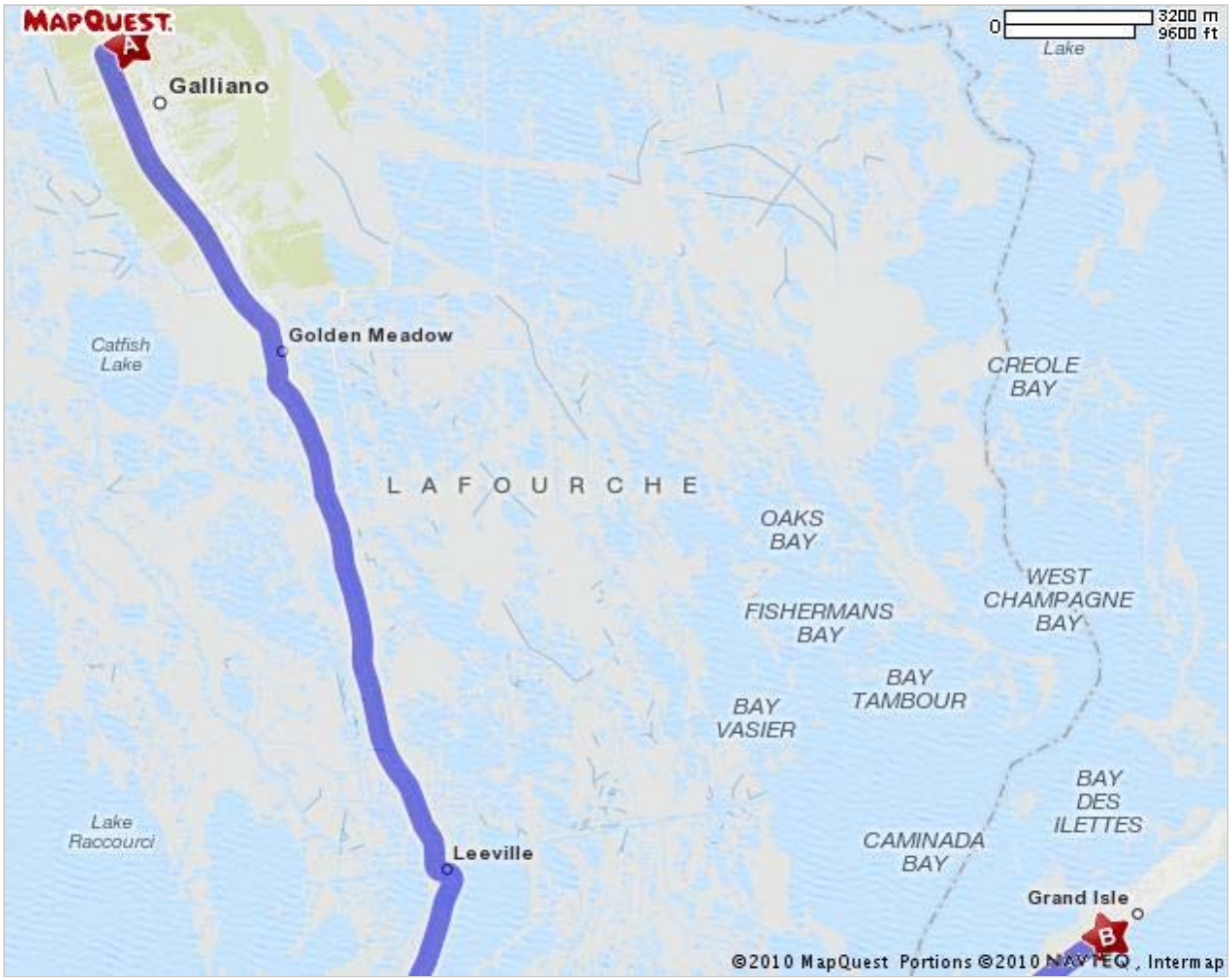
200 W 134th Pl, Cut Off, LA 70345-4143

1. Start out going **WEST** on **W 134TH PL** toward **HIGHWAY 3235 / LA-3235 N**.	go 0.5 mi
2. Turn **LEFT** onto **HIGHWAY 3235 / LA-3235 S**. Continue to follow **LA-3235 S**.	go 7.1 mi
3. **LA-3235 S** becomes **HIGHWAY ONE / LA-1**.	go 29.0 mi
4. **HIGHWAY 1 & CHIGHIZOLA LN**.	go 0.0 mi

Highway 1 & Chighizola Ln, Grand Isle, LA 70358

Total Travel Estimate : 36.54 miles - about 54 minutes

Route Map Hide



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MAPQUEST.

Trip to 1978 Industrial Blvd

Houma, LA 70363-7055
27.93 miles - about 45 minutes

Notes

Leonard J Chabert Medical Center
1978 Industrial Boulevard, Houma, LA -
(985) 873-2200

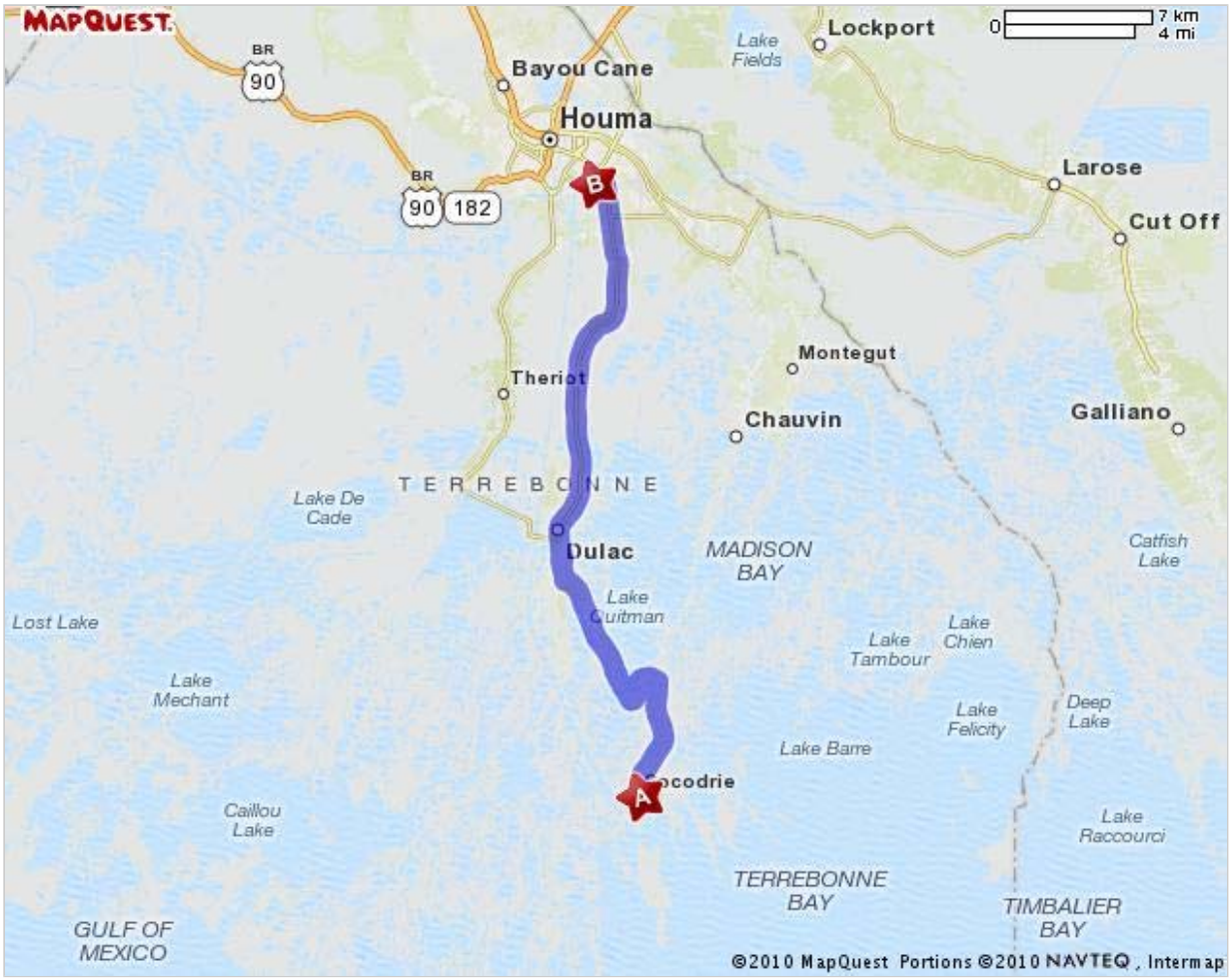
Cocodrie, LA

START	1. Start out going **NORTHEAST** on **REDFISH ST** toward **SHRIMP ST**.	go 0.1 mi
	2. Turn **LEFT** onto **SHRIMP ST**.	go 0.0 mi
56	3. Turn **RIGHT** onto **LA-56**.	go 4.4 mi
57	4. Turn **LEFT** onto **LA-57**.	go 7.9 mi
57	5. Turn **RIGHT** to stay on **LA-57**.	go 14.8 mi
	6. Turn **LEFT** onto **INDUSTRIAL BLVD**.	go 0.6 mi
END	7. **1978 INDUSTRIAL BLVD** is on the **LEFT**.	go 0.0 mi

1978 Industrial Blvd, Houma, LA 70363-7055

Total Travel Estimate : 27.93 miles - about 45 minutes

Route Map Hide



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Local Medical Emergency Facility(s)		
Name of Hospital: Venice- Plaquemines Medical Center, Chalmette-Tulane Medical Center, Houma- LJC Medical Center, Grand Isle – Lady of the Sea Hospital		
Address: See attached maps for Hospital information		Phone No.:
Name of Contact: Head ER Nurse		Phone No.: 504-998-5800
Type of Service: ☐ Physical trauma only ☐ Chemical exposure only ☒ Physical trauma and chemical exposure ☒ Available 24 hours	**Route to Hospital:** **(See Attached)**	**Travel time from site:** TBD **Distance to hospital:** TBD **Name/no. of 24-hr ambulance service:** 911

Hospital Location Map and Directions Sources

1. Yahoo Maps- http://maps.yahoo.com ;
2. Google Maps- http://google.com/maps ;

15. DECONTAMINATION PROCEDURES

☒ Wet Decontamination: Boats only at USCG DECON stations

☒ Dry Decontamination: sample gloves and trash should be bagged in thrown away at USCG DECON station

☐ All investigative derived waste (IDW) generated will be placed in appropriate containers, labeled and stored on site for eventual disposal. –

☒ It is not anticipated that field teams will generated IDW

☐ Refer to Attachment A for additional Decontamination Procedures.

PPE Reference Web Links

1. MSA Response Respirator Selector - http://msanet.com/response/chemicalsearch.asp
2. MSA Cartridge Life Expectancy Calculator - http://webapps.msanet.com/cartlife/
3. Scott Respirator Selection - http://www.scotthealthsafety.com/airpur.htm
4. Kappler Suit Smart PPE Selector - http://www.kappler.com/techdata_main.html
5. DuPont™ SafeSPEC™ - http://www2.dupont.com/NOWApp/DPPRequestGateway/

Air Monitoring Instrument						
Instrument Selection and Initial Check Record Reporting Format: ☒ Field Notebook ☐ Field Data Sheets* ☐ Air Monitoring Log ☐ Trip Report ☐ Other						
Instrument	**Task No.(s)**	**Number Required**	**Number Received**	**Checked Upon Receipt**	**Comment**	**Initials**
☐ **RADIATION**				☐		
☐ GM (Pancake)				☐		
☐ NaI (Micro R)				☐		
☐ ZnS (Alpha Scintillator)				☐		
☐ Other _____				☐		
☒ **PID**				☐		
☒ MiniRAE (10.6 lamp)	All	1 per team		☐		
☒ MultiRAE (LEL/O2/H2S/CO/PID 10.6 lamp)	All	1 per team		☐		
☐ TVA 1000 (PID/FID)				☐		
☐ Other _____				☐		
☐ **FID**						
☐ TVA 1000 (FID/PID)				☐		
☐ Other				☐		
☒ **PDR 1000 (Particulate) (Field)**	All	1 per station		☐		
DataRam 4000 / EBam at field site						
☐ Single Gas Monitor				☐		
Specify Chemical: _____				☐		
☐ **Personal Sampling Pump**				☐		
Specify Media: _____				☐		
☐ Bio-Aerosol Monitor				☐		
☒ **Colorimetric tubes w/ pump**				☐		
Specify (MSA, Dräeger, Sensidyne)						
☒ Tubes/type: Drager Benzene	All	1 set per field location		☐		

Action Levels				
	Tasks	**Action Level**		**Action**
☐ **Explosive atmosphere**		Ambient Air Concentration	Confined Space Concentration	
		<10% LEL 10 to 25% LEL >25% LEL	0 to 1% LEL 1 to 10% LEL (5% LEL if alternate entry methods are used) >10% LEL (5% LEL if alternate entry methods are used).	Work may continue. Consider toxicity potential. Work may continue. Increase monitoring frequency. Work must stop. Leave the area or if in a confined space evacuate the space. Ventilate and test for acceptable conditions before returning to a confined space. Use initial site assessment air monitoring procedures for return to area in ambient air
☐ **Oxygen**		Ambient Air Concentration	Confined Space Concentration	
		<19.5% O_2 19.5% to 25% O_2 >25% O_2	<19.5% O_2 19.5% to 23.5% O_2 >23.5% O_2	Leave area. Re-enter only with self-contained breathing apparatus. Work may continue. Investigate changes from 21%. Work must stop. Ventilate area before returning.
☐ **Radiation**		< 3 times background 3 times background to < 1 mR/hour > 1 mR/hour		Continue work. Radiation above background levels (normally 0.01-0.02 mR/hr) signifies possible radiation source(s) present. Continue investigation with caution. Perform thorough monitoring. Consult with a Health Physicist. Potential radiation hazard. Evacuate site. Continue investigation only upon the advice of Health Physicist.
Toxic Substance Action levels = These Action Levels, if not defined by regulation, are some percent (usually 50%) of the applicable PEL/TLV/REL. That number must also be adjusted to account for instrument response factors.				
☒ **Gases and vapors** Action Level formula (1/2 PEL * RF)	All	Action levels: 10 units detected on PID in breathing zone; Use Drager tubes to confirm the presence of Benzene in the atmosphere - <0.5 ppm benzene, Level D PPE; 10 units sustained for 10 minutes or >/= 0.5 ppm benzene – evacuate area and contact SO/Field Supervisor		Evacuate zone, upgrade PPE, apply engineering controls, and obtain COC specific instruments.
☒ **Solids / Particulate (dust) hazards** Action Level Formula (10^6 * PEL) / (Concentration * 2)	All	Action levels: 1.5 mg/m3 (1/2 of ACGIH nuisance dust level) sustained on PDR/DataRam/EBAM in breathing zone for 10 minutes		Evacuate zone, upgrade PPE, apply engineering controls, and obtain COC specific instruments.

17. SITE HEALTH AND SAFETY PLAN ACKNOWLEDGEMENT

Name (Printed)	Signature	Affiliation	Date

Disclaimer: This Health and Safety Plan (HASP) was prepared for work under the Superfund Technical Assessment and Response Team (START) Contract. Use of this HASP by WESTON and its subcontractors is intended to fulfill the OSHA requirements found in 29 CFR 1910.120. Items not specifically covered in this HASP are included by reference to 29 CFR 1910 and 1926.

Name (Printed)	Signature	Affiliation	Date

Disclaimer: This Health and Safety Plan (HASP) was prepared for work under the Superfund Technical Assessment and Response Team (START) Contract. Use of this HASP by WESTON and its subcontractors is intended to fulfill the OSHA requirements found in 29 CFR 1910.120. Items not specifically covered in this HASP are included by reference to 29 CFR 1910 and 1926.

Name (Printed)	Signature	Affiliation	Date

Disclaimer: This Health and Safety Plan (HASP) was prepared for work under the Superfund Technical Assessment and Response Team (START) Contract. Use of this HASP by WESTON and its subcontractors is intended to fulfill the OSHA requirements found in 29 CFR 1910.120. Items not specifically covered in this HASP are included by reference to 29 CFR 1910 and 1926.

Attachment A
DECONTAMINATION PLAN

(If applicable, include additional decontamination procedures,
e.g. Section 5 from Weston Corporate HASP)

Attachment B
HAZCOM Program

SITE-SPECIFIC HAZARD COMMUNICATION PROGRAM

Location-Specific Hazard Communication Program/Checklist

To ensure an understanding of and compliance with the Hazard Communication Standard, WESTON will use this checklist/document (or similar document) in conjunction with the WESTON Written Hazard Communication Program as a means of meeting site- or location-specific requirements.

While responsibility for activities within this document reference the WESTON Safety Officer (SO), it is the responsibility of all personnel to effect compliance. Responsibilities under various conditions can be found within the WESTON Written Hazard Communication Program.

To ensure that information about the dangers of all hazardous chemicals used by WESTON are known by all affected employees, the following Hazard Communication Program has been established. All affected personnel will participate in the Hazard Communication Program. This written program, as well as WESTON's Corporate Hazard Communication Program, will be available for review by any employee, employee representative, representative of OSHA, NIOSH, or any affected employer/employee on a multi-employer site.

☐ *Site or other location name/address:* *Mississippi Canyon Oil Spill, Gulf of Mexico*

☐ *Site/Project/Location Manager:* *TBD*

☐ *Site/Location Safety Officer:* *TBD*

☐ *List of chemicals compiled, format:* ☒ *HASP* ☐ *Other:* _____

☒ *Location of MSDS files:* *HASP and Site ICP*

☐ *Training conducted by: Name:* _____ *Date:* _____

☒ *Indicate format of training documentation:* ☐ *Field Log:* ☒ *Other:* *Training will be provided upon mobilization to site*

☐ *Client briefing conducted regarding hazard communication:* _____

☐ *If multi-employer site (client, subcontractor, agency, etc.), indicate name of affected companies:*

_____

☐ *Other employer(s) notified of chemicals, labeling, and MSDS information:* _____

☒ *Has WESTON been notified of other employer's or client's hazard communication program(s), as necessary?* ☒ *Yes* ☐ *No*

List of Hazardous Chemicals

A list of known hazardous chemicals used by WESTON personnel must be prepared and attached to this document or placed in a centrally identified location with the MSDSs. Further information on each chemical may be obtained by reviewing the appropriate MSDS. The list will be arranged to enable cross-reference with the MSDS file and the label on the container. The SO or Location Manager is responsible for ensuring the chemical listing remains up-to-date.

Container Labeling

The WESTON SO will verify that all containers received from the chemical manufacturer, importer, or distributor for use on-site are clearly labeled.

The SO is responsible for ensuring that labels are placed where required and for comparing MSDSs and other information with label information to ensure correctness.

Material Safety Data Sheets (MSDSs)

The SO is responsible for establishing and monitoring WESTON's MSDS program for the location. The SO will ensure that procedures are developed to obtain the necessary MSDSs and will review incoming MSDSs for new or significant health and safety information. He/she will see that any new information is passed on to the affected employees. If an MSDS is not received at the time of initial shipment, the SO will call the manufacturer and have an MSDS delivered for that product in accordance with the requirements of WESTON's Written Hazard Communication Program.

A log for, and copies of, MSDSs for all hazardous chemicals in use will be kept in the MSDS folder at a location known to all site workers. MSDSs will be readily available to all employees during each work shift. If an MSDS is not available, immediately contact the WESTON SO or the designated alternate. When a revised MSDS is received, the SO will immediately replace the old MSDS.

Employee Training and Information

The SO is responsible for the WESTON site-specific personnel training program. The SO will ensure that all program elements specified below are supplied to all affected employees.

At the time of initial assignment for employees to the work site, or whenever a new hazard is introduced into the work area, employees will attend a health and safety meeting or briefing that includes the information indicated below.

- Hazardous chemicals present at the work site.
- Physical and health risks of the hazardous chemicals.
- The signs and symptoms of overexposure.
- Procedures to follow if employees are overexposed to hazardous chemicals.
- Location of the MSDS file and Written Hazard Communication Program.
- How to determine the presence or release of hazardous chemicals in the employee's work area.
- How to read labels and review MSDSs to obtain hazard information.
- Steps WESTON has taken to reduce or prevent exposure to hazardous chemicals.
- How to reduce or prevent exposure to hazardous chemicals through the use of controls procedures, work practices, and personal protective equipment.
- Hazardous, nonroutine tasks to be performed (if any).
- Chemicals within unlabeled piping (if any).

Hazardous Nonroutine Tasks

When employees are required to perform hazardous nonroutine tasks, the affected employee(s) will be given information by the SO about the hazardous chemicals he or she may use during such activity. This information will include specific chemical hazards, protective and safety measures the employee can use, and steps WESTON is using to reduce the hazards. These steps include, but are not limited to, ventilation, respirators, presence of another employee, and emergency procedures.

Chemicals in Unlabeled Pipes

Work activities may be performed by employees in areas where chemicals are transferred through unlabeled pipes. Prior to starting work in these areas, the employee will contact the SO, at which time information as to the chemical(s) in the pipes, potential hazards of the chemicals or the process involved, and the safety precautions that should be taken will be determined and presented.

Multi-Employer Work Sites

It is the responsibility of the SO to provide other employers with information about hazardous chemicals imported by WESTON to which their employees may be exposed, along with suggested safety precautions. It is also the responsibility of the SO and the Site Manager to obtain information about hazardous chemicals used by other employers to which WESTON employees may be exposed. WESTON's chemical listing will be made available to other employers, as requested. MSDSs will be available for viewing, as necessary.

The location, format, and/or procedures for accessing MSDS information must be relayed to affected employees.

Attachment C
Site MSDSs and CSDSs

SAFETY DATA SHEET

PRODUCT

COREXIT(R) EC9527A

EMERGENCY TELEPHONE NUMBER(S)

(800) 424-9300 (24 Hours) CHEMTREC

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME : **COREXIT(R) EC9527A**

APPLICATION : OIL SPILL DISPERSANT

COMPANY IDENTIFICATION : Nalco Company
1601 W. Diehl Road
Naperville, Illinois
60563-1198

EMERGENCY TELEPHONE NUMBER(S) : (800) 424-9300 (24 Hours) CHEMTREC

NFPA 704M/HMIS RATING
HEALTH : 2 / 2 FLAMMABILITY : 1 / 1 INSTABILITY : 0 / 0 OTHER :
0 = Insignificant 1 = Slight 2 = Moderate 3 = High 4 = Extreme

2. COMPOSITION/INFORMATION ON INGREDIENTS

Our hazard evaluation has identified the following chemical substance(s) as hazardous. Consult Section 15 for the nature of the hazard(s).

Hazardous Substance(s)	CAS NO	% (w/w)
2-Butoxyethanol	111-76-2	30.0 - 60.0
Organic sulfonic acid salt	Proprietary	10.0 - 30.0
Propylene Glycol	57-55-6	1.0 - 5.0

3. HAZARDS IDENTIFICATION

****EMERGENCY OVERVIEW****

WARNING
Eye and skin irritant. Repeated or excessive exposure to butoxyethanol may cause injury to red blood cells (hemolysis), kidney or the liver. Harmful by inhalation, in contact with skin and if swallowed.
Do not get in eyes, on skin, on clothing. Do not take internally. Use with adequate ventilation. Wear suitable protective clothing. Keep container tightly closed. Flush affected area with water. Keep away from heat. Keep away from sources of ignition - No smoking.
May evolve oxides of carbon (COx) under fire conditions.

PRIMARY ROUTES OF EXPOSURE :
Eye, Skin

HUMAN HEALTH HAZARDS - ACUTE :

EYE CONTACT :
Can cause moderate irritation.

SKIN CONTACT :
Can cause moderate irritation. Harmful if absorbed through skin.

INGESTION :
May be harmful if swallowed. May cause liver and kidney effects and/or damage. There may be irritation to the gastro-intestinal tract.

INHALATION :
Harmful by inhalation. Repeated or prolonged exposure may irritate the respiratory tract.

SYMPTOMS OF EXPOSURE :
Acute :
Excessive exposure may cause central nervous system effects, nausea, vomiting, anesthetic or narcotic effects.
Chronic :
Repeated or excessive exposure to butoxyethanol may cause injury to red blood cells (hemolysis), kidney or the liver.

AGGRAVATION OF EXISTING CONDITIONS :
Skin contact may aggravate an existing dermatitis condition.

HUMAN HEALTH HAZARDS - CHRONIC :
Contains ethylene glycol monobutyl ether (butoxyethanol). Prolonged and/or repeated exposure through inhalation or extensive skin contact with EGBE may result in damage to the blood and kidneys.

4. FIRST AID MEASURES

EYE CONTACT :
Flush affected area with water. Get medical attention.

SKIN CONTACT :
Flush affected area with water. Get medical attention.

INGESTION :
Do not induce vomiting without medical advice. If conscious, washout mouth and give water to drink. Get medical attention.

INHALATION :
Remove to fresh air, treat symptomatically. If symptoms develop, seek medical advice.

NOTE TO PHYSICIAN :
Based on the individual reactions of the patient, the physician's judgement should be used to control symptoms and clinical condition.

5. FIRE FIGHTING MEASURES

FLASH POINT : 163 °F / 72.7 °C (TCC)

This product does not sustain combustion per the method outlined in 49 CFR Appendix H.

EXTINGUISHING MEDIA :
This product would not be expected to burn unless all the water is boiled away. The remaining organics may be ignitable. Use extinguishing media appropriate for surrounding fire.

FIRE AND EXPLOSION HAZARD :
May evolve oxides of carbon (COx) under fire conditions.

SPECIAL PROTECTIVE EQUIPMENT FOR FIRE FIGHTING :
In case of fire, wear a full face positive-pressure self contained breathing apparatus and protective suit.

6. ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS :
Restrict access to area as appropriate until clean-up operations are complete. Stop or reduce any leaks if it is safe to do so. Do not touch spilled material. Ventilate spill area if possible. Use personal protective equipment recommended in Section 8 (Exposure Controls/Personal Protection).

METHODS FOR CLEANING UP :
SMALL SPILLS: Soak up spill with absorbent material. Place residues in a suitable, covered, properly labeled container. Wash affected area. LARGE SPILLS: Contain liquid using absorbent material, by digging trenches or by diking. Reclaim into recovery or salvage drums or tank truck for proper disposal. Contact an approved waste hauler for disposal of contaminated recovered material. Dispose of material in compliance with regulations indicated in Section 13 (Disposal Considerations).

ENVIRONMENTAL PRECAUTIONS :
Do not contaminate surface water.

7. HANDLING AND STORAGE

HANDLING :
Avoid eye and skin contact. Do not take internally. Ensure all containers are labeled. Keep the containers closed when not in use.

STORAGE CONDITIONS :
Store the containers tightly closed.

SUITABLE CONSTRUCTION MATERIAL :
Stainless Steel 316L, Hastelloy C-276, MDPE (medium density polyethylene), Nitrile, Plexiglass, Kalrez, TFE, Alfax, Teflon, HDPE (high density polyethylene), Neoprene, Aluminum, Polypropylene, Polyethylene, Carbon Steel C1018, Stainless Steel 304, Compatibility with Plastic Materials can vary; we therefore recommend that compatibility is tested prior to use., FEP (encapsulated), Perfluoroelastomer, PVC

UNSUITABLE CONSTRUCTION MATERIAL :
Copper, Mild steel, Brass, Nylon, Buna-N, Natural rubber, Polyurethane, Hypalon, Viton, Ethylene propylene, EPDM

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

OCCUPATIONAL EXPOSURE LIMITS :
Exposure guidelines have not been established for this product. Available exposure limits for the substance(s) are shown below.

ACGIH/TLV :
Substance(s)

2-Butoxyethanol	TWA: 20 ppm , 97 mg/m3
Propylene Glycol	

OSHA/PEL :
Substance(s)

2-Butoxyethanol	TWA: 50 ppm , 240 mg/m3 (Skin)
Propylene Glycol	

AIHA/WEEL :
Substance(s)
For propylene glycol, an 8 hour TWA of 10 mg/m3 (aerosol) and 50 ppm (total).

ENGINEERING MEASURES :
General ventilation is recommended.

RESPIRATORY PROTECTION :
Where concentrations in air may exceed the limits given in this section, the use of a half face filter mask or air supplied breathing apparatus is recommended. A suitable filter material depends on the amount and type of chemicals being handled. Consider the use of filter type: Multi-contaminant cartridge. with a Particulate pre-filter. In event of emergency or planned entry into unknown concentrations a positive pressure, full-facepiece SCBA should be used. If respiratory protection is required, institute a complete respiratory protection program including selection, fit testing, training, maintenance and inspection.

HAND PROTECTION :
Neoprene gloves, Nitrile gloves, Butyl gloves, PVC gloves

SKIN PROTECTION :
Wear standard protective clothing.

EYE PROTECTION :
Wear chemical splash goggles.

HYGIENE RECOMMENDATIONS :
Keep an eye wash fountain available. Keep a safety shower available. If clothing is contaminated, remove clothing and thoroughly wash the affected area. Launder contaminated clothing before reuse.

HUMAN EXPOSURE CHARACTERIZATION :
Based on our recommended product application and personal protective equipment, the potential human exposure is: Low

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE	Liquid
APPEARANCE	Clear Amber
ODOR	Mild

SPECIFIC GRAVITY	0.98 - 1.02
DENSITY	8.2 - 8.5 lb/gal
SOLUBILITY IN WATER	Complete
pH (100 %)	6.1
VISCOSITY	160 cst @ 32 °F / 0 °C
POUR POINT	ASTM D-97 -66.9 °F / -55 °C
POUR POINT	< -40 °F / < -40 °C
BOILING POINT	340 °F / 171 °C
VAPOR PRESSURE	< 5 mm Hg @ 100 °F / 38 °C Same as water
EVAPORATION RATE	0.1

Note: These physical properties are typical values for this product and are subject to change.

10. STABILITY AND REACTIVITY

STABILITY :
Stable under normal conditions.

HAZARDOUS POLYMERIZATION :
Hazardous polymerization will not occur.

CONDITIONS TO AVOID :
Extremes of temperature

MATERIALS TO AVOID :
Contact with strong oxidizers (e.g. chlorine, peroxides, chromates, nitric acid, perchlorate, concentrated oxygen, permanganate) may generate heat, fires, explosions and/or toxic vapors.

HAZARDOUS DECOMPOSITION PRODUCTS :
Under fire conditions: Oxides of carbon

11. TOXICOLOGICAL INFORMATION

No toxicity studies have been conducted on this product.

SENSITIZATION :
This product is not expected to be a sensitizer.

CARCINOGENICITY :
None of the substances in this product are listed as carcinogens by the International Agency for Research on Cancer (IARC), the National Toxicology Program (NTP) or the American Conference of Governmental Industrial Hygienists (ACGIH).

HUMAN HAZARD CHARACTERIZATION :
Based on our hazard characterization, the potential human hazard is: High

12. ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL EFFECTS :

No toxicity studies have been conducted on this product.

ACUTE FISH RESULTS :

Species	Exposure	LC50	Test Descriptor
Turbot	96 hrs	50 mg/l	

MOBILITY :
The environmental fate was estimated using a level III fugacity model embedded in the EPI (estimation program interface) Suite TM, provided by the US EPA. The model assumes a steady state condition between the total input and output. The level III model does not require equilibrium between the defined media. The information provided is intended to give the user a general estimate of the environmental fate of this product under the defined conditions of the models.
If released into the environment this material is expected to distribute to the air, water and soil/sediment in the approximate respective percentages;

Air	Water	Soil/Sediment
<5%	10 - 30%	70 - 90%

The portion in water is expected to be soluble or dispersible.

BIOACCUMULATION POTENTIAL
Component substances have a low potential to bioconcentrate.

ENVIRONMENTAL HAZARD AND EXPOSURE CHARACTERIZATION
Based on our hazard characterization, the potential environmental hazard is: Moderate
Based on our recommended product application and the product's characteristics, the potential environmental exposure is: Low

If released into the environment, see CERCLA/SUPERFUND in Section 15.

13. DISPOSAL CONSIDERATIONS

If this product becomes a waste, it is not a hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA) 40 CFR 261, since it does not have the characteristics of Subpart C, nor is it listed under Subpart D.

As a non-hazardous waste, it is not subject to federal regulation. Consult state or local regulation for any additional handling, treatment or disposal requirements. For disposal, contact a properly licensed waste treatment, storage, disposal or recycling facility.

14. TRANSPORT INFORMATION

The information in this section is for reference only and should not take the place of a shipping paper (bill of lading) specific to an order. Please note that the proper Shipping Name / Hazard Class may vary by packaging, properties, and mode of transportation. Typical Proper Shipping Names for this product are as follows.

LAND TRANSPORT :

Proper Shipping Name : PRODUCT IS NOT REGULATED DURING TRANSPORTATION

AIR TRANSPORT (ICAO/IATA) :

Proper Shipping Name : PRODUCT IS NOT REGULATED DURING TRANSPORTATION

MARINE TRANSPORT (IMDG/IMO) :

Proper Shipping Name : PRODUCT IS NOT REGULATED DURING TRANSPORTATION

15. REGULATORY INFORMATION

This section contains additional information that may have relevance to regulatory compliance. The information in this section is for reference only. It is not exhaustive, and should not be relied upon to take the place of an individualized compliance or hazard assessment. Nalco accepts no liability for the use of this information.

NATIONAL REGULATIONS, USA :

OSHA HAZARD COMMUNICATION RULE, 29 CFR 1910.1200 :
Based on our hazard evaluation, none of the substances in this product are hazardous.

CERCLA/SUPERFUND, 40 CFR 117, 302 :
Notification of spills of this product is not required.

SARA/SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 (TITLE III) - SECTIONS 302, 311, 312, AND 313 :

SECTION 302 - EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355) :
This product does not contain substances listed in Appendix A and B as an Extremely Hazardous Substance.

SECTIONS 311 AND 312 - MATERIAL SAFETY DATA SHEET REQUIREMENTS (40 CFR 370) :
Our hazard evaluation has found this product to be hazardous. The product should be reported under the following indicated EPA hazard categories:

X	Immediate (Acute) Health Hazard
X	Delayed (Chronic) Health Hazard
X	Fire Hazard
	Sudden Release of Pressure Hazard
	Reactive Hazard

Under SARA 311 and 312, the EPA has established threshold quantities for the reporting of hazardous chemicals. The current thresholds are: 500 pounds or the threshold planning quantity (TPQ), whichever is lower, for extremely hazardous substances and 10,000 pounds for all other hazardous chemicals.

SECTION 313 - LIST OF TOXIC CHEMICALS (40 CFR 372) :
This product contains the following substance(s), (with CAS # and % range) which appear(s) on the List of Toxic Chemicals

Hazardous Substance(s)	CAS NO	% (w/w)
Glycol Ethers		30 - 60

TOXIC SUBSTANCES CONTROL ACT (TSCA) :
The substances in this preparation are included on or exempted from the TSCA 8(b) Inventory (40 CFR 710)

FEDERAL WATER POLLUTION CONTROL ACT, CLEAN WATER ACT, 40 CFR 401.15 / formerly Sec. 307, 40 CFR 116.4 / formerly Sec. 311 :
None of the substances are specifically listed in the regulation.

CLEAN AIR ACT, Sec. 112 (40 CFR 61, Hazardous Air Pollutants), Sec. 602 (40 CFR 82, Class I and II Ozone Depleting Substances) :
None of the substances are specifically listed in the regulation.

CALIFORNIA PROPOSITION 65 :
This product does not contain substances which require warning under California Proposition 65.

MICHIGAN CRITICAL MATERIALS :
None of the substances are specifically listed in the regulation.

STATE RIGHT TO KNOW LAWS :
The following substances are disclosed for compliance with State Right to Know Laws:

2-Butoxyethanol	111-76-2
Propylene Glycol	57-55-6

NATIONAL REGULATIONS, CANADA :

WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM (WHMIS) :
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.

WHMIS CLASSIFICATION :
D2B - Materials Causing Other Toxic Effects - Toxic Material

CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) :
The substances in this preparation are listed on the Domestic Substances List (DSL), are exempt, or have been reported in accordance with the New Substances Notification Regulations.

AUSTRALIA
All substances in this product comply with the National Industrial Chemicals Notification & Assessment Scheme (NICNAS).

CHINA
All substances in this product comply with the Chemical Control Law and are listed on the Inventory of Existing Chemical Substances China (IECSC).

EUROPE
The substance(s) in this preparation are included in or exempted from the EINECS or ELINCS inventories

JAPAN
All substances in this product comply with the Law Regulating the Manufacture and Importation Of Chemical Substances and are listed on the Ministry of International Trade & industry List (MITI).

KOREA
All substances in this product comply with the Toxic Chemical Control Law (TCCL) and are listed on the Existing Chemicals List (ECL)

PHILIPPINES
All substances in this product comply with the Republic Act 6969 (RA 6969) and are listed on the Philippines Inventory of Chemicals & Chemical Substances (PICCS).

16. OTHER INFORMATION

Due to our commitment to Product Stewardship, we have evaluated the human and environmental hazards and exposures of this product. Based on our recommended use of this product, we have characterized the product's general risk. This information should provide assistance for your own risk management practices. We have evaluated our product's risk as follows:

* The human risk is: Low

* The environmental risk is: Low

Any use inconsistent with our recommendations may affect the risk characterization. Our sales representative will assist you to determine if your product application is consistent with our recommendations. Together we can implement an appropriate risk management process.

This product material safety data sheet provides health and safety information. The product is to be used in applications consistent with our product literature. Individuals handling this product should be informed of the recommended safety precautions and should have access to this information. For any other uses, exposures should be evaluated so that appropriate handling practices and training programs can be established to insure safe workplace operations. Please consult your local sales representative for any further information.

REFERENCES

Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices, American Conference of Governmental Industrial Hygienists, OH., (Ariel Insight™™ CD-ROM Version), Ariel Research Corp., Bethesda, MD.

Hazardous Substances Data Bank, National Library of Medicine, Bethesda, Maryland (TOMES CPS™™ CD-ROM Version), Micromedex, Inc., Englewood, CO.

IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Man, Geneva: World Health Organization, International Agency for Research on Cancer.

Integrated Risk Information System, U.S. Environmental Protection Agency, Washington, D.C. (TOMES CPS™™ CD-ROM Version), Micromedex, Inc., Englewood, CO.

Annual Report on Carcinogens, National Toxicology Program, U.S. Department of Health and Human Services, Public Health Service.

Title 29 Code of Federal Regulations, Part 1910, Subpart Z, Toxic and Hazardous Substances, Occupational Safety and Health Administration (OSHA), (Ariel Insight™™ CD-ROM Version), Ariel Research Corp., Bethesda, MD.

Registry of Toxic Effects of Chemical Substances, National Institute for Occupational Safety and Health, Cincinnati, OH, (TOMES CPS™™ CD-ROM Version), Micromedex, Inc., Englewood, CO.

Ariel Insight™™ (An integrated guide to industrial chemicals covered under major regulatory and advisory programs), North American Module, Western European Module, Chemical Inventories Module and the Generics Module (Ariel Insight™™ CD-ROM Version), Ariel Research Corp., Bethesda, MD.

The Teratogen Information System, University of Washington, Seattle, WA (TOMES CPS™™ CD-ROM Version), Micromedex, Inc., Englewood, CO.

Prepared By : Product Safety Department
Date issued : 10/15/2008
Version Number : 1.7

SAFETY DATA SHEET

PRODUCT

COREXIT (R) EC9500A

EMERGENCY TELEPHONE NUMBER(S)

(800) 424-9300 (24 Hours) CHEMTREC

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME : **COREXIT (R) EC9500A**

APPLICATION : OIL SPILL DISPERSANT

COMPANY IDENTIFICATION : Nalco Company
1601 W. Diehl Road
Naperville, Illinois
60563-1198

EMERGENCY TELEPHONE NUMBER(S) : (800) 424-9300 (24 Hours) CHEMTREC

NFPA 704M/HMIS RATING
HEALTH : 1 / 1 FLAMMABILITY : 1 / 1 INSTABILITY : 0 / 0 OTHER :
0 = Insignificant 1 = Slight 2 = Moderate 3 = High 4 = Extreme

2. COMPOSITION/INFORMATION ON INGREDIENTS

Our hazard evaluation has identified the following chemical substance(s) as hazardous. Consult Section 15 for the nature of the hazard(s).

Hazardous Substance(s)	CAS NO	% (w/w)
Distillates, petroleum, hydrotreated light	64742-47-8	10.0 - 30.0
Propylene Glycol	57-55-6	1.0 - 5.0
Organic sulfonic acid salt	Proprietary	10.0 - 30.0

3. HAZARDS IDENTIFICATION

****EMERGENCY OVERVIEW****

CAUTION
May cause irritation with prolonged contact.
Keep away from heat. Keep away from sources of ignition - No smoking. Keep container tightly closed. Do not get in eyes, on skin, on clothing. Do not take internally. Avoid breathing vapor. Use with adequate ventilation. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. After contact with skin, wash immediately with plenty of soap and water.
Wear suitable protective clothing.
Low Fire Hazard; liquids may burn upon heating to temperatures at or above the flash point. May evolve oxides of carbon (COx) under fire conditions. May evolve oxides of sulfur (SOx) under fire conditions.

PRIMARY ROUTES OF EXPOSURE :
Eye, Skin

HUMAN HEALTH HAZARDS - ACUTE :

EYE CONTACT :
Can cause mild irritation.

SKIN CONTACT :
May cause irritation with prolonged contact.

INGESTION :
Not a likely route of exposure. May cause nausea and vomiting. Can cause chemical pneumonia if aspirated into lungs following ingestion.

INHALATION :
Repeated or prolonged exposure may irritate the respiratory tract.

SYMPTOMS OF EXPOSURE :
Acute :
A review of available data does not identify any symptoms from exposure not previously mentioned.
Chronic :
Frequent or prolonged contact with product may defat and dry the skin, leading to discomfort and dermatitis.

AGGRAVATION OF EXISTING CONDITIONS :
Skin contact may aggravate an existing dermatitis condition.

4. FIRST AID MEASURES

EYE CONTACT :
Flush affected area with water. Get medical attention.

SKIN CONTACT :
Flush affected area with water. If symptoms develop, seek medical advice.

INGESTION :
Do not induce vomiting: contains petroleum distillates and/or aromatic solvents. If conscious, washout mouth and give water to drink. Get medical attention.

INHALATION :
Remove to fresh air, treat symptomatically. Get medical attention.

NOTE TO PHYSICIAN :
Based on the individual reactions of the patient, the physician's judgement should be used to control symptoms and clinical condition.

5. FIRE FIGHTING MEASURES

FLASH POINT : 181.4 °F / 83 °C (PMCC)

This product does not sustain combustion per the method outlined in 49 CFR Appendix H.

LOWER EXPLOSION LIMIT : Not flammable

UPPER EXPLOSION LIMIT : Not flammable

EXTINGUISHING MEDIA :
Alcohol foam, Carbon dioxide, Foam, Dry powder, Other extinguishing agent suitable for Class B fires, For large fires, use water spray or fog, thoroughly drenching the burning material.
Water mist may be used to cool closed containers.

UNSUITABLE EXTINGUISHING MEDIA :
Do not use water unless flooding amounts are available.

FIRE AND EXPLOSION HAZARD :
Low Fire Hazard; liquids may burn upon heating to temperatures at or above the flash point. May evolve oxides of carbon (COx) under fire conditions. May evolve oxides of sulfur (SOx) under fire conditions.

SPECIAL PROTECTIVE EQUIPMENT FOR FIRE FIGHTING :
In case of fire, wear a full face positive-pressure self contained breathing apparatus and protective suit.

6. ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS :
Restrict access to area as appropriate until clean-up operations are complete. Stop or reduce any leaks if it is safe to do so. Ventilate spill area if possible. Do not touch spilled material. Remove sources of ignition. Have emergency equipment (for fires, spills, leaks, etc.) readily available. Use personal protective equipment recommended in Section 8 (Exposure Controls/Personal Protection). Notify appropriate government, occupational health and safety and environmental authorities.

METHODS FOR CLEANING UP :
SMALL SPILLS: Soak up spill with absorbent material. Place residues in a suitable, covered, properly labeled container. Wash affected area. LARGE SPILLS: Contain liquid using absorbent material, by digging trenches or by diking. Reclaim into recovery or salvage drums or tank truck for proper disposal. Clean contaminated surfaces with water or aqueous cleaning agents. Contact an approved waste hauler for disposal of contaminated recovered material. Dispose of material in compliance with regulations indicated in Section 13 (Disposal Considerations).

ENVIRONMENTAL PRECAUTIONS :
Do not contaminate surface water.

7. HANDLING AND STORAGE

HANDLING :
Use with adequate ventilation. Keep the containers closed when not in use. Do not take internally. Do not get in eyes, on skin, on clothing. Have emergency equipment (for fires, spills, leaks, etc.) readily available.

STORAGE CONDITIONS :
Store away from heat and sources of ignition. Store separately from oxidizers. Store the containers tightly closed.

SUITABLE CONSTRUCTION MATERIAL :
Compatibility with Plastic Materials can vary; we therefore recommend that compatibility is tested prior to use., Stainless Steel 304, Stainless Steel 316L, Aluminum, Hastelloy C-276, MDPE (medium density polyethylene), HDPE (high density polyethylene), PVC, Plexiglass, Teflon, Kalrez, Perfluoroelastomer, PTFE, TFE, FEP (encapsulated)

UNSUITABLE CONSTRUCTION MATERIAL :
Mild steel, Carbon steel, Buna-N, Brass, Copper, Natural rubber, Polyethylene, Polypropylene, Ethylene propylene, EPDM, Neoprene, Nitrile, Polyurethane, Viton, Alfax, Hypalon

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

OCCUPATIONAL EXPOSURE LIMITS :
Exposure guidelines have not been established for this product. Available exposure limits for the substance(s) are shown below.

ACGIH/TLV :

Substance(s)	
Oil Mist (Mineral)	TWA: 5 mg/m3
	STEL: 10 mg/m3

OSHA/PEL :

Substance(s)	
Oil Mist (Mineral)	TWA: 5 mg/m3

AIHA/WEEL :

Substance(s)	
Propylene Glycol	TWA: 10 mg/m3

ENGINEERING MEASURES :
General ventilation is recommended.

RESPIRATORY PROTECTION :
Where concentrations in air may exceed the limits given in this section, the use of a half face filter mask or air supplied breathing apparatus is recommended. A suitable filter material depends on the amount and type of chemicals being handled. Consider the use of filter type: Multi-contaminant cartridge. with a Particulate pre-filter. In event of emergency or planned entry into unknown concentrations a positive pressure, full-facepiece SCBA should be used. If respiratory protection is required, institute a complete respiratory protection program including selection, fit testing, training, maintenance and inspection.

HAND PROTECTION :
Nitrile gloves, PVC gloves

SKIN PROTECTION :
Wear standard protective clothing.

EYE PROTECTION :
Wear chemical splash goggles.

HYGIENE RECOMMENDATIONS :
Keep an eye wash fountain available. Keep a safety shower available. If clothing is contaminated, remove clothing and thoroughly wash the affected area. Launder contaminated clothing before reuse.

HUMAN EXPOSURE CHARACTERIZATION :
Based on our recommended product application and personal protective equipment, the potential human exposure is: Low

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE	Liquid
APPEARANCE	Clear Hazy Amber
ODOR	Hydrocarbon

SPECIFIC GRAVITY	0.95 @ 60 °F / 15.6 °C
DENSITY	7.91 lb/gal
SOLUBILITY IN WATER	Miscible
pH (100 %)	6.2
VISCOSITY	177 cst @ 32 °F / 0 °C 70 cst @ 60 °F / 15.6 °C
POUR POINT	< -71 °F / < -57 °C
BOILING POINT	296 °F / 147 °C
VAPOR PRESSURE	15.5 mm Hg @ 100 °F / 37.8 °C

Note: These physical properties are typical values for this product and are subject to change.

10. STABILITY AND REACTIVITY

STABILITY :
Stable under normal conditions.

HAZARDOUS POLYMERIZATION :
Hazardous polymerization will not occur.

CONDITIONS TO AVOID :
Heat and sources of ignition including static discharges.

MATERIALS TO AVOID :
Contact with strong oxidizers (e.g. chlorine, peroxides, chromates, nitric acid, perchlorate, concentrated oxygen, permanganate) may generate heat, fires, explosions and/or toxic vapors.

HAZARDOUS DECOMPOSITION PRODUCTS :
Under fire conditions: Oxides of carbon, Oxides of sulfur

11. TOXICOLOGICAL INFORMATION

No toxicity studies have been conducted on this product.

SENSITIZATION :
This product is not expected to be a sensitizer.

CARCINOGENICITY :
None of the substances in this product are listed as carcinogens by the International Agency for Research on Cancer (IARC), the National Toxicology Program (NTP) or the American Conference of Governmental Industrial Hygienists (ACGIH).

HUMAN HAZARD CHARACTERIZATION :
Based on our hazard characterization, the potential human hazard is: Moderate

12. ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL EFFECTS :

The following results are for the product.

ACUTE INVERTEBRATE RESULTS :

Species	Exposure	LC50	EC50	Test Descriptor
Acartia tonsa	48 hrs	34 mg/l		Product
Artemia	48 hrs	20.7 mg/l		Product

MOBILITY :
The environmental fate was estimated using a level III fugacity model embedded in the EPI (estimation program interface) Suite TM, provided by the US EPA. The model assumes a steady state condition between the total input and output. The level III model does not require equilibrium between the defined media. The information provided is intended to give the user a general estimate of the environmental fate of this product under the defined conditions of the models.
If released into the environment this material is expected to distribute to the air, water and soil/sediment in the approximate respective percentages;

Air	Water	Soil/Sediment
<5%	10 - 30%	50 - 70%

The portion in water is expected to float on the surface.

BIOACCUMULATION POTENTIAL
Component substances have a potential to bioaccumulate.

ENVIRONMENTAL HAZARD AND EXPOSURE CHARACTERIZATION
Based on our hazard characterization, the potential environmental hazard is: Low
Based on our recommended product application and the product's characteristics, the potential environmental exposure is: Low

If released into the environment, see CERCLA/SUPERFUND in Section 15.

13. DISPOSAL CONSIDERATIONS

If this product becomes a waste, it could meet the criteria of a hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA) 40 CFR 261. Before disposal, it should be determined if the waste meets the criteria of a hazardous waste.

Hazardous Waste: D018

Hazardous wastes must be transported by a licensed hazardous waste transporter and disposed of or treated in a properly licensed hazardous waste treatment, storage, disposal or recycling facility. Consult local, state, and federal regulations for specific requirements.

14. TRANSPORT INFORMATION

The information in this section is for reference only and should not take the place of a shipping paper (bill of lading) specific to an order. Please note that the proper Shipping Name / Hazard Class may vary by packaging, properties, and mode of transportation. Typical Proper Shipping Names for this product are as follows.

LAND TRANSPORT :

Proper Shipping Name : PRODUCT IS NOT REGULATED DURING TRANSPORTATION

AIR TRANSPORT (ICAO/IATA) :

Proper Shipping Name : PRODUCT IS NOT REGULATED DURING TRANSPORTATION

MARINE TRANSPORT (IMDG/IMO) :

Proper Shipping Name : PRODUCT IS NOT REGULATED DURING TRANSPORTATION

15. REGULATORY INFORMATION

This section contains additional information that may have relevance to regulatory compliance. The information in this section is for reference only. It is not exhaustive, and should not be relied upon to take the place of an individualized compliance or hazard assessment. Nalco accepts no liability for the use of this information.

NATIONAL REGULATIONS, USA :

OSHA HAZARD COMMUNICATION RULE, 29 CFR 1910.1200 :
Based on our hazard evaluation, the following substance(s) in this product is/are hazardous and the reason(s) is/are shown below.

Distillates, petroleum, hydrotreated light : Irritant
Propylene Glycol : Exposure Limit
Organic sulfonic acid salt : Irritant

CERCLA/SUPERFUND, 40 CFR 117, 302 :
Notification of spills of this product is not required.

SARA/SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 (TITLE III) - SECTIONS 302, 311, 312, AND 313 :

SECTION 302 - EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355) :
This product does not contain substances listed in Appendix A and B as an Extremely Hazardous Substance.

SECTIONS 311 AND 312 - MATERIAL SAFETY DATA SHEET REQUIREMENTS (40 CFR 370) :
Our hazard evaluation has found this product to be hazardous. The product should be reported under the following indicated EPA hazard categories:

X	Immediate (Acute) Health Hazard
-	Delayed (Chronic) Health Hazard
-	Fire Hazard
-	Sudden Release of Pressure Hazard
-	Reactive Hazard

Under SARA 311 and 312, the EPA has established threshold quantities for the reporting of hazardous chemicals. The current thresholds are: 500 pounds or the threshold planning quantity (TPQ), whichever is lower, for extremely hazardous substances and 10,000 pounds for all other hazardous chemicals.

SECTION 313 - LIST OF TOXIC CHEMICALS (40 CFR 372) :
This product does not contain substances on the List of Toxic Chemicals.

TOXIC SUBSTANCES CONTROL ACT (TSCA) :
The substances in this preparation are included on or exempted from the TSCA 8(b) Inventory (40 CFR 710)

FEDERAL WATER POLLUTION CONTROL ACT, CLEAN WATER ACT, 40 CFR 401.15 / formerly Sec. 307, 40 CFR 116.4 / formerly Sec. 311 :
None of the substances are specifically listed in the regulation.

CLEAN AIR ACT, Sec. 112 (40 CFR 61, Hazardous Air Pollutants), Sec. 602 (40 CFR 82, Class I and II Ozone Depleting Substances) :
None of the substances are specifically listed in the regulation.

CALIFORNIA PROPOSITION 65 :
This product does not contain substances which require warning under California Proposition 65.

MICHIGAN CRITICAL MATERIALS :
None of the substances are specifically listed in the regulation.

STATE RIGHT TO KNOW LAWS :
The following substances are disclosed for compliance with State Right to Know Laws:

Propylene Glycol	57-55-6

NATIONAL REGULATIONS, CANADA :

WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM (WHMIS) :
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.

A claim has been submitted to the Hazardous Materials Information Review Commission (HMIRC) for exemption from disclosure of a substance.

HMIRC Registry Number : 6639
Filed : 06/01/2006

WHMIS CLASSIFICATION :
B3 - Combustible Liquids

CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) :
The substance(s) in this preparation are included in or exempted from the Domestic Substance List (DSL).

AUSTRALIA
All substances in this product comply with the National Industrial Chemicals Notification & Assessment Scheme (NICNAS).

CHINA
All substances in this product comply with the Chemical Control Law and are listed on the Inventory of Existing Chemical Substances China (IECSC).

EUROPE
The substance(s) in this preparation are included in or exempted from the EINECS or ELINCS inventories

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All substances in this product comply with the Law Regulating the Manufacture and Importation Of Chemical Substances and are listed on the Ministry of International Trade & industry List (MITI).

KOREA
All substances in this product comply with the Toxic Chemical Control Law (TCCL) and are listed on the Existing Chemicals List (ECL)

PHILIPPINES
All substances in this product comply with the Republic Act 6969 (RA 6969) and are listed on the Philippines Inventory of Chemicals & Chemical Substances (PICCS).

16. OTHER INFORMATION

Due to our commitment to Product Stewardship, we have evaluated the human and environmental hazards and exposures of this product. Based on our recommended use of this product, we have characterized the product's general risk. This information should provide assistance for your own risk management practices. We have evaluated our product's risk as follows:

* The human risk is: Low

* The environmental risk is: Low

Any use inconsistent with our recommendations may affect the risk characterization. Our sales representative will assist you to determine if your product application is consistent with our recommendations. Together we can implement an appropriate risk management process.

This product material safety data sheet provides health and safety information. The product is to be used in applications consistent with our product literature. Individuals handling this product should be informed of the recommended safety precautions and should have access to this information. For any other uses, exposures should be evaluated so that appropriate handling practices and training programs can be established to insure safe workplace operations. Please consult your local sales representative for any further information.

REFERENCES

Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices, American Conference of Governmental Industrial Hygienists, OH., (Ariel Insight™™ CD-ROM Version), Ariel Research Corp., Bethesda, MD.

Hazardous Substances Data Bank, National Library of Medicine, Bethesda, Maryland (TOMES CPS™™ CD-ROM Version), Micromedex, Inc., Englewood, CO.

IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Man, Geneva: World Health Organization, International Agency for Research on Cancer.

Integrated Risk Information System, U.S. Environmental Protection Agency, Washington, D.C. (TOMES CPS™™ CD-ROM Version), Micromedex, Inc., Englewood, CO.

Annual Report on Carcinogens, National Toxicology Program, U.S. Department of Health and Human Services, Public Health Service.

Title 29 Code of Federal Regulations, Part 1910, Subpart Z, Toxic and Hazardous Substances, Occupational Safety and Health Administration (OSHA), (Ariel Insight™™ CD-ROM Version), Ariel Research Corp., Bethesda, MD.

Registry of Toxic Effects of Chemical Substances, National Institute for Occupational Safety and Health, Cincinnati, OH, (TOMES CPS™™ CD-ROM Version), Micromedex, Inc., Englewood, CO.

Ariel Insight™™ (An integrated guide to industrial chemicals covered under major regulatory and advisory programs), North American Module, Western European Module, Chemical Inventories Module and the Generics Module (Ariel Insight™™ CD-ROM Version), Ariel Research Corp., Bethesda, MD.

The Teratogen Information System, University of Washington, Seattle, WA (TOMES CPS™™ CD-ROM Version), Micromedex, Inc., Englewood, CO.

Prepared By : Product Safety Department
Date issued : 10/22/2008
Version Number : 1.13

Appendix 6A

Composition of Crude Oil and Refined Products

Crude oils can vary greatly in composition, viscosity, density, and flammability. They can be found in a continuum ranging from highly flammable, light liquids (similar to gas condensate), to highly viscous and heavy tar-like materials. Organic compounds range from methane to extremely heavy hydrocarbon molecules with up to 80 carbon atoms. The chemical composition of crude varies between regions and even within the same geologic formation.

No two batches of crude oil are chemically identical. Crude oil is categorized based on the molecular weight distribution of their constituents, and distinctions are made between light, medium, and heavy crude oil. The EPC pipeline carried at least 22 types of crude oil during its operation between 1950 and 1995. In Table 6A-1, crude oil parameters were averaged for these 22 types based on Exxon crude oil assay sheets. No data are available on the amount of crude oils shipped, so this is not a weighted average. From the data, it appears the EPC pipeline carried mostly medium and heavy crude oil. A study done by the National Research Council in 1985 titled, *Oil in the Sea, National Academy Press* cited in Jones and Neuse (1995), was used to develop a summary compositional analysis of crude oil. This typical crude oil composition is provided in Table 6A-2.

Crude oil is composed of varying fractions of different boiling point ranges of hydrocarbon mixtures. The major fractions are defined as:

- Light ends;
- Light naphtha;
- Medium naphtha;
- Heavy naphtha;
- Kerosene;
- Light gas oil;
- PGO; and
- Residual oil.

The most flammable components are in the light ends through medium naphtha fractions, which together form a mixture somewhat similar in properties to gasoline. The heavy naphtha through residual fractions reflect properties typically perceived as those associated with oils.

The aromatic components of the crude oil, found primarily within medium to heavy naphtha fractions and gas oil fractions, include benzene, a known human carcinogen. Other aromatic compounds include toluene, ethylbenzene, and xylene. These aromatic compounds have relatively high solubilities in water, compared with other hydrocarbons.

Refined products, to be carried by the Longhorn pipeline, include various gasoline grades, diesel fuel, and jet fuel. As with crude oil, gasoline is also a complex mixture of hydrocarbons. Gasoline contains more lower molecular weight hydrocarbons than crude oil, and higher fractions of both light hydrocarbons and aromatics. The hazard level of these materials must be considered on two levels: 1) their impact should they contaminate surface water or ground water, and 2) their potential to ignite and explode. To adequately model worst-case scenarios, a product most likely to rank high on both scales was selected. To accurately represent the worst-case gasoline composition that could be transported through the Longhorn pipeline, the survey composition was modified to reflect a gasoline composition containing MTBE (methyl tertiary-butyl ether).

From the point of view of toxicity and environmental impact, benzene and MTBE have greater concern. Benzene is the primary known carcinogen in gasoline. It is one of the most water-soluble hydrocarbons at 1,700 milligrams per liter (mg/L). There are also a number of hydrocarbons closely related to benzene, that have relatively high solubilities. As a result of the relatively high solubility of mono- and dialkylbenzenes, benzene-toluene-ethylbenzene-xylene (BTEX) tends to dominate the dissolved hydrocarbons in water. BTEX is readily oxidized microbiologically, provided other microbial nutrients are sufficiently available. This natural attenuation of BTEX typically constrains the extent of plume spread in contaminated water and soils, as biodegradation destroys the BTEX at the edge of the plume.

MTBE is a suspected carcinogen by some. MTBE is very mobile and has a low odor and taste threshold. This makes contaminated drinking water unpalatable at concentrations as low as 20 micrograms per liter. MTBE's mobility is due to three factors: solubility, diffusivity, and lack of biodegradability. Up to 4.8 percent MTBE dissolves in water, it adsorbs very poorly to soil, and very little biodegradation has been observed in natural conditions. As a result, MTBE usually migrates substantially ahead of a hydrocarbon plume.

In summary, MTBE and benzene are the prime water contaminants of concern for fuel hydrocarbon spills. Gasolines are the lightest, most volatile, and flammable of the products that could be carried by the Longhorn pipeline. Gasolines are the only products with the potential to contain MTBE. They also have the highest benzene content. For these reasons, gasoline was identified as the worst-case product to be carried by the pipeline.

The model gasoline composition for this study is provided in Table 6A-3. An existing gasoline composition (without MTBE) survey was reviewed (LUFT, 1988) and it was concluded that the hydrocarbon composition in this survey adequately represents the typical flammability range of gasolines. To accurately represent the worst-case gasoline that could be transported through the Longhorn pipeline, the survey composition was modified to reflect a gasoline composition containing MTBE.

First, the benzene concentration was adjusted. The Longhorn pipeline specifies a maximum benzene content of 4.9 percent by weight in the products carried. To properly represent a worst-case relative to benzene concentration, the LUFT survey average benzene concentration of 1.8 percent (wt) was replaced with the Longhorn pipeline product specification of 4.9 percent.

Gasoline blends may contain up to 15 percent MTBE, so this percentage was added as the worst-case. After making these two changes, the fractions of the other components were adjusted so that the total would still equal 100 percent.

Table 6A-1. Composition of Crude Oil Carried by EPC Pipeline

Exxon PL/Longhorn	Historical Crude Assays												
Crude Type:	**Conroe**	**Gulf Coast Mix**	**Salt Flat**	**Salt Flat Mix 1**	**Salt Flat Mix 2**	**Salt Flat Mix 3**	**W Coast Hvy**	**W. Coast Sour**	**W Texas Intermed. 1**	**W Texas Intermed. 2**	**W Texas Intermed. Crane**	**W Texas Intermed. 3**	**W Texas Intermed. Monah.**
API Gravity	37.4	40.3	37.0	34.2	32.6	35.5	23.2	29.0	38.0	40.5	40.9	40.3	37.2
Sulfur, wt%	0.07	0.08	0.58	0.80	1.27	0.78	1.02	0.80	0.35	0.34	0.34	0.41	0.43
H_2S, ppm						60		2	1				
Light ends, Vol%													
C2 – hydrocarbons	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.00	0.04	0.05	0.05
C3- hydrocarbons	0.22	0.11	0.17	0.04	0.18	0.09	0.01	0.15	0.72	0.40	0.81	0.40	0.55
IC4 (isobutane)	0.19	0.26	0.18	0.06	0.13	0.09	0.07	0.17	0.41	0.40	0.39	0.23	0.25
NC4 (Normal butane)	0.47	1.51	0.36	0.15	0.56	0.21	0.51	0.96	2.38	1.91	1.88	1.00	1.48
IC5 (Isopentane)	0.43	1.44	0.54	0.24	0.61	0.25	1.13	1.57	1.24	1.27	1.09	0.81	0.90
NC5 (Normal Pentane)	0.48	1.83	0.50	0.25	0.81	0.32	1.29	1.79	1.94	1.95	1.89	1.52	1.61
Sum C2-C5	1.8	5.2	1.8	0.7	2.3	1.0	3.0	4.6	6.8	5.9	6.1	4.0	4.8
Light Naphthene (bp<175F)													
Volume %	4.38	8.52	3.67	2.25	4.64	2.77	5.90	8.24	7.65	9.04	8.92	7.59	7.31
Reid Vapor Pressure (psia)		10.1	8.9	7.9	9.3	8.1	10.6	10.7	10.6	9.8	9.8	9.1	9.7
Medium Naphtha (175<bp<250F)													
Volume %	9.11	10.09	6.77	4.5	5.97	5.44	5.05	6.78	8.21	10.63	11.77	11.57	8.03
Aromatics Vol.%	19.2	12.5	4.8	4.5	8.3	7.5	5.8	8.1	3.8	5.4	10.8	5.6	4.2
Naphthene Vol.%	50.3	45.3	35.9	30.4	33.9	30.5	47.7	39.6	41.5	52.2	43.0	39.9	45.7
Paraffins Vol.%													
Sum	69.5	57.8	40.7	34.9	42.2	38	53.5	47.7	45.3	57.6	53.8	45.5	49.9
Heavy Naphtha (250<bp<375F)													
Volume %	18.2	16.7	16.2	12.9	12.1	15.43	8.67	12.2	13.5	16.2	16.71	17.89	13.23
Aromatic Vol.%	35.7	19.9	11.0	10.9	11.1	11.4	13.4	15.8	8.2	12.0	16.7	11.0	8.7
Naphthenes Vol.%	31.0	38.1	38.2	33.6	33.6	35.2	52.4	39.7	43.3	43.3	39.1	36.6	45.5
Paraffins Vol.%													
Sum	66.7	58.0	49.2	44.5	44.7	46.6	65.8	55.5	51.5	55.3	55.8	47.6	54.2
Kerosene (375<bp<650F)													
Volume %	28.68	19.63	19.84	20.07	16.95	20.19	12.02	15.31	15.62	16.88	17.26	17.38	15.23
Light Gasoil (530<bp<650F)													
Volume %	18.19	13.56	13.43	16.68	12.34	14.88	11.37	11.88	11.18	11.30	11.72	11.90	11.57
PGO (650<bp<1049F)													
Volume %	19.17	23.50	30.80	31.08	30.50	33.50	31.84	26.40	29.90	24.30	23.90	24.20	32.30
Aromatics Vol.%	8.4	8.4	8.5	7.6	10.5	9.5	17.1	16.4	10.2	8.4	11.0	11.4	10.4
Naphthene Vol.%	30.5	28.2	28.2	31.5	31.9	29.8	52.1	49.2	32.5	30.1	31.2	32.2	32.1
Residual Oil (bp>1049F)													
Volume %	1.40	6.10	8.60	12.24	16.60	7.40	24.56	17.89	10.40	9.00	6.60	7.80	10.00
Sum Volume %	100.9	103.3	101.0	100.5	101.4	100.6	102.4	103.4	103.2	103.2	103.0	102.3	102.5

Table 6A-1. (Continued)

Exxon PL/Longhorn												
Crude Type:	**W Texas Sour Kemper**	**W Texas Sour 2**	**W Texas Sour 1**	**Yates**	**Yates Mix**	**Prudhoe 1**	**Prudhoe 2**	**Prudhoe 3**	**Point Arguello**	**Average**	**Fractions Vol.%, approx. Cn**	
API Gravity	32.6	31.8	32.1	28.9	29.4	27.1	27.5	24.9	19.0	32.7		
Sulfur, wt%	1.92	2.05	1.73	1.59	1.49	1.02	0.97	1.06	4.30	1.1		
H_2S, ppm				118	189				74.0			
Light ends, Vol%												
C2 – hydrocarbons	0.08	0.02	0.00	0.00	0.00	0.05	0.09	0.01	0.10	0.03		
C3 – hydrocarbons	0.52	0.5	0.73	0.06	0.16	0.38	0.66	0.10	0.69	0.35		
IC4 (Isobutane)	0.45	0.25	0.38	0.15	0.22	0.05	0.09	0.01	0.10	0.21		
NC4 (Normal butane)	1.35	0.86	0.94	0.42	0.54	0.30	0.43	0.08	0.45	0.85		
IC5 (Isopentane)	1.12	0.97	0.98	0.91	0.89	0.55	0.63	0.12	0.67	0.83		
NC5 (Normal pentane)	1.16	1.09	0.93	0.20	0.30	0.63	0.67	0.18	0.71	1.00		
Sum C2-C5	4.7	3.7	4.0	1.7	2.1	2.0	2.6	0.5	2.7	3.27	3.21	Light ends
Light Naphtha (bp<175F)												(C2-C5)
Volume %	6.91	6.33	6.74	3.66	3.54	3.87	4.00	1.54	3.91	5.52		
Reid Vapor Presence (psia)	9.8	9.6	9.3	9.6	10.1	9.2	9.5	7.6	9.9	9.5		
Medium Naphtha (175<bp<250F)												
Volume %	6.99	7.45	7.01	5.09	5.62	5.51	5.31	3.55	4.51	7.04		
Aromatic Vol.%	11.0	11.6	6.5	3	0.4	14.5	15.9	15.8	6.7	8.5		
Naphthnens Vol.%	40.4	34.3	49.8	42.3	44.5	25	24.2	33.2	29.9	39.07		
Paraffins Vol.%						60.4	59.9	51.0	63.4	58.7		
Sum	51.4	45.9	56.3	45.3	44.9	99.9	100.0	100.0	100.0	58.19		
Heavy Naphtha (250<bp<375F)												
Volume %	12.70	13.39	12.90	12.85	12.52	10.49	9.75	8.52	8.63	13.26	25.35	Naphta
Aromatics Vol.%	18.0	18.2	16.1	10.0	7.8	21.3	21.1	22.5	16.7	15.3		(C6-C10)
Naphthenes Vol.%	43.5	38.2	47.2	52.3	55.9	36.5	35.2	34.5	40.0	40.6		
Paraffins Vol.%						42.2	43.8	43.0	43.3	43.1		
Sum	61.5	56.4	63.3	62.3	63.7	100.0	100.1	100.0	100.0	63.8		
Kerosene (375<bp<650F)												
Volume %	16.00	15.89	15.80	16.85	16.65	16.23	16.17	16.20	11.46	17.11	16.80	Kerosene
Light Gasoil (530<bp<650F)												(C10-C12)
Volume %		11.90	12.09	12.21	13.14	12.75	12.00	14.19	8.9	12.69	12.46	LtGO
PGO (650<bp<1049F)												(C12-C20)
Volume %	31.80	29.40	31.10	30.67	33.30	30.28	32.72	37.60	24.21	29.20	28.68	PGO
Aromatics Vol.%	14.7	11.9	13.6	12.8	14.6	15.2	11.7	14.0	16.3	11.9		(C20-C40)
Naphthenes Vol.%	38.4	39.5	41.7	40.9	41.3	42.3	42.0	47.2	36.9			
Residual Oil (bp>1049F)												
Volume %	11.20	14.00	12.40	18.04	14.30	20.05	18.76	18.18	37.04	13.75	13.50	Resid
												(>C40)
Sum Volume %	102.3	102.1	102.0	101.1	101.2	101.1	101.3	100.3	101.4	101.8	100.00	

Table 6A-2. Representative Characteristics of Crude Oil Carried by the EPC Pipeline

Based on Historical Crude Assays					
				Fractions	
	High	Low	Average	Vol.%	Name & Approx.
General					
API Gravity	40.9	19.0	32.7		C-range
Sulfur, wt%	4.3	0.1	1.1		
H2S, ppm [1]	189.0	1.0	74.0		
Light ends, Vol%					
C2 – hydrocarbons	0.10	0.00	0.03		
C3 – hydrocarbons	0.81	0.01	0.35		
iC4 (Isobutane)	0.45	0.01	0.21		
nC4 (Normal butane)	2.38	0.08	0.85		
iC5 (Isopentane)	1.57	0.12	0.83		
nC5 (Normal pentane)	1.95	0.18	1.00		
Sum C2-C5	6.75	0.50	3.27	3.21	Light ends
Light Naphtha (bp<175F)					(C2-C5)
Volume %	9.0	1.5	5.5		
Reid Vapor Pressure (psia)	10.7	7.6	9.5		
Medium Naphtha (175<bp<250F)					
Volume %	11.8	3.6	7.0		
Aromatics Vol.%	19.2	0.4	8.5		
Naphthenes Vol.%	52.2	24.2	39.1		
Paraffins Vol.% [1]	63.4	51.0	58.7		
Heavy Naphtha (250<bp<375F)					
Volume %	18.2	8.5	13.3	25.35	Naphta
Aromatics Vol.%	35.7	7.8	15.3		(C6-C10)
Naphthenes Vol.%	55.9	31.0	40.6		
Paraffins Vol.% [1]	43.8	42.2	43.1		
Kerosene (375<bp<650F)					
Volume %	28.7	11.5	17.1	16.80	Kerosene
Light Gasoil (530<bp<650F)					(C10-C12)
Volume %	18.2	8.9	12.7	12.46	LtGO
PGO (650<bp<1049F)					(C12-C20)
Volume %	37.6	19.2	29.2	28.68	PGO
Aromatics Vol.%	17.1	7.6	11.9		(C20-C40)
Naphthenes Vol.%	52.1	28.2	36.9		
Residual Oil (bp>1049F)					
Volume %	37.0	1.4	13.8	13.50	Resid
					(>C40)

[1] Not available for most crudes carried.

Table 6A-3. Model Gasoline Composition [1]

Carbon Number	Compound	Mass %	Properties: Solubility (mg/L)	Vapor Pressure (atm)	Henry's Law Coefficient
Straight-chain Alkanes					
4	C4 (Butanes)	3.67	61.4	2.4	38.7
5	C5 (Pentanes)	7.08	38.5	0.675	51.7
6	C6 (Hexanes)	1.59	9.5	0.199	73.9
7	C7 (Heptanes)	0.96	2.93	0.0603	84.3
8	C8 (Octanes)	0.76	0.66	0.0178	126
	Subtotal	**14.07**			
Branched Alkanes					
6	2,3-Dimethyl butanes	0.91	19.1	31.6	58.3
5	Isopentanes	6.90	13.8	0.904	193
6	2-Methyl pentanes	2.87	13.8	0.278	71.1
6	3- Methyl Pentanes	2.04	12.8	0.25	68.7
7	2,4-Dimethyl Pentanes	0.82	4.06	0.129	130
7	2,3-Dimethyl Pentanes	1.91	5.25	0.0906	70.7
8	2,2,4-Trimethyl Pentanes	2.08	2.44	0.0647	124
8	2,3,3-Trimethyl pentanes	0.99			
8	2,3,4-Trimethyl Pentanes	1.24	2	0.0355	83
7	2-Methyl hexanes	0.78	2.54	0.0867	140
7	3-Methyl hexanes	0.88	3.3	0.081	101
9	2,2,5-Trimethyl hexanes	2.58	1.15	0.0218	99.5
9	2,3,5-Trimethyl hexanes	0.48			
8	2-Methyl heptanes	0.65	0.85	0.0257	141
8	3-Methyl heptanes	0.92	0.792	0.0258	152
10	2,2,4-Trimethyl heptanes	0.77			
	Subtotal	**26.83**			
Branched Alkenes					
6	2-Methyl-2-butene	0.95			
	Subtotal	**0.95**			
Alkyl Benzenes					
6	Benzene	4.90	1,780	0.125	0.225
7	Toluene	10.43	515	0.0375	0.274
8	otho-xylene	1.37	220	0.0115	0.228
8	meta-xylene	1.50	160	0.0109	0.295
8	para-xylene	2.40	215	0.0115	0.233
8	Ethylbenzene	0.99	152	0.0125	0.358
9	1-Methyl-4-Ethylbenzene	0.50	95	0.0039	0.202
9	1-Methyl-3-Ethylbenzene	1.35		0.00386	
9	1,2,4-Trimethylbenzene	1.68	57	0.00266	0.23
	Subtotal	**26.18**			

Table 6A-3. (Continued)

Carbon Number	Compound	Mass %	Properties		
			Solubility (mg/L)	Vapor Pressure (atm)	Henry's Law Coefficient
	Benzo(a)pyrene	1.27E-04	3.80E-03	2.10E-10	1.86E-05
	Subtotal	1.27E-04			
	MTBE	15.00	48,000	0.309	
	Other	16.97			
	Total	100.00			

[1] 15 percent MTBE, 4.9 percent Benzene, according to Longhorn product specs (RAD 05138-05155)

Source: LUFT 1988

ATSDR
AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

BENZENE

CAS # 71-43-2

Division of Toxicology and Environmental Medicine ToxFAQs™ August 2007

This fact sheet answers the most frequently asked health questions (FAQs) about benzene. For more information, call the ATSDR Information Center at 1-800-232-4636. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It is important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Benzene is a widely used chemical formed from both natural processes and human activities. Breathing benzene can cause drowsiness, dizziness, and unconsciousness; long-term benzene exposure causes effects on the bone marrow and can cause anemia and leukemia. Benzene has been found in at least 1,000 of the 1,684 National Priority List sites identified by the Environmental Protection Agency (EPA).

What is benzene?

Benzene is a colorless liquid with a sweet odor. It evaporates into the air very quickly and dissolves slightly in water. It is highly flammable and is formed from both natural processes and human activities.

Benzene is widely used in the United States; it ranks in the top 20 chemicals for production volume. Some industries use benzene to make other chemicals which are used to make plastics, resins, and nylon and other synthetic fibers. Benzene is also used to make some types of rubbers, lubricants, dyes, detergents, drugs, and pesticides. Natural sources of benzene include emissions from volcanoes and forest fires. Benzene is also a natural part of crude oil, gasoline, and cigarette smoke.

What happens to benzene when it enters the environment?

❏ Industrial processes are the main source of benzene in the environment.
❏ Benzene can pass into the air from water and soil.
❏ It reacts with other chemicals in the air and breaks down within a few days.
❏ Benzene in the air can attach to rain or snow and be carried back down to the ground.
❏ It breaks down more slowly in water and soil, and can pass through the soil into underground water.
❏ Benzene does not build up in plants or animals.

How might I be exposed to benzene?

❏ Outdoor air contains low levels of benzene from tobacco smoke, automobile service stations, exhaust from motor vehicles, and industrial emissions.
❏ Vapors (or gases) from products that contain benzene, such as glues, paints, furniture wax, and detergents, can also be a source of exposure.
❏ Air around hazardous waste sites or gas stations will contain higher levels of benzene.
❏ Working in industries that make or use benzene.

How can benzene affect my health?

Breathing very high levels of benzene can result in death, while high levels can cause drowsiness, dizziness, rapid heart rate, headaches, tremors, confusion, and unconsciousness. Eating or drinking foods containing high levels of benzene can cause vomiting, irritation of the stomach, dizziness, sleepiness, convulsions, rapid heart rate, and death.

The major effect of benzene from long-term exposure is on the blood. Benzene causes harmful effects on the bone

marrow and can cause a decrease in red blood cells leading to anemia. It can also cause excessive bleeding and can affect the immune system, increasing the chance for infection.

Some women who breathed high levels of benzene for many months had irregular menstrual periods and a decrease in the size of their ovaries, but we do not know for certain that benzene caused the effects. It is not known whether benzene will affect fertility in men.

How likely is benzene to cause cancer?

Long-term exposure to high levels of benzene in the air can cause leukemia, particularly acute myelogenous leukemia, often referred to as AML. This is a cancer of the blood-forming organs. The Department of Health and Human Services (DHHS) has determined that benzene is a known carcinogen. The International Agency for Research on Cancer (IARC) and the EPA have determined that benzene is carcinogenic to humans.

How can benzene affect children?

Children can be affected by benzene exposure in the same ways as adults. It is not known if children are more susceptible to benzene poisoning than adults.

Benzene can pass from the mother's blood to a fetus. Animal studies have shown low birth weights, delayed bone formation, and bone marrow damage when pregnant animals breathed benzene.

How can families reduce the risks of exposure to benzene?

Benzene exposure can be reduced by limiting contact with gasoline and cigarette smoke. Families are encouraged not to smoke in their house, in enclosed environments, or near their children.

Is there a medical test to determine whether I've been exposed to benzene?

Several tests can show if you have been exposed to benzene. There is a test for measuring benzene in the breath; this test must be done shortly after exposure. Benzene can also be measured in the blood; however, since benzene disappears rapidly from the blood, this test is only useful for recent exposures.

In the body, benzene is converted to products called metabolites. Certain metabolites can be measured in the urine. The metabolite S-phenylmercapturic acid in urine is a sensitive indicator of benzene exposure. However, this test must be done shortly after exposure and is not a reliable indicator of how much benzene you have been exposed to, since the metabolites may be present in urine from other sources.

Has the federal government made recommendations to protect human health?

The EPA has set the maximum permissible level of benzene in drinking water at 5 parts benzene per billion parts of water (5 ppb).

The Occupational Safety and Health Administration (OSHA) has set limits of 1 part benzene per million parts of workplace air (1 ppm) for 8 hour shifts and 40 hour work weeks.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 2007. Toxicological Profile for Benzene (Update). Atlanta, GA: U.S. Department of Public Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology and Environmental Medicine, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-800-232-4636, FAX: 770-488-4178. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html. ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

Attachment D

Hospital Maps

MAPQUEST.

Trip to 26851 Highway 23

Port Sulphur, LA 70083-2509
29.78 miles - about 43 minutes

Notes

Plaquemines Medical Center
26851 Highway 23, Port Sulphur, LA -
(504) 564-3346

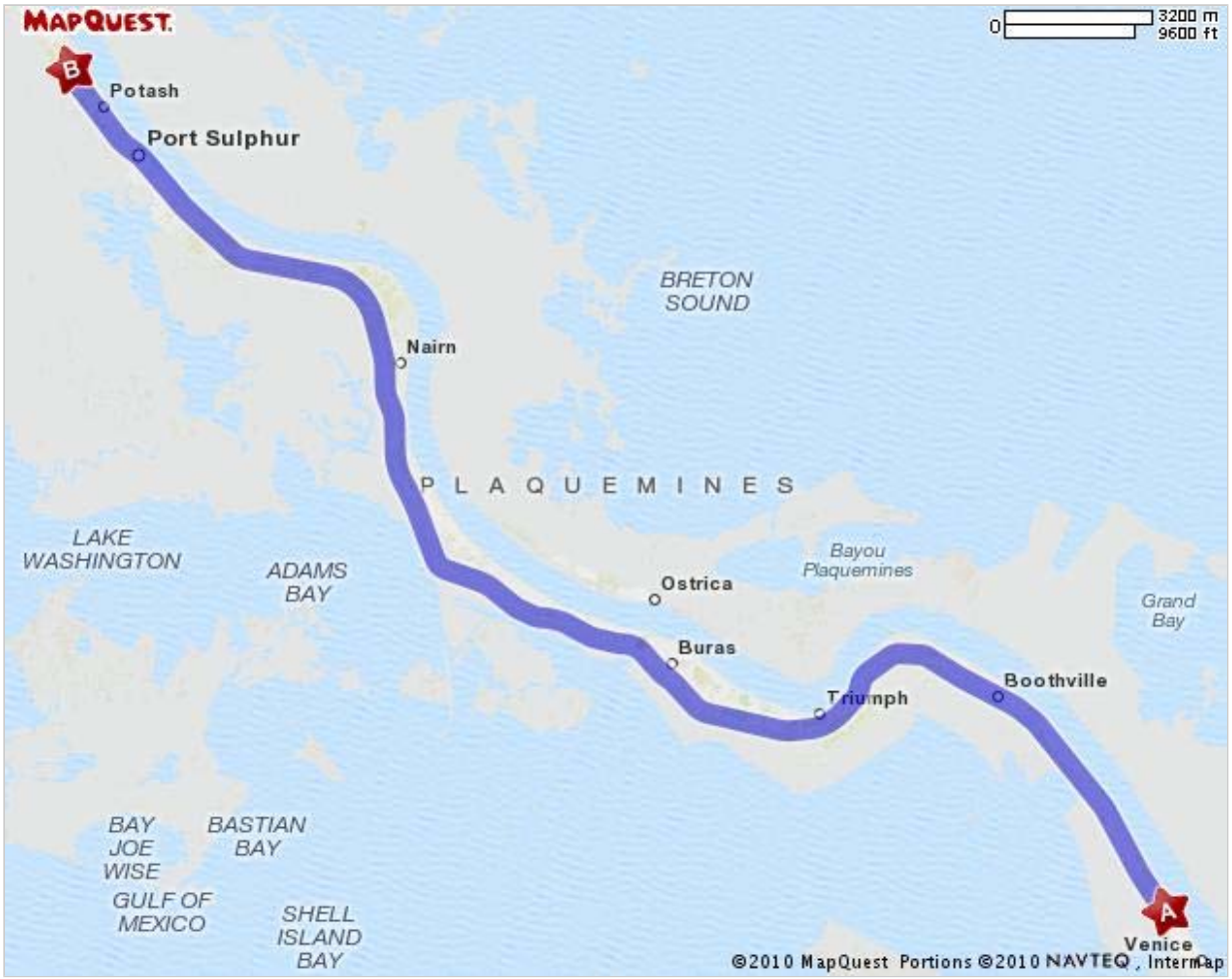
42256 Highway 23, Venice, LA 70091-4104

START	1. Start out going **SOUTH** on **LA-23 S** toward **MARATHON LN**.	go 0.1 mi
NORTH 23	2. Make a **U-TURN** at **MARATHON LN** onto **LA-23 N**.	go 29.6 mi
END	3. **26851 HIGHWAY 23**.	go 0.0 mi

26851 Highway 23, Port Sulphur, LA 70083-2509

Total Travel Estimate : 29.78 miles - about 43 minutes

Route Map Hide



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MAPQUEST.

Trip to 1415 Tulane Ave

New Orleans, LA 70112-2600
13.39 miles - about 27 minutes

Notes

Tulane Medical Center
1415 Tulane Avenue, New Orleans, LA -
(504) 988-5800

5680 E Judge Perez Dr, Violet, LA 70092-2938

START	1. Start out going **SOUTHEAST** on **E JUDGE PEREZ DR / LA-39 S** toward **LICCIARDI DR**.	go 0.2 mi
NORTH 39	2. Make a **U-TURN** at **OAK DR** onto **LA-39 N**.	go 9.6 mi
	3. Turn **LEFT** onto **POLAND AVE**.	go 0.4 mi
	4. Turn **RIGHT** onto **ST CLAUDE AVE / LA-46 W**. Continue to follow **ST CLAUDE AVE**.	go 1.8 mi

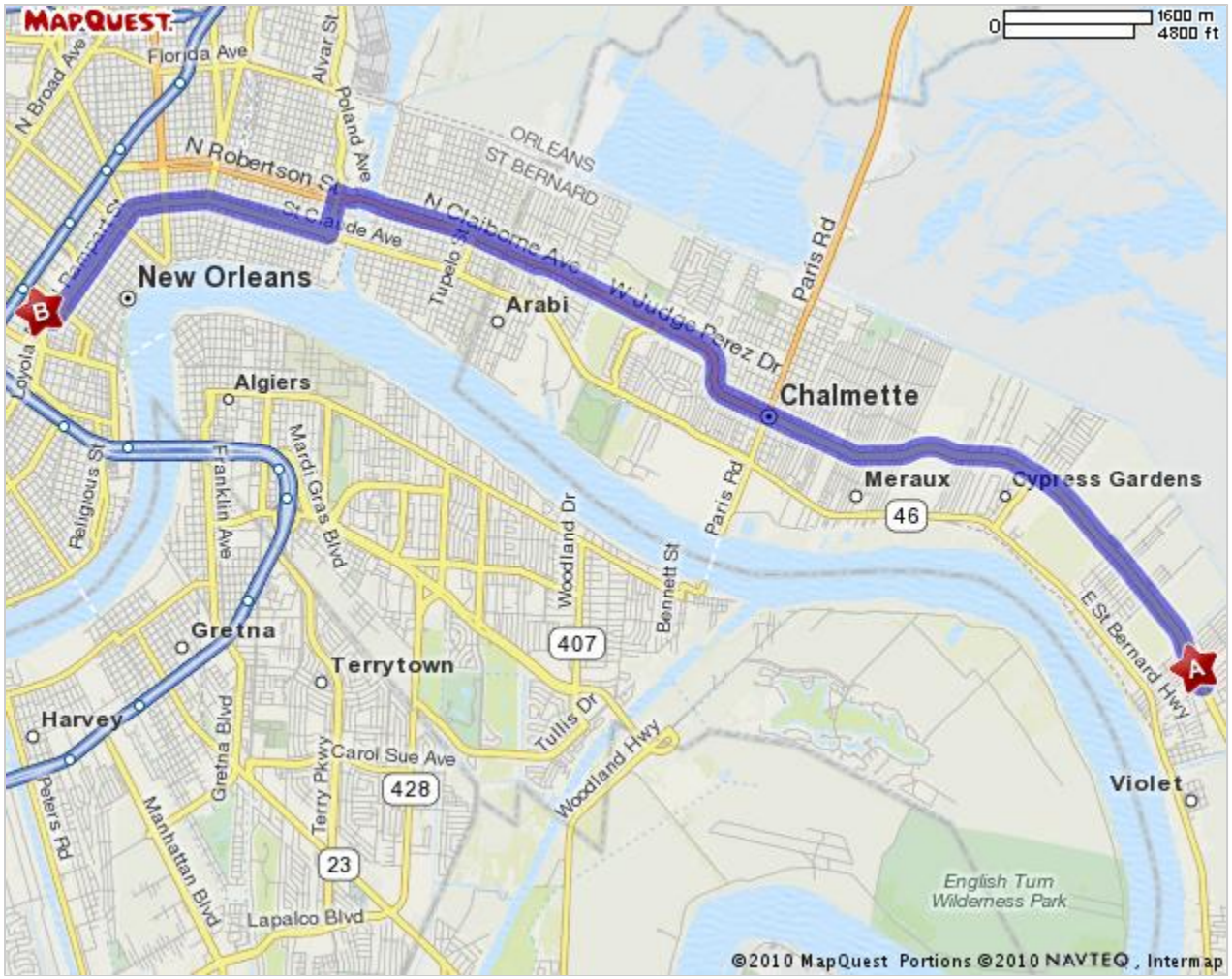
	5. Turn **SLIGHT LEFT** onto **MCSHANE PL**.	go 0.1 mi
	6. **MCSHANE PL** becomes **N RAMPART ST**.	go 1.1 mi
	7. Turn **RIGHT** onto **COMMON ST / TULANE AVE**. Continue to follow **TULANE AVE**.	go 0.2 mi
END	8. **1415 TULANE AVE** is on the **RIGHT**.	go 0.0 mi

B

1415 Tulane Ave, New Orleans, LA 70112-2600

Total Travel Estimate : 13.39 miles - about 27 minutes

Route Map Hide



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MAPQUEST.

Trip to Highway 1 & Chighizola Ln

Grand Isle, LA 70358
36.54 miles - about 54 minutes

Notes

Lady of the Sea General Hospital
200 West 134th Place
Cut Off, LA 70345-4143
(985) 325-8585

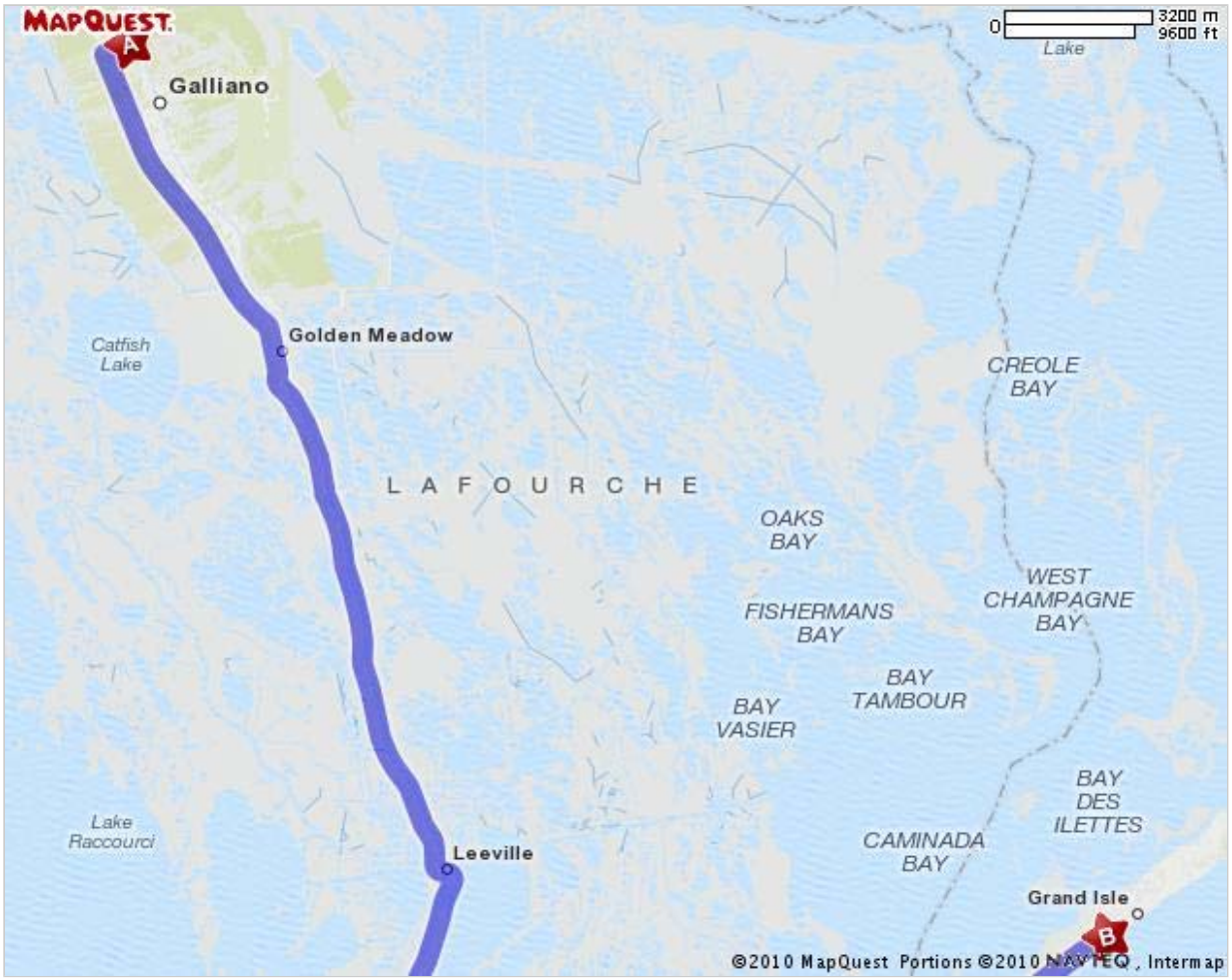
200 W 134th Pl, Cut Off, LA 70345-4143

1. Start out going **WEST** on **W 134TH PL** toward **HIGHWAY 3235 / LA-3235 N**.	go 0.5 mi
2. Turn **LEFT** onto **HIGHWAY 3235 / LA-3235 S**. Continue to follow **LA-3235 S**.	go 7.1 mi
3. **LA-3235 S** becomes **HIGHWAY ONE / LA-1**.	go 29.0 mi
4. **HIGHWAY 1 & CHIGHIZOLA LN**.	go 0.0 mi

Highway 1 & Chighizola Ln, Grand Isle, LA 70358

Total Travel Estimate : 36.54 miles - about 54 minutes

Route Map Hide



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MAPQUEST.

Trip to 1978 Industrial Blvd

Houma, LA 70363-7055
27.93 miles - about 45 minutes

Notes

Leonard J Chabert Medical Center
1978 Industrial Boulevard, Houma, LA -
(985) 873-2200

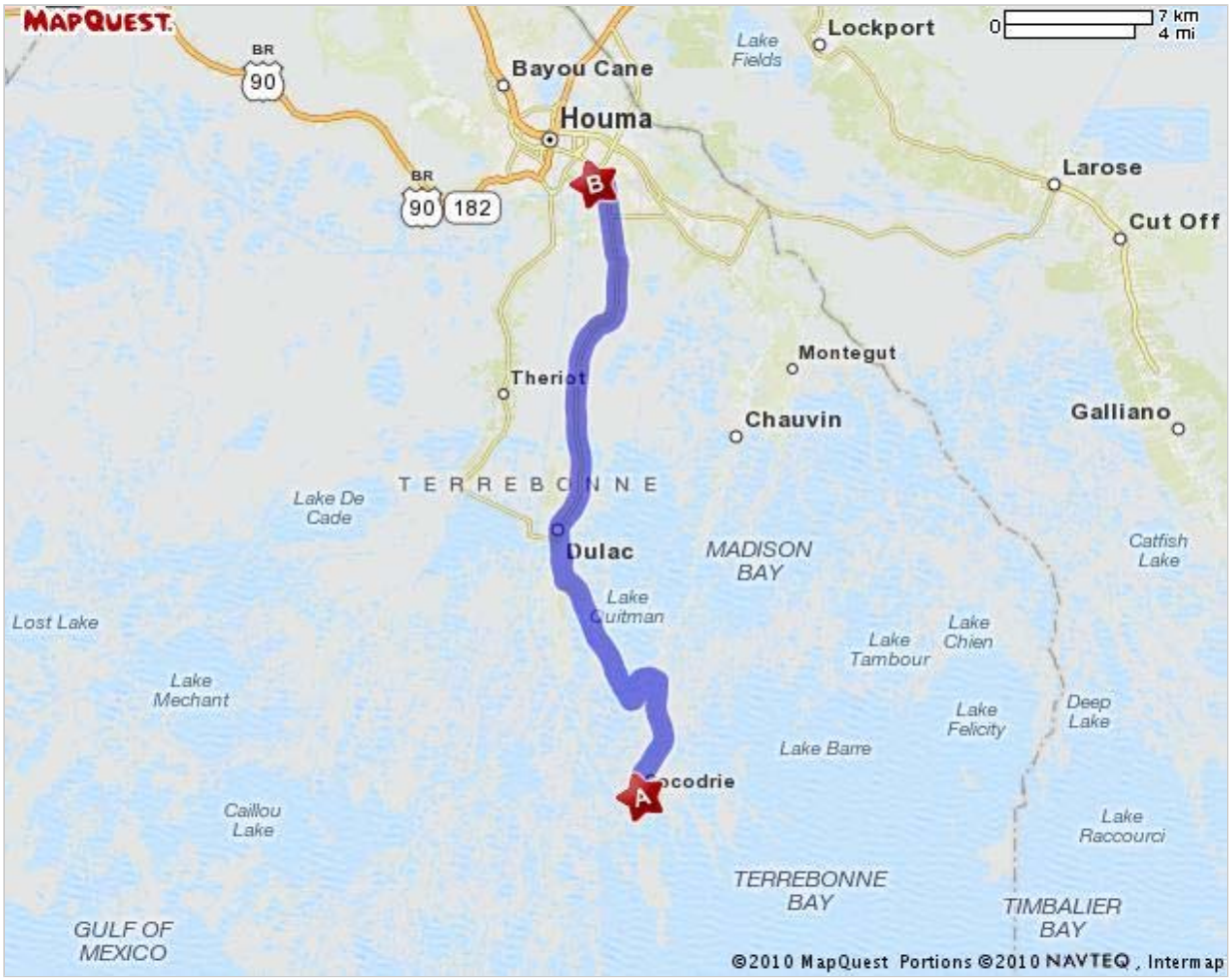
Cocodrie, LA

START	1. Start out going **NORTHEAST** on **REDFISH ST** toward **SHRIMP ST**.	go 0.1 mi
	2. Turn **LEFT** onto **SHRIMP ST**.	go 0.0 mi
56	3. Turn **RIGHT** onto **LA-56**.	go 4.4 mi
57	4. Turn **LEFT** onto **LA-57**.	go 7.9 mi
57	5. Turn **RIGHT** to stay on **LA-57**.	go 14.8 mi
	6. Turn **LEFT** onto **INDUSTRIAL BLVD**.	go 0.6 mi
END	7. **1978 INDUSTRIAL BLVD** is on the **LEFT**.	go 0.0 mi

1978 Industrial Blvd, Houma, LA 70363-7055

Total Travel Estimate : 27.93 miles - about 45 minutes

Route Map Hide



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Attachment E
Spot Crime Maps

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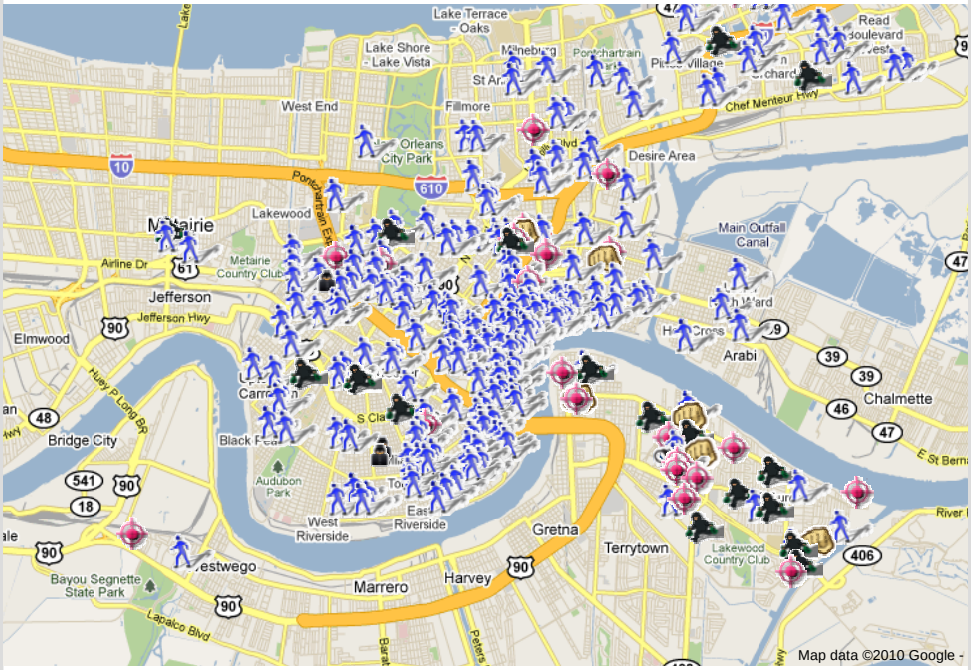
Date: 03/03/10 To: 05/03/10 Keyword: Refresh Map

View all Arrest Arson Assault Burglary Robbery Shooting Theft Vandalism Other User Reported Analytics Help

Address Search (i.e. 1234 Main Street) Records found: 287



	Date	Time	Crime Type	Address
	04/29/2010		Shooting	AMES BOULEVARD AND MT. KENNEDY DRIVE
	04/23/2010	08:30 PM	Shooting	13XX SAINT BERNARD AVENUE
	04/22/2010	01:00 AM	Shooting	24XX ALLEN STREET
	04/21/2010	07:20 PM	Robbery	FLORENCE AND LAWRENCE
	04/21/2010	11:19 PM	Shooting	31XX BENNETT
	04/21/2010	11:45 PM	Robbery	34XX WALL
	04/20/2010	01:30 PM	Theft	13XX FOUCHER STREET
	04/20/2010	01:10 AM	Theft	TREASURE STREET & PARIS AVENUE
	04/20/2010	04:00 PM	Robbery	53XX LACOUR MONIQUE
	04/19/2010	12:30 AM	Theft	18XX N ROCHEBLAVE STREET
	04/19/2010	01:30 AM	Theft	51XX BUNDY RD
	04/19/2010	12:00 PM	Theft	91XX PALMETTO STREET
	04/19/2010	11:50 AM	Theft	45XX CARDENAS DRIVE
	04/19/2010	09:20 PM	Assault	16XX HORACE
	04/19/2010	05:26 PM	Shooting	57XX TULLIS

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RSS - Analytics - Shooting Timeline - View in Google Earth - Add to Facebook - View in Google Maps

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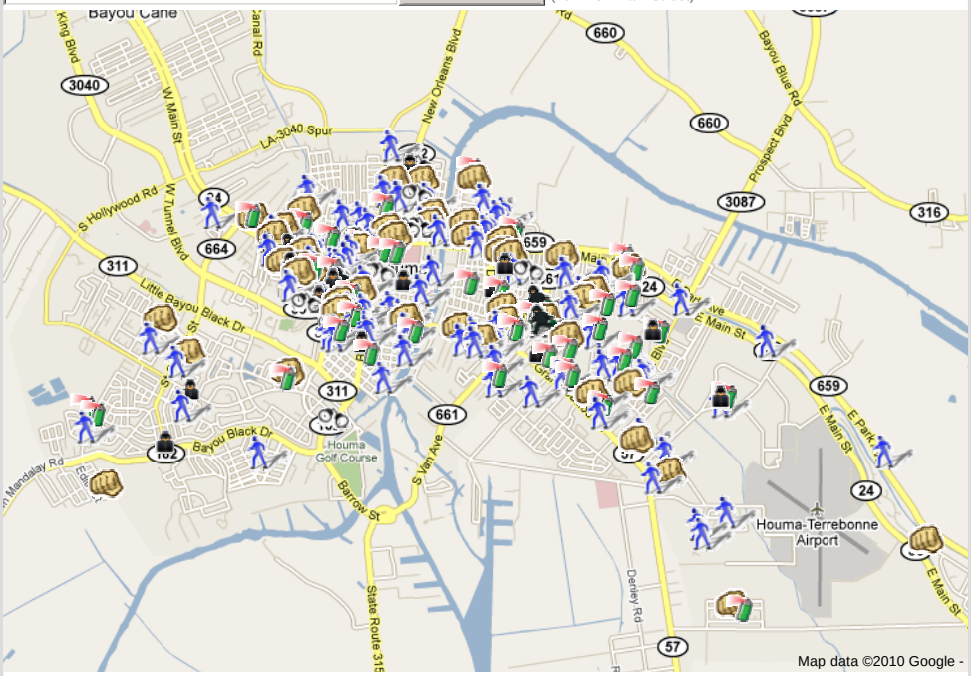
Date: 03/03/10 To: 05/03/10 Keyword: Refresh Map

View all Arrest Arson Assault Burglary Robbery Shooting Theft Vandalism Other User Reported Analytics Help

Address Search (i.e. 1234 Main Street) Records found: 236



Date	Time	Crime Type	Address
04/20/2010	12:00 AM	Theft	1XX SUTHON AVENUE
04/20/2010	05:44 AM	Theft	1XX CHATEAU RD.
04/19/2010	12:00 AM	Theft	1XX CADIERE ST
04/19/2010	05:04 AM	Assault	18XX HARVEST DRIVE
04/18/2010	12:00 AM	Theft	19XX PROSPECT BLVD
04/18/2010	12:00 AM	Theft	GRINAGE ST. AND SCHOOL ST
04/17/2010	12:23 PM	Vandalism	3XX LAUREL SRIVE
04/17/2010	12:00 AM	Assault	5XX MORGAN STR
04/17/2010	12:00 AM	Theft	11XX BOND ST.
04/17/2010	12:00 AM	Theft	97XX MAIN ST
04/17/2010	12:00 AM	Theft	7XX HONDURAS ST
04/16/2010	12:00 AM	Theft	2XX CHERBOURG ST
04/16/2010	12:00 AM	Vandalism	11XX GOODE ST.
04/16/2010	12:00 AM	Burglary	1XX CLENDENNING ROAD
04/16/2010	12:00 AM	Assault	13XX GRAND CAILLOU ROAD

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Attachment F
Police Station Maps

Google maps **police station** near **Venice, LA**

Get Google Maps on your phone
Text the word "GMAPS" to 466453

A. Port Sulphur **Police** Department
113 Civic Drive, Port Sulphur, LA -
(504) 564-2525

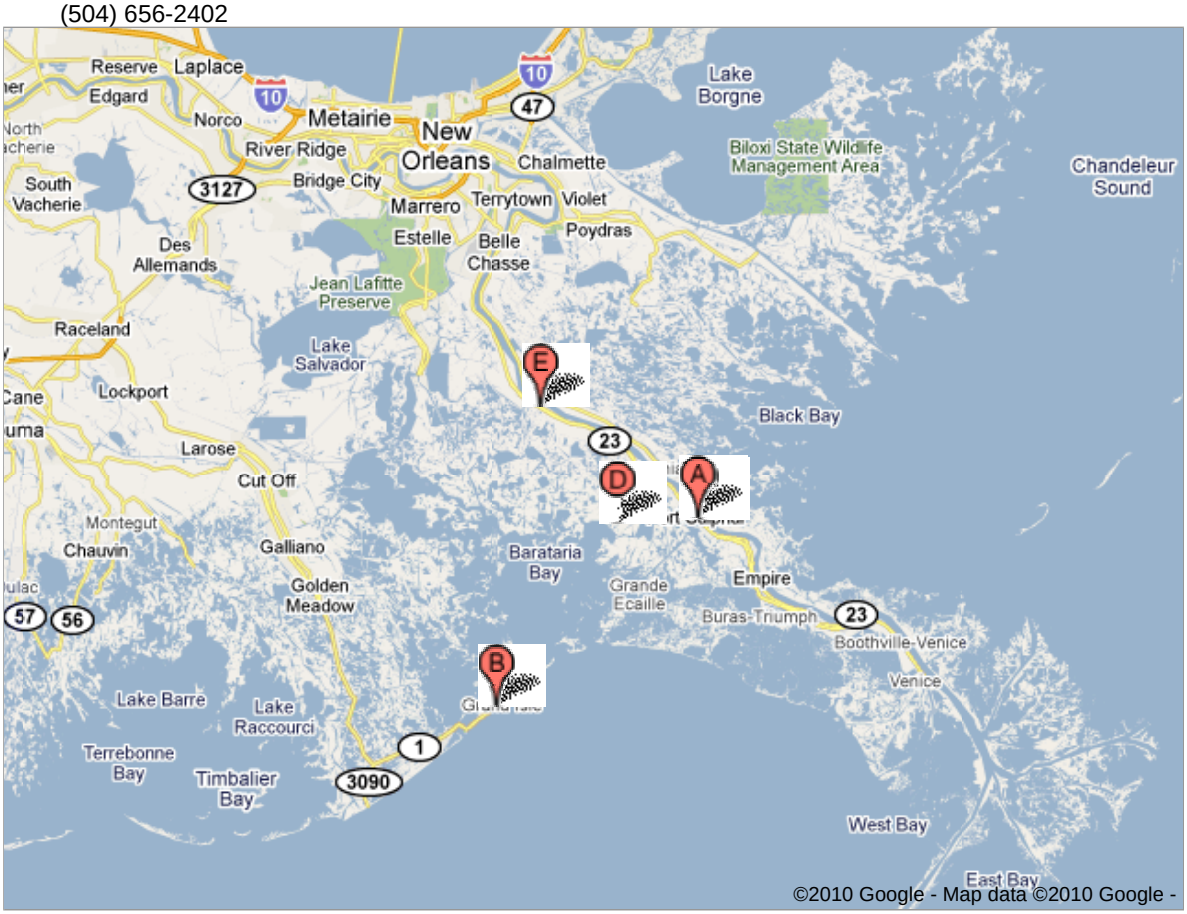
B. Grand Isle **Police** Department
170 Ludwig Lane, Grand Isle, LA -
(985) 787-2204

C. Ppsopsdet
139 Delta Street, Port Sulphur, LA -
(504) 564-3853

D. **Police**
201 Freeport Dr, Port Sulphur, LA -
(504) 564-2578

E. Plaquemines Parish Sheriff
18038 Highway 23, Myrtle Grove, LA -
(504) 656-2402

F. Buras Volunteer Fire Dept
Port Sulphur, LA - (504) 564-2525



Google maps police station

Get Google Maps on your phone
Text the word "GMAPS" to 466453

A. Houma **Police** Department
500 Honduras Street, Houma, LA -
(985) 873-6371

B. Terrebonne Parish: Sheriff's Office
7856 West Main Street, Houma, LA -
(985) 876-2500

C. State **Police** Office Gaming
103 Melissa Lane, Houma, LA - (985) 876-8834

D. Parish of Terrebonne
5000 Hondraus St, Houma, LA -
(985) 873-6304

E. **Police** Detective Bureau
500 Honduras Street, Houma, LA -
(985) 873-6321

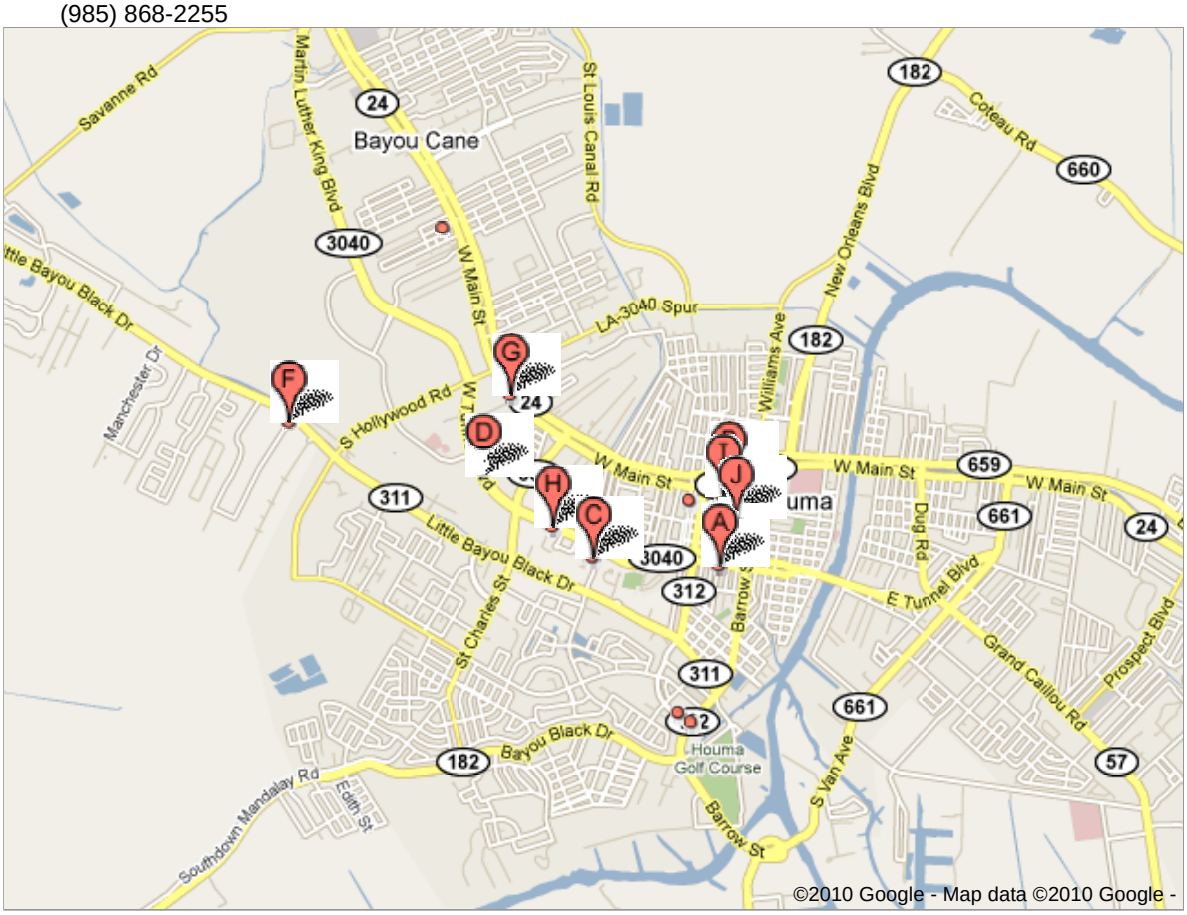
F. Public Safety Reinstatement
108 Capitol Blvd, Houma, LA - (985) 873-2045

G. State **Police** Traffic Violation
400 West Main Street, Houma, LA -
(985) 873-6530

H. State **Police**
106 Moss Lane, Houma, LA - (985) 873-2045

I. Lafourche Parish Sheriff's Office: Bayou Blue
400 Church Street, Houma, LA -
(985) 868-2255

J. Terrebonne Parish Fire Department
600 Wood Street, Houma, LA - (985) 873-6391



Google maps **police departments** near **Grand Isle, LA**

Get Google Maps on your phone
Text the word "GMAPS" to 466453

A. Grand Isle **Police Department**
170 Ludwig Lane, Grand Isle, LA -
(985) 787-2204

B. Golden Meadow Chief of **Police**
313 North Bayou Drive, Golden Meadow, LA -
(985) 475-5213

C. Port Sulphur **Police Department**
113 Civic Drive, Port Sulphur, LA -
(504) 564-2525

D. Plaquemines Parish Sheriff
18038 Highway 23, Myrtle Grove, LA -
(504) 656-2402

E. Ppsopsdet
139 Delta Street, Port Sulphur, LA -
(504) 564-3853

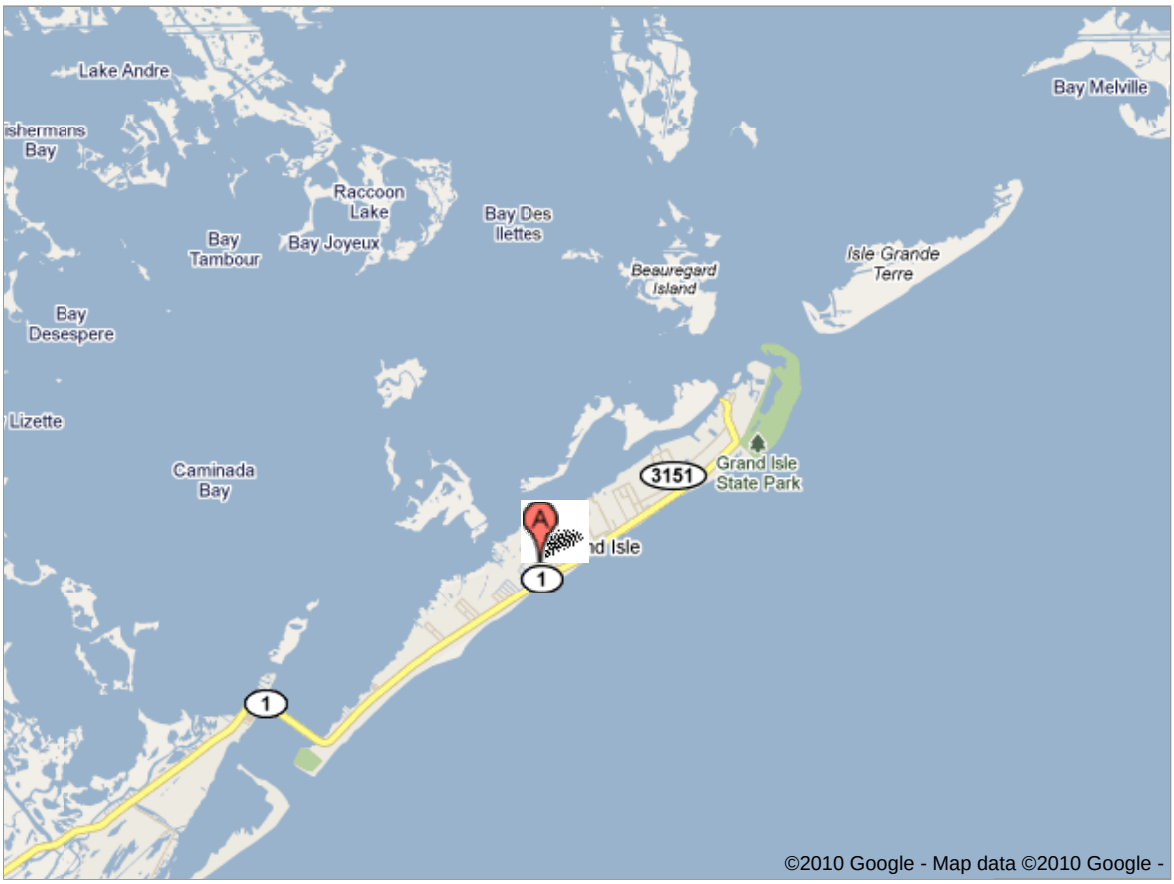
F. Plaquemines Parish Crime Prevention
8344 Highway 23, Belle Chasse, LA -
(504) 391-2004

G. Plaquemines Parish Sheriff's **Department**
104 Ave G, Belle Chasse, LA - (504) 394-0649

H. Sheriff **Department**
805 Crescent Avenue, Lockport, LA -
(985) 532-4371

I. Plaquemine Parish Economic
104 New Orleans Street, Belle Chasse, LA -
(504) 394-0018

J. Jean Lafitte **Police Department**
2654 Jean Lafitte Boulevard, Lafitte, LA -
(504) 689-3132



Google maps police departments

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Text the word "GMAPS" to 466453

A. Houma **Police Departments**: Complaints
500 Honduras Street, Houma, LA - (985) 868-5500

B. Morgan City **Police** Chief
723 Myrtle Street, Morgan City, LA - (985) 380-4605
1 review

C. State **Police** Office
4047 W Park Ave, Gray, LA - (985) 857-3680

D. Town of Berwick **Police** Department
3225 3rd Street, Berwick, LA - (985) 384-7710

E. Jean Lafitte **Police** Department
2654 Jean Lafitte Boulevard, Lafitte, LA - (504) 689-3132

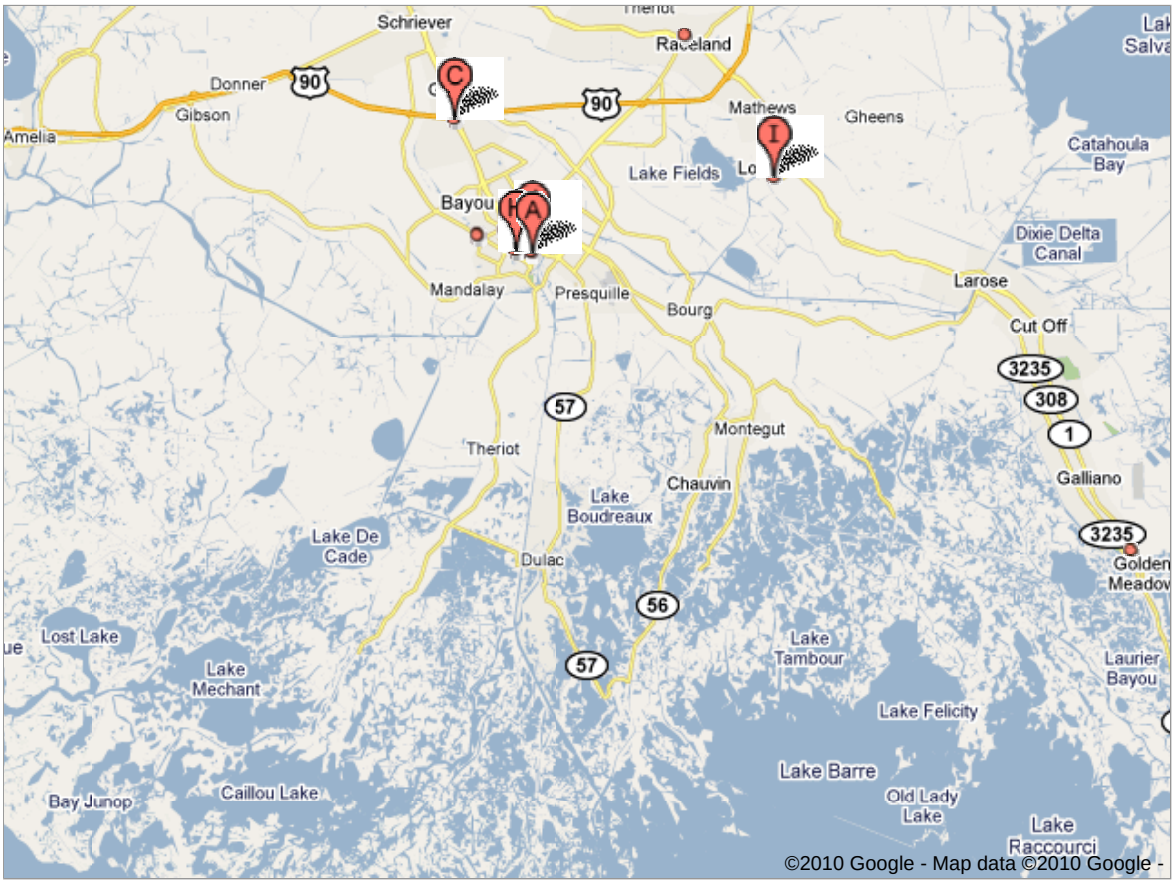
F. Lafourche Parish Sheriff's Office
200 Canal Boulevard, Thibodaux, LA - (985) 446-2255

G. Houma **Police Departments**: Switchboard
500 Honduras Street, Houma, LA - (985) 873-6300

H. State **Police** Office Gaming
103 Melissa Lane, Houma, LA - (985) 876-8834

I. Lafourche Parish Sheriff Office
805 Crescent Avenue, Lockport, LA - (985) 532-2255

J. Terrebonne Parish: Sheriff's Office
7856 West Main Street, Houma, LA - (985) 876-2500



Google maps police station

Get Google Maps on your phone
Text the word "GMAPS" to 466453

A. Gretna City Chief of **Police**
200 5th Street, Gretna, LA - (504) 363-1700

B. New Orleans **Police** Department
1348 Richland Road, New Orleans, LA - (504) 658-6040

C. Cresent City Connection **Police**
2001 Mardi Gras Boulevard, New Orleans, LA - (504) 376-8181

D. New Orleans **Police** Department
2372 Saint Claude Avenue, New Orleans, LA - (504) 658-6050

E. Gretna **Police** Vehicle Maintenance
200 5th Street, Gretna, LA - (504) 363-1534

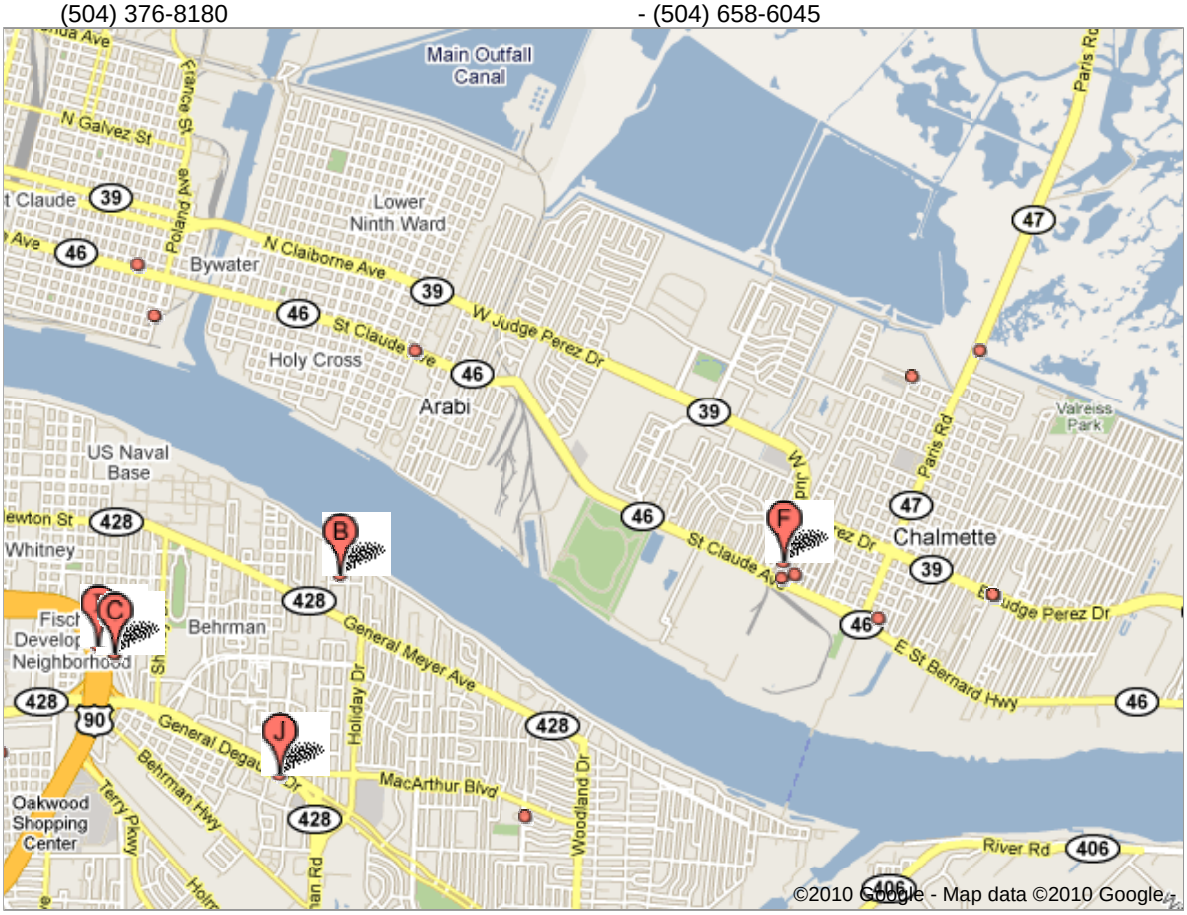
F. St Bernard Parish Sheriff Office
2 Courthouse Square, Chalmette, LA - (504) 271-2501

G. Jefferson Parish Sheriff
197 Westbank Expressway, Gretna, LA - (504) 363-5670

H. Gretna **Police** Detective Bureau
200 5th Street, Gretna, LA - (504) 363-1529

I. Crescent City **Police** Department
2001 Behrman Avenue, New Orleans, LA - (504) 376-8180

J. New Orleans **Police** Department
3751 General Degaulle Drive, New Orleans, LA - (504) 658-6045



Attachment G
WESTON FLDs

FLD 02 INCLEMENT WEATHER

Hot weather (ambient temperatures over 70°F), cold weather (ambient temperatures below 40°F), rain, snow, ice, and lightning are examples of inclement weather that may be hazardous or add risk to work activities. Extremes of heat, cold, and humidity, as well as rain, snow, and ice, can adversely affect monitoring instrument response and reliability, respiratory protection performance, and chemical protective clothing materials.

RELATED FLDs AND OP

FLD 05 – Heat Stress Prevention and Monitoring
FLD 06 – Cold Stress
OP 05-03-008 – Inclement Weather & Business Disruption Policy

PROCEDURE

The potential for exacerbating the impact of physical hazards must be considered for tasks that expose personnel to inclement weather. Risk assessment and hazards analysis should be accomplished during the planning stages of a project for the most likely inclement weather conditions that may be encountered, i.e., rain and lightning in late spring, summer, and early fall, or lightning prone areas; cold, snow, and ice in winter. The Field Safety Officer (FSO) must determine the proper safety procedures and recommend them to the site manager. Each worker must evaluate the risk associated with his/her work and be actively alert to these hazards. Managers and workers must be familiar with the requirements of FLD 05 and FLD 06.

A pre-site activity risk assessment must be completed when inclement weather occurs. Weather conditions that affect instruments and personal protective equipment (PPE) function must be conveyed to site workers who should monitor function and integrity of PPE and be alert to changing weather conditions. A decision must be made on the proper safety procedures to use if work must continue, or to stop work if the risk is too great. The appropriate Safety Professional **must be notified of all instances of the need to stop work for safety reasons, including inclement weather**.

Heat

Hot, dry weather increases risk of soil drying, erosion, and dust dispersion, which may present or increase risk of exposure and environmental impact from toxic hazards. Hot weather will increase pressure on closed containers and the rate of volatilization, thereby potentially increasing the risk of exposure to toxic, flammable, or explosive atmospheres.

<u>Prevention and Protective Measures</u>

Employees must be protected from airborne contaminants using engineering controls such as wetting dry soil to prevent particle dispersion, and providing local ventilation to reduce volatile air contaminants to safe levels, or if engineering controls are infeasible, using prescribed PPE. Wind shifts and velocity should be measured where change may result in dispersion of airborne contaminants into the work area.

Rain, Wet Weather, and High Humidity

Wet conditions resulting from rain and wet weather increase slipping and tripping hazards, braking distances of vehicles, the potential for vehicle skidding, or difficulties in handling powered devices such as augers and drills. 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 (especially for personnel wearing respiratory protection) and limit the effectiveness of certain direct-reading instruments (e.g., photoionization detectors [PIDs]).

Feet that become wet and are allowed to remain wet can lead to serious problems under both heat and cold conditions. Activities that may result in wet feet include extended work in chemical protective clothing and wading in water/liquid during biological assessments. Trench foot, paddy foot, and immersion foot are terms associated with foot ailments resulting from feet being wet for long periods of time. All have similar symptoms and effects. Initial symptoms include edema (swelling), tingling, itching, and severe pain. These may be followed by more severe symptoms including blistering, death of skin tissue, and ulceration. (NOTE: The following Preventive and Protective Measures also apply to Cold, Snow, and Ice.)

Preventive and Protective Measures

Walkways, stairs, ladders, elevated workplaces, and scaffold platforms must be kept free of mud, ice, and snow. Employees shall be prohibited from working on scaffolds covered with snow, ice, or other slippery material except as necessary for removal of such materials.

Vehicles used in rain or cold weather must have working windshield wipers and defrosters, and windows must be kept clear of obstruction.

Drivers must observe traffic laws, including maintaining speed within limits safe for weather conditions, and wearing seat belts at all times. Note that this may mean operating below the posted speed limit.

When walking, workers should use a walking stick or probe to test footing ahead where there is standing water, snow, or ice to protect the walker against stepping into potholes or onto puncture hazards, buried containers, or other potential structurally unsound surfaces.

Prior to using vehicles or equipment in off-road work, workers should walk the work area or intended travelway when puddles or snow may obscure potholes, puncture hazards, or buried containers, or other potential structurally unsound surfaces.

Project managers should arrange to have winches, come-alongs, or other mechanical assistance available when vehicles are used in areas where there is increased risk of getting stuck. Cable or rope and mechanical equipment used for pulling stuck vehicles must be designed for the purpose, of sufficient capacity for the load, and be inspected regularly and before use to ensure safety. **Manually pushing stuck vehicles is to be avoided**.

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. Proper hygiene is critical. Workers must dry their feet and change socks regularly to avoid conditions associated with wet feet. Use of foot talc or powder can additionally assist in prevention of this type of condition.

Cold, Snow, and Ice

Cold weather affects vehicle operation by increasing difficulty in starting and braking. Ice, frost, and snow can accumulate on windows and reduce vision. Cold, wet weather can cause icing of roadways,

driveways, parking areas, general work places, ladders, stairs, and platforms. Ice is not always as obvious to see as snow or rain, and requires special attention, especially when driving or walking.

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. Heavy snow and ice storms may cause electric lines to sag or break, and the use of electrical equipment in snow increases the risk of electric shock. Snow can hide potholes and mud, which can result in vehicles getting stuck or persons falling when stepping into hidden holes. Snow also may cover water, drums or other containers, sharp metal objects, debris, or other objects that can cause falls or punctures.

Preventive and Protective Measures

WESTON personnel are cautioned against operating motor vehicles such as cars or trucks on ice under any circumstances. If traveling in icy conditions, WESTON personnel should follow all public service advisories that curtail driving activities.

Personnel performing activities that require working over ice should be aware of minimal ice thickness safety guidelines as follows:

- 4-inch minimum: activities such as walking or skating.
- 6-inch minimum: activities such as snowmobiling or the use of equipment with the same weight and cross-sectional area as a snowmobile.

Personnel should always be aware that these measurement guidelines are under ideal conditions and that snow cover, conditions on rivers, ponds, or lakes with active currents, and other environmental factors impact the safety of working on ice. Clear ice typically is the strongest, while ice that appears cloudy or honeycombed (contains entrained air) is not as structurally strong. Measurements made by drilling or cutting through the ice should be made every few feet to verify safe conditions. Provisions for rescue (e.g., ladders or long poles and effective communications) must be available at the work site.

Lightning

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 such as stacks, radio towers, and drill rigs. Lightning has caused chemical storage tank fires and grass or forest fires. Static charges associated with nearby electrical storms can increase risk of fire or explosion when working around flammable materials, and can adversely affect monitoring instruments.

Lightning is the most dangerous and frequently encountered weather hazard people experience each year. Lightning affects all regions. **Florida, Michigan, Pennsylvania, North Carolina, New York, Ohio, Texas, Tennessee, Georgia, and Colorado** have the most lightning deaths and injuries.

Preventive and Protective Measures

Prior to working in areas or beginning projects when or where there is an increased potential for lightning striking personnel, steps must be taken to predict the occurrence of lightning strikes. Recommendations include:

- Check with client management to determine if there are any patterns or noted conditions that can help predict lightning or if there are structures that are prone to lightning strikes. Arrange for

client notification when there is increased potential for lightning activities. Ensure that clients include WESTON workers in lightning contingency plans.

- Monitor weather reports.
- Note 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.
- Ensure all personnel are provided with safe areas of refuge. Prevent personnel from standing in open areas, under lone trees, or under drill rigs.
- Observe the "30-30" Rule. If you see lightning and thunder is heard within 30 seconds (approximately 6 miles), seek shelter. If you hear thunder, but did not see the lightning, you can assume that lightning is within 6 miles and you should seek shelter. Remain in the sheltered location for 30 minutes following the last lightning strike.
- Use a hand held static potential meter (lightning detection device) to monitor the potential difference between a cloud and the ground. When the measured potential is greater than 2 kV/m, there is a potential for a lightning strike – seek shelter.

High Wind and Tornado Safety

High Winds

Many construction workers have died due to wind-related accidents and injuries. A ladder that seems secure under normal circumstances can become unstable during windy conditions and cause you to fall. Scaffolding that is improperly secured can rip free during strong winds and kill bystanders. The risk of injury for construction workers increases during strong winds. Keep in mind that changing weather conditions can affect your daily work tasks, and make sure you have a game plan to prevent proper damage and personal injury.

Stay Informed: With today's modern technology available at the touch of a button, you should keep up to date with the latest local weather reports. Visit weatherbug.com or weather.gov to stay informed in case of wind warnings, watches, and advisories. Larger projects may have their own weather station on site to provide instant weather data. Use daily hazard assessments to determine if working conditions have changed or will change throughout the day.

Be Prepared: When you know the weather will be windy, secure loose building materials, scaffolding and fencing that could be picked up or torn loose by strong winds and thrown onto surrounding streets, structures, vehicles, or bystanders.

Know the Limits of Your Equipment: When operating any equipment, take time to read the operator's manual and become familiar with the wind specifications. Many crane manufacturers have high-wind guidelines to prevent you from operating a crane in unsafe weather. You should also check safety equipment such as fall protection to determine if it is adequate for windy conditions.

Know the Terminology

Severe Thunderstorm Watch

A Severe Thunderstorm Watch means that strong thunderstorms capable of producing winds of 58 mph or higher and/or hail 3/4 inches in diameter or larger are possible. If you are in the area of a Severe Thunderstorm Watch, you should be prepared to take shelter from thunderstorms. Severe Thunderstorm Watches are generally issued for 6-hour periods.

Severe Thunderstorm Warning

A Severe Thunderstorm Warning means that thunderstorms capable of strong winds and/or large hail are occurring or could form at any time. If you are in the area of a severe thunderstorm, you should take shelter indoors immediately, avoid windows, and be prepared for high winds and hail. Severe Thunderstorm Warnings are generally in effect for an hour or less.

High Wind Watch

A High Wind Watch is issued when sustained winds exceeding 40 mph and/or frequent gusts over 60 mph are likely to develop in the next 24 to 48 hours. For summit areas, high wind watches are issued when sustained winds are expected to exceed 45 mph and/or frequently gust over 60 mph. If you are in an area for which a High Wind Watch has been issued you should secure loose objects outdoors that may blow about and avoid outdoor activity that exposes you to high winds.

High Wind Warning

A High Wind Warning is issued when sustained winds exceeding 40 mph and/or frequent gusts over 60 mph are occurring or imminent. For summit areas, warnings are issued for winds exceeding 45 mph and/or frequently gusting over 60 mph. Wind warnings may issued up to 24 hours ahead of the onset of high winds and remain in effect for 6 to 12 hours. If you are in an area where a high wind warning is in effect you should avoid activities that expose you to high winds. Loose objects may be blown around. Tree limbs may break and fall. Power lines may be blown down.

Wind Advisory

A Wind Advisory is issued when sustained winds of 30 to 39 mph and/or frequent gusts to 50 mph or greater are occurring or imminent. Wind advisories may be in effect for 6 to 12 hours. If you are in an area where a wind advisory is in effect you should secure loose objects that may be blown about outdoors and limit activity that may expose you to high winds.

Work Safely: If you will be working on a windy day, you should be alert and protected. Wear eye protection to prevent dust and other particles from entering or striking your eyes. Keep your hard hat on at all times to prevent injuries from falling or flying objects. The likelihood of falls from heights is greatly increased by strong winds. Wear the necessary PPE to ensure your safety.

To avoid flying debris and to minimize damage during high winds:

- Shut down outdoor activities involving work at elevation on ladders, scaffolding, aerial lifts, etc.; handling large tarps and plastic sheeting when wind speeds exceed 25 mph; including work with radioactive materials and highly toxic materials that could be dispersed by the winds.
- At 13 - 18 mph wind will raise dust. Follow the dust action level.

- Move mobile items stored outside to indoor storage.
- Secure any items that cannot be moved inside.
- Be careful opening exterior doors.
- Be cautious about downed power lines, tree limbs, and debris on roads.
- Be alert for animals who have escaped from farms and zoos.

Stay Away from Power Lines: High winds can cause tree limbs to fall on power lines resulting in electrocution hazards or loss of power. Your best bet is to keep your distance.

Tornados

What is a TORNADO?

A tornado is a violent windstorm characterized by a twisting, funnel-shaped cloud. It is spawned by a thunderstorm or as a result of severe weather associated with hurricanes. A funnel cloud is formed as cool air overrides a layer of warm air, forcing the warm air to rise rapidly. The damage from a tornado results from high wind velocity and wind blown debris.

Tornado Safety

When a tornado approaches, you have only a brief amount of time to make life-or-death decisions. Advance planning and quick response are the keys to surviving a tornado.

Purchase a NOAA Weather Alert radio with an alert feature. When tuned to the proper frequency, these weather radios remain silent until a weather emergency occurs. Once they pick up the alarm tone, they will begin broadcasting emergency weather information so that citizens can protect themselves and their property. Some models of the NOAA weather radio incorporate the Specific Area Message Encoder technology, allowing users to target only those warnings that affect their immediate geographic area.

Conduct tornado drills. Designate an area to serve as your safe area, and practice having team members assemble there in response to a mock tornado warning.

Emergency Communications Plan. Develop an emergency communications plan in case team members are separated from one another when a tornado warning goes into effect. Designate an emergency coordinator. Instruct everyone to contact this coordinator in a weather emergency for instructions on what to do during the storm and where to reassemble after the emergency has passed. Design contingency plans to be consistent with client contingency plans. When possible use client warning and alerting systems and confirm that team members have access to shelters and know how to get to them.

Know the Difference between a Tornado Watch and a Tornado Warning

Tornado Watch: Issued by the National Weather Service when tornadoes are possible in your area. You should remain alert for approaching storms. Remind family members of where the safe areas are within your home, and carefully monitor radio or television reports for further developments.

Tornado Warning: Indicates that a tornado has been sighted in your area, or is indicated on weather radar. You should proceed to safe shelter immediately.

When A Tornado Warning Goes In Effect, Put Your Safety Plans In Action.

In Your Automobile: Motor vehicles are easily overturned by tornado winds. Leave your vehicle and seek shelter in a sturdy building. As a last resort, seek shelter in a ditch or culvert. Do not try to outrun or outmaneuver a tornado! Use the time to seek appropriate shelter outside your vehicle.

Office Buildings, Hotels, and Shopping Centers: Take shelter in an interior hallway on a lower floor. A closet, bathroom or other small room with short, stout walls will give some protection from collapse and flying debris. Otherwise, get under heavy furniture and stay away from windows. Many tornado deaths have occurred in large buildings due to the collapse of a roof or wide span wall. A corner area, away from a window, is safer than the middle of a wide span wall.

Out In Open Country: When severe weather approaches, seek inside shelter immediately. The chances of encountering falling trees, downed power lines and lightning are far greater than encountering a tornado itself. If a tornado approaches, lie flat in the nearest depression, such as a culvert or ditch, and cover your head with your arms.

BE ALERT TO CHANGING WEATHER CONDITIONS

HAVE AN EMERGENCY WEATHER PLAN IN PLACE

REHEARSE YOUR CONTINGENCY PLANS PERIODICALLY

KNOW WHERE TO GO WHEN A TORNADO THREATENS.

FLD 05 HEAT STRESS PREVENTION AND MONITORING

Heat stress may occur at any time work is performed at elevated temperatures. If the body's physiological processes fail to maintain a normal body temperature because of excessive heat, a number of physical reactions can occur such as fatigue, irritability, anxiety, and decreased concentration or dexterity, and possibly death. Because heat stress is one of the most common and potentially serious illnesses at field sites, regular monitoring and other preventive measures are vital to ensure worker safety. Wearing chemical protective clothing often decreases natural body heat loss (cooling) and increases the risk of heat stress.

Employees who are taking prescription or over-the-counter medications should consult with their personal physician prior to working in high-temperature environments to see if their medication would impair their ability to handle heat stress.

REFERENCES

OSHA 29 CFR 1910 and 1926

RELATED FLDs

FLD 02 – Inclement Weather
FLD 03 – Hot Processes – Steam, Low Temperature Thermal Treatment Unit, and Transportable Incinerator
FLD 08 – Confined Space Entry Program
FLD 36 – Welding/Cutting/Brazing/Radiography
FLD 37 – Pressure Washers/Sandblasting

PROCEDURE

Heat Stress Symptoms and Treatment

Heat Rash

Heat rash, also known as prickly heat, may occur in hot and humid environments where sweat is not easily removed from the surface of the skin by evaporation and is aggravated by chafing clothes. When extensive or complicated by infection, heat rash can be so uncomfortable that it inhibits sleep and impairs a worker's performance.

Symptoms – Mild red rash, especially in areas of the body that come into contact with protective gear.

Treatment – Decrease amount of time spent working in protective gear and provide body powder to help absorb moisture and decrease chafing. Heat rash can be prevented by showering, resting in a cool place, and allowing the skin to dry.

Heat Cramps

Heat cramps are caused by inadequate electrolyte intake. The individual may be receiving adequate water; however, if not combined with an adequate supply of electrolytes, the blood can thin to the point where it seeps into the active muscle tissue, causing cramping.

Symptoms – Acute painful spasms of voluntary muscles, most notably the abdomen and extremities.

Treatment – Move the victim to a cool area and loosen clothing. Have the victim drink 1 to 2 cups of cool potable water or diluted commercial electrolyte solution (e.g., Gatorade, Quench) immediately, and then every 20 minutes thereafter until symptoms subside. Electrolyte supplements can enhance recovery; however, it is best to double the amount of water required by the dry mix package directions or add water to the liquid form.

Heat Exhaustion

Heat exhaustion is a state of weakness or exhaustion caused by the loss of fluids from the body. Heat exhaustion is not as dangerous as heat stroke, but if not properly managed in the field it may lead to heat stroke.

Symptoms – Pale, clammy, and moist skin, profuse perspiring, and extreme weakness. Body temperature is normal, pulse is weak and rapid, and breathing is shallow. The person may have a headache, may vomit, may feel dizzy, and may be irritable or confused.

Treatment – Move the victim to a cool, air-conditioned or temperature-controlled area, loosen clothing, place in a position with the head lower than the feet (shock prevention), and allow the victim to rest. Consult a physician. Ensure that the victim is not nauseated or vomiting. If not nauseated or vomiting, give the victim small sips of cool water or diluted electrolyte replenishment solution (one to one dilution with water, or if mixing from powder, double the water added). If this is tolerated, have the victim drink 1 to 2 cups of fluid immediately, and every 20 minutes thereafter until symptoms subside. Seek medical attention at the advice of the consulting physician.

Heat Stroke

Heat stroke is an acute and dangerous reaction to heat stress caused by a failure of the body's heat regulating mechanisms, i.e., the individual's temperature control system (sweating) stops working correctly. Body temperature rises so high that brain damage and death may result if the person is not cooled quickly.

Symptoms – Red, hot, dry skin (although the person may have been sweating earlier); nausea, dizziness, confusion, extremely high body temperature (i.e., 104°F or greater as measured with an oral thermometer), rapid respiratory and pulse rate, seizures or convulsions, unconsciousness or coma.

Treatment – Immediately call for emergency medical assistance. Remove the victim from the source of heat and cool the victim quickly. If the body temperature is not brought down quickly, permanent brain damage or death may result. Remove all PPE and as much personal clothing as decency permits. Fan the person while sponging or spraying with cool or tepid water. Apply ice packs (if available) to the back of the neck, armpits, groin area, or behind the knees. Place the victim flat on their back or with head and shoulders slightly elevated. If conscious, and not nauseated or vomiting, the victim may be provided sips of cool water. Do not give the victim coffee, tea, or alcoholic beverages. Emergency medical personnel will take over treatment when they arrive.

Recognition and Risk Assessment

In the planning stages of a project, the potential for heat stress disorders must be considered as a physical hazard in the site-specific Health and Safety Plan (HASP). Risk assessment can be accomplished in the development stages of a project by listing in the HASP the most likely heat stress disorders that may occur. The Field Safety Officer (FSO) must make decisions on the proper safety procedures and recommend them to the site 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. In addition, all site personnel must be aware of these symptoms in both themselves and their co-workers.

Prevention and Protection Programs

Heat stress is affected by several interacting factors including, but not limited to, age, obesity, physical condition, substance abuse, level of personal protective equipment (PPE) worn, and environmental conditions (temperature, shade, and humidity). Site workers must learn to recognize and treat the various forms of heat stress. The following recommendations should be followed to prevent heat stress:

- The most important measure to prevent heat-related illness is adequate fluid intake. Workers should drink 1/2 to 1 quarts of liquids per hour in high heat conditions. Most of this liquid should be water. Under heavy work and heat conditions, the body may lose up to 2 gallons of fluids per day. To prevent heat stress symptoms, the individual must ensure replacement of this fluid.
- Provide disposable cups that hold about 4 ounces, and water that is maintained at 50 to 60°F. Workers should drink 16 ounces of water before beginning work, and a cup or two at each break period.
- Provide a shaded area for rest breaks. Ensure that adequate shelter is available to protect personnel against heat and direct sunlight. When possible, shade the work area.
- Discourage the intake of caffeinated drinks during working hours.
- Monitor for signs of heat stress.
- Encourage workers to maintain a good diet during these periods. In most cases, a balanced diet and lightly salted foods should help maintain the body's electrolyte balance. Bananas are especially good for maintaining the body's potassium level.
- 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 workers to site work conditions by slowly increasing workloads (i.e., do not begin work activities with extremely demanding tasks).
- Rotate shifts of workers who are required to wear impervious clothing in hot weather.
- Encourage workers to wear lightweight, light-colored, loose-fitting clothing.
- In extremely hot weather, conduct field activities in the early morning and evening.
- Provide cooling devices to aid natural body heat regulation. These devices, however, add weight and their use should be balanced against worker efficiency. An example of a cooling aid is long cotton underwear, which acts as a wick to absorb moisture and protect the skin from direct contact with heat-absorbing protective clothing.
- Good hygienic standards must be maintained by frequent showering and changes of clothing.
- Clothing should be permitted to dry during rest periods.
- Whenever working in the sun, provide employees with sunscreen with both UVA and UVB protection.
- Persons who notice skin problems should immediately consult medical personnel.

Heat Stress Monitoring and Work Cycle Management

When strenuous field activities are part of on-going site work conducted in hot weather, the following guidelines should be used to monitor the body's physiological response to heat, and to manage the work cycle, even if workers are not wearing impervious clothing. These procedures should be instituted when the temperature exceeds 70°F and the tasks/risk analysis indicates an increased risk of heat stress problems. Consult the HASP and a safety professional (e.g., Division EHS Manager, FSO) if questions arise as to the need for specific heat stress monitoring. In all cases, the site personnel must be aware of the signs and symptoms of heat stress and provide adequate rest breaks and proper aid as necessary.

Measure Heart Rate – Heart rate should be measured by the radial pulse for 30 seconds as early as possible in the rest period. The heart rate at the beginning of the rest period should not exceed 110 beats per minute. If the heart rate is higher, the next work period should be shortened by 33%, while the length of the rest period stays the same. If the pulse rate still exceeds 110 beats per minute at the beginning of the next rest period, the following work cycle should be further shortened by 33%. The procedure is continued until the rate is maintained below 110 beats per minute.

Measure Body Temperature – When ambient temperatures are over 90°F, body temperatures should be measured with a clinical thermometer as early as possible in the rest period. If the oral temperature exceeds 99.6°F (or 1 degree change from baseline) at the beginning of the rest period, the following work cycle should be shortened by 33%. The procedure is continued until the body temperature is maintained below 99.6°F (or 1 degree change from baseline). Under no circumstances should a worker be allowed to work if their oral temperature exceeds 100.6°F.

Measure Body Water Loss – Body water loss greater than 1.5% of total body weight is indicative of a heat stress condition. Body weight is measured before PPE is donned and after the PPE is removed following a work cycle. Body water loss can be measured with an ordinary bathroom scale; however, the scale must be sensitive to one-half pounds increments. A worker is required to drink additional fluids and rest if their body water loss is greater than 1.5%.

NOTE: For purposes of this operating practice, a break is defined as a 15-minute period and/or until an individual's vital signs are within prescribed guidelines.

A physiological monitoring schedule is determined by following the steps below:

- Measure the air temperature with a standard thermometer.
- Estimate the fraction of sunshine by judging what percent the sun is out (refer to Table 1).
- Calculate the adjusted temperature based on the following formula:

  Adjusted Temperature = Actual Temperature + 13 X (where X = sunshine fraction from Table 1)
- Using Table 2, determine the physiological monitoring schedule for fit and acclimated workers for the calculated adjusted temperature.

The length of work period is governed by frequency of physiological monitoring (Table 2). The length of the rest period is governed by physiological parameters (heart rate and oral temperature).

Table 1. Percent Sunshine Factors
Heat Stress Prevention and Monitoring

Percent Sunshine (%)	Cloud Cover	Sunshine fraction
100	No cloud cover	1.0
50	50% cloud cover	0.5
0	Full cloud cover	0.0

Table 2. Physiological Monitoring Schedule
Heat Stress Prevention and Monitoring

Adjusted Temperature	Level D (Permeable clothing)	Level C, B, or A (Nonpermeable clothing)
90°F (32.2°C) or above	After each 45 minutes of work	After each 15 minutes of work
87.5°F (30.8° - 32.2°C)	After each 60 minutes of work	After each 30 minutes of work
82.5° - 87.5°F (28.1° - 32.2°C)	After each 90 minutes of work	After each 60 minutes of work
77.5° - 82.5°F (25.3° - 28.1°C)	After each 120 minutes of work	After each 90 minutes of work
72.5° - 77.5°F (22.5° - 25.3°C)	After each 150 minutes of work	After each 120 minutes of work

Example: Site personnel anticipate wearing level C (impermeable clothing) during site activities. The air temperature is 80°F and there are no clouds in the sky (100% sunshine). The adjusted temperature is calculated in the following manner:

Adjusted Temperature (Adj T °F) = Actual Temperature (Amb T °F) + (13 x sunshine fraction)
Adj T °F = 80°F + (13 x 1.0)
Adj T °F = 93°F

Using Table 2, the pulse rate, oral temperature and body water loss monitoring would be conducted after each 15 minutes of work. The adjusted temperature may need to be redetermined if the percent sunshine and ambient temperature changes drastically during site work.

If an individual's heart rate exceeds 110 beats per minute at the beginning of the rest period, that individual will continue to rest until his or her heart rate drops to baseline; the next work period is then decreased by 33%.

FLD 10 MANUAL LIFTING AND HANDLING OF HEAVY OBJECTS

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. 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. Lifting tasks which are awkward and repetitive, even if involving only light objects, can lead to nerve and joint damage.

At the project level, the need for manual lifting or handling of heavy objects must be identified as a physical hazard in the planning stages of a project Health and Safety Plan (HASP).

MANUAL LIFTING

Plan any manual lifting task noting the following:

Contact hazards. Check each object before lifting for presence of splinters, slivers, sharp edges or parts, cracks and loose joints, which can result in cuts. Signs of biological hazards, and chemical or radioactive material contamination.

- **Weight of object**. Unless involved in weight training, recommended safe lifting weights for an average man or woman are 50 and 35 pounds, respectively.
- **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.
- **Area in which lifting is to be done.** Heavy objects can pinch or crush fingers, toes, arms, and legs between the object and nearby objects (e.g., walls, tables, counters, or railings). Check for pinch points such as other objects close by and ensure there is room for safe lifting.
- **Conditions under which lifting is to be accomplished.** Check for wet or slippery surfaces. Consider level of protection to be used. Level B or A protection may add up to 40 lbs. To be lifted, as well as restricting range of motion and adding to area restriction by increasing bulk.

Route to be traveled, if lifting includes carrying. 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.

Manual Lifting - Prevention and Protection

- Before lifting, identify the potential for contact hazards on objects to be lifted. Check each object before lifting, remove any noted hazards as feasible, and wear gloves (cotton, at a minimum, or leather, kevlar, or chemical resistant material, depending on the nature of the hazard).
- Avoid contact with, or cover cracks or loose joints to reduce hazards of pinching.
- Workers must know their lifting limitations, plan before lifting, keep themselves in good physical condition, and get help if uncertain that they can lift safely. Managers must plan and allow for safe lifting.
- When lifting an object from the floor:
  - Determine that the object is within the safe weight limit.
  - Check for contact hazards.
  - Walk the intended route of travel to identify and remove slip and fall hazards.
  - Identify changes in elevation, steps, ramps, stairs and ladders that must be negotiated.

- To lift square or rectangular objects:
  - Avoid reaching as you lift.
  - Set feet firmly, placing one foot alongside the load and the other slightly behind the load.
  - Keep objects close to the body.
  - Squat in front of the load.
  - 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.

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, being sure not to trap the bottom hand between the object and the surface on which the object is set.

Workers must be trained and have the opportunity to use the above steps with lighter objects before performing heavy lifting. **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.

Carry objects so one hand is free to hold the handrail on stairs and that there is an unobstructed view of footing. Carry objects in a manner to permit use of both hands while climbing a ladder.

MANUAL HANDLING OF HEAVY OBJECTS

Manual handling of heavy objects, even when not lifting, can pose the same hazards as lifting including cuts, pinches, bruises, crushing, muscle and joint strain, and contact with hazardous materials and biological hazards.

Drums and other containers which must be maneuvered for access to information or sampling locations, that are inaccessible to mechanical handling equipment, require manual handling and special precautions. When handling of heavy objects does not involve lifting, workers can handle heavier objects safely, even those weighing several hundred pounds, if proper techniques are used. In many instances, the procedures involve balancing and taking advantage of the shape of the object.

Manual Handling - Prevention and Protection

Prior to performing manual handling, it must be determined that it can be done safely and that mechanical assistance is infeasible. 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, safety boots, and coveralls. Metatarsal guards, chemical protective clothing, and metal mesh or kevlar gloves must be used as risk increases of heavy items falling, hazardous materials contact and sharp edges, splinters or slivers.

Workers must be aware of and work within their weight-handling capabilities.

Objects to be manually handled must be checked for contact hazards before handling, and to ensure handling will not trap hands, arms, legs, or feet between the object and other objects, walls, or railings.

Properly trained personnel may roll heavy objects with a round base such as 55-gallon drums or compressed gas cylinders, if rolling will not damage the structural integrity. 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.

Only properly trained personnel may move cylindrical objects which must remain upright by hand. Cylindrical objects, such as drums that must remain upright, are handled manually by slightly tilting the object, using the legs for control, and balancing the object on the bottom edge. The handler then walks beside the object, with the object tilted toward the body, positioning the hands on the top edge away from the body and moving so they do not cross, thus maintaining balance and a steady controlled forward motion.

Prior to moving cylindrical objects in this way, the route of travel must be walked to identify any changes of elevation, pot holes, or other obstructions that could cause the object to snag, tip, or get out of control.

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.

FLD 11 ROUGH TERRAIN/ATV USE

RELATED FLDs

FLD 02 – Inclement Weather
FLD 05 – Heat Stress Prevention and Monitoring
FLD 06 – Cold Stress
FLD 22 – Heavy Equipment Operation
FLD 47 – Clearing, Grubbing, and Logging Operations
FLD 57 – Motor Vehicle Safety

HAZARD

Physical hazards associated with rough terrain include vehicle accidents, heavy equipment incidents, falling, slipping, and tripping.

Driving vehicles on uneven surfaces creates a possibility of the vehicle rolling, getting stuck in mud or ditches, or of an accident due to flat tires or striking obstacles and other vehicles.

When working on foot, step inclines and heavy or downed vegetation can hide holes or breaks in the terrain, increasing the risk of slips, trips, and falls.

RECOGNITION AND RISK ASSESSMENT

Rough terrain complicates work activities and adds to or increases risk. In the planning stages of a project, rough terrain must be considered as a physical hazard and identified in the site-specific health and safety plan (HASP). Risk assessment is usually accomplished from site history information (i.e., site topography) and on site by the Field Safety Officer (FSO).

HAZARD PREVENTION AND PROTECTION PROGRAMS

Safety on Foot

Personnel working on rough terrain should maintain a high level of physical conditioning due to increased body stress and exertion.

The site crew should be alert and observe terrain while walking to minimize slips, trips, and falls.

Boots should be ankle high or higher to provide additional support and stability.

Work will be completed in adequate natural light or sufficient illumination will be maintained.

Site personnel will conduct an initial walkover and the “buddy system” will be implemented.

Emergency communications such as a cell phone or two-way radio should be carried at all times.

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.

VEHICLE SAFETY

Vehicle drivers and passengers will wear seatbelts at all times.

Hazards can be prevented by ensuring regular maintenance is performed on vehicles and all safety features are working. Have brakes and wheel bearings of vehicles used off road or in four wheel drive inspected at increased frequency (suggest inspections at twice the manufacturer's recommended frequency).

In order to minimize accidents, site surveillance on foot may be required to ensure clear driving paths.

Minimize side hill travel. Travel straight up and down hills whenever possible. Passengers will not be allowed when side hill travel is required.

Take into account loads or superstructure of vehicles which raise the center of gravity and increase risk of tipping.

Cross streams, small logs or other passable (there is adequate clearance of the undercarriage) obstructions at right angles.

Four wheel drive vehicles should be used if terrain conditions are wet, frozen, broken, or otherwise deemed unsafe for two wheel drive vehicles by the FSO. Use of vehicles off-road will be specifically addressed in the HASP and personnel operating vehicles will be checked for proficiency.

- Before moving a vehicle in the field, first walk the route of travel, inspecting for depressions, stumps, gullies, ruts, and similar obstacles.
- Always check the brakes of a vehicle before traveling, particularly on rough, uneven, or hilly ground.
- Check the complete drive train of a carrier at least weekly for loose or damaged bolts, nuts, studs, shafts, and mountings.
- Engage the all wheel drive when traveling off highway on hilly terrain.
- Increase tire pressures before traveling in hilly terrain (do not exceed rated tire pressure).
- Use the assistance of someone on the ground as a guide when lateral or overhead clearance is close.
- After the vehicle/equipment has been moved to a new site, set all brakes and/or locks. When grades are steep, block the wheels.

Definitions

Class I, All-terrain vehicle (ATV): A motorized off-highway vehicle, 50 in. (127 cm) or less in width, having dry weight of 800 lbs (362.9 kg) or less, and traveling on three or more low pressure tires (10 lbs [4.5 kg] psi or less), with a seat designed to be straddled by the operator.

Class I, Category G, ATV: An ATV intended for general recreational and utility use.

Class I, Category U, ATV: An ATV intended primarily for utility use.

Class II, ATV: A motorized off-highway vehicle with a width which exceeds 50 in. (127 cm) or having a dry weight that exceeds 800 lbs (362.9 kg), traveling on four or more low-profile, low-pressure tires (10 lbs [4.5 kg] psi or less) and having a bench seat.

NOTE: Utility Vehicles are designed to perform off-road utility tasks such as passenger and cargo transportation and are addressed separately below. Examples are Rangers, Rhino, M-Gators, Gators, and Mules.

Rollover Protective Structure (ROPS). A cab or frame that provides a safe environment for the tractor operator in the event of a rollover.

ALL TERRAIN VEHICLES (ATVS)

Qualifications

ATV operators will have completed a nationally recognized accredited ATV training course (such as provided by the Specialty Vehicles Institute of America or in-house resources that have been certified as trainers by an accredited organization) prior to operation of the vehicle.

The operator must pass an operating skills test prior to being allowed to operate an ATV. Proof of completion of this training will be maintained.

Equipment

All ATVs shall be equipped with:

- An operable audible warning device (horn);
- Headlights (if it will be used during hours of darkness);
- Taillights; and
- Brake lights.
- Mufflers and spark arresters.

All Class II ATVs will be equipped with ROPS and seatbelts

Operation

Only Class I and Class II ATVs with four or more wheels may be used. Class III ATV's may not be used.

The manufacturer's recommended payload will not be exceeded at any time.

Gloves and an approved motorcycle helmet with full-face shield or goggles will be worn at all times while operating a Class I ATV.

An ATV will not be driven on public roadways except to cross the roadway, and it will only be driven on a public roadway at designated crossing points or with a road guard (no paved road use unless allowed by the manufacturer).

A copy of the operator's manual will be kept on the vehicle and protected from the elements (if practicable).

Tires shall be inflated to the pressures recommended by the manufacturer.

Passengers are prohibited on Class I ATVs.

UTILITY VEHICLES

Utility vehicles are defined as specialty Class II ATVs designed to perform off-road utility tasks such as passenger and cargo transportation. Examples are Rangers, Rhino, M-Gators, Gators, and Mules.

Utility vehicle operators shall be trained and familiar with the use of all controls; understand proper moving, stopping, turning and other operating characteristics of the vehicle. Operators must review all training materials provided by the manufacturer for the specific vehicles, and training should be in accordance with appropriate manufacturer recommendations. A copy of the operator's manual shall be kept on the vehicle at all times and protected from the elements. At a minimum, training should address:

- Basic riding tips from the manufacturer's published literature for each vehicle.
- Reading terrain.
- Climbing hilly terrain.
- Descending a hill.
- Traversing a slope.
- Riding through water.
- Cargo carriers and accessories.
- Loading and unloading.
- Troubleshooting.
- Proper preventative maintenance, (i.e., oil levels, tire pressure requirements and scheduled maintenance requirements according to the manufacturer's guidelines.).

Utility vehicles shall be equipped with:

- Operable audible warning device (horn).
- Headlights.
- Taillights.
- Brake lights.
- Seatbelts.
- ROPS.

Occupancy in utility vehicles is limited to manufacturer designated seating that has built-in seatbelts. Passengers may not ride in the vehicle's back cargo area unless the vehicle is otherwise equipped. Note: When used for emergency response, medical litters may be placed in the back cargo area but must be secured as described below.

The manufacturer's recommended load carrying capacity, personnel capacity, or maximum safe vehicle speed shall not be exceeded at any time.

Cargo items will be secured as necessary to prevent movement/tipping. All loads over fifty pounds (to include medical litters) must be securely strapped to cargo tie-downs in the rear and to the cargo shelf in the front.

Seatbelts will be worn by operators and passengers of specialty vehicles where installed by the manufacturer. Operators and passengers shall wear goggles at all times when a utility vehicle, not equipped with a windshield, is in motion.

Utility vehicles will not normally be driven on public roadways except to cross the roadway, and will only be driven on a public roadway at designated crossing points or with a road guard. Utility vehicles that are allowed to operate outside a controlled work area and/or on public roads will meet the minimum vehicle safety standards in accordance with 49 CFR 571.5, to include ROPs, seatbelts and placement of "Slow Moving Vehicle" emblems where required.

Manufacturer-installed safety equipment will be maintained in working order and used in compliance with the requirement of this regulation and in accordance with manufacturer's recommendations.

RULES

Observe the following practices to help prevent accidents:

- Do not misuse utility vehicles.
- Reduce speed and exercise extreme caution on slopes or on rough ground.
- Do not overload vehicle and avoid shifting loads. Reduce load when operating over rough or hilly terrain.
- Do not stop or start suddenly when going uphill or downhill. Be especially cautious when changing direction on slopes.
- Stay alert for holes, rocks, and other hidden hazards in the terrain.
- Keep away from drop-offs, ditches, embankments, as well as ponds and other bodies of water. The machine could suddenly turn over if a wheel is over the edge of a cliff or ditch, or if an edge caves in.
- Keep front wheels straight at crest of hill or going over bumps.
- When descending a hill, remove foot from accelerator and apply brakes to reduce speed and maintain control.

Transport Loads Safely

- Be sure load is evenly distributed.
- Do not load above the load guard.
- Securely anchor all loads in cargo box.
- Reduce cargo box capacity when operating on rough or hilly terrain.
- Use existing trails. Avoid terrain such as dangerous slopes and impassable swamps. Watch carefully for sharp bumps, holes, ruts, or obstacles.
- Look ahead at terrain. Know what is coming and be prepared to react. Be alert for hazards.
- Keep front wheels straight at the crest of a hill or going over bumps.
- Reduce speed according to trail, terrain, and visibility conditions.
- The passenger should always use the hand holds.

Climbing or Descending a Hill

- Always use the brakes when going down slopes, the utility vehicle can speed up (freewheel) going down a slope. Engine or clutch braking effect is minimal.
- Balance loads evenly and secure them. Braking could shift the load and affect vehicle stability.
- Sit on the center of the seat and keep both feet within the foot platform.
- Never drive past the limit of visibility. Slow down near the crest of a hill until getting a clear view of the other side.
- If the vehicle stops or loses power going up a hill, lock the park brake to hold the vehicle on slope. Maintain direction of travel and release the brake slowly. Back straight down hill slowly while maintaining control. Do not turn the vehicle sideways. The vehicle is more stable in a straight forward or rearward position.
- If the utility vehicle begins to tip, turn the front wheel downhill to gain control before proceeding.

Riding Through Water

- Avoid water whenever possible. If the drive belt becomes wet, slippage will occur and the vehicle will lose power.
- Never cross any body of water where the depth may be unknown to the operator. As an operational guideline, deep water is considered anything in excess of 152 mm (6 in.) in depth. Tires may float, making it difficult to maintain control.
- Choose a course within the waterway where both banks have a gradual incline. Cross at a point known to be safe.
- Proceed at a slow steady speed to avoid submerged obstacles and slippery rocks.
- Avoid water crossings where the operation of a utility vehicle may cause damage to waterway beds or erode waterway shoreline.

FLD 12 HOUSEKEEPING

Hazards associated with poor housekeeping include but are not limited to slips, trips, falls, punctures, cuts, and fires. Good housekeeping is a critical element when working under all FLDs. Housekeeping inspection checklists are available on-line on the Weston Environmental, Health, and Safety (EHS) Portal site.

RECOGNITION AND RISK ASSESSMENT

Good housekeeping is an important element of incident prevention. Good housekeeping should be planned at the beginning of the job and carefully supervised and monitored through project completion.

Housekeeping requirements must be addressed in the planning stages of a project Health and Safety Plan (HASP). Risk assessment can be accomplished in the development stages of a project by listing in the site-specific HASP, good housekeeping requirements and the hazards associated with poor housekeeping (e.g., slips, trips and falls). The Field Safety Officer (FSO) must make decisions on the proper safety procedures and recommend them to the site 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.

PREVENTION AND PROTECTION

Incidents can be prevented or minimized by following the general guidelines described below:

1. Plan ahead. A materials storage area which has been planned is more orderly than one which has developed haphazardly.
2. Assign responsibilities. If the size of the job and work force merit, a person should be assigned specific responsibility for clean up. Ideally, each individual should pick up his or her work area and help keep the site neat.
3. Implement the program. Housekeeping must be part of the daily routine, with clean-up being a continuous procedure.

Incidents caused by poor housekeeping can also be prevented by adherence to the following rules.

Lunch areas should be kept clear of empty bottles, containers, and papers. Trash disposal cans should be provided. An effective means of preventing litter is the provision of suitable receptacles for hazardous waste as well as no hazardous waste.

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 (e.g., covered metal container) and disposed of regularly.

Materials must be stacked and stored to prevent sliding or collapsing.

WESTON project managers and WESTON subcontractors should provide sufficient personnel and equipment to ensure compliance with all housekeeping requirements.

Work will not be allowed in areas that do not comply with the requirements of this FLD.

The FSO and WESTON subcontractors will inspect the work area daily for adequate housekeeping and record findings on the daily inspection report.

Adequate lighting should be provided in or around all work areas, passageways, stairs, ladders, and other areas used by personnel.

All stairways, passageways, gangways, decontamination lines, and accessways shall be kept free of materials, supplies, and obstructions at all times.

Loose or light material should not be stored or left on roofs or floors that are not enclosed, unless it is safely secured.

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.

Tools, materials, and equipment subject to displacement or falling should be adequately secured.

Empty bags that contained lime, cement, and other dust-producing materials should be removed periodically, as specified by the designated authority.

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.

Walkways, runways, and sidewalks should be kept clear of excavated material or other obstructions and no sidewalks should be undermined unless shored to carry a minimum live load of 125 pounds per square foot.

Containers should be provided for storing or carrying rivets, bolts, and drift pins, and secured against accidental displacement when aloft.

When rivet heads are knocked off or backed out, they should be prevented from falling.

Form and scrap lumber and debris should be cleared from work areas, passageways, and stairs in and around building storage yards and other structures.

All storage and construction sites should be kept free of the accumulation of combustible materials.

All materials should be maintained in neat stockpiles for ease of access. Aisles and walkways should be kept clear of loose materials and tools.

Areas prone to weeds and grass should be kept mowed. A standard procedure should be established for cleanup of such areas, as specified by the FSO.

Rubbish, brush, long grass, or other combustible material must be kept from areas where flammable and combustible liquids are stored, handled, or processed.

FLD 18 OPERATION AND USE OF BOATS

GENERAL

WESTON acknowledges the significant hazard that operating watercraft creates for our personnel, vendors and clients. This procedure describes the minimum requirements for WESTON personnel to be involved in activities or tasks that require the use of boats (watercraft). The following is an outline of the combinations of personnel that are possible in a boating related job:

1. Only WESTON Personnel
2. WESTON personnel and client and/or vendor personnel
3. Vendor personnel only

WESTON requires that a Pilot, Helmsman, or Captain of the vessel be identified and approved for all three of these personnel combinations involving watercraft. For tasks that require non-WESTON personnel to be present on a WESTON boat, the boat or other watercraft may need to be operated by an individual with a current U.S. Coast Guard (USCG) Captain's license and rating for the type of vessel being operated.

NOTE: *The local Coast Guard Regional Marine Safety Office (MSO) should be contacted to determine the need for a Captains license. Criteria to be assessed would include; location, type craft, tasks to be conducted, personnel involved and the basis for passengers to be onboard.*

APPROVALS

Use of watercraft requires the written approval of the Division Safety Manager (DSM) **and** a Boating Safety Review Committee Member. The DSM and Boating Safety Review Committee Member shall review and approve Health and Safety Plan tasks associated with the use of all watercraft. Approved Boating Safety Review Committee Members are that can be contacted are as follows:

Name	Location	Work Phone Number	Cell Phone Number
James Davis	Mobile, AL	(251) 602-1898	(334) 319-0380
Brad Benson	Carlsbad, CA	(760) 931-5105	
Mike Stuart	Albuquerque, NM	(505) 837-6566	(505) 259-7613
Theodore Blackburn	Bedford, NH	(603) 656-5442	(603) 860-4457

A Pilot, Helmsman, or Captain shall be identified by name and approved by the DSM and a member of the Boating Safety Review Committee. The Pilot, Helmsman, or Captain shall prepare a float plan and file the float plan with the DSM, Safety Officer, and the Project Manager. The Float Plan may also be filed with the appropriate authority (U.S. Coast Guard). Pilot, Helmsman, or Captain qualifications and experience shall be defined at a minimum as follows:

- License and rating (Coast Guard and State or other) if required,
- Experience with type/size of boat being used
- Experience on body of water where the boat will be operating

REFERENCES

Related FLD OPS:

FLD02 - Inclement Weather
FLD05 - Heat Stress Prevention and Monitoring
FLD06 - Cold Stress
FLD07 - Wet Feet
FLD10 - Manual Lifting of Heavy Objects
FLD15 - Remote Areas
FLD19 - Working Over or Near Water
FLD32 - Fire Extinguisher Required and Requirements

Reference Guide to State Boating Laws (fifth edition)-USCG

PROCEDURE

This field operating procedure is intended as an overview and guide for boating operation and safety. This field operating procedure is much too brief to adequately prepare personnel to operate watercraft or work on the water. At a minimum, WESTON requires that WESTON personnel and Vendors who plan to operate watercraft take a course on Boating Skills and Seamanship offered by the Coast Guard Auxiliary, as well as any State-required training. Topics covered usually include sailing, marine engines, navigation, ropes and knots, locks and dams, and safe boat handling and operation.

Introduction

Watercraft are frequently used in WESTON field activities to gather environmental information and samples. The use of boats without adequate preparation and training can lead to accidents, injuries, and death.

Whether a passenger or Pilot, Helmsman, or Captain of the Boat used for environmental monitoring, all personnel have responsibilities for safety. All personnel working on boats need some basic information about boat safety equipment and preparation, and about routine boating procedures and emergency procedures. Even if an individual does not plan to pilot a boat, an accident may unexpectedly put him or her in command or in the water alone.

Three major areas of boating safety will be discussed in this field operating procedure:

1. Selection and preparation of the vessel and its equipment.

Coast Guard Notes:
A Coast Guard study of boating accidents shows that the main cause of fatalities to be boats capsizing due to someone standing up in the boat, improper loading of the boat, or ignoring weather warnings. Most boating fatalities resulted from boats capsizing. The second and third largest number of fatalities resulted from falls overboard, vessels sinking, and collisions.

Every person operating a boat is legally responsible for inspecting, equipping, and operating the boat in compliance with federal and state regulations and for any damage that may be caused by operation of the boat. The person in command of a boat is required to know the requirements for operation and navigation of the boat, the regulations that apply locally, and the mandatory rules of the road.

The rules of the road are the codes governing the lights to be carried by boats, the signals to be made, and the actions of one boat with respect to another when the risk of collision exists. International Rules of the Road for preventing collision at sea were first formalized in 1889 for navigation in international waters. The United States has adopted similar rules that must be followed in all United States waters. (The separate rules that have existed for the Great Lakes, the Mississippi River and its tributaries, and the intracoastal waterway and other inland waters are in the process of

2. Preparation of information and other items needed for the field trip.
3. Operation of the vessel under routine and emergency conditions.

Much of the information in this field operating procedure has been drawn from publications of the U.S. Coast Guard and the U.S. Coast Guard Auxiliary. Many other references are available, such as "Chapman Piloting – Seamanship & Small Boat Handling" by Elbert S. Maloney. Please refer to these sources for additional information.

Hazard Recognition

The hazards associated with the operation and use of watercraft include but are not limited to:

- drowning,
- heat stress,
- cold stress,
- hypothermia, and
- injuries from slips, trips, and falls.

The potential for back injuries due to improper lifting techniques also exists when working on boats. Carelessness, horseplay, or other unsafe acts that could cause injury to personnel when operating or using boats are prohibited.

There are also serious hazards associated with untrained, inexperienced personnel operating boats and/or boating equipment, lack of USCG-approved Personal Floatation Devices (PFD), and misuse of appropriate PPE , which could result in injury or death.

Some of the most serious and often neglected hazards associated with boating safety include:

- Weather – weather and weather forecasts need to be reviewed prior to departure and while boating. Changes in weather conditions can happen quickly and can create serious problems if caught unaware.
- Operating in unfamiliar waters – currents, subsurface obstructions, and navigation need to be included in float plan development
- Operating an unfamiliar vessel – different types of boats have different characteristics in handling and performance. The type of vessel must be both appropriate for the type of waters where the vessel will operate and for the type of work expected to be performed.

Documentation Requirements

Health and Safety Plan

A WESTON HASP is required for any work involving a boat or other watercraft. This HASP shall include specific descriptions of :

- Work to be performed from the watercraft,
- Body of water that will be involved,
- Type of boat to be used,
- Identity and qualifications & experience of the Pilot, Helmsman, or Captain and the crew.
- Definition of conditions such as weather and hours of operation where the boat will be prohibited from operating or will be required to stop work and return to port.

- Communication methods and frequency.
- Methods of navigation, charts and maps

Pre-Trip Hazard Assessment and Boating Checklist

The Pilot, Helmsman or Captain shall be responsible for completing a Daily Boating Pre-Trip Inspection Checklist (Refer to attachment "A") prior to each days operations. Any deficiencies noted shall be resolved prior to leaving the dock.

Registration

All boats must be registered and their numbers and validation stickers displayed. The certificate of registration must be onboard at all times when the boat is being operated.

NOTE: Livery boats under 26 feet in length, hired for less than seven days, need not carry the certificate, but must have copy of the lease or rental agreement on board, signed by the owner/representative and by the person renting the boat. The agreement must show the registration number and the period of time for which the boat is rented.

Navigation Charts

Up-to-date navigation charts, a GPS, and a compass should be taken and information should be obtained about any unusual navigation hazards that may be likely in the are, such as shoals, sandbars, rocks, or rapids.

Float Plans

The Pilot, Helmsman, or Captain shall prepare a float plan for each trip and file it with the DSM, Safety Officer and the Project PM who will be responsible to request a search if necessary. At a minimum, the Float Plan should include destination, time of return, who is on board, and a description of the boat (refer to Attachment E—Sample Float Plan).

The Coast Guard's recommended format for a Float Plan provides space for recording:

1. Description of boat in detail, so the boat can be identified and its position can be estimated

2. Number of persons aboard and who they are

3. Radio type and frequencies available

4. Trip expectations, destination, and latest expected return time

5. Name and telephone numbers of Coast Guard or other agency to be notified if return is delayed beyond the latest expected return time.

Selection and Preparation of the Vessel

This section describes requirements for the selection and preparation of a vessel, compliance with WESTON operating procedures, boating safety regulations, and recommendations for achieving more than the minimum protection required.

Only watercraft that is considered to be stable in the environment of use should be used for environmental monitoring and sampling projects. Canoes and kayaks, due to their tipable nature, are not considered to be stable and should not be used unless specific approval is obtained from the responsible DSM. and a Boating Safety Review Committee member.

One convenient way to see if a watercraft is in compliance with the minimum safety requirements is to request a complimentary inspection from the local Coast Guard Auxiliary. A member of the Coast Guard Auxiliary will examine the watercraft for compliance with the federal regulations and additional recommendations that the Auxiliary considers desirable for safety. If the watercraft passes the inspection, a current Courtesy Examination decal will be placed on the watercraft. If the watercraft does not pass, a confidential report of deficiencies will be given to the watercraft owner.

All powered watercraft are required to be registered, usually with a number assigned by the state.

Equipment Needed or Required

Equipment needed or required on all motorboats includes a fire extinguisher, a signaling device, means of preventing accumulation of flammable fuel vapors, an approved PFD for each person onboard, visual distress signals, and lights if the vessel will be operated at any time before sunrise or after sunset. Refer to Attachment "B" for additional equipment discussion and Attachment "A" for an Daily Pre-trip Inspection/Equipment Checklist

Recommended Inspections

Before a boat is taken out on a field trip, it should be inspected carefully to see that the engine has an adequate fuel supply and is in good working order, that all navigation and communication equipment is working, and that all safety equipment is on board and accessible. In addition, all watercraft equipment is expected to be in good operating condition.

The Coast Guard Auxiliary publishes information that can be used to develop a pre-trip checklist for each specific type of boat. They also provide information that can be used to prepare guidelines for engine troubleshooting and for routine engine maintenance. The watercraft should not be operated unless a complete pre-trip watercraft inspection is conducted and there are no deficiencies detected.

Refueling Precautions

Gasoline is flammable and watercraft are very susceptible to damage from fire that special safety precautions must be taken. Four basic precautions are:

- keep all sources of ignition away from flammable vapors
- keep the nozzle of the fueling source in contact with the fill opening to prevent static sparks
- avoid overfilling tanks
- never fill portable fuel tanks in the boat. (Portable tanks should be filled on the dock or at another location.)

The precautions for fueling boats with inboard engines are usually more elaborate than for outboard motors because inboard engine fuel tanks cannot be filled remote from the boat and special ventilation equipment is needed.

Equipment

All boats to be used on WESTON projects will be require to have, at a minimum, the equipment indicated below. Additional information on equipment, loading and boat handling is contained in Attachment B.

Minimum Required Safety Equipment for Boats to 26 Feet

Equipment	*Class A* *Less Than 16 Feet (4.9m)*	*Class 1* *16 Feet to Less Than 26 Feet (4.9–7.9m)*
Personal flotation devices	One Type I, II, III, or IV for each person.	One Type I, II, or III for each person on board or being towed on water skiis, etc., plus one Type IV available to be thrown.
Fire extinguishers		
When no fixed fire extinguishing system is installed in machinery space(s)	At least one B-I type approved hand portable fire extinguisher. Not require on outboard motorboats less than 26 feet (7.9 m) in length and not carrying passengers for hire if the construction of such motorboats will not permit the entrapment of flammable gases or vapors.*	
When fixed fire extinguishing system is installed in machinery space(s)	None	
Ventilation	At least two ventilator ducts fitted with cowls or their equivalent for the purpose of properly and efficiently ventilating the bilges of every engine and fuel tank compartment of boats constructed or decked over after 25 April 1940, using gasoline or other fuel having a flashpoint less than 110°F. (43°C). Boats built after 31 July 1981 must have operable power blowers.	
Whistle	Boats up to 39.4 feet (12 m)—any device capable of making an "efficient sound signal" audible 1/2 mile.	
Bell	Boats up to 39.4 feet (12 m)—any device capable of making an "efficient sound signal."	
Backfire flame arrester	One approved device on each carburetor of all gasoline engines installed after 25 April 1940, expect outboard motors.	
Visual distress signals	Required only when operating at night or carrying six or fewer passengers for hire. Same equipment as for larger boats.	Orange flag with black square-and-disc (D); and an S-O-S electric light (N); or three orange smoke signals, hand held or floating (D); or three red flares of handheld, meteor, or parachute type (D/N).

*Dry chemical and carbon dioxide (CO_2) or the most widely used types, in that order. Other approved types are acceptable. Toxic vaporizing-liquid type fire extinguishers, such as those containing tetrachloride or chlorobromomethane, are not acceptable.

Minimum Required Safety Equipment for Boats 26 to 65 Feet

Equipment	*Class 2* *26 Feet to Less Than 40 Feet (7.9–12.2m)*	*Class 3* *40 Feet to Not More Than 65 Feet (12.2–19.8m)*
Personal flotation devices	One Type I, II, or III for each person on board devices or being towed on water skiis, etc., plus one Type IV available to be thrown.	
Fire extinguishers		
When no fixed fire extinguishing system is installed in machinery space(s)	At least two B-I type approved hand portable fire extinguishers, or at least one B-II type approved hand portable fire extinguisher.	At least three B-I type approved hand protable fire extinguishers, or at least one B-I type plus one B-II type approved hand portable fire extinguisher.
When fixed fire estinguishing system is installed in machinery space(s)	At least one B-I type approved hand portable fire extinguisher.	At least two B-I type approved hand portable fire extinguishers, or at least one B-II approved unit.
Ventilation	At least two ventilator ducts fitted with cowls or their equivalent for the purpose of properly and efficiently ventilating the bilges of every engine and fuel tank compartment of boats constructed or decked over after 25 April 1940, using gasoline or other fuel having a flashpoint less than 110°F. (43°C). Boats built after 31 July 1981 must have operable power blowers.	
Whistle	Boats up to 39.4 feet (12 m)—any device capable of making an "efficient sound signal" audible 1/2 mile.	Boats 39.4 to 65.7 feet (12–20 m)—device meeting technical specifications of Inland Rules Annex III, audible 1/2 mile.
Bell	Boats up to 39.4 feet (12 m)—any device capable of making an "efficient sound signal."	Boats 39.4 to 65.7 feet (12–20 m)—bell meeting technical specifications of Inalnd Rules Annex II; mouth diameter of at least 7.9 inches (200 m).
Backfire flame arrester	One approved device on each carburetor of all gasoline engines installed after 25 April 1940, expect outboard motors.	
Visual distress signals	Orange flag with black square-and-disc (D); and an S-O-S electric light (N); or three orange smoke signals, hand held or floating (D); or three red flares of handheld, meteor, or parachute type (D/N).	

Accidents

Various studies have shown the following to be the major causes of boating accidents:

- Overloading, overpowering, and improper trim.
- High speed turns, especially in rough water.
- Failure to keep a sharp lookout for obstructions.
- Going out in bad weather (or not starting for home soon enough when good weather turns bad).
- Standing in a moving boat.
- Having too much weight too high in the boat, as when someone sits on the deck of a small outboard.
- Leaks in the fuel system.
- Going too far offshore.

Each of these factors, and others not listed here, should be avoided. A carefully matched boat, motor, and propeller, operated in accordance with the law and with courtesy, will go a long way

toward eliminating accidents. Always remember that the possibility of trouble always exists; be prepared to act in an emergency.

Man Overboard

If someone falls overboard, maneuver the boat's stern away from him. Shift into neutral immediately (kill the motor if you do not have a gearshift) and throw a buoyant cushion or life jacket near the victim (try to get it close, but do not aim directly at the victim). Make sure you are well clear of the person in the water before shifting into gear again.

Circle around quickly, selecting a course that will allow you to approach the person with the boat headed into the wind or waves. Approach him slowly, taking care to come alongside and not over him. Stop the motor before attempting to get the victim aboard.

When alongside, extend a paddle or boathook to him, or one end of a line. With the motor stopped, lead him around to the stern, where the freeboard is the lowest, if there is enough space at the transom for him to get aboard without contacting the motor. If this is not feasible, help the victim aboard over the side as far aft as possible. In either case, the use of a boarding ladder will be of help. To avoid a capsize while the victim is coming aboard, other passengers should shift their weight to the opposite side to maintain trim as much as possible. When helping a person aboard, hold him under the armpits and lift gently.

In Case of an Accident

Personnel involved in a boating accident are required to stop and give as much help as possible without seriously endangering their boat or passengers. Personnel must identify themselves and their boat to any person injured or to the owner of any property damaged.

Personnel witnessing an accident may now render assistance with reasonable assurance of freedom from liability. The Federal Boat Safety Act of 1971 contains a "good samaritan" section which provides that any person who renders assistance at the scene of a vessel accident will not be liable for civil damages from such action if he acts as a reasonably prudent man would have acted under the same circumstances.

When giving first aid, proceed slowly. More damage may be done by the well-meaning amateur than was caused by the actual injury. Remember, there are only three instances when speed in giving first aid is required:

1. When the victim has stopped breathing and has no pulse.
2. When there is arterial bleeding.
3. When the victim has been subjected to other injuries that may be life threatening.

The measures required in these instances are taught in standard first aid courses. An NOI is to be completed and submitted, as appropriate. If the incident results in the sinking of the vessel, or damage to the vessel, a Coast Guard report and NOI is to be submitted as soon as possible.

ATTACHMENT A
PRE-BOAT TRIP INSPECTION CHECKLIST

Boat Pre-trip Inspection Checklist

Date:
Name of inspector:
Type of vessel:
Type of engine(s):
Rated boat weight capacity:
Captain of the boat:
List of personnel who will be part of the trip:

BASICS			
Is there a fire extinguisher on board (Type ABC)?	☐ YES	☐ NO*	
Is the fire extinguisher inspected?	☐ YES Date of inspection ___/___/_____	☐ NO*	☐ Not Applicable
Are lifejackets available for each person on board?	☐ YES Specify Type: _____	☐ NO*	
Has the first aid kit been inspected?	☐ YES Date of inspection ___/___/_____	☐ NO	
Is the first aid kit in a waterproof container?	☐ YES	☐ NO	
Indicate the emergency signaling devices on board (e.g., flares, mirrors, flags, etc.).	List:		
What electronics/navigational devices are you planning to use (e.g., radar, GPS, depth finder, compass, communications [e.g., 2-way radio, _____, marine radio, etc.], etc.)?	List:		
What body of water will the boat be operating in?	☐ river ☐ stream ☐ lake ☐ ocean ☐ pond	Name: _____ Location: _____	
Are there any special conditions present (barge traffic, dam, adverse weather, operation near shipping lanes, near sand bars, etc…)	☐ YES	☐ NO	List:

BOAT			
Is the boat registration inspection updated for the current year?	☐ YES	☐ NO*	
Are the fuel levels adequate?	☐ YES Fuel levels_____	☐ NO*	
Are bail plugs (upper and lower) present on boat?	☐ YES	☐ NO*	
Is the motor size adequate for the boat (see boat specifications)?	☐ YES	☐ NO*	
Are there holes or cracks in the hull?	☐ YES*	☐ NO	
Is the bilge pump operational?	☐ YES	☐ NO*	
Do all engine(s) operate properly?	☐ YES	☐ NO*	
Are spare fuses available on board? (if req'd)	☐ YES	☐ NO	
Does the boat need to have an anchor?	☐ YES	☐ NO	
Is an anchor present?	☐ YES	☐ NO	
Is there enough rope on the anchor for the location, depth, and scope?	☐ YES Length of rope_____	☐ NO	
If operating at night, are the navigational lights working?	☐ YES	☐ NO*	☐ Not Applicable
If operating at night, does the pilot, helmsman, or captain have prior experience operating in such conditions?	☐ YES	☐ NO*	
Overall, is the vessel sea-worthy? (If possible this determination should be made by Coast Guard personnel, prior to the trip.)	☐ YES	☐ NO*	
Will the dead weight (people + equipment) exceed the maximum weight requirements for the boat?	☐ YES*	☐ NO	
TRAILER			
Is trailer in good condition?	☐ YES	☐ NO	☐ Not Applicable
Are the trailer lights working properly?	☐ YES	☐ NO	
Is the winch operating properly?	☐ YES	☐ NO	
Is the winch strap in good condition?	☐ YES	☐ NO	
Are the trailer rollers cracked?	☐ YES	☐ NO	
Are the trailer boat guides straight and in good condition?	☐ YES	☐ NO	
Do the tires have appropriate air pressure?	☐ YES	☐ NO	
Are the tires in good condition?	☐ YES	☐ NO	
Are the engines secured to or removed from the transom during transportation?	☐ YES	☐ NO	

SUPPLEMENTAL INFORMATION			
WEATHER FORECAST			
How will the pilot, helmsman, or captain and crew keep track of changing weather conditions?			
Will someone onshore track weather conditions also?	☐ YES	☐ NO	
How will that person remain in contact with the boat?			
For a small boat (under 21'), are the waves equal or greater than 2 feet (1' wave)?	☐ YES*	☐ NO	☐ Not Applicable
For a larger boat, are the waves equal or greater to 4 feet (2' wave)?	☐ YES*	☐ NO	☐ Not Applicable
For any boat, is the wind speed equal or greater than 15 knots?	☐ YES*	☐ NO	☐ Not Applicable
OTHER			
Has a float plan been filed with the Project PM?	☐ YES Plan filed with _____	☐ NO	
Is the operator licensed (with the State or with Coast Guard)?	☐ YES	☐ NO*	
Are any members of the crew capable of operating the boat if the pilot, helmsman, or captain is incapacitated?	☐ YES	☐ NO*	
Does the HASP describe the task(s) involved with the operation of boats?	☐ YES	☐ NO*	

*If any answer followed by an asterisk is checked, justify task continuation if a "No" is checked.

I certify that I have inspected all the items on this checklist and that the information is accurate to the best of my knowledge.

Reviewer's Signature: _____ Date: _____

NOTE: Copy of checklist to be placed in Project file.

ATTACHMENT B
HANDLING AND EQUIPMENT DISCUSSION

HANDLING

Before getting underway, have all weight evenly distributed so that the boat will trim properly – level from side to side and slightly down at the stern, never down at the bow. Passengers should be seated toward the centerline of the craft and not hanging over the sides; with not too many forward or aft. If the load is concentrated near the bow or stern, the boat will plow or drag needlessly, reducing the safety margin and increasing fuel consumption. Proper trim is essential to proper performance.

In boarding from a pier, step into the boat as near to the center as possible, keeping body weight low. When boarding from a beach, come in over the bow. Keep lines tight or have someone steady the boat.

Never jump into a boat or step on the gunwale (edge of the hull). Pile gear to be taken aboard on the pier so that it can be easily reached from the center of the boat. Better still, hand it in to someone already aboard. It is the team leader's responsibility to determine that each boat, after loading, is within the maximum allowed load.

Trim the boat as well as possible before getting underway. In smaller craft, it is dangerous for passengers to change places or move while the boat is in motion. If movement becomes essential, slow or stop the boat first, remembering in rough weather to keep enough momentum to retain steerage control and to keep the craft headed into wind and waves. Have the person who must move keep low and near the boat's centerline.

Outboard craft are often operated at relatively high speeds and their stability becomes a matter of safety. Some hulls will run straight ahead quite steadily but have a tendency to heel excessively, or even flip over, when turned sharply. The faster a boat goes, the less keel it requires, and the more important it is to reduce speed before starting a turn. Never turn more sharply than necessary. Normal operation seldom requires a sudden, sharp, high-speed turn. Every outboard operator must carry one or more types of emergency signaling equipment, in good condition and ready for immediate use. If no distress equipment is on board, an outboard boatman in need of help can always signal by slowly and repeatedly raising and lowering his arms outstretched to each side while he stands in the craft (or from a kneeling position if rough water conditions make standing hazardous).

Whenever boating in unfamiliar waters, take advantage of "local knowledge:" watch the operation of boats piloted by skippers who are at home in these waters, and do not hesitate to ask questions about possible hazards.

Many persons who have not handled a small boat have the misconception that one can be maneuvered and stopped as easily as an automobile. This is not the case; however, much can be done with a boat if one takes it slowly and easily. The new boat operator should practice leaving from and returning to the pier, and other maneuvers, until he has developed both skill and confidence. Begin cautiously at first and gradually build up to the procedures of experienced operators.

Always slow down gradually rather than pulling the throttle back quickly. All boats have a stern wave that will catch up with and pass the craft if it comes to an abrupt stop. This can bring water into the boat, especially if it has a low-cut transom with no motor well.

All boating at night will be performed at reduced speeds. Personnel, who become disoriented, or unsure of their position, should stop the boat until they can determine where they are.

Radio contact between crews should be more frequent; crew check-ins at set intervals will be mandatory.

Fire Extinguisher

Every motorboat will have a fire extinguisher suitable for putting out a fire of burning liquids or electrical equipment. Fire extinguishers must show approval by Underwriters' Laboratories, Inc. (UL) or another testing laboratory. For boats less than 26 feet in length, the required extinguisher has to have a rating of B-1.

Small extinguishers usually have very limited fire-fighting capability, and may be inadequate for a fire involving liquid fuel. WESTON recommends that new or replacement fire extinguishers be the dry chemical, of the largest capacity that will fit conveniently in the boat. (A 6-pound dry chemical fire extinguisher with a rating of 2A; 40B is commercially available.)

If WESTON has responsibility for a fueling location, WESTON requires that a special extinguisher be available at that location that is effective on spill fires (a foam-type that forms an aqueous film).

Signaling Devices for Navigation

Boats up to 39.4 feet are required to carry a whistle or horn that can be heard for at least one mile. The device can be operated by mouth, hand, or power. Longer boats have the same requirements except that the whistle or horn must be operated by power.

Preventing Accumulation of Fuel Vapors

Powered ventilation is needed for motorboats with enclosed spaces in which flammable fuel vapors may accumulate, such as engine and fuel tank compartments, in order to prevent explosion and fire. Special ventilation is not required in open boats in which flammable vapors are not likely to accumulate. (If gasoline is spilled in any boat, there will be an accumulation of flammable vapors in the boat until the vapors are removed by exhaust blowers or air circulation.)

Personal Flotation Devices

All boats less than 16 feet in length are required by law to carry at least one approved personal flotation device for each person onboard. Boats of greater length are required to carry at least one approved wearable personal flotation device for each person onboard, plus one throw-able flotation device. Five types of personal flotation devices are approved by the Coast Guard. Four of the types are acceptable for recreational boats and readily available: Types I, II, III, and IV. A Type V work-jacket is not approved for recreational boats. Of the four wearable types of approved flotation devices, only two Types I and II are designed to prevent the drowning of an unconscious person.

A Type I device is the familiar collar-type life jacket. It provides more than 20 pounds of buoyancy and is designed to deep the wearer afloat for extended periods of time in rough water. A Type I device is recommended for maximum protection. Type I devices are required on commercial vessels and on licensed passenger-carrying vessels. (Reflective tape is required on Type I devices on passenger-carrying vessels.)

A Type II device is more comfortable to wear than a Type I device, but has less buoyancy (15.5 pounds) and is less able to turn an unconscious person face upwards.

A Type III personal flotation device is designed to keep a conscious person in a vertical or slightly backward position, but not to turn an unconscious person over from a face downward position (even though it does have some turning ability). Buoyancy provided is 15.5 pounds minimum.

A Type IV personal flotation device is not designed to be worn but to be thrown to a conscious person in the water. Buoyancy provided is 16.5 pounds. One Type IV device is required for each boat 16 feet and over in length. Type IV devices are permitted as the minimum required in canoes, kayaks, and other vessels less than 16 feet in length.

A Type V personal flotation device is a wearable work jacket designed to deep a conscious person in a vertical or slightly backward position, but it is not designed to turn an unconscious person over from a face-downward position. Buoyancy provided is 27 pounds minimum. (Type V devices are not approved for use in recreational boats, and they usually cannot be purchased in stores that sell only recreational boats and equipment.)

WESTON personnel working on a boat are required to use either a Type I or II personal flotation device while underway. For cold weather operations, recommended devices are float coats or exposure suits, both Coast Guard approved. Other types of PFDs may be approved for use based upon location (i.e., ponds, lakes, etc.) and task activities (i.e., sampling, surveying, etc.) under a site-specific HASP and Float Plan.

Visual Distress Signals

Visual distress signals are needed for any boating activity where the need to signal for emergency help may arise. Personnel who are close to another boat can wave their outstretched arms up and down to signal distress. However, at distances farther from shore or other boats, another way may be needed to signal for help. By carrying approved visual distress signals, boaters can assure that they have a noticeable and effective way of attracting attention to secure prompt assistance in case of an emergency.

Since January 1981, visual distress signals have been required for all recreational boats except manually-propelled boats, boats less than 16 feet in length, open sailboats less than 26 feet in length, boats on Western rivers, and boats participating in organized events such as races and regattas.

When a search is underway, the time it takes to locate a boat in difficulty or a person in the water can be reduced by the use of visual distress signals.

There are two types of signaling devices: non-pyrotechnic and pyrotechnic. Each device is approved for day use, for night use, or for both day and night. Visual distress signaling devices must carry the manufacturer's certification that they meet Coast Guard requirements.

Non-pyrotechnic devices include:

- An orange distress flag, 3-feet square with a black square and a black ball. This is accepted as a day signal only.
- An electric distress light, which must automatically flash the international SOS distress signal (three short flashes, three long flashes, and three short flashes) four to six times each minute. This is accepted as a night signal only. (An ordinary flashlight is not acceptable since it must be flashed manually and does not normally produce enough candle power.)

One flag and one electric distress light will meet the requirements for visual distress signals. These are best for small boats because there is less chance for fire and explosion than with pyrotechnic devices.

Pyrotechnic devices that meet the requirements include:

- Hand-held orange smoke distress signals (day use only)
- Floating orange smoke distress signals lasting 5 or 15 minutes (day use)
- Hand-held red flare distress signals (day or night use)

The minimum number of pyrotechnic devices required (because they are single-use devices, with limited burning time) is three for day use and three for night use, or three that can be used effectively either day or night.

Pistol-projected parachute red flare distress signals, which require suitable approved launching devices, can be used in the day or at night. Also approved for day or night use are self-contained rocket-propelled parachute red flares and red aerial pyrotechnic flare signals, which may need approved, suitable launching devices.

Visual distress signals are an important part of a boat's safety and survival gear. They should be in good condition and easily accessible. Pyrotechnic devices must be stored to protect them from water, puncturing and access by children. They must also be handled very carefully to prevent setting fire to the boat.

Pyrotechnic devices that have passed their expiration date (42 months from the date of manufacture) need to be replaced. The expiration date on pyrotechnic devices, if used, should be checked before the boat is launched.

Identification Lights

Every boat is required to be equipped with certain lights if it is on the water at any time after sunset and before sunrise. The purpose of these lights is to identify the boat's location so that collision can be avoided.

Vessels underway after sunset and before sunrise are required to display at least three lights: a green light and a red running light, each visible for one mile, and a white anchor light visible for two miles. (Details of location and visibility distance may vary, depending on the area in which the boat will be operating.)

The green light must be visible only from directly ahead of a boat and on the right or starboard side of the boat through an arc of 112½ degrees, or only as far back as an angle of 22½ degrees to the rear of a right angle from the centerline of the boat. In the corresponding sector on the left side of a vessel, from dead ahead to 2 points aft of the port beam, the vessel must display a red light.

Each vessel must display a white anchor light that can be seen from all directions. Two white lights are required for vessels operating in international waters, and two lights may be used by vessels in other waters. One white light must be visible through the combined arcs of the red and green lights and be mounted 1 meter (3.3 feet) higher than they are. The second white light must be visible from the rear of the boat, through the arc that is not covered by the front white light.

Under the rules governing all United States waters (except the Great Lakes until March 1983), motorboats from 26 feet up to 65 feet in length must have an additional white light in the forepart of

the vessel that is visible for a distance of 2 miles through the same arc of visibility as the red and green lights (20 points).

The nautical jargon for the 112½ degree arc of visibility for the starboard green light is: "Visible from dead ahead to 2 points abaft the starboard beam." In nautical terminology, a circle of 360 degrees has 32 points, corresponding to the points of the compass, and each point equals 11¼ degrees of the circle. Another way of describing the arc of visibility would be to say that on a boat heading north, the green light would have to be seen by boats approaching from any direction between north and east-south-east.

The particular arc of 112½ degrees, or 10 points, represents the "Danger Zone" for the boat, the directions in which the boat must yield the right of way to other vessels. Any vessel that can see the green light on the boat can "Go," because it has the right of way.

In that sector of approach, you are in the Give Way vessel (or Burdened vessel). The other vessel is the Stand On vessel (or Privileged Vessel).

Personnel who expect to be out in a boat after dark in waters where large vessels, tugboats, or working boats may be encountered, need to learn exactly what lighting such vessels will display in order to avoid dangerous situations.

Additional Equipment Recommended

In addition to required equipment, other equipment is recommended for safe boating operations, including an up-to-date chart of the area of operations, a compass for open waters, paddles or oars, a boat hook, and a bailing bucket or bilge pump.

The Coast Guard Auxiliary recommends that each boat carry a first aid kit, emergency water and food, an anchor and rope, a radio for monitoring weather information, and a radiotelephone for emergencies.

The Coast Guard Auxiliary also recommends that spare parts and tools be carried in case of engine trouble or an emergency. For outboard motorboats this includes:

- spare spark plugs
- starter cord
- shear pins
- cotter pins
- a propeller

For inboard motorboats, spare equipment includes:

- bilge pump
- carburetor drip pan
- backfire arrestor
- spark plugs
- coil
- fuel pump
- fuel filter element and gasket
- points and condenser
- propeller

- distributor or parts
- generator and starter brushes
- fuses
- V-belts
- spare oil

The anchor should be selected for the type of bottom where it will be used and be capable of holding the boat against wind and current. Since anchors hold better against a horizontal pull, a 3-foot length of chain is recommended to hold the top of the anchor down. The length of anchor rope should be seven times as the deep as the water.

Personal Gear

Personal gear should include appropriate footwear, clothing to provide protection from extremes of heat and cold, extra dry clothing, medication for motion sickness, if needed, and a water-resistant outer garment. If water temperatures below 60□F or 16□C are expected, wearing a float coat, wet suit, or exposure coveralls is recommended.

Sampling Apparatus and Equipment

Sampling apparatus and equipment should be weighed and the weight marked on an outside surface for convenience in balancing the load in a boat. It will also make it easier to calculate the total load being placed in a boat and to avoid overloading. In figuring the load on the boat, remember to add the estimated weight of samples to be gathered on the trip.

Preparation for Emergencies

Preparation for emergencies should include making sure that everyone in the boat can put on his or her personal flotation device quickly and correctly, and that everyone knows to stay with the boat if it should capsize. Preparation should also be made for any other emergency procedures. (If the passengers on the boat include non-swimmers, they should wear personal flotation devices when there is any likelihood that they may fall into the water.) A site-specific H&S meeting should be given immediately prior to conducting boat operations.

One of the Coast Guard requirements for personal flotation devices that are not worn is that they be readily accessible. They must not be in a locker or be obstructed by other gear.

Field personnel should plan how to conduct scheduled sampling activities with minimum disturbance of the balance of the boat or risk of capsizing or falling out of the boat. Planning should include any special precautions that may be needed (such as using a safety line on a piece of apparatus or on a person using sampling equipment).

In order to prevent capsizing or swamping, a boat must not be overloaded. The total load of passengers, motor, sampling apparatus and other gear should not exceed the weight limit stated on the capacity plate on the boat. It may be prudent to reduce the load in the boat if inclement weather, turbulent water conditions, or vigorous sampling activities are anticipated.

Getting Into and Loading a Boat

Getting into and loading a boat at a dock takes a little care and practice, because it is different from simply stepping down to another level. If you board a boat the wrong way, it may move away from the dock or it may tip precariously. Be sure that the boat is secured to the dock, then grasp one or both

sides of the boat and step into the center of the boat. Stepping into the center of the boat, or as near the centerline as possible, reduces the chance of tipping the boat and losing your balance.

Loading gear into a boat also takes care and practice. Incorrect loading may cause the boat to tip and the gear may fall into the boat or the water.

It is always preferable to load a boat with another person. One person stands with both feet on the dock, passing the gear over and down to another person standing in the center of the boat.

Sampling apparatus, equipment and containers must be loaded into a boat in a safe manner so there is no damage or spill. In the boat, the load should be stashed equally on both sides fore and aft (front and back) with the weight distributed as evenly as possible.

All sampling gear, particularly any that is heavy, should be tied down or secured to keep it from moving around when the boat gets underway, turns, vibrates, or reacts to rough waters.

Although sampling activities may require standing up or leaning over the side of the boat, such actions should be done carefully and under controlled conditions, when the boat is <u>not</u> moving. When the boat is moving, personnel should sit on the seats provided. No one should ride on the bow or gunwales (sides) of the boat.

Personal flotation devices should be worn whenever there is a higher than normal risk of falling out of a boat, such as when the boat is moving at high speed or in rough water. (In some boating activities the safe practice would be to wear a personal flotation device at all times.)

ATTACHMENT C
WEIGHT CAPACITY CALCULATION

WEIGHT CARRYING CAPACITY

One of the most important safety requirements is to limit the weight of the total load on a boat to the rated capacity of the boat. Most boats built since 1972 have been required to display their load capacity on a plate mounted in the boat.

Capacity Considerations

a. Listed capacity of vessel:	_____	Certified Capacity of the Vessel in Pounds	
b. # of People & Weight:	_____	Approximate Weight of Personnel in Pounds	
c. Weight of Motor:	_____	Listed Weight of Motor in Pounds	
d. Weight of Gear:	_____	List Equipment and Weight	
……Fuel (Gallons/Pounds)…….	_____	…….	_____
…….	_____	…….	_____
…….	_____	…….	_____
…….	_____	…….	_____
…….	_____	…….	_____
e.Total Weight of Gear/Equip:	_____	Add items (c + d)	
e.Number/Volume of water samples:	_____	List the number and Volume of Water Samples (in Gallons) to be collected	
f. Weight of Water Samples:	_____	Multiply (# of Samples x Volume in Gallons x 8.33 lbs/gallon)	
g. Weight of Other Samples:	_____	Estimate the number and weight of other samples	
h. Total Weight of Samples:	_____	Add items (f + g)	
i.Weight of Personnel & Equip:	_____	**Add items (b + e + h)**	
j. Capacity Factor:	_____	**Insert a Capacity Reduction for Rough Weather**	
k. Planned Weight:	_____	**Add (i +j)**	

If The Planned Weight in (k) is greater than the Certified Weight in (a), then the weight shall be adjusted be limiting equipment, personnel or samples as necessary to reduce the weight in the vessel.

In the combination capacity plate and certificate of compliance for an outboard motorboat, the first entry lists the manufacturer's rating of the maximum horsepower engine that is safe to use on the boat. The second entry lists the maximum number and weight of persons that can be carried and the third entry lists the maximum weight that can safely be carried by the boat (including persons, motor, and gear). Some boats may have two plates: a certificate of compliance and a separate capacity plate.

In order to avoid exceeding the load carrying capacity of a boat, it is necessary to know the number and total weight of all passengers and the weight of all the equipment and gear planned to be taken on board, including fuel, food, and environmental sampling apparatus. To this total weight must be added the estimated weight of the water or other samples to be collected and brought on board.

The recommended maximum weight shown on the capacity plate may be more than can be carried safely under some weather conditions and for some activities. For example, if rough water is expected, less weight should be carried so that the boat rides higher in the water and is less likely to be swamped by waves.

ATTACHMENT D
BOATING OPERATION UNDER ROUTINE AND EMERGENCY CONDITIONS

OPERATION OF THE VESSEL UNDER ROUTINE AND EMERGENCY CONDITIONS

Boating Operations

Operation of a boat used for WESTON field activities may be so routine that everyone knows how to operate the boat and is thoroughly qualified to operate it under all conditions. If that is not the case, the person in charge of the boat should familiarize a second person on board with the operation and navigation of the boat. Doing so ensures a backup person who can run the boat and get it back to port if the pilot becomes disabled.

Weather Conditions

Before leaving the dock, check the local weather forecast for the area and look for weather signals that may be displayed at marinas, municipal piers, lighthouses, or Coast Guard stations.

The U.S. Weather Bureau publishes charts giving the locations and telephone numbers of all Weather Bureau offices and the location and time schedule of all stations that broadcast marine weather information. The charts also show the location of all storm warning display stations. Charts for local areas can be obtained from the Government Printing Office.

A small craft warning indicates winds up to 38 miles per hour, or 33 knots, and /or sea conditions considered dangerous for small craft such as the ones used commonly in WESTON activities. The daytime signal is one triangular red pennant. Although most display sites do not post night signals, the night signal for a small craft warning is one red light displayed above one white light.

A gale warning, with winds within the range of 34 to 47 knots, or 39 to 54 miles per hour, is signaled by two triangular red flags.

A storm, which may have winds of 48 to 63 knots, or 55 miles per hour up to 73 miles per hour, is forecast when a single square red flag with a black center is displayed.

Two square red flags with black centers are displayed only to show the forecast of a hurricane or tropical cyclone, in which winds speeds of more than 74 knots can be expected.

In addition to getting weather information before beginning a boat trip, it is a good idea to keep track of weather conditions as they develop while the boating activity is underway. Pay attention to increases in wind speed or waves, changes in wind direction, or approach of storm clouds, listen for static on an AM radio, or monitor a weather radio.

Rules of the Road

Every person operating a boat is legally responsible for any damage the boat or its waste may cause. For example, creating an unnecessarily large wake can cause problems in a crowded anchorage or other area, and the boat operator may be held responsible for any damage caused by such a wake.

The person in command of a boat is required to have knowledge of the requirements for operation and navigation of the boat, and of the regulations that apply locally, including the mandatory rules of the road.

The rules of the road that must be followed by everyone operating a boat govern three major subjects: identification lights, rules for steering and signaling course, and signals in fog. The major emphasis in this section will be on rules for steering and signaling course.

Rules for steering and for signaling course are designed to prevent collision by defining which of two approaching vessels has the right-of-way, and what signals are used to quickly signal intent and agreement or disagreement.

The vessel that has the right-of-way is the privileged vessel, now referred to as the Stand On vessel. The Stand On vessel has a right to maintain its course and speed. It also has a duty to maintain its course and speed so that the other vessel can base its actions on known conditions. If a collision becomes imminent, the Stand On vessel no longer has the right-of-way or any privilege.

The vessel that does not have the right-of-way is the Give Way vessel, previously referred to as the "burdened" vessel. When this vessel approaches another closely enough so that collision is possible if both vessels continue, the Give Way vessel must slow, turn or take other positive action to avoid collision.

The steering rules for power vessels apply when two are in sight of each other and close enough so that a collision could occur if both vessels continue on the same course at the same speed.

When two vessels are meeting, crossing, or overtaking, which vessel has the right-of-way? What signals are used to communicate? The following discussion presents three different situations, recommended actions, and recommended signals.

Meeting Situation

When two vessels are approaching head, on or nearly so, in a meeting situation, neither has the right-of-way. If their courses are likely to result in a collision, both must alter their course to the starboard (right) so that each can pass safely to the port (left) of the other.

As a confirmation of its intention to take a particular course, a vessel will give a "course indicating signal" of one or two short blasts on a whistle or horn. In United States waters, the other vessel will signal its understanding and agreement by answering with the same signal, and its lack of understanding or agreement by sounding the danger signal, four short blasts. (In international waters no response is required, and the danger signal is five short blasts.)

One blast in a meeting situation signals intention to alter course to the starboard and to pass the other vessel port to port. Two blasts in the same situation signals intention to alter course to the port and to pass starboard to starboard.

Crossing Situation

When two vessels are approaching at an angle in a crossing situation, the vessel on the right has the right-of-way. As described earlier, your vessel must "give way" or yield the right-of-way to any vessel approaching from any direction on your right between dead ahead to two compass points abaft your starboard beam (the arc of 112½ degrees in which your vessel shows the green light at night). The Give Way vessel must slow or alter course to avoid collision, while the Stand On vessel maintains her course and speed. The U.S. signals are one short blast by the Stand On vessel to indicate intention to maintain course and speed, and an answering blast from the Give Way vessel to
indicate that she has heard and understood the signal the signal and will keep clear. If there is any doubt, the danger signal of four blasts should be sounded and both vessels must stop. Then the vessels must exchange signals until there is an agreement on the courses to be taken.

If you see the red light of a vessel which is crossing your course at night, that vessel has the right-of-way and your vessel must keep clear.

Overtaking Situation

If one vessel is overtaking another, the overtaking vessel is burdened and must be ready to give way until the overtaken vessel has been passed safely.

If the overtaking vessel wishes to pass to the starboard side of the other vessel (altering course to the starboard), the overtaking (Give Way) vessel gives one short signal on the whistle or horn. If she wishes to pass to the port side the overtaking vessel gives two short signals. The Stand On, or privileged, vessel (the one being overtaken) must either indicate agreement by repeating the signal given or disagreement by giving the danger signal.

If you see the white light of another vessel at night, but cannot see either the red or green lights, you are approaching the vessel from the rear and must follow the rules for overtaking another vessel.

Special Situation

In a narrow channel, keep to the right side of the channel if possible, and when nearing a bend where another vessel might not be seen, signal with a prolonged whistle blast of 4 to 6 seconds.

Large deep-draft ships, which may not be able to maneuver or stop easily, have the right-of-way in such situations.

Generally, right-of way must be given to fishing vessels, sailing vessels, and very large vessels.

Fog Signals

In orders to avoid collisions in fog or other conditions of poor visibility, the rules of the road require all vessels to sound fog, mist, falling snow or heavy rain, by day or by night.

A power vessel underway must should signal one prolonged blast on the whistle at least every minute. A vessel at anchor (outside of a specified anchorage area) must ring its bell or sound its horn or whistle rapidly for 5 seconds at a time and at least one time each minute.

Towing vessels underway must sound a series of three blasts in succession every minute, in a series consisting of one prolonged and two short blasts.

Navigation Aids

On the navigable waters of the United States a system of aids to navigation exist that boaters should be familiar with: buoys, markers and lights.

These navigation aids are provided to mark channels and obstructions for the convenience and safety of vessels, to provide direction, and to give information on exact position.

The basic system provides black rectangular buoys or markers with odd numbers on one side of the channel, and red triangular buoys or markers with even numbers on the other side. On rivers, the black rectangular shapes and odd numbers will be on the <u>left</u> or port side of the boat if it is traveling <u>up</u> the flow of the river.

When returning from the sea, going upstream, the red triangular shapes and the even numbers will be on the right or starboard side of the boat: "red right returning.". Conversely, if the red buoys are on the opposite side, the boat is traveling downriver and heading toward the sea.

In the Great Lakes, going westerly, or to the source of one of the lakes, corresponds to going upstream from the sea. When traveling in that direction, the black rectangular and odd will be on the port side (left), and the red triangular and even will be on the starboard side.

On the Intracoastal Waterway, "upstream" or "returning from the sea" is marked from New Jersey going south to the southernmost tip of Florida, and west to Texas. On the Pacific Coast, "upstream" is marked in the direction of travel from California to Alaska. Another way of viewing the system is that travel "clockwise" corresponds to "upstream."

Buoys and markers on the Intracoastal Waterway are marked with a yellow band, stripe, square or triangle. For example, a yellow band near the top of a black can buoy identifies it as being on the Intracoastal Waterway, as does a yellow square on a lighted black marker.

Regulatory markers may provide information or give warning, such as a boat speed restrictions.

In waters too deep for other types of navigation aides, Texas Tower structures and lightships provide warning and guidance to ships. Most of the lightships have been replaced by the Texas Towers.

Large navigational buoys have primary and standby generators for operation of a high-intensity light, a radio beacon and a fog signal. These 40-foot diameter buoys are replacing lighthouses at major harbor entrances. (They have meteorological monitoring apparatus for air and water temperature, wind speed and direction, and other data.)

Some buoys have an automated light, a fog horn, and a marine radio beacon.

Boat Handling

Even in calm water a boat does not handle like any land vehicle. It turns differently, starts differently, and stops differently. The Corporate Health and Safety Department recommends personnel take one of the boating skills courses offered by the Coast Guard Auxiliary and practice handling a boat under calm conditions.

Even personnel who have operated a boat may not have had training or experience in the type of boat used to perform work for WESTON, handling a boat under conditions where there is heavy traffic, narrow channels, and swift current or stormy weather. Training is recommended before difficult conditions arise. For example, the Boating Skills and Seamanship textbook and courses cover topics such as towing a disabled boat, operating on a river and going through locks, special hazards of dams, and navigating safely through waves that could capsize a vessel.

Boating Emergencies

Boating personnel need to understand two aspects of distress signals: when to use them and how to respond when others use them. If a boat capsizes, loses power in high winds or heavy seas, or collides with a fixed object or another boat, emergency help will be needed. If such an event occurs, or if a member of the team has a major medical emergency, call for help by any means available: horn, whistle, radio, or visual distress signals.

If a radio is onboard, should send a “Mayday” distress message on either VHF Channel 16 or 2182 kilohertz, following the recommended format. A Mayday message must include the following information:

1. Boat and call letters
2. Location
3. The nature of distress
4. The number of persons aboard and conditions of any injured
5. Estimated seaworthiness of the boat
6. Detailed description of the boat
7. Anything else that may help rescuers locate the boat

If the distressed boat is close enough to shore or other vessels for someone to see it, use the short-range distress signal or arm waving, as well as an orange smoke signal. (Do not stand up unless the water is calm.)

If no other vessel or source of assistance is close by, hoist a distress flag if one is onboard and can be seen, or if it is dark, use an electric distress light.

If only pyrotechnic distress signals are onboard, prepare to use them when someone is in a position to see them. In general, wait until another boat or an aircraft can be seen or heard, or it is reasonably sure that someone on shore is in position to see the signal. Use caution when using pyrotechnic devices not to set fire to the boat or its cargo.

If the boat capsizes, “ STAY WITH THE BOAT" Get into it if possible. Water conducts heat away from the body rapidly, and in 50 degree water, survival time may be as little as three hours.

Conserving body heat is important to extend survival time. To conserve body heat:

1. Wear the warmest personal flotation device available
2. DO NOT SWIM AWAY FROM THE BOAT
3. Get up out of the water as far as possible

If it is not possible to get out of the water, assume the fetal position to reduce the escape of heat from the body. If there are several persons, huddle with the others, side-by-side in a circle. Do not swim for shore unless there is absolutely no chance of rescue. The boat is easier for rescuers to spot than an individual in the water.

A response to a distress signal should be made by anyone near enough to answer or assist.

Personnel in boats equipped with a radio should notify the nearest Coast Guard station on VHF marine Channel 16, or someone else on CB Channel 9, upon seeing or hearing a distress signal. Personnel in a position to assist without being endangered should do so. (The “Good Samaritan” clause in the Federal Boat Safety Act of 1971 protects from liability anyone who provides or arranges towage, medical treatment, or other assistance as an ordinary, reasonably prudent person would under the same or similar circumstances.)

ATTACHMENT E
BOATING SAFETY REGULATIONS
FEDERAL REQUIREMENTS
FLOAT PLAN

FLOAT PLAN

Compplete this form before going boating and leave it with a reliable person who can be depended upon to notify the Coast Fuard or other rescue organization, should you not return as scheduled. Do not file this plan with the Coast Guard.

1. Person Reporting Overdue

Name: _____ Phone: _____

Address: _____

_____

2. Description of Boat

Registration/Documentation No.: _____

Length: _____ Make: _____ Type: _____

Hull Color: _____ Trim Color: _____

Fuel Capacity: _____ Engine Type: _____ No. of Engines: _____

Distinguishing Features: _____

3. Operator of Boat

Name: _____ Age: _____

Health: _____ Phone: _____

Address:

_____

Operator's Experience: _____

_____

4. Survival Equipment (Check as Appropriate)

☐ # PFDs: _____ ☐ Flares ☐ Mirror

☐ Smoke Signals ☐ Water ☐ Anchor

☐ Raft or Dinghy ☐ EPIRB ☐ **Horn** ☐ **Whistle**

☐ Others _____

_____

5. Marine Radio

☐ Yes ☐ No

Type: _____ Freqs.: _____

6. Trip Expectations

Depart From: _____

Departure Date: _____ Time: _____

Going To: _____

Arrival Date: _____ Time: _____

If Operator has not arrived/returned by: Date: _____ Time: _____

Call the Coast Guard or Local Authority at the following number:

_____

_____

7. Vehicle Description

License No.: _____ Make: _____

Model: _____ Color: _____

Where is vehicle parked? _____

8. Persons on Board

Name	Age	Phone	Medical Conditions

9. Remarks

_____

_____

_____

_____

ATTACHMENT F
GLOSSARY OF BOATING TERMS

A

ABAFT - Toward the rear (stern) of the boat. Behind.
ABEAM - At right angles to the keel of the boat, but not on the boat.
ABOARD - On or within the boat.
ABOVE DECK - On the deck (not over it - see ALOFT).
AFT - Toward the stern of the boat.
AGROUND - Touching or fast to the bottom.
AHEAD - In a forward direction.
AIDS TO NAVIGATION (AtoN) - Artificial objects to supplement natural landmarks to indicate safe and unsafe waters.
ALOFT - Above the deck of the boat.
AMIDSHIPS - In or toward the center of the boat.
ANCHOR - A heavy metal device, fastened to a chain or line, to hold a vessel in position, partly because of its weight, but chiefly because the designed shape digs into the bottom.
ANCHORAGE - A place suitable for anchoring in relation to the wind, seas and bottom.
ASTERN - In back of the boat, opposite of ahead.
ATHWARTSHIPS - At right angles to the centerline of the boat; rowboat seats are generally athwartships.

B

BATTEN DOWN - Secure hatches and loose objects both within the hull and on deck.
BEACON - A lighted or unlighted fixed aid to navigation attached directly to the earth's surface. (Lights and daybeacons both constitute "beacons.")
BEAM - The greatest width of the boat.
BEARING - The direction of an object expressed either as a true bearing as shown on the chart, or as a bearing relative to the heading of the boat.
BELOW - Beneath the deck.
BIGHT - The part of the rope or line, between the end and the standing part, on which a knot is formed. A shallow bay.
BILGE - The interior of the hull below the floor boards.
BITTER END - The last part of a rope or chain. The inboard end of the anchor rode.
BLOCK - A wooden or metal case enclosing one or more pulleys and

having a hook, eye, or strap by which it may be attached.
BOAT - A fairly indefinite term. A waterborne vehicle smaller than a ship. One definition is a small craft carried aboard a ship.
BOAT HOOK - A short shaft with a fitting at one end shaped to facilitate use in putting a line over a piling, recovering an object dropped overboard, or in pushing or fending off.
BOW - The forward part of a boat.
BOW LINE - A docking line leading from the bow.
BOW SPRING LINE - A bow pivot line used in docking and undocking, or to prevent the boat from moving forward or astern while made fast to a pier.
BOWLINE KNOT - A knot used to form a temporary loop in the end of a line.
BOWSPRIT - A spar extending forward from the bow.
BRIDGE - The location from which a vessel is steered and its speed controlled. "Control Station" is really a more appropriate term for small craft.
BULKHEAD - A vertical partition separating compartments.
BUOY - An anchored float used for marking a position on the water or a hazard or a shoal and for mooring.

C

CABIN - A compartment for passengers or crew.
CAPSIZE - To turn over.
CAST OFF - To let go.
CATAMARAN - A twin-hulled boat, with hulls side-by-side.
CHAFING GEAR - Tubing or cloth wrapping used to protect a line from chafing on a rough surface.
CHANNEL - 1. That part of a body of water deep enough for navigation through an area otherwise not suitable. It is usually marked by a single or double line of buoys and sometimes by range markers. 2. The deepest part of a stream, bay, or strait, through which the main current flows. 3. A name given to a large strait, for example, the English Channel.
CHART - A map for use by navigators.
CHINE - The intersection of the bottom and sides of a flat or v-bottomed boat.
CHOCK - A fitting through which anchor or mooring lines are led. Usually U-shaped to reduce chafe.
CLEAT - A fitting to which lines are made fast. The classic cleat to which lines are belayed is approximately anvil-shaped.
CLOVE HITCH - A knot for temporarily fastening a line to a spar or piling.
COAMING - A vertical piece around the edge of a cockpit, hatch, etc. to prevent water on deck from running below.
COCKPIT - An opening in the deck from which the boat is handled.
COIL - To lay a line down in circular turns.
COMPASS - Navigation instrument, either magnetic (showing magnetic north) or gyro (showing true north).
COMPASS CARD - Part of a compass, the card is graduated in degrees, to conform with the magnetic meridian-referenced direction system inscribed with direction which remains constant; the vessel turns, not the card.

COMPASS ROSE - The resulting figure when the complete 360° directional system is developed as a circle with each degree graduated upon it, and with the 000° indicated as True North. True North is also known as true rose. This is printed on nautical charts for determining direction.
CURRENT - The horizontal movement of water.

D

DAYBEACON - A fixed navigation aid structure used in shallow waters upon which is placed one or more daymarks.
DAYMARK - A signboard attached to a daybeacon to convey navigational information presenting one of several standard shapes (square, triangle, rectangle) and colors (red, green, orange, yellow, or black). Daymarks usually have reflective material indicating the shape, but may also be lighted.
DEAD AHEAD - Directly ahead.
DEAD ASTERN - Directly aft or behind.
DEAD RECKONING - A plot of courses steered and distances traveled through the water.
DECK - A permanent covering over a compartment, hull or any part of a ship serving as a floor.
DISPLACEMENT - The weight of water displaced by a floating vessel.
DISPLACEMENT HULL - A type of hull that plows through the water, displacing a weight of water equal to its own weight, even when more power is added.
DOCK - A protected water area in which vessels are moored. The term is often used to denote a pier or a wharf.
DRAFT - The depth of water a boat draws.

E

EASE - To slacken or relieve tension on a line.
EBB TIDE - A receding tide.
EVEN KEEL - When a boat is floating on its designed waterline, it is said to be floating on an even keel.
EYE OF THE WIND - The direction from which the wind is blowing.
EYE SPLICE - A permanent loop spliced in the end of a line.

F

FAST - Said of an object that is secured to another.
FATHOM - Six feet.
FENDER - A cushion, placed between boats, or between a boat and a pier, to prevent damage.
FIGURE EIGHT KNOT - A knot in the form of a figure eight, placed in the end of a line to prevent the line from passing through a grommet or a block.

FLAME ARRESTER - A safety device, such as a metal mesh protector, to prevent an exhaust backfire from causing an explosion; operates by absorbing heat.
FLARE - The outward curve of a vessel's sides near the bow. A distress signal.
FLYING BRIDGE - An added set of controls above the level of the normal control station for better visibility. Usually open, but may have a collapsible top for shade.
FOLLOWING SEA - An overtaking sea that comes from astern.
FORE AND AFT - In a line parallel to the keel.
FORWARD - Toward the bow of the boat.
FOULED - Any piece of equipment that is jammed or entangled, or dirtied.
FOUNDER - hen a vessel fills with water and sinks.
FREEBOARD - The minimum vertical distance from the surface of the water to the gunwale.

G

GAFF - A spar to support the head of a gaff sail.
GALLEY - The kitchen area of a boat.
GANGWAY - The area of a ship's side where people board and disembark.
GEAR - A general term for ropes, blocks, tackle and other equipment.
GIVE-WAY VESSEL - A term, from the Navigational Rules, used to describe the vessel which must yield in meeting, crossing, or overtaking situations.
GRAB RAILS - Hand-hold fittings mounted on cabin tops and sides for personal safety when moving around the boat.
GROUND TACKLE - Anchor, anchor rode (line or chain), and all the shackles and other gear used for attachment.
GUNWALE - The upper edge of a boat's sides.

H

HARBOR - A safe anchorage, protected from most storms; may be natural or man-made, with breakwaters and jetties; a place for docking and loading.
HATCH - An opening in a boat's deck fitted with a watertight cover.
HEAD - A marine toilet. Also the upper corner of a triangular sail.
HEADING - The direction in which a vessel's bow points at any given time.
HEADWAY - The forward motion of a boat. Opposite of sternway.
HEAVE TO - To bring a vessel up in a position where it will maintain little or no headway, usually with the bow into the wind or nearly so.
HEEL - To tip to one side.
HELM - The wheel or tiller controlling the rudder.
HITCH - A knot used to secure a rope to another object or to another rope, or to form a loop or a noose in a rope.
HOLD - A compartment below deck in a large vessel, used solely for

carrying cargo.
HULL - The main body of a vessel.
HYPOTHERMIA - A life-threatening condition in which the body's warming mechanisms fail to maintain normal body temperature and the entire body cools.

I

INBOARD - More toward the center of a vessel; inside; a motor fitted inside the boat.

J

There are no boating terms under this heading.

K

KEDGE - To use an anchor to move a boat by hauling on the anchor rode; a basic anchor type.
KEEL - The centerline of a boat running fore and aft; the backbone of a vessel.
KETCH - A two-masted sailboat with the smaller after mast stepped ahead of the rudder post.
KNOT - A measure of speed equal to one nautical mile (6076 feet) per hour. A fastening made by interweaving rope to form a stopper, to enclose or bind an object, to form a loop or a noose, to tie a small rope to an object, or to tie the ends of two small ropes together.

L

LEEWARD - The direction away from the wind. Opposite of windward.
LEEWAY - The sideways movement of the boat caused by either wind or current.
LINE - Rope and cordage used aboard a vessel.
LOG - A record of courses or operation. Also, a device to measure speed.

LUBBER'S LINE - A mark or permanent line on a compass indicating the direction forward; parallel to the keel when properly installed.

M

MAST - A spar set upright to support rigging and sails.
MONOHULL - A boat with one hull.

MOORING - An arrangement for securing a boat to a mooring buoy or a pier.
MOORING BUOY - A buoy secured to a permanent anchor sunk deeply into the bottom.

N

NAUTICAL MILE - One minute of latitude; approximately 6076 feet - about 1/8 longer than the statute mile of 5280 feet.
NAVIGATION - The art and science of conducting a boat safely from one point to another.

O

OUTBOARD - Toward or beyond the boat's sides. A detachable engine mounted on a boat's stern.
OUTDRIVE - A propulsion system for boats with an inboard engine operating an exterior drive, with drive shaft, gears, and propeller; also called stern-drive and inboard/outboard.
OVERBOARD - Over the side or out of the boat.

P

PAINTER - A line attached to the bow of a boat for use in towing or making fast.
PAY OUT - To ease out a line, or let it run in a controlled manner.
PENNANT (sometimes PENDANT) - The line by which a boat is made fast to a mooring buoy.
PERSONAL FLOTATION DEVICE (PFD) - PDF is official terminology for life jacket. When properly used, the PDF will support a person in the water. Available in several sizes and types.
PIER - A loading/landing platform extending at an angle from the shore.
PILOTING - Navigation by use of visible references, the depth of the water, etc.
PITCH - 1. The alternate rise and fall of the bow of a vessel proceeding through waves; 2. The theoretical distance advanced by a propeller in one revolution; 3. Tar and resin used for caulking between the planks of a wooden vessel.
PITCHPOLING - A small boat being thrown end-over-end in very rough seas.
PLANING HULL - A type of hull shaped to glide easily across the water at high speed.
PORT - The left side of a boat looking forward. A harbor.
PROPELLER - A rotating device, with two or more blades, that acts as a screw in propelling a vessel.

Q

QUARTER - The sides of a boat aft of amidships.
QUARTERING SEA - Sea coming on a boat's quarter.

R

REEF - To reduce the sail area.
RIGGING - The general term for all the lines of a vessel.
RODE - The anchor line and/or chain.
ROLL - The alternating motion of a boat, leaning alternately to port and starboard; the motion of a boat about its fore-and-aft axis.
ROPE - In general, cordage as it is purchased at the store. When it comes aboard a vessel and is put to use, it becomes a line.
RUDDER - A vertical plate or board for steering a boat.
RUNNING LIGHTS - Lights required to be shown on boats underway between sundown and sunup.

S

SCOPE - The ratio of the length of an anchor line, from a vessel's bow to the anchor, to the depth of the water.
SCREW - A boat's propeller.
SEA ANCHOR - Any device used to reduce a boat's drift before the wind.

SECURE - To make fast.
SHACKLE - A "U" shaped connector with a pin or bolt across the open end.
SHEAR PIN - A safety device, used to fasten a propeller to its shaft; it breaks when the propeller hits a solid object, thus preventing further damage.
SHEET BEND - A knot used to join two ropes. Functionally different from a square knot in that it can be used between lines of different diameters.
SHIP - A larger vessel usually used for ocean travel. A vessel able to carry a "boat" on board.
SHOAL - An offshore hazard to navigation at a depth of 16 fathoms (30 meters or 96 feet) or less, composed of unconsolidated material.
SLACK - Not fastened; loose. Also, to loosen.
SLOOP - A single masted vessel with working sails (main and jib) set fore and aft.
SPLICE - To permanently join two ropes by tucking their strands alternately over and under each other.
SPRING LINE - A pivot line used in docking, undocking, or to prevent the boat from moving forward or astern while made fast to a dock.
SQUALL - A sudden, violent wind often accompanied by rain.
SQUARE KNOT - A knot used to join two lines of similar size. Also called a reef knot.
STANDING PART - That part of a line which is made fast. The main

part of a line as distinguished from the bight and the end.
STAND-ON VESSEL - That vessel which continues its course in the same direction at the same speed during a crossing or overtaking situation, unless a collision appears imminent. (Was formerly called "the privileged vessel.")
STARBOARD - The right side of a boat when looking forward.
STERN - The after part (back) of the boat.
STERN LINE - A docking line leading away from the stern.
STOW - To pack or store away; especially, to pack in an orderly, compact manner.
SWAMP - To fill with water, but not settle to the bottom.

T

TACKLE - A combination of blocks and line to increase mechanical advantage.
THWART - A seat or brace running laterally across a boat.
TIDE - The periodic rise and fall of water level in the oceans.
TILLER - A bar or handle for turning a boat's rudder or an outboard motor. **TOPSIDES** - The sides of a vessel between the waterline and the deck; sometimes referring to onto or above the deck.
TRANSOM - The stern cross-section of a square-sterned boat.
TRIM - Fore and aft balance of a boat.
TRIMARAN - A boat with three hulls.
TRIPLINE - A line fast to the crown of an anchor by means of which it can be hauled out when dug too deeply or fouled; a similar line used on a sea anchor to bring it aboard.
TRUE NORTH POLE - The north end of the earth's axis. Also called North Geographic Pole. The direction indicated by 000° (or 360°) on the true compass rose.
TRUE WIND - The actual direction from which the wind is blowing.
TURNBUCKLE - A threaded, adjustable rigging fitting, used for stays, lifelines and sometimes other rigging.

U

UNDERWAY - Vessel in motion, i.e., when not moored, at anchor, or aground.

V

V BOTTOM - A hull with the bottom section in the shape of a "V."
VARIATION - The angular difference between the magnetic meridian and the geographic meridian at a particular location.
VHF RADIO - A very high frequency electronic communications and direction finding system.

W

WAKE - Moving waves, track or path that a boat leaves behind when moving across the waters.
WATERLINE - A line painted on a hull which shows the point to which a boat sinks when it is properly trimmed.
WAY - Movement of a vessel through the water, such as headway, sternway, or leeway.
WHARF - A man-made structure bonding the edge of a dock and built along or at an angle to the shoreline, used for loading, unloading, or tying up vessels.
WINCH - A device used to increase hauling power when raising or trimming sails.
WINDWARD - Toward the direction from which the wind is coming. Opposite of leeward.

X

There are no boating terms under this heading.

Y

YAW - To swing off course, as when due to the impact of a following or quartering sea.
YAWL - A two-masted sailboat with the small mizzen mast stepped abaft the rudder post.

Z

There are no boating terms under this heading.

Revised 4/2002

FLD 19 WORKING OVER OR NEAR WATER

RELATED FLDs

FLD02 – Inclement Weather
FLD05 – Heat Stress Prevention and Monitoring
FLD06 – Cold Stress
FLD18 – Operation and Use of Boats
FLD22 – Heavy Equipment Operation
FLD23 – Cranes, Rigging, and Slings
FLD24 – Aerial Lifts/Manlifts
FLD25– Working at Elevation/Fall Protection

RECOGNITION AND HAZARD ASSESSMENT

Hazards associated with working around water include drowning, frostbite, hypothermia, and/or injury from falling into the water. Heat stress hazards may also be present. Carelessness, horseplay, or other unsafe acts could cause injury to personnel working over or near water. There are also hazards associated with untrained personnel operating equipment. Lack of personal protective equipment (PPE) or misuse of PPE could result in injury or death.

Proper precautions should be taken at all times when personnel are working over or near water. Whenever there is a body of water in close proximity to a work location, the proper safety procedures should be implemented. Requirements for equipment or procedures will be based on an evaluation of work tasks, drowning, and injury potential.

New field team members should be thoroughly indoctrinated in safe work practices pertinent to the work to which they are assigned.

PREVENTION AND PROTECTION PROGRAM

When working over or near water where there is potential for drowning, engineering controls such as installation of guardrails, toeboards, and other PPE such as safety line systems, shall be used to prevent personnel from falling into the water. In addition, flotation devices must be worn and other lifesaving devices must be present. Personal flotation devices (PFDs) should be designed to float unconscious or helpless persons face up.

Safety Nets

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 is impractical.

- Where safety net protection is required, operations shall not be undertaken until the net is in place and has been tested.
- Nets shall extend 8 feet beyond the edge of the work surface where employees are exposed and shall be installed as close under the work surface as practical, but in no case more than 25 feet below such work surface. Nets shall be hung with sufficient clearance to prevent user's contact with the surfaces or structures below. Such clearances shall be determined by impact load testing.
- It is intended that only one level of nets be required for bridge construction.

- The mesh size of nets shall not exceed 6 inches by 6 inches. All new nets shall meet accepted performance standards of 17,500 foot-pounds minimum impact resistance, as determined and certified by the manufacturer, and shall bear a label of proof test. Edge ropes shall provide a minimum breaking strength of 5,000 pounds.

General Safety Precautions

Work shall be halted when significant wave action exists.

All general safety precautions will be adhered to when working over or near water to prevent accidents caused from careless behavior or horseplay.

Only personnel who are trained in the operation of marine equipment (e.g., boats, barges) will be allowed to operate the equipment.

Ramps for vehicle or personnel access to or between barges shall be of adequate strength, provided with guard rails, well-maintained and properly secured. For personnel access, a safe walkway may be substituted for the ramp. All access routes and passageways shall be kept free of ice, snow, grease, mud, and other obstructions. Nonslip surfaces shall be provided on all working decks, stair treads, ship ladders, platforms, catwalks, and walkways, particularly on the weather side of all doorways opening on deck.

Guardrails, bulwarks, or taut cable guardlines shall be provided for deck openings, elevated surfaces, and similar locations where persons may fall or slip. They shall be at least 42 inches high and have an intermediate rail.

If a Jacob's ladder is used, it will be of the double-rung or flat-tread type. It will be well-maintained and properly secured. The ladder will either hang without slack from its lashings or be pulled up entirely. When the upper end of the access-way rests on or is flush with the top of the bulwark (side of the ship above the upper deck), steps, properly secured and equipped with at least one hand rail approximately 33 inches in height, shall be provided between the top of the bulwark and the deck.

Obstructions will not be laid on or across gangways. The access-way will be adequately illuminated for its full length. All attempts will be made to place the access-way in a position that the load will not pass over personnel.

Any obstruction in a passageway that restricts normal passage shall be posted with warning signs or distinctively marked. Employees shall not be permitted to pass fore and aft, over or around the deck loads unless there is a safe passage. Decks and other working surfaces will be maintained in a safe condition and adequate safe walkways will be maintained for passage around the deck. All deck fittings and other obstructions that present stumbling hazards shall be painted yellow or marked with yellow trim.

Personnel will not walk along the sides of covered barges with coamings (raised frame to keep out water) more than 5 feet high unless there is a 3-foot clear walkway, a grab rail, or a taut handline.

Unless railings or other suitable protection exists, all personnel will use suitable protection against falling and/or drowning.

First-aid supplies should be aboard all lifesaving craft (or readily accessible) and arrangements for ambulance service should be made as location changes.

Personnel should be 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.

In areas subject to tidal flow or rising water levels, the Field Safety Officer (FSO) will monitor the water level to ensure that employees will not be trapped between a work area and the water level.

Life Saving Equipment

Equipment and procedures will conform to U.S. Coast Guard (USCG) and/or Occupational Safety and Health Administration (OSHA) requirements and applicable local regulations.

Personnel working over or near water shall be provided with USCG-approved PFDs (life jackets or buoyant work vests), which shall be worn whenever there is potential drowning hazard. 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. At no times will defective units be used.

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.

Lights conforming to 16 CFR 161.012 will be required whenever there is a potential need for life rings to be used after dark. Lights on life rings are required only in locations where adequate general lighting (e.g., floodlights) is not provided.

In locations where waters are rough or swift, or where manually-operated boats are not practical, a power boat suitable for the waters shall be provided and equipped for lifesaving.

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.

Any vessel, except those easily boarded from the water, shall provide at least one portable or permanent ladder of sufficient length to rescue a person overboard.

FLD 20 TRAFFIC

RELATED FLDs AND PROGRAMS

FLD 02 – Inclement Weather
Occupational Noise and Hearing Conservation Program

PROCEDURE

Traffic presents hazards in three ways: 1) when site workers are working close to roadways, the potential exists to be hit by oncoming traffic, 2) driving to, from, and on the site poses a potential accident hazard; and 3) increased heavy vehicle traffic may pose risk to the public.

Recognition and Risk Assessment

In the planning stages of a project and safety plan, the potential for traffic hazards must be considered as physical hazards in the site-specific Health and Safety Plan (HASP).

Risk assessment can be accomplished in the development stages of a project by listing in the HASP the most likely traffic hazards that may occur. The Field Safety Officer (FSO) must make decisions on the proper safety procedures and recommend them to the Site 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.

The conduct of over the road haulers and delivery vehicles when working for WESTON reflects on WESTON. Traffic violations and in particularly accidents involving other vehicles or environmental damage can be associated with WESTON in the minds of the client and community. Over the road haulers used for WESTON work must understand fully WESTON's expectations relative to compliance with traffic laws and the consequences for failure to comply or being in an accident.

Prevention and Protection Program

Driving safety is to be addressed in each HASP. As a minimum the form in Appendix A is to be used to develop this part of the HASP.

Traffic Control Plan Guide

The Traffic Control Plan Checklist provided in Appendix B may be used to develop this part of the HASP. Traffic Control Plans may involve two main types of traffic control.

1. Traffic traveling over the public highway system may be driven by regulations at the State or local government level.

2. On-site traffic: While OSHA regulations cover certain aspects related to on-site traffic control there is no specific standard that addresses the issue. The USACE Regulations EM 385-1-1, reference use of the Manual on Uniform Traffic Control Devices (MUTCD). THE USACE also has specific requirements for haul road construction (provided as Appendix C) that are required for WESTON USACE jobs. For other than USACE jobs, these requirements should be considered best practices.

Requirements for Traffic Control Plans are often found in Construction Contract Specifications.

State, Local Government, and Municipal Traffic Control Requirements

The addition of traffic, particularly heavy vehicles, due to a construction project may require compliance with State, County, Township, and Municipal Regulations. These regulations must be considered when completing the Traffic Control Plan Checklist.

If vehicles will be crossing or affecting traffic (slowing to turn or pulling out into traffic) traffic controls may be needed based on general requirements adopted by the agency with authority. These are often based on the MUTCD. There are 45 States which have adopted the MUTCD. Seven States which have not yet formally adopted the MUTCD include: the district of Columbia, Indiana, Kentucky, Pennsylvania (uses the 2003 edition with supplemental requirements), and Tennessee, New York, and Texas (have their own versions).

- Traffic control requirements may include the following:
- Use of signs with specified sizes, color, wording, and distances from the turn; or access point to requiring "flaggers." **Note:** More states now require training and/or certification of "flaggers."
- If traffic lanes will be blocked or diverted, there are additional requirements for signs, barriers, or cones. Consideration must be given to protecting persons working along side of the road, such as by use of barriers.
- Specific travel routes and specified times of operation may be required by some agencies.
- The use of "Jack" brakes or "retarder" brakes may be prohibited in some municipalities due to the noise.
- Permits for encroaching on or making new access-ways to highways may be required.

On-site Traffic Control Considerations

Personally Owned Vehicle (POV) Parking

One area of traffic control which is not often addressed in plans, but which has resulted in several accidents on WESTON Projects is in POV parking areas. Particularly when space is tight or at a premium, any open space available for parking of POV's becomes prime space for materials lay down or parking of construction equipment either when not in use, following delivery, or awaiting pick-up by vendors. Another factor that often affects POV parking areas is influx of trades contractors as the project moves from earthwork to demolition or construction. Planning is necessary to keep the POV parking area from becoming an area too crowded to allow safe parking space entry and exit.

Client Requirements

Industrial and government clients may also have traffic control requirements which must be incorporated into Traffic Control Plans.

On-Site Haul Vehicle Routes and Controls

Two scenarios that need to be considered relative to on-site haul routes include routes for over-the-road trucks and routes for off-road haulers, such as articulated dumps. Common concerns include, collisions, backing, road surface, inclement weather, congestion, overturning due to hung up load or unbalanced load, overturning due to road surface or speed, and contact with overhead utilities and structures.

Collisions and backing incidents are ideally avoided by creating loops with all traffic traveling in one direction. If backing is necessary, minimize the distance. Build aprons of sufficient size to allow maneuvering. Control backing with spotters or flaggers. Establish a set of standard hand signals that all spotters use. Spotters must never back more than one vehicle at a time. Spotters must be highly visible and positioned so that in the event of an overturn, they are sufficiently far from the vehicle so that they will not be struck. Spotters must also be trained to look out for overhead obstacles, unbalanced loads, unstable terrain, and load hang-ups, and to prohibit dump trucks from driving more than the distance required to dump a load with the bed raised.

To avoid turnover, roadways must be maintained to provide solid surfaces for travel by the largest anticipated vehicles. Dumping areas must also be sound. Most over the road dump truck turnovers are due to the rear wheels settling to one side or the other while raising the loaded bed to dump, or when parts of loads hang up near the front of the dump body. On semi-type dump trucks, if possible specify reinforced dump beds. and if high wind conditions, 15 plus miles per hour, occur consider stopping dumping. If winds exceed 25 mph, halt dumping.

Routes for Over-the-Road Trucks

Over-the-road dump trucks are not designed for off-road travel. The use of board roads is a best practice to consider if soil cannot be compacted sufficiently to provide a firm surface or if schedule is tight and rain or other inclement weather would make dirt or stone roads unusable. Board roads can provide solid footing for over-the-highway trucks and can easily be reconfigured when dumping areas change. Board roads sections can also be used to establish turn-around and apron areas.

If board roads are not used, roads must constantly be maintained and a procedure for dealing safely with stuck trucks must be developed.

Routes for Off-Road Haulers

Off-road trucks are designed for travel on less -maintained roads, however past experience has shown that incidents involving off-road trucks include: bed tip-over and injury to drivers from bouncing around in the cab. One factor that has resulted in tip-over is ruts in roads that are either of different depths or in other ways uneven or not directly perpendicular to the roadway. This results in the truck body twisting as designed, however, when the momentum of the load shifts sideways the bed tips over. A second factor resulting in tip-over is speed. A third factor is driving across slope or turning on grade.

Bed tip-over may be prevented by diligent maintenance of roads and posting and enforcing speed limits based on the vehicles capabilities. See Appendix C for USACE requirements (or for use as best practices).

Injuries to operators from bouncing may be prevented by strict enforcement of use of seat belts and hard hats.

Construction Equipment and Smaller Vehicles on Site

Vehicle damage incidents may occur where a pickup truck or other small vehicle is left along a roadway or in the actual construction zone and it is struck by a piece of construction equipment because it was in the equipment's blind spot or swing radius.

Prevention of these types of incident includes: limiting use of smaller vehicles in areas where construction equipment is operating and communication between operators. Another preventive measure is to place strobe type lights on the smaller vehicles to increase awareness of their presence.

Pedestrians/Workers on Foot

Construction workers working around construction equipment may be struck by the construction equipment. Such incidents usually result in fatalities. Communication is critical between construction workers and others on the ground working around construction equipment and the operators.

The following are practices to protect workers on foot in heavy equipment operating areas:

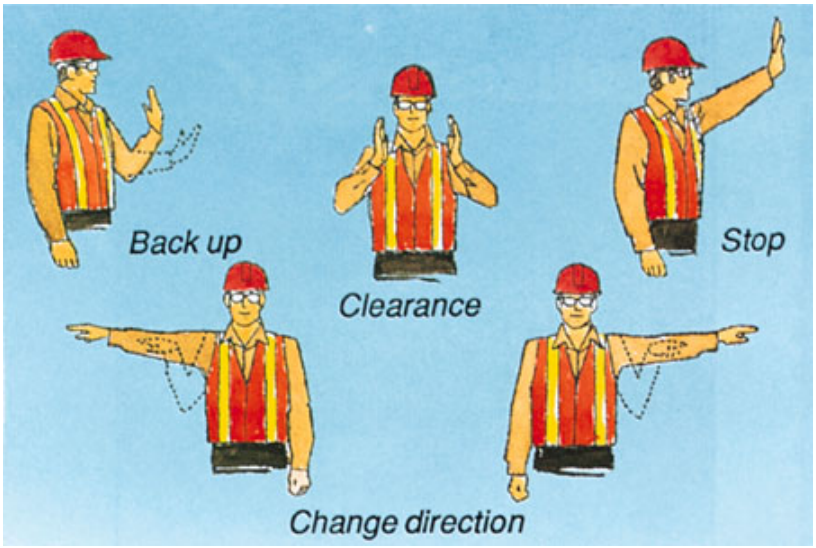
- Workers on foot should be kept out of areas where heavy equipment frequently moves and operates. Plan to have workers in the area *before* activities requiring heavy equipment start or *after* they have ended.
- When workers on foot and equipment must both share the same area, each should work in their designated space with some form of barrier erected to create a physical separation.
- Where workers on foot share the site with moving equipment, especially reversing equipment, everyone should be aware of the need for a signaler whenever the view of the intended path of travel is obstructed or workers are in danger. Signs should be posted on site to remind equipment operators and workers that a signaler must be used when traveling in reverse or any other direction affording the operator only limited visibility.

<u>Signaler</u>

Where there is a danger to workers from moving vehicles, particularly vehicles operating in reverse, a signaler must be used to safely direct traffic. The signaler must be trained in the on-site signals to be used, positioning, visibility, communication, and other points outlined in the following sections.

A signaler must wear personal protective equipment such as approved boots, hard hat, and reflective fluorescent vest.

Part-time Signaler Where a full-time signaler is not required because vehicle movement is limited, a worker must be designated as part-time signaler and accordingly notify all vehicles entering the work zone. Operators must understand that, where visibility is obstructed, no equipment will move without the signaler's assistance. The part-time signaler does regular work until a vehicle enters the work zone and requires assistance. Then the worker stops work to direct equipment. While signaling, the worker should not be doing any other work. Equipment operators must stop their vehicle at once if the signaler is not paying attention to the task at hand. Once signaling is finished, the worker should continue regular work until required to signal again.



Signalers must stand outside the equipment's path of travel in case they trip and fall. When directing on-site traffic, the signaler must have a clear view of the intended path and must be fully visible to drivers to ensure that signals are being received. The signaler should stand squarely in the operator's mirror view, thereby ensuring maximum visibility.

For radio communication, equipment must be in good operating condition and batteries fully charged. When visual signals are used, they must be clear. Use the entire arm to indicate directional changes, not just fingers.

Workers should be instructed in the proper methods

Training

Site personnel should be trained to recognize blind spots, the areas around every vehicle that are partly or completely invisible to the operator or driver, even with the help of mirrors. Specific training can then focus on the following points:

Workers on Foot

- Know how to work safely around trucks and operating equipment.
- Understand the effect of blind spots around vehicles and equipment.
- Avoid entering or standing in blind spots.
- Make eye contact with the driver or operator before approaching equipment.
- Signal intentions to the driver or operator.
- Where available, use separate access rather than vehicle ramps to enter and exit the site.
- Avoid standing and talking near vehicle paths, grading operations, and other activities where heavy equipment is moving back and forth.
- Advise fellow workers whenever they may be in a hazardous location.

Drivers and Operators

- Always obey the signaler or spotter. If more than one person is signaling, stop your vehicle and determine which one to obey.
- Remain in the cab if possible in areas where other equipment is likely to be backing up or may not see you because of blind spots.
- Make sure all mirrors are intact, functional, and properly adjusted for the best view.
- If you must leave your vehicle, you must have on safety shoes, hard hat, and safety glasses.
- Climbing on truck bodies to check loads must be via designed and well constructed ladders.
- Prior to climbing, to check loads, loading or unloading must stop and driver must verify equipment operators understand the driver intends to climb on the body.
- After leaving your equipment for any period of time, do a circle check when you return. Walk around the equipment to ensure the area is clear before you get into the cab and start moving.
- Stop the vehicle at once when a spotter, worker, or anyone else disappears from view.
- Other than needed to dump your load, traveling with dump beds raised is prohibited.
- Empty dump beds must be fully lowered prior to pulling away from unloading areas.

Signalers

- Stay alert to recognize and deal with dangerous situations.
- Know and use the standard signals for on-site traffic.
- Wear reflective fluorescent vest and bright hard hat for high visibility.
- Understand the maneuvering limitations of vehicles and equipment.
- Know driver and operator blind spots.
- Stand where you can see and be seen by the driver or operator.
- Make eye contact with driver or operator before signaling or changing location.
- Never become distracted by other work when directing equipment.
- Notify drivers or operators that you are the designated signaler and that they must not maneuver without your guidance where their view is obstructed.
- Observe dump beds for hung up loads.
- Signalers are responsible for alerting operators of over head utilities or obstructions.
- Enforce the “no driving with beds raised” rule.

REFERENCES

USACE Regulations, EM 385-1-1, Safety and Health Requirements, 3 November 2003

Federal Highway Administration, Manual on Uniform Traffic Control Devices (MUTCD), December 2007 (2003 Edition with Revisions 1 and 2)

APPENDIX A VEHICLE USE ASSESSMENT AND SELECTION

Driving is one of the most hazardous and frequent activities for WESTON employees. The most appropriate type of vehicle (s) authorized for use on this project is/are: 1. 2. 3. 4.
The following team member's qualifications and experience in driving these vehicles was evaluated and found to be acceptable (indicate the vehicle type(s) number next to each employee's name) 1. 2. 3. 4. 5. 6. 7. 8. 9. 10.
The project site was evaluated and a **Traffic Control Plan** ☐ is required☐ is not required.
If required, the **Traffic Control Plan** can be found in Appendix _____ of this HASP.

APPENDIX B TRAFFIC CONTROL PLAN CHECKLIST

State, Local Government and Municipal Traffic Control Requirements

Yes	No	
		Will the project result in an increase of traffic volume or the type of vehicles that will be regulated by a government entity?
		Are there requirements for specific travel routes within the boundaries of any government jurisdiction?
		If so, are maps and descriptions provided to drivers along with clear communication of consequences of failing to follow these routes?
		Is there a system in place for communicating routes to vendors beside the vehicle operators involved in day to day material transport?
		Are there restrictions on when traffic is permitted?
		If so, is there clear communication of these requirements to all drivers and of consequences of failing to follow these routes?
		Is there a system in place for communicating these requirements to vendors beside the vehicle operators involved in day to day material transport?
		Are there prohibitions on types of brakes?
		Will signs be required?
		Is color, wording, size and spacing of signs specified?
		Are “flaggers” required?
		Must “flaggers” be certified or trained?
		Will barriers or other protection be required to protect workers along roadways?
		Are permits required for encroaching on, access to or providing new access to a highway?
		Have over-the-road drivers been informed that they are expected to obey all traffic laws while traveling to and from the WESTON site on WESTON business and that if WESTON learns of a traffic violation being issued or an accident occurs that that can result in prohibition of the driver being used for WESTON related work?

Personally Owned Vehicle (POV) Parking

Yes	No	
		Is there ample space for POV parking with safe access and exit to streets or highways?
		Are there separate areas provided for POV parking, equipment/materials lay-down and construction equipment parking?
		Are POV parking areas, equipment/material lay-down areas and construction equipment areas part of regular EHS inspections and checklists?

On site Traffic Control

Yes	No	
		Are routes established with all traffic traveling in one direction?
		If backing is necessary, is the distance minimized?
		Are aprons for turn around or dumping of sufficient size to allow maneuvering?
		Are dumping areas of sufficient soundness to support the largest anticipated loaded dump vehicles?
		Are spotters or flaggers used to control backing?
		Are spotters trained?
		Is a set of standard hand signals established that all spotters use?
		Are spotters prohibited from directing more than one vehicle at a time?
		Are spotters highly visible and positioned so that in the event of an overturn, they are sufficiently far from the vehicle so that they will not to be struck?
		Do spotters understand their responsibility to look out for overhead obstacles, unbalanced loads, unstable terrain, load hang-ups, and to prohibit dump trucks from driving more that the distance required to dump a load with the bed raised?
		Are roadways maintained to provide solid surfaces without ruts for travel by the largest anticipated vehicles?
		Is the project regulated by USACE EM 385-1-1?
		If so, do haul ways meet the requirements of EM 385-1-1, Section 8.D?
		Have reinforced dump beds been specified for semi-type dump truck beds?
		Is dumping curtailed in high wind conditions?
		Has the use of board roads been considered?
		Are speed limits posted on site roads?
		Are the limits enforced?
		Is driving across slope or turning on grade minimized?
		Is use of seat belts and wearing of hard hats by operators of on-site haul vehicles strictly enforced?

APPENDIX C Good Practice Based EM 385-1-1 SECTION 8.D

(For Projects subject to EM 385-1-1 see the specific regulation wording.)

HAUL ROADS

Access/haul roads will be designed in accordance with current engineering criteria. Prior to construction, the Contractor will provide the client representative with a copy of the plan for review and if required by contract acceptance. If required by contract, work on the haul road will not commence until the client representative has accepted the plan.

The plan will address the following items:

- Equipment usage, traffic density, and hours of operation.
- Road layout and widths, horizontal and vertical curve data, and sight distances.
- Sign and signalperson requirements, road markings, and traffic control devices.
- Drainage controls.
- Points of contact between vehicles and the public, and safety controls at these points of contact.
- Maintenance requirements, including roadway hardness and smoothness and dust control.
- Hazards adjacent to the road such as bodies of water, steep embankments, etc.

No employer will move, or cause to be moved, any equipment or vehicle on an access or haul road unless the roadway is constructed and maintained to safely accommodate the movement of the equipment or vehicle involved.

When road levels are above working levels, berms, barricades, or curbs will be constructed to prevent vehicles overrunning the edge or end of embankment. Berms/curbs will be constructed to one-half the diameter of the tires of the largest piece of equipment using the roadway.

Roadways will have a crown and ditches for drainage. Water will be intercepted before reaching a switch back or large fill and be led off.

Haul roads will be constructed to widths suitable for safe operation of the equipment at the travel speeds proposed by the Contractor and accepted by the Government Designated Authority (GDA).

All roads, including haul roads, will be posted with maximum speed limits.

An adequate number of turn-outs will be provided on single lane roads haul roads with two-way traffic. When turn-outs are not practical, the Contractor will provide a traffic control system to prevent accidents.

Whenever possible, use a right-hand traffic pattern on two-way haul roads.

<u>Curves</u>

- All curves will have open sight line and as great a radius as practical.
- Vehicle speed will be limited on curves so that vehicles can be stopped within one-half the visible distance of the roadway.
- The design of horizontal curves will consider vehicle speed, roadway width and surfacing, and super elevation.

Grades

- When necessary, based on grade and machine and load weight, machines will be equipped with retarders to assist in controlling downgrade descent.
- Truck haul roads should be kept to less than a10% grade.
- There should be no more than 400 ft (121.9 m) of grade exceeding 10%.
- The maximum allowable grade will not exceed 12%.

Lighting will be provided as necessary.

Traffic control lights, barricades, road markings, signs, and signalpersons for the safe movement of traffic will be provided in accordance with the DOT Federal Highway Administration's "Manual on Uniform Traffic Control Devices" and this Section.

Roadway hardness, smoothness, and dust control will be used to maintain the safety of the roadway.

All roads will be maintained in a safe condition and eliminate or control dust, ice, and similar hazards.

The deposition of mud and or other debris on public roads will be minimized to the extent possible and in accordance with local requirements.

FLD 30 HAZARDOUS MATERIALS USE AND STORAGE

RELATED FLDs

FLD 21 – Explosives
FLD 31 – Fire Prevention and Protection Planning
FLD 32 – Fire Extinguishers Required and Requirements
FLD 36 – Welding/Cutting/Burning

Flammable Liquids

Flammables and oxidizers must be stored in separate non-smoking areas and flammable gases must be stored away from combustible materials.

Flammable liquids shall be stored in approved containers in an approved flammable storage cabinet or 25 feet from any open flame or ignition source in a well-ventilated area.

Fuels shall be separated from oxidizers, and corrosives must be separated from flammables and stored in approved cabinets or properly ventilated store rooms and separated by 25 feet from other storage areas or buildings that contain ignition sources or incompatible materials

Approved grounding and bonding procedures shall be used for transfer of flammable liquids from one container to another, which includes heavy equipment operation.

Areas where flammable liquids are stored or flammable vapors may be released must be evaluated and identified by hazard class, group, and location (division) according to the National Fire Protection Association. Electrical equipment use must conform to NEC codes. All fuels materials are to be secured within a primary and secondary containment and inspected daily for integrity

All tanks and secondary containments, containers, and pumping equipment, portable or stationary, used for the storage or handling of flammable and combustible liquids will be listed by UL or FM, or approved by the Occupational Safety and Health Administration (OSHA).

As a minimum, a 10-lb fire extinguisher appropriate for the type of fire that could occur must be within 75 feet of any accumulation of 5 gallons or more of flammable liquids or gases.

Cylinders

Cylinders must be stored upright and secured to prevent them from falling over. The gas supplier must be consulted prior to storing gas cylinders in other than an upright position.

Cylinder caps must be in place when cylinders are not in use.

Cylinders must be secured with a fire resistant material.

Cylinders should be stored out of direct sunlight.

Cylinders containing fuels (e.g., acetylene) must be separated from oxidizers (e.g., oxygen, carbide) by 20 feet or a 5-foot high fire wall with a minimum 1/2-hour fire resistance rating if outside, or 1-hour resistance rating if inside.

Explosives

Explosives must be handled under the direct supervision of a competent person that has demonstrated years of safe experience with the site specific material.

HAZCOM

A Hazard Communication program in accordance with 29 CFR 1910.1200 and Weston's Hazard Communication is to be developed and implemented at each work location where hazardous materials are stored and/or used.

FLD 32 FIRE EXTINGUISHERS REQUIRED AND REQUIREMENTS

RELATED FLDs

FLD 03 – Hot Processes - Steam, Low Temperature, Thermal Treatment Unit, and Transportable Incinerator
FLD 21 – Explosives
FLD 22 – Heavy Equipment Operation
FLD 30 – Hazardous Materials Use and Storage
FLD 31 – Fire Prevention and Protection Planning
FLD 36 – Welding/Cutting/Burning

Fire extinguishers are a key component of fire fighting. Small fires that are small can be effectively fought with properly selected and correctly located extinguishers. The Fire Department should be notified as soon as a fire is discovered, and should not be delayed by awaiting the results of the application of portable fire extinguishers.

The successful use of fire extinguishers, according to the National Fire Protection Association (NFPA) Standard 10, depends on the following conditions having been met:

1. The fire extinguisher is properly located and in working order.
2. The fire extinguisher is of the proper type for a fire that can occur.
3. The fire is discovered while still small enough for the fire extinguisher to be effective.
4. The fire is discovered by a person ready, willing, and able to use the fire extinguisher.

To select an appropriate fire extinguisher, the situation must be considered for the type of fires anticipated (based on flammable and/or combustible sources on site), the facility construction, the anticipated hazard level, as well as the ambient air temperature conditions.

FIRE TYPES

To determine the types of fires anticipated on site, NFPA classifies fires by type:

- Class A Fires – Fires in ordinary combustible materials, such as wood, cloth, paper, rubber, and many plastics.
- Class B Fires – Fires in flammable liquids, combustible liquids, petroleum greases, tars, oil-based solvents, lacquers, alcohols, and flammable gases.
- Class C Fires – Fires that involve energized electrical equipment.
- Class D Fires – Fires in combustible metals, such as magnesium, titanium, zirconium, sodium, lithium, and potassium.
- Class K Fires – Fires in cooking appliances that involve combustible cooking media (vegetable or animal oils and fats).

Corresponding to the types of fires, fire extinguishers are labeled to match fire types. Extinguishers suitable for Class A fires should be identified by a triangle containing the letter “A,” and green (if colored). Extinguishers suitable for Class B fires should be identified by a square containing the letter “B,” and red (if colored). Extinguishers suitable for Class C fires should be identified by a circle containing the letter “C,” and blue (if colored). Extinguishers suitable for Class D fires should be identified by a 5-pointed star containing the letter “D,” and yellow (if colored).

HAZARD CLASSIFICATION

NFPA 10 classifies hazards on three levels; Light (Low), Ordinary (Moderate), and Extra (Heavy) Hazards.

Light Hazard

Light (Low) hazard areas constitute locations where the total amount of Class A combustible materials is of minor quantity. This assumes that the majority of the items are either noncombustible or arranged so that fire is not likely to spread rapidly. An example of this hazard level would be an office setting. Small amounts of Class B flammables are included in this hazard level, provided that they are kept in closed containers, and appropriately stored.

Ordinary Hazard

Ordinary (Moderate) hazard areas are locations where the total amount of Class A combustibles and Class B flammables are present in greater amounts than expected in Light hazard areas. Examples of these areas are dining areas, light manufacturing, workshops and support service areas of Light hazard occupancies.

Extra Hazard

Extra (Heavy) hazard areas are locations where the total amount of Class A combustibles and Class B flammables present in storage, production, use, and finished product (or combination thereof) is above areas of Ordinary hazard. These areas include woodworking, vehicle repair, cooking areas, and storage and manufacturing processes.

FIRE EXTINGUISHER RATINGS

The classification and rating system describing fire extinguishers is that of Underwriters Laboratories, Inc. The class ratings correspond to the various fire types (A, B, C, D, and K), and the numerical value in front of the class rating dictates the size of fire it can extinguish. In principle, a 2-A fire extinguisher can extinguish twice as much fire as a 1-A; a 20-A fire extinguisher can extinguish 20 times as much fire. Each class rating has its own extinguishing media and corresponding volume. A 1-A fire extinguisher is the equivalent of 1¼ gallons of water, for reference.

Class B extinguishers can have gallons of foam, pounds of carbon dioxide, or pounds of a dry chemical.

Note: A fire extinguisher may be rated to fight the appropriate size fire, but the training and degree of experience of the operator influences this amount.

EXTINGUISHER SELECTION

To select the appropriate number and locations of fire extinguishers throughout a facility, work areas must be evaluated based on a minimum rated single extinguisher (dictated by hazard level), the maximum floor area per unit of Class A hazards, the maximum floor area for the extinguisher, and the maximum distance of travel to the extinguisher.

Fire Extinguisher Size and Placement for Class A Hazards

Criteria	Light Hazard	Ordinary Hazard	Extra Hazard
Minimum rated single extinguisher	2-A	2-A	4-A
Maximum floor area per unit of Class A hazards	3,000 square feet	1,500 square feet	1,000 square feet
Maximum floor area for extinguisher	11,250 feet	11,250 feet	11,250 feet
Maximum travel distance to extinguisher	75 feet	75 feet	75 feet

Fire Extinguisher Size and Placement for Class B Hazards

Type of Hazard	Basic Minimum Extinguisher Rating	Maximum Travel Distance to Extinguishers (feet)
Light	5-B	30
	10-B	50
Ordinary	10-B	30
	20-B	50
Heavy	40-B	30
	80-B	50

INSPECTION

Fire extinguishers shall be inspected when initially placed into service, and every 30 days thereafter. More frequent intervals can be maintained, should the situation require. Inspections should document the following:

1. Location in designated place
2. Obstructions to access or visibility
3. Operating instructions legible (with nameplate facing outwards)
4. Safety seals and tamper indicators intact
5. Fullness determined by weighing ("hefting" is acceptable)
6. Examination for obvious physical damage, corrosion, leakage, and clogged nozzle
7. Pressure gauge in the operable range or position
8. HMIS label in place

SERVICING

Only trained personnel can perform maintenance, servicing, and recharging of fire extinguishers. Trained personnel will have the appropriate tools, manuals, recharge materials, lubricants, and manufacturer's replacement parts specifically listed for use in the fire extinguisher.

PROCEDURE

Fire extinguishers appropriate in size and classification shall be present, readily accessible, and ready for use in all areas where there is potential for fires.

Fire extinguishers must be used in conjunction with an emergency response or contingency plan.

Health and Safety Plans must identify number, type, and location of all fire extinguishers related to a specific project.

FLD 38 HAND AND POWER HAND TOOLS

REFERENCES

29 CFR 1926 Subpart I
29 CFR 1910 Subpart P
ANSI Standard A10.3-1970, Safety Requirements for Explosive-Actuated Fastening Tools

RELATED FLDs

FLD 06 – Cold Stress
FLD 10 – Manual Lifting and Handling of Heavy Objects
FLD 16 – Pressure Systems: Compressed Gas Systems
FLD 35 – Electrical Safety

INTRODUCTION

Injuries from hand tools are often caused by improper use, using the wrong tool for the job, or from using a defective tool. Workers often assume that they know how to use a common hand tool. Working with something other than the simplest non-powered hand tools shall be performed only by those persons competent or qualified through formal training or documented experience.

Like all tools, hand and power tools must be maintained properly for effective use and safety. This Field Operating Procedure describes general safety guidelines for the four major categories of hand tools: cutting tools, torsion tools, impact tools, and power tools.

The use of any machinery, tool, material, or equipment which is not in compliance with any applicable OSHA 1910/1926 requirement is prohibited. Any tools or equipment identified as unsafe or defective will be "tagged or locked-out." Controls shall be applied rendering the unsafe or defective tool or equipment inoperable. Any damaged or defective equipment shall be removed from its place of operation. Weston shall be responsible for the safe condition of tools and equipment used by employees, including tools and equipment that may be furnished by employees.

Tags shall be used as a means to prevent accidental injury or illness to employees who are exposed to hazardous or potentially hazardous conditions, equipment or operations, which are out of the ordinary, unexpected, or not readily apparent. Tags shall be used until the identified hazard is eliminated or the hazardous operation is completed. Tags need not be used where signs, guarding, or other positive means of protection are being used.

GENERAL SAFETY RULES – APPLICABLE TO USE OF ALL TOOLS

- Tools will be inspected prior to each use. Tools found to be unsafe will be tagged by the inspector "Do Not Use" and either repaired or removed from the site.
- Keep the work area clear of clutter.
- Keep the work area properly illuminated.
- Maintain and keep tools sharpened, oiled, and stored in a safe, dry place.
- Wear ear and eye protection when cutting, sawing, drilling, or grinding.
- Supervisor should instruct everyone using equipment on safe procedures before they use them.
- Inspect tools, cords, and accessories regularly and document any repairs.

- Repair or replace problem equipment immediately.
- Electric power tools must have a 3-wire cord plugged into a grounded receptacle, be double-insulated or powered by a low-voltage isolation transformer, and fitted with guards and safety switches.
- Machine guards must be in-place and not removed during equipment operation.
- Do not alter factory-supplied safety features on tools.
- Install and repair equipment only if you are qualified.
- Use the right tool for the job; for instance, do not use a screwdriver as a chisel or a wrench as a hammer.
- Carry a sharp tool pointed downward or place in a tool belt or toolbox.
- Protect a sharp blade with a shield.
- Store tools in drawers or chests with cutting edge down.
- When using power tools, wear long hair in a protective manner, do not wear jewelry or loose clothing, use safety glasses, respiratory protection, hard hats, etc., as needed/specified by the manufacturer. Note that protective gloves should not be worn when operating powered woodworking tools because of the possibility of the work piece snagging the glove and pulling the hand to the cutting surface.
- All hand-held power-driven tools must be equipped with one of the following: a constant pressure switch that shuts off the power upon release (e.g., circular saws, hand-held power drills, chain saws) or an on-off switch (e.g., routers, planers scrolls saws, jigsaws).
- Never leave a running tool unattended.
- All workers using hand and power tools must be properly trained, and training must be documented.
- Tools of a non-sparking material must be used if fire/explosion hazards exist.
- All fuel-operated tools shall be stopped and allowed to cool prior to being refueled, serviced, or maintained, and proper ventilation provided when used in enclosed spaces.
- Bench grinders shall be properly grounded. Work rests must be kept at a distance not to exceed 1/8 inch from the grinding wheel surface.
- All persons using grinders or abrasive wheels shall use approved eye-protective devices.
- Hand held grinders shall have grinding wheel guards in place during operation.
- Train personnel to recognize that tasks involving lifting, repetitive motion, excess pressure, vibration, awkward positions, and remaining stationary for prolonged periods and work in cold conditions increase the risk of musculoskeletal injury. Procedures for avoiding or minimizing risk include: using mechanical devices for lifting, following procedures in FLD 10 when manual lifting is necessary, using shock absorbing gloves when using vibrating tools, choosing tools that reduce gripping force and align joints in a neutral position or holding tools in an ergonomically neutral position, taking breaks or alternating repetitive jobs, and following procedures in FLD 06.
- Hand tools such as chisels and punches, which develop mushroomed heads during use must be taken out of service and reconditioned by qualified persons or replaced, as necessary.
- Broken or fractured handles on hammers, axes and similar equipment must be replaced promptly.
- Worn or bent wrenches must be replaced.

- Handles designed for use on files and similar tools must be used.
- Jacks must be checked periodically to ensure they are in good operating condition

TORSION TOOLS

Torsion tools are used to grip, fasten, and turn. These include wrenches, pliers, screwdrivers, vises, and clamps. There is a variety of each type of these tools. Selection is very important. Here are a few safety precautions for common torsion tools:

- Wrenches should always be pulled and not pushed. Pushing a wrench can cause a loss of control if there is a sudden release of pressure. A short, steady pull should be used rather than quick, jerky motions. Where available, use a socket wrench instead of an adjustable or open-ended wrench. Socket wrenches are generally easier to control, are more convenient, and are less likely to damage a bolt or nut. When using an adjustable wrench, the pressure should be applied to the fixed jaw
- Pipe wrenches can easily slip on pipes or fittings, causing injury. To prevent slipping, make sure that the pipe or fitting is clean and the wrench jaws are sharp and kept clean of oil and debris.
- Pliers should never be substituted for a wrench. They do not have the same gripping power and can easily slip on a tight object. When using cutting pliers, the object being cut can fly off and cause injury. Wear safety glasses when cutting with pliers.
- Screwdrivers are often misused. They should not be used for prying, or as punches or wedges. These misuses can damage the head of the screwdriver. A dull tip can cause the screwdriver to slip. The tip must be flat at the tip and tapered for a snug fit on the screw.
- When using vises, make sure that the vise is bolted solidly to a base (e.g., work bench). When cutting material in a vise, try to cut as close to the vise as possible to minimize vibration.
- Oil vises regularly.

Screwdrivers

- Most screwdrivers are not designed to be used on electrical equipment. Use an insulated screwdriver.
- Do not hold an object in the palm of one hand and press a screwdriver into it; place the object on a bench or a table.
- Never hammer with a screwdriver.
- Check for broken handles, bent blade, etc.
- Select a screwdriver of the proper size to fit the screw.
- Screwdrivers with a split or splintered handle shall not be used.
- The point shall be kept in proper shape with a file or grinding wheel.
- Screwdrivers shall not be used as a substitute punch, chisel, nail-puller, etc.

Pliers

- Do not use pliers as a substitute for hammers or wrenches.
- Use insulated pliers when doing electrical work.

- Inspect pliers frequently to make certain that they are free of breaks or cracks.
- Pliers shall be kept free from grease and oil and- the teeth or cutting edges shall be kept clean and sharp.
- The fulcrum pin, rivet or bolt shall be snug but not tight.

Wrenches

- Select the correct size of wrench for the job.
- Never use a piece of pipe or another wrench as a wrench handle extension.
- Too much leverage can ruin a tool and cause injury.
- To avoid sudden slips, stand in a balanced position and always pull on the wrench instead of pushing against the fixed jaw.
- Only wrenches in good condition shall be used; a bent wrench, if straightened, has been weakened and shall not be used.
- Watch for sprung jaws on adjustable wrenches.
- Always pull toward yourself, never push, since it is easier to brace against a sudden lunge toward you should the tool slip or break.
- When using a wrench on a tight nut - first use some penetrating oil, use the largest wrench available that fits the nut, when possible pull on the wrench handle rather than pushing, and when possible apply force to the wrench with both hands while both feet are firmly placed. Always assume that you may lose your footing - check the place where you may fall for sharp objects.
- Keep all pipe wrenches clean and in good repair. The jaws of pipe wrenches should be wire brushed frequently to prevent an accumulation of dirt and grease that would otherwise build up and cause wrenches to slip.
- Never use pipe wrenches in place of a rod holding device.
- Replace hook and heel jaws when they become visibly worn.
- Position your hands so that your fingers will not be smashed between the wrench handle and the ground or other work surface; when breaking joints the wrench may slip or the joint may suddenly let go.

IMPACT TOOLS

Impact tools include various types of hammers such as riveting hammers, carpenter's claw hammers, and sledgehammers. The main hazard associated with all these tools is damage to the hands and arms. The following safety procedures should be employed when using hammers:

- The handle shall be securely fitted and suited for the type of job and type of hammerhead. The striking face of the hammer shall be kept well dressed according to the application.
- The handle shall be smooth and free of oil to prevent slippage.
- Safety goggles shall be worn at all times when hammering to protect from flying nails, wood chips, and metal or plastic fragments.

- To properly drive a nail, hold the hammer near the end of the handle and start off with a light blow. Increase power after the nail is set.
- To avoid chipping or spalling of the hammerhead, use the lightest swing possible, hammer straight and not on an angle. Inspect the head of the hammer for potential chipping and spalling.

Hammers

- Use the correct hammer for the type of work to be done.
- Have an unobstructed swing when using a hammer and watch for overhead interference.
- Check for defects before using.
- The head of a hammer shall be wedged securely and squarely on the handle and neither the head nor the handle shall be chipped or broken.

CUTTING TOOLS

The main hazard associated with cutting tools is tool slippage. A dull tool or poor tool technique can cause a slip, which can redirect the cutting part of the tool toward the body. In addition, a sudden release or change in the force applied to a tool can throw the user off balance, possibly falling into another object, which may cause injury. To prevent slippage, tools shall be kept sharp and handled in such a way that, if a slip occurs, the direction of force will be away from the body. In addition, cutting along the grain of a material can help prevent changes in the pressure applied to the tool, thereby preventing slippage.

Chisels

- Always wear safety goggles or a face shield when using a chisel.
- Drive wood chisel outward and away from your body.
- Do not use chisels to pry.
- Keep edges sharp for most effective work and protect when not in use.

Knives

- Always cut away from the body.
- Keep hands and body clear of the knife stroke.
- Use a locking blade knife when possible.
- Keep blades sharp.
  - Knives and other sharp or edged tools must be maintained in proper condition. A sharp edged tool, used properly, is safer than a dull or improperly maintained tool.
  - When not in immediate use edged tools must be properly secured via, sheathing, closing, capping or covering.
  - Any task involving the use of an edged tool must be properly evaluated, alternatives to edged tools reviewed and training in the proper use, maintenance and handling verified by management and/or the site safety officer.
  - Knives, box cutters or like tools will not be authorized for cutting plastic wire ties or tubing. Use appropriately shaped and sized wire cutters or snips.
  - Remove knives from carry on luggage and place in checked baggage.

POWERED TOOLS

- Portable power tools shall be carefully inspected before use and shall be kept repaired.
- Switches and plugs must operate properly, and the cords must be clean and free from defects.
- Portable powered tools capable of receiving guards and/or designed to accommodate guards shall be equipped with guards to prevent the operator from having any part of his body in the danger zone during the operating cycle.
- Electric powered portable tools with exposed conducting parts shall be grounded. Portable tools protected by an approved system of double insulation, or its equivalent, need not be grounded. Where such an approved system is employed, the equipment shall be distinctively marked.
- Hand-held powered tools of a hazardous nature such as circular saws having a blade diameter greater than two inches, chain saws, percussion tools, drills, tappers, fasteners, drivers, grinders with wheels greater than two inches in diameter, disc sanders, belt sanders, reciprocating saws, saber scroll saws and jig saws with blade shanks greater than one-fourth inch, and other similarly operating powered tools shall be equipped with a constant pressure switch or control (”dead-man switch”) that will shut the power off when the pressure is released.
- Portable circular saws having a blade diameter over two inches shall be equipped with guards or hoods which will automatically adjust themselves to the work when the saw is in use, so that none of the teeth are exposed to contact above the work. When withdrawn from the work, the guard shall completely cover the saw to at least the depth of the teeth. The saw shall not be used without a shoe or guide.
- Pneumatic powered portable tools shall be equipped with automatic air shut-off valves that stop the tool when the operators hand is no longer in contact with the tool. Safety clips, retainers, or other effective means shall be installed on pneumatic tools to prevent the tools from accidentally misfiring.
- Abrasive wheels with a diameter of more than two inches shall be used only on machines provided with safety guards. The guards shall cover the spindle end, nut, and flange projections. Guards on operations where the work provides a suitable measure of protection to the operator may be so constructed that the spindle end, nut, and other flanges are exposed.
- Explosive-actuated fastening tools' muzzle ends shall have a protective shield or guard designed to confine any flying fragments or particles. The tool shall be so designed that it cannot be fired unless it is equipped with a protective shield or guard. Weston Solutions, Inc. employees are not permitted to use a power-actuated tool until properly trained as prescribed by the manufacturer.

Extension Cords

See FLD 35, Electric Safety, for requirements and procedures for using extension cords.

SPECIALTY TOOLS

Pneumatic Powered Tools

Tools powered by air must be inspected and maintained as described above. Hose or tubing used to deliver air to pneumatic tools must be used as required and according to procedures in FLD 16, Pressure Systems: Compressed Gas Systems.

Powder-Actuated Tools

- Only employees who have been trained in the operation of the particular tool in use shall be allowed to operate a powder-actuated tool.
- Powder-actuated tools shall be tested each day before loading to see that safety devices are in proper working condition. The method of testing shall be in accordance with the manufacturer's recommended procedure.
- Any tool found not in proper working order, or that develops a defect during use, shall be immediately removed from service and not used until properly repaired.
- Personal protective equipment shall be selected in accordance with manufacturer’s recommendations and in consideration of the potential hazards of the task.
- Tools shall not be loaded until just prior to the intended firing time. Neither loaded nor empty tools are to be pointed at any employees. Hands shall be kept clear of the open barrel end.
- Loaded tools shall not be left unattended.
- Fasteners shall not be driven into very hard or brittle materials including, but not limited to, cast iron, glazed tile, surface-hardened steel, glass block, live rock, face brick, or hollow tile.
- Driving into materials easily penetrated shall be avoided unless such materials are backed by a substance that will prevent the pin or fastener from passing completely through and creating a flying missile hazard on the other side.
- No fastener shall be driven into a spalled area caused by an unsatisfactory fastening.
- Tools shall not be used in an explosive or flammable atmosphere.
- All tools shall be used with the correct shield, guard, or attachment recommended by the manufacturer.
- Powder-actuated tools used by employees shall meet all other applicable requirements of American National Standards Institute, A10.3-1970, Safety Requirements for Explosive-Actuated Fastening Tools.

FLD 39 ILLUMINATION

RELATED FLDs

FLD 08 – Confined Space Entry Program
FLD 10 – Manual Lifting and Handling of Heavy Objects
FLD 12 – Housekeeping
FLD 13 – Structural Integrity
FLD 18 – Operation and Use of Boats
FLD 22 – Heavy Equipment Operation
FLD 23 – Cranes, Rigging, and Slings
FLD 33 – Demolition
FLD 38 – Hand and Power Hand Tools

PROCEDURE

While work is in progress, offices, facilities, access-ways, working areas, construction roads, etc., will be lighted by at least the minimum light intensities specified in Table 1.

Office lighting will be in accordance with American National Standards Institute (ANSI)/ Illuminating Engineering Society of North America (IESNA) RP-1.

Roadway lighting will be in accordance with ANSI/IESNA RP-8.

Marine lighting will be in accordance with ANSI/IESNA RP-12.

Means of Egress

- Means of egress will be illuminated, with emergency and non-emergency lighting, to provide a minimum of 1 footcandle (fc) (lumens per square foot [lm/ft^2]) (11 lux [lx], measured at the floor. (Reference NFPA 101)
- The illumination will be arranged so that the failure of any single lighting unit, including the burning out of an electric bulb, will not leave any area in total darkness.

Lamps and fixtures will be guarded and secured to preclude injury to personnel. Open fluorescent fixtures will be provided with wire guards, lenses, tube guards and locks, or safety sockets that require force in the horizontal axis to remove the lamp.

Lamps for general illumination shall be protected from accidental contact or breakage. Protection shall be provided by elevation of at least 7 ft (2.1 m) from normal working surface or suitable fixture or lamp holder with a guard.

TABLE 1 - MINIMUM LIGHTING REQUIREMENTS

Facility or Function	Illuminance – lx (lm/ft2)
Accessways	
– general indoor	55 (5)
– general outdoor	33 (3)
– exitways, walkways, ladders, stairs	110 (10)
Administrative areas (offices, drafting/meeting rooms, etc.)	540 (50)
Chemical laboratories	540 (50)
Construction Areas	
– general indoor	55 (5)
– general outdoor	33 (3)
– tunnels and general underground work areas, (minimum 110 lx required at tunnel and shaft heading during drilling, mucking, and scaling)	55 (5)
Conveyor routes	110 (10)
Docks and loading platforms	33 (3)
Elevators (freight and passenger)	215 (20)
First-aid stations and infirmaries	325 (30)
Maintenance/Operating Areas/Shops	
– vehicle maintenance shop	325 (30)
– carpentry shop	110 (10)
– outdoors field maintenance area	55 (5)
– refueling area, outdoors	55 (5)
– shops, fine detail work	540 (50)
– shops, medium detail work	325 (30)
– welding shop	325 (30)
Mechanical/electrical equipment rooms	110 (10)
Parking areas	33 (3)
Toilets, wash, and dressing rooms	110 (10)
Visitor areas	215 (20)
Warehouses and Storage Rooms/Areas	
– indoor stockroom, active/bulk storage	110 (10)
– indoor stockroom, inactive	55 (5)
– indoor rack storage	270 (25)
– outdoor storage	33 (3)
Work areas – general (not listed above)	325 (30)

FLD 41 HAND AND EMERGENCY SIGNALS/RADIO COMMUNICATION

REFERENCES

29 CFR 1910.120
29 CFR 1926.65

It is essential that workers have a means of communicating rapidly and effectively during heavy equipment operations, construction, hazardous waste operations, and other types of activities. Communication while wearing personal protective equipment can be extremely difficult. This FLD establishes guidance for uniform communication protocols to be used, as needed, in field operations.

GENERAL HAND SIGNALS

SIGNAL	MEANING
Point index finger toward self	I; me
Point index finger toward object	It; them
Point index finger toward person	You; them
Circle index finger at group	We; us; all of us
Pointed finger on extended arm	Look in that direction
Beckon with index finger	Come here
Point with thumb in a particular direction	Move this way; go this way
Hold index finger up near head	Wait
Slowly ease palm face down	Relax; slow down
Put palm over brow	Scout it out; Check it out
Move hand far away from body	Stay away
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; Bad; Not OK
Hand gripping throat	Cannot breathe, out of air
Wave hands over head from side-to-side	Attention; Stand-by for the 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/hold position
Draw index finger across front of throat	Shut off engine; cut off power/Quit
Palm down and rotated from side to side	Unsure; Can’t decide
Form a circle with thumb and index finger	OK; I understand; Agree
Military salute	I understand and will comply

EMERGENCY SIGNALS

Emergency signals are critical for alerting workers of danger and to maintain site control during an emergency. Bullhorns, radios, air horns, and similar devices may be used for emergency communications if background noise does not preclude their use. Emergency hand signals should be used as a secondary means of communication.

SIGNAL	MEANING
One long sound/blast of the emergency alarm signal, air horn, siren, whistle	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
Two long blasts of the emergency alarm signal, air horn, siren, whistle	All clear
Point one arm in direction of evacuation, make a large circling motion with the other arm in direction of evacuation	Evacuate the area
Hand clutching throat	Cannot breathe; out of air
Grip partners wrist or place both hands around partners arm	Leave area immediately

SIGNALS FOR VEHICLE OPERATIONS

The following signals should be used for assisting in operations with vehicles other than cranes. See FLD 23, Cranes, Rigging, and Slings for hand and body signals for crane operations compliant with 29 CFR 1926.550.

SIGNAL	MEANING
Move arm in circular (cranking motion) at waist level	Start engine
Move hand, palm down across throat	Stop engine
Circular motion with hand pointing to ground	Lower equipment
Circular motion with hand pointing up	Raise equipment
Palms in front of head at ear level, moving laterally to indicate distance to go	This far to go
Point to vehicle, beckon with arm motioning toward body	Come toward me
One hand above head, palm toward face, waving back	Move straight back
Both arms pointing in same direction, index fingers extended	Turn (direction indicated)
Put fist in air or cross arms in front of head, fists closed	Stop
Thrust fist upward from shoulder and downward to shoulder several times	Speed up
Extend arm sideways, palm down, and wave arm downward 45 degrees several times	Slow down

RADIO COMMUNICATION

When radio communication is used, personnel should be instructed in the use of the radio, which channel should be used, and in the following radio guidelines. Personnel should use the radio only for necessary work-related communication.

- Speak clearly.
- Call the name or call sign of the individual or unit you are trying to reach and identify yourself (e.g., “Unit One; this is Safety.”).
- Wait for acknowledgement (e.g., “Safety this is Unit One”) before you continue transmission.
- Proceed with your transmission. When finished, say “Over” when you expect a response. When transmission is complete and no response is expected, say “Out”.
- When receiving a radio call, acknowledge the call immediately unless doing so would interfere with safety.
- If a transmission is incomplete or not understood, request clarification.
- Emergency calls should begin with the words “Emergency, Emergency, Emergency.” Give absolute priority to emergency communication. Unless answering or aiding the emergency call, do not use the radio until certain it will not interfere with further emergency communication.
- Ensure that radios are charged and tested prior to each work shift and as necessary thereafter. Malfunctioning radios must not be used and must be replaced immediately.
- Do not transmit false information or unidentified communication.
- Profanity and indecent language are prohibited. Transmittal of sensitive information over the radio is prohibited.

Use the phonetic alphabet (below) to pronounce letters clearly.

Letter	Word
A	Alpha
B	Bravo
C	Charlie
D	Delta
E	Echo
F	Foxtrot
G	Golf
H	Hotel
I	India
J	Juliet
K	Kilo
L	Lima
M	Mike

Letter	Word
N	November
O	Oscar
P	Papa
Q	Quebec
R	Romeo
S	Sierra
T	Tango
U	Uniform
V	Victor
W	Whiskey
X	X-Ray
Y	Yankee
Z	Zulu

FLD 43 BIOLOGICAL HAZARDS - GENERAL

RELATED FLDS

FLD 44 – Biological Hazards – Bloodborne Pathogens Exposure Control Plan – First Aid Providers
FLD 45 – Biological Hazards – Bloodborne Pathogens Exposure Control Plan – Work with Infectious Waste

Field personnel and travelers may encounter biological hazards that include endemic hazards as follows: animals, insects, molds and fungus, and plants. In addition, personnel may be exposed to etiological agents (infectious diseases). An important part of health and safety planning and protection includes identifying and understanding local flora and fauna. Animals, insects, molds, fungus, and poisonous plants, and potential for exposure to infectious agents, which are also referred to as microbes, vary from site to site. 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, molds and fungus and infectious agents (microbes).

A set of guidance documents on the WESTON EHS Portal Site describe General Biological Hazards. While extensive, these guidance documents may not be all inclusive. They should provide a starting point for developing Accident Prevention Plans and Site-Specific Health and Safety Plans, but staff is encouraged to review additional information sources. A variety of resources are available to determine potential biological hazards at a work location, including the local health department.

Guidance documents on the EHS Portal Site provide information on the following biological hazards:

- Animals
- Insects
- Molds And Fungi
- Poisonous Plants
- Infectious Diseases (Microbes)

FLD 43A ANIMALS

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

Feral Animals

Landfills and abandoned buildings often attract stray or abandoned dogs. These animals often become pack-oriented, very aggressive, and represent serious risk of harm to unprotected workers.

Workers entering abandoned buildings should be alert for such animals and avoid approaching them since this may provoke aggressive behavior. Avoidance and protection protocols include watching for animal dens, using good housekeeping, and using repellents.

Dangerous Wild Animals

Work in remote areas inhabited by wild animals that have been known to cause injury and kill human beings, requires that companies working in these areas carefully plan for wildlife encounters. This FLD outlines actions that, when properly implemented, should provide a high degree of protection for WESTON employees and wildlife.

See Wildlife Hazard Recognition and Protection Procedure (Attached).

Venomous Snakes and Lizards

Venomous Shakes

Venomous snakes are common around the world. The major variables are the likelihood of encounter and the snake that is likely to be encountered. Encounters with snakes may be caused by moving containers, reaching into holes, or just walking through high grass, swampy areas, or rocks. **Do not attempt to catch any snakes.**

Symptom of venomous snake bites:

- Bloody wound discharge, blurred vision, burning, convulsions, diarrhea, dizziness, excessive sweating, fainting, fang marks in the skin, fever, increased thirst, local tissue death, loss of muscle coordination, nausea and vomiting, numbness and tingling, rapid pulse, severe pain, skin discoloration, swelling at the site of the bite, weakness.

Venom from venomous snakes and lizards can be divided into three types of toxins, however, there are some indications that snake venom may have more than one toxin and characteristics may change as a snake ages. The three types of toxins and their effects are:

Hemotoxins destroy blood cells and affect the circulatory system. The site of the bite rapidly becomes swollen, discolored, and painful. This is usually accompanied by swelling, discoloration, and pain progressing toward the heart.

Neurotoxins affect the nervous system and symptoms vary from foggy vision, dizziness, and other comparatively mild symptoms to rigid or flaccid paralysis, shortness of breath, weakness or paralysis of the lower limbs, double vision, inability to speak or swallow, drooping eyelids, and involuntary tremors of the facial muscles. Death can occur in as little as ten minutes, usually due to abrupt cessation of respiration.
Myotoxins destroy cells and cause muscle necrosis.

In the US, with the exception of the coral snakes which tend to have neuron-toxic venom, most venomous snakes have been categorized as having hemotoxic venom (in some areas Mojave rattlesnakes are found to have neuron-toxic venom). There is some indication that some species of rattlesnakes have both hemotoxic and neuron-toxic venom. It is also reported that venom of younger snakes may be more neuron-toxic

There are many are highly venomous snakes worldwide, some are deadly and most can be deadly without proper care.

Lizards

There are two lizards recognized as venomous, the Gila monster and the Mexican Beaded Lizard. Venom of the Gila monster is considered to be neuron-toxic and that of the Mexican Beaded Lizard is considered to be hemo-toxic.

Geographical Listing of Venomous Snakes and Lizards

Following is a list of poisonous snakes and lizards by geographic area. This list is extensive but may not be all inclusive. In planning for work around the world, also contact local agencies to determine whether there may be additional venomous snakes or lizards.

North America (including Mexico)

> **Copperhead**s (Broad-banded, Northern, Osage, Southern, Trans-Pecos)
> **Rattlesnakes (**Banded rock, Black-tailed, Canebrake, Diamondback [eastern and western], Massasauga (eastern and western), Mojave, Mottled rock, Pacific (northern and southern), Pigmy (southeastern and western), Prairie, Red diamond, Ridge-nosed, Sidewinder, Speckled, Tiger, Timber, Twin-spotted)
> **Coral Snake** (Arizona, Eastern, Texas, Western (red bands touching yellow "bad fellow")
> **Cottonmouth or water moccasin** (Eastern, Florida, Western)

North America - Lizards

> Gila Monster

Central and South America – Venomous Snakes

Bushmaster, Eyelash Pit Viper, Fer-de-lance, Jumping Viper, Tropical Rattlesnake

Central and South America – Venomous Lizards

Mexican Beaded Lizard

Europe

Common Adder, Long-Nosed Adder, Pallas Viper, Ursini Viper

Venomous Snakes of Africa and Asia

Boomslang, Bush Viper, Common Cobra, Egyptian Cobra, Gaboon Viper, Green Mamba, Green Tree Pit Viper, Habu Pit Viper, Horned Desert Viper, King Cobra, Krait, Levant Viper, Malayan Pit Viper, McMahon's Viper, Mole Viper or Burrowing Viper, Palestinian Viper, Puff Adder, Rhinoceros Viper or River Jack, Russel's Viper, Sand Viper, Saw-Scaled Viper, Wagler's Pit Viper or Temple Viper,

Australasia

Australian Copperhead, Death Adder, Taipan, Tiger Snake,

Poisonous Sea Snakes
Banded Sea Snake, Yellow-bellied Sea Snake

Prevention of Bites

Key factors to working safely in areas where snakes or lizards may be encountered include:

- Be alert
- Use care when reaching into or moving containers
- Use sticks or long-handled tools when reaching where you cannot see
- Be familiar with the habits and habitats of snakes in the vicinity of an incident or site
- In areas or activities where encounters with snakes are likely, wear sturdy leather or rubber work boots and snake chaps
- Do not attempt to catch snakes unless required and qualified

A snake bite warrants medical attention after administration of proper first-aid procedures. It is important to contact local medical facilities to determine where anti-venoms are located.

First-Aid

1. Keep the person calm. Restrict movement, and keep the affected area below heart level to reduce the flow of venom.

2. Remove any rings or constricting items because the affected area may swell. Create a loose splint to help restrict movement of the area.

3. If the area of the bite begins to swell and change color, the snake was probably venomous.

4. Monitor the person's vital signs -- temperature, pulse, rate of breathing, and blood pressure if possible. If there are signs of shock (such as paleness), lay the person flat, raise the feet about a foot, and cover the person with a blanket.

5. Get medical help immediately.

6. Try to photograph or identify the snake. Do not waste time hunting for the snake, and do not risk another bite. Be careful of the head of a dead snake. A snake can actually bite for up to an hour after it is dead (from a reflex).

- DO NOT allow the person to become over-exerted. If necessary, carry the person to safety.
- DO NOT apply a tourniquet.
- DO NOT apply cold compresses to a snake bite.
- DO NOT cut into a snake bite with a knife or razor.
- DO NOT try to suction the venom by mouth.
- DO NOT give stimulants or pain medications unless instructed to do so by a doctor.
- DO NOT give the person anything by mouth.
- DO NOT raise the site of the bite above the level of the person's heart
- Transport the victim to medical attention immediately

Animal Borne Diseases

Rabies

Animal borne diseases include rabies (generally found in dogs, skunks, raccoons, bats, and foxes). Rabies varies from area to area as do the animals most likely to be rabid.

Questions and Answers about Rabies

Q. What is Rabies and how is it transmitted?

A. Rabies is a viral infection most often transmitted by bites of animals infected with the virus.

Q. What animals are most likely to be infected?

A. 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.

Q. How can you tell if an animal is rabies-infected?

A. 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.

Q. What should you do if bitten by an animal you suspect is infected with rabies?

A. As quickly as possible, wash the bite area with soap and water, then disinfect with 70% alcohol and seek medical attention for follow-up. Try to capture the animal. Avoid being bitten again or contacting the mouth or any saliva of the animal. Keep the animal under surveillance and call the police for assistance to capture it. Have the animal tested.

A dead animal believed to be infected should be preserved and tested for rabies. Health departments are often sources where information can be found regarding testing.

Q. Is there a cure for rabies?

A. 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.**

There are vaccines available that should be considered if a work assignment involves trapping animals likely to carry rabies. Medical consultants must be involved in decisions to immunize workers against rabies.

Hantavirus

WESTON employees or contractors/subcontractors conducting field work in areas where there is evidence of a rodent population should be aware of an increased level of concern regarding the transmission of “Hantavirus”-associated diseases. Hantavirus is associated with rodents, especially the deer mouse (*Peromyscus maniculanis*) as a primary reservoir host. Hantavirus has resulted in several deaths in the U.S.

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/semi-rural areas. Hantavirus begins 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.

Prevention

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.

Field personnel involved in trapping or contacting rodents or their waste products will need to wear respirators with high-efficiency particulate air (HEPA) filters, eye protection, Tyvek coveralls, chemical-resistant gloves, and disposable boot covers. Strict decontamination requirements are needed. Double-bag, label, and specific handling, packaging, shipping, storage, and analytical procedures are required to minimize the risks of exposure from collected mice. More detailed procedures can be obtained from WESTON Corporate Health and Safety.

For employees and facilities in rural/semi-rural 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).

Plague

Described under Insects (Fleas)

Anthrax

Anthrax is an acute infectious disease caused by the spore-forming bacterium *Bacillus anthracis*. Anthrax most commonly occurs in wild and domestic lower vertebrates (cattle, sheep, goats, camels, antelopes, and other herbivores), but it can also occur in humans when they are exposed to infected animals or tissue from infected animals.

Anthrax is most common in agricultural regions where it occurs in animals. These include South and Central America, Southern and Eastern Europe, Asia, Africa, the Caribbean, and the Middle East. When anthrax affects humans, it is usually due to an occupational exposure to infected animals or their products. Workers who are exposed to dead animals and animal products from other countries where anthrax is more common may become infected with *B. anthracis* (industrial anthrax). Anthrax in wild livestock has occurred in the U.S.

Anthrax infection can occur in three forms: cutaneous (skin), inhalation, and gastrointestinal. *B. anthracis* spores can live in the soil for many years, and humans can become infected with anthrax by handling products from infected animals or by inhaling anthrax spores from

contaminated animal products. Anthrax can also be spread by eating undercooked meat from infected animals. It is rare to find infected animals in the U.S.

Cutaneous: Most (about 95%) anthrax infections occur when the bacterium enters a cut or abrasion on the skin, such as when handling contaminated wool, hides, leather, or hair products (especially goat hair) of infected animals. Skin infection begins as a raised itchy bump that resembles an insect bite but within 1-2 days develops into a vesicle and then a painless ulcer, usually 1-3 cm in diameter, with a characteristic black necrotic (dying) area in the center. Lymph glands in the adjacent area may swell. About 20% of untreated cases of cutaneous anthrax will result in death. Deaths are rare with appropriate antimicrobial therapy.

Inhalation: Initial symptoms may resemble a common cold. After several days, the symptoms may progress to severe breathing problems and shock. Inhalation anthrax is usually fatal.

Intestinal: The intestinal disease form of anthrax may follow the consumption of contaminated meat and is characterized by an acute inflammation of the intestinal tract. Initial signs of nausea, loss of appetite, vomiting, and fever are followed by abdominal pain, vomiting of blood, and severe diarrhea. Intestinal anthrax results in death in 25% to 60% of cases.

Anthrax is not known to spread from one person to another person. Communicability is not a concern in managing or visiting patients with inhalation anthrax.

Prevention

In countries where anthrax is common and vaccination levels of animal herds are low, humans should avoid contact with livestock and animal products and avoid eating meat that has not been properly slaughtered and cooked. Also, an anthrax vaccine has been licensed for use in humans. The vaccine is reported to be 93% effective in protecting against anthrax.

Doctors can prescribe effective antibiotics. To be effective, treatment should be initiated early. If left untreated, the disease can be fatal.

Direct person-to-person spread of anthrax is extremely unlikely; however, a patient's clothing and body may be contaminated with anthrax spores. Effective decontamination of people can be accomplished by a thorough wash down with anti-microbe effective soap and water. Waste water should be treated with bleach or other anti-microbial agent. Effective decontamination of articles can be accomplished by boiling contaminated articles in water for 30 minutes or longer and using common disinfectants. Chlorine is effective in destroying spores and vegetative cells on surfaces. Burning the clothing is also effective. After decontamination, there is no need to immunize, treat, or isolate contacts of people ill with anthrax unless they also were also exposed to the same source of infection. Early antibiotic treatment of anthrax is essential–delay seriously lessens chances for survival. Treatment for anthrax infection and other bacterial infections includes large doses of intravenous and oral antibiotics, such as fluoroquinolones, like ciprofloxacin (cipro), doxycycline, erythromycin, vancomycin, or penicillin. In possible cases of inhalation anthrax exposure to unvaccinated personnel, early antibiotic prophylaxis treatment is crucial to prevent possible death.

No skin, especially if it has any wounds or scratches, should be exposed. Disposable personal protective equipment is preferable, but if not available, decontamination can be achieved by washing any exposed equipment in hot water, bleach and detergent. Disposable personal protective equipment and filters should be burned and buried. The size of Bacillus anthracis bacillii ranges from 0.5 µm to 5.0 µm. Anyone working with anthrax in a suspected or confirmed victim should wear respiratory equipment capable of filtering this size of particle or smaller. The U.S. National Institute for Occupational Safety and Health (NIOSH) and Mine Safety and Health Administration (MSHA) approved high efficiency-respirator, such as a half-face disposable respirator with a HEPA filter, is recommended. All possibly contaminated bedding or clothing should be isolated in double plastic bags and treated as possible bio-hazard waste. Dead victims that are opened and not burned provide an ideal source of anthrax spores; the victim should be sealed in an airtight body bag. Cremating victims is the preferred way of handling body disposal. No embalming or autopsy should be attempted without a fully equipped biohazard lab and trained and knowledgeable personnel.

Delays of only a few days may make the disease untreatable and treatment should be started even without symptoms if possible contamination or exposure is suspected. Animals with anthrax often just die without any apparent symptoms. Initial symptoms may resemble a common cold – sore throat, mild fever, muscle aches and malaise. After a few days, the symptoms may progress to severe breathing problems and shock and ultimately death. Death can occur from about two days to a month after exposure with deaths apparently peaking at about 8 days after exposure. [8] Antibiotic-resistant strains of anthrax are known.

Aerial spores can be trapped by a simple HEPA or P100 filter. Inhalation of anthrax spores can be prevented with a full-face mask using appropriate filtration. Unbroken skin can be decontaminated by washing with simple soap and water. All of these procedures do not kill the spores which are very hard to kill and require extensive treatment to eradicate them. Filters, clothes, etc. exposed to possible anthrax contaminated environments should be treated with chemicals or destroyed by fire to minimize the possibility of spreading the contamination.

In recent years there have been many attempts to develop new drugs against anthrax; but the existing supply still works fine if treatment is started soon enough.

Prevention can also be accomplished through early detection. In response to the U.S. Postal Service (USPS) anthrax attacks of October 2001, the USPS has installed BioDetection Systems (BDS) in their large-scale mail cancellation facilities. BDS response plans have been formulated by the USPS in conjunction with local responders including fire, police, hospitals, and public health. Employees of these facilities have been educated about anthrax, response actions and prophylactic medication. Because of the time delay inherent in getting final verification that anthrax has been used, prophylactic antibiotics for possibly exposed personnel should commence as soon as possible.

The ultimate in prevention is vaccination against infection but this has to be done well in advance of exposure.

Anthrax spores can survive for long periods of time in the environment after release. Methods for cleaning anthrax contaminated sites commonly use oxidizing agents such as peroxides, ethylene Oxide, Sandia Foam, chlorine dioxide (used in the Hart Senate office building), and liquid bleach products containing sodium hypochlorite. These agents slowly destroy bacterial spores. A bleach solution for treating hard surfaces has been approved by the EPA and can be prepared by mixing one part bleach (5.25%-6.00%) to one part white vinegar to eight parts water. Bleach and vinegar must not be combined together directly, rather some water must first be added to the bleach (e.g., two cups water to one cup of bleach), then vinegar (e.g., one cup), and then the rest of the water (e.g., six cups). The pH of the solution should be tested with a paper test strip; and treated surfaces must remain in contact with the bleach solution for 60 minutes (repeated applications will be necessary to keep the surfaces wet).

Chlorine dioxide has emerged as the preferred biocide against anthrax-contaminated sites, having been employed in the treatment of numerous government buildings over the past decade. Its chief drawback is the need for *in situ* processes to have the reactant on demand.

To speed the process, trace amounts of a non-toxic catalyst composed of iron and tetro-amido macrocyclic ligands are combined with sodium carbonate and bicarbonate and converted into a spray. The spray formula is applied to an infested area and is followed by another spray containing tertiary-butyl hydroperoxide

Using the catalyst method, a complete destruction of all anthrax spores takes 30 minutes. A standard catalyst-free spray destroys fewer than half the spores in the same amount of time. They can be heated, exposed to the harshest chemicals, and they do not easily die.

Brucellosis

Brucellosis, also called undulant fever or Malta fever, is a zoonosis (infectious disease transmitted from animals to humans) caused by bacteria of the genus *Brucella*. It is primarily a disease of domestic animals (goats, pigs, cattle, dogs, etc.) and humans and has a worldwide distribution.

Although brucellosis can be found worldwide, it is more common in countries that do not have good standardized and effective public health and domestic animal health programs. Areas currently listed as high risk are the Mediterranean Basin (Portugal, Spain, Southern France, Italy, Greece, Turkey, North Africa), South and Central America, Eastern Europe, Asia, Africa, the Caribbean, and the Middle East.

The disease is transmitted either through contaminated or untreated milk (and its derivates) or through direct contact with infected animals, which may include dogs, pigs, camels, and ruminants, primarily sheep, goats, cattle, and bison. This also includes contact with their carcasses.

Leftovers from parturition are also extremely rich in highly virulent brucellae. Brucellae, along with leptospira have the unique property of being able to penetrate through intact human skin, so infection by mere hand contact with infectious material is likely to occur.

The disease is now usually associated with the consumption of un-pasteurized milk and soft cheeses made from the milk of infected animals and with occupational exposure of veterinarians and slaughterhouse workers. Some vaccines used in livestock, most notably *B. abortus* strain 19 also cause disease in humans if accidentally injected. Problems with vaccine induced cases in the United States declined after the release of the RB-51 strain developed in the 1990s and the relaxation of laws requiring vaccination of cattle in many states.

The incubation period of brucellosis is, usually, of one to three weeks, but some rare instances may take several months to surface.

Brucellosis induces inconstant fevers, sweating, weakness, anemia, headaches, depression and muscular and bodily pain.

The symptoms are like those associated with many other febrile diseases, but with emphasis on muscular pain and sweating. The duration of the disease can vary from a few weeks to many months or even years. In first stage of the disease, septicaemia occurs and leads to the classic triad of undulant fevers, sweating (often with characteristic smell, likened to wet hay) and migratory arthralgia and myalgia.

Prevention

The main way of preventing brucellosis is by using fastidious hygiene in producing raw milk products, or by pasteurization of all milk that is to be ingested by human beings, either in its pure form or as a derivate, such as cheese.

Provide protection from skin contact when handling potentially infected animals.

Q fever

Q fever is caused by infection with *Coxiella burnetii*. This organism is uncommon but may be found in cattle, sheep, goats and other domestic mammals, including cats and dogs. The infection results from inhalation of contaminated particles in the air, and from contact with the vaginal mucus, milk, feces, urine or semen of infected animals. The incubation period is 9-40 days.
It is considered possibly the most infectious disease in the world, as a human being can be infected by a single bacterium.

The most common manifestation is flu-like symptoms with abrupt onset of fever, malaise, profuse perspiration, severe headache, myalgia (muscle pain), joint pain, loss of appetite, upper respiratory problems, dry cough, pleuritic pain, chills, confusion and gastro-intestinal symptoms such as nausea, vomiting and diarrhea. The fever lasts approximately 7-14 days.

During the course, the disease can progress to an atypical pneumonia, which can result in a life threatening acute respiratory distress syndrome (ARDS), whereby such symptoms usually occur during the first 4-5 days of infection.

Less often the Q fever causes (granulomatous) hepatitis which becomes symptomatic with malaise, fever, liver enlargement (hepatomegaly), pain in the right upper quadrant of the abdomen and jaundice (icterus).

The chronic form of the Q fever is virtually identical with the inflammation of the inner lining of the heart (endocarditis), which can occur after months or decades following the infection. It is usually deadly if untreated. However, with appropriate treatment this lethality is around 10%.

The pathogenic agent is to be found everywhere except Antarctica and New Zealand. In Europe it appears as hepatitis rather than pneumonia as in the United States. The common way of infection is inhalation of contaminated dust, contact with contaminated milk, meat, wool and particularly birthing products. Ticks can transfer the pathogenic agent to other animals. Transfer between humans seems extremely rare and has so far been described in very few cases.

Prevention

Q fever is effectively prevented by intradermal vaccination with a vaccine composed of killed *Coxiella burnetii* organisms. Skin and blood tests should be done before vaccination to identify preexisting immunity; the reason is that vaccinating subjects who already have immunity can result in a severe local reaction. After a single dose of vaccine, protective immunity lasts for many years. Revaccination is not generally required. Annual screening is typically recommended.

Wear appropriate PPE when handling potentially infected animals or materials**.**

Leptospirosis

Leptospirosis is a bacterial disease that affects humans and animals. It is caused by bacteria of the genus *Leptospira*.

The time between a person's exposure to a contaminated source and becoming sick is 2 days to 4 weeks. Illness usually begins abruptly with fever and other symptoms. Leptospirosis may occur in two phases; after the first phase, with fever, chills, headache, muscle aches, vomiting, or diarrhea, the patient may recover for a time but become ill again. If a second phase occurs, it is more severe; the person may have kidney or liver failure or meningitis. This phase is also called Weil's disease.

The illness lasts from a few days to 3 weeks or longer. Without treatment, recovery may take several months. In rare cases death occurs.

Many of these symptoms can be mistaken for other diseases. Leptospirosis is confirmed by laboratory testing of a blood or urine sample.

Leptospira organisms have been found in cattle, pigs, horses, dogs, rodents, and wild animals. Humans become infected through contact with water, food, or soil containing waste from these infected animals. This may happen by consuming contaminated food or water or through skin

contact, especially with mucosal surfaces, such as the eyes or nose, or with broken skin. The disease is not known to be spread from person to person.

Leptospirosis occurs worldwide but is most common in temperate or tropical climates. It is an occupational hazard for many people who work outdoors or with animals, for example, farmers, sewer workers, veterinarians, fish workers, dairy farmers, or military personnel. It is a recreational hazard for campers or those who participate in outdoor sports in contaminated areas and has been associated with swimming, wading, and whitewater rafting in contaminated lakes and rivers. The incidence is also increasing among urban children.

The risk of acquiring leptospirosis can be greatly reduced by not swimming or wading in water that might be contaminated with animal urine.

Protective clothing or footwear should be worn by those exposed to contaminated water or soil because of their job or recreational activities.

Prevention

Avoid risky foods and drinks.

Buy it bottled or bring it to a rolling boil for 1 minute before drink it. Bottled carbonated water is safer than non-carbonated water.

Ask for drinks without ice unless the ice is made from bottled or boiled water. Avoid popsicles and flavored ices that may have been made with contaminated water.
Eat foods that have been thoroughly cooked and that are still hot and steaming

Avoid raw vegetables and fruits that cannot be peeled. Vegetables like lettuce are easily contaminated and are very hard to wash well. When eating raw fruit or vegetables that can be peeled, peel them yourself. (Wash your hands with soap first.) Do not eat the peelings.

Avoid foods and beverages from street vendors. It is difficult for food to be kept clean on the street, and many travelers get sick from food bought from street vendors.

Leptospirosis is treated with antibiotics, such as doxycycline or penicillin, which should be given early in the course of the disease. Intravenous antibiotics may be required for persons with more severe symptoms. Persons with symptoms suggestive of leptospirosis should contact a health care provider.

Machupo virus

Machupo virus, Bolivian hemorrhagic fever (**BHF**), also known as **black typhus** is a hemorrhagic fever and zoonotic infectious disease occurring in Bolivia. First identified in 1959, black typhus is caused by infection with machupo virus, a negative single-stranded RNA virus of the arenaviridae family. The infection has a slow onset with fever, malaise, headache and muscular pains. Petechiae (blood spots) on the upper body and bleeding from the nose and gums

are observed when the disease progresses to the hemorrhagic phase, usually within seven days of onset. The mortality rate is estimated at 5 to 30 percent.

The vector is the vesper mouse (*Calomys callosus*), a rodent indigenous to northern Bolivia. Infected animals are asymptomatic and shed virus in excretions, by which humans are infected. Evidence of person-to-person transmission of Machupo virus exists but is believed to be rare (Kilgore, et. al, 1995).

Measures to reduce contact between the vesper mouse and humans have effectively limited the number of outbreaks, with no cases identified between 1973 and 1994. A vaccine being developed for the genetically related Junín virus which causes Argentine hemorrhagic fever has shown evidence of cross-reactivity with Machupo virus and may be an effective prophylactic measure for people at high risk of infection.

Prevention

Appropriate PPE including respiratory protection for handling animals or when there is potential exposure to wastes from the animals.

Ebola

Ebola is both the common term used to describe a group of viruses belonging to genus Ebolavirus, family Filoviridae, and the common name for the disease which they cause, Ebola hemorrhagic fever. Ebola viruses are morphologically similar to the Marburg virus, also in the family Filoviridae, and share similar disease symptoms. Ebola has caused a number of serious and highly publicized outbreaks since its discovery.

It is known to be a zoonotic virus as it is currently devastating the populations of lowland gorillas in Central Africa. Despite considerable effort by the World Health Organization, no animal reservoir capable of sustaining the virus between outbreaks has been identified. However, it has been hypothesized that the most likely candidate is the fruit bat.

Ebola hemorrhagic fever is potentially lethal and encompasses a range of symptoms including fever, vomiting, diarrhea, generalized pain or malaise, and sometimes internal and external bleeding. Mortality rates are extremely high, with the human case-fatality rate ranging from 50% - 89%, according to viral subtype. [2] The cause of death is usually due to hypovolemic shock or organ failure.

Because Ebola is potentially lethal and since no approved vaccine or treatment is available, Ebola is classified as a biosafety level 4 agent, as well as a Category A bioterrorism agent by the Centers for Disease Control and Prevention.

Symptoms are varied and often appear suddenly. Initial symptoms include high fever (at least 38.8°C), severe headache, muscle joint, or abdominal pain, severe weakness and exhaustion, sore throat, nausea, and dizziness. Before an outbreak is suspected, these early symptoms are easily

mistaken for malaria, typhoid fever, dysentery, influenza, or various bacterial infections, which are all far more common and less reliably fatal.

Ebola may progress to cause more serious symptoms, such as diarrhea, dark or bloody feces, vomiting blood, red eyes due to distention and hemorrhage of sclerotic arterioles, petechia, maculopapular rash, and purpura. Other secondary symptoms include hypotension (less than 90 mm Hg systolic /60 mm Hg diastolic), hypovolemia, tachycardia, organ damage (especially the kidneys, spleen, and liver) as a result of disseminated systemic necrosis, and protinuria. The interior bleeding is caused by a chemical reaction between the virus and the platelets which creates a chemical that will cut cell sized holes into the capillary walls.

Among humans, the virus is transmitted by direct contact with infected body fluids, or to a lesser extent, skin or mucus membrane contact. The incubation period can be anywhere from 2 to 21 days, but is generally between 5 and 10 days.

Although airborne transmission between monkeys has been demonstrated by an accidental outbreak in a laboratory located in Virginia, USA, there is very limited evidence for human-to-human airborne transmission in any reported epidemics.

The infection of human cases with Ebola virus has been documented through the handling of infected chimpanzees, gorillas, and forest antelopes--both dead and alive--as was documented in Côte d'Ivoire, the Republic of Congo and Gabon. The transmission of the Ebola Reston strain through the handling of cynomolgus monkeys has also been reported.[7]

So far, all epidemics of Ebola have occurred in sub-optimal hospital conditions, where practices of basic hygiene and sanitation are often either luxuries or unknown to caretakers and where disposable needles and autoclaves are unavailable or too expensive. In modern hospitals with disposable needles and knowledge of basic hygiene and barrier nursing techniques, Ebola rarely spreads on such a large scale.

Prevention

Prevention methods include good hygiene in medical settings and awareness of the virus in travel areas. There is no known effective vaccine for humans.

Prevention efforts should concentrate on avoiding contact with host or vector species. Travelers should not visit locations where an outbreak is occurring. Contact with rodents should be avoided. Minimize exposure to arthropod bites by using permethrin-impregnated bed nets and insect repellents.

Strict compliance with infection control precautions (i.e., use of disposable gloves, face shields, and disposable gowns to prevent direct contact with body fluids and splashes to mucous membranes when caring for patients or handling clinical specimens; appropriate use and disposal of sharp instruments; hand washing and use of disinfectants) is recommended to avoid health care-associated infections.

Contact with dead primates should be avoided.

Marburg Virus

The **Marburg virus** is the causative agent of **Marburg hemorrhagic fever**. Both the disease and virus are related to Ebola and originate in Uganda and Eastern Congo. The zoonosis is of unknown origin, but fruit bats are suspected. In the spring of 2005, there was an outbreak in Angola.

Because many of the signs and symptoms of Marburg hemorrhagic fever are similar to those of other infectious diseases, such as malaria or typhoid, diagnosis of the disease can be difficult, especially if only a single case is involved.

The disease is spread through bodily fluids, including blood, excrement, saliva, and vomit.

Early symptoms are often non-specific, and usually include fever, headache and myalgia after an incubation period of 3-9 days. After five days, a macropapular rash is often present on the trunk. Later-stage Marburg infection is acute and can include jaundice, pancreatitis, weight loss, delirium and neuropsychiatric symptoms, hemorrhaging, hypovolemic shock and multi-organ dysfunction with liver failure most common.
Accounts of external hemorrhaging from bodily orifices are in fact rare. Time course varies but symptoms usually last for one to three weeks until the disease either resolves or kills the infected host. The fatality rate is between 23-90%.

Prevention

Prevention methods include good hygiene in medical settings and awareness of the virus in travel areas. There is no known effective vaccine for humans.

Prevention efforts should concentrate on avoiding contact with host or vector species. Travelers should not visit locations where an outbreak is occurring. Contact with rodents should be avoided. Minimize exposure to arthropod bites by using permethrin-impregnated bed nets and insect repellents.

Strict compliance with infection control precautions (i.e., use of disposable gloves, face shields, and disposable gowns to prevent direct contact with body fluids and splashes to mucous membranes when caring for patients or handling clinical specimens; appropriate use and disposal of sharp instruments; hand washing and use of disinfectants) is recommended to avoid health care-associated infections.

Contact with dead primates should be avoided.

Rift Valley Fever.

Rift Valley Fever (RVF**)** is a viral Zoonosis affects primarily domestic livestock, but can be passed to humans) causing fever. It is spread by the bite of infected mosquitoes. The disease is caused by the RVF virus, a member of the genus *Phlebovirus* (family *Bunyaviridae*).

The disease was first reported in Kenya around 1915and has since been reported across sub-Saharan Africa. There have been outbreaks in Egypt in 1977-78, Saudi Arabia and Yemen..

In humans the virus can cause several different syndromes. Usually sufferers have either no symptoms or only a mild illness with fever, headache, myalgia and liver abnormalities. In a small percentage of cases (< 2%) the illness can progress to hemorrhagic fever syndrome, meningoencephalitis inflammation of the brain), or affecting the eye. Patients who become ill usually experience fever, generalized weakness, back pain, dizziness, and weight loss at the onset of the illness. Typically, patients recover within 2-7 days after onset.

The vast majority of human infections result from direct or indirect contact with the blood or organs of infected animals. The virus can be transmitted to humans through the handling of animal tissue during slaughtering or butchering, assisting with animal births, conducting veterinary procedures, or from the disposal of carcasses or fetuses. Certain occupational groups such as herders, farmers, slaughterhouse workers and veterinarians are therefore at higher risk of infection. The virus infects humans through inoculation, for example via a wound from an infected knife or through contact with broken skin, or through inhalation of aerosols produced during the slaughter of infected animals. The aerosol mode of transmission has also led to infection in laboratory workers.

There is some evidence that humans may also become infected with RVF by ingesting the unpasteurized or uncooked milk of infected animals.

Human infections have also resulted from the bites of infected mosquitoes, most commonly the Aedes mosquito.

Transmission of RVF virus by hematophagous (blood-feeding) flies is also possible.

To date, no human-to-human transmission of RVF has been documented, and no transmission of RVF to health care workers has been reported when standard infection control precautions have been put in place.

There has been no evidence of outbreaks of RVF in urban areas.

Mild form of RVF in humans

The incubation period (interval from infection to onset of symptoms) for RVF varies from two to six days.

Those infected either experience no detectable symptoms or develop a mild form of the disease characterized by a feverish syndrome with sudden onset of flu-like fever, muscle pain, joint pain and headache.

Some patients develop neck stiffness, sensitivity to light, loss of appetite and vomiting; in these patients the disease, in its early stages, may be mistaken for meningitis.

The symptoms of RVF usually last from four to seven days, after which time the immune response becomes detectable with the appearance of antibodies and the virus gradually disappears from the blood.

Severe form of RVF in humans

While most human cases are relatively mild, a small percentage of patients develop a much more severe form of the disease. This usually appears as one or more of three distinct syndromes: ocular (eye) disease (0.5-2% of patients), meningoencephalitis (less than 1%) or haemorrhagic fever (less than 1%).

Ocular form: In this form of the disease, the usual symptoms associated with the mild form of the disease are accompanied by retinal lesions. The onset of the lesions in the eyes is usually one to three weeks after appearance of the first symptoms. Patients usually report blurred or decreased vision. The disease may resolve itself with no lasting effects within 10 to 12 weeks. However, when the lesions occur in the macula, 50% of patients will experience a permanent loss of vision. Death in patients with only the ocular form of the disease is uncommon.

Meningoencephalitis form: The onset of the meningoencephalitis form of the disease usually occurs one to four weeks after the first symptoms of RVF appear. Clinical features include intense headache, loss of memory, hallucinations, confusion, disorientation, vertigo, convulsions, lethargy and coma. Neurological complications can appear later (> 60 days). The death rate in patients who experience only this form of the disease is low, although residual neurological deficit, which may be severe, is common.

Haemorrhagic fever form: The symptoms of this form of the disease appear two to four days after the onset of illness, and begin with evidence of severe liver impairment, such as jaundice. Subsequently signs of haemorrhage then appear such as vomiting blood, passing blood in the faeces, a purpuric rash or ecchymoses (caused by bleeding in the skin), bleeding from the nose or gums, menorrhagia and bleeding from venepuncture sites. The case-fatality ratio for patients developing the haemorrhagic form of the disease is high at approximately 50%. Death usually occurs three to six days after the onset of symptoms. The virus may be detectable in the blood for up to 10 days, in patients with the hemorrhagic icterus form of RVF.

The total case fatality rate has varied widely between different epidemics but, overall, has been less than 1% in those documented. Most fatalities occur in patients who develop the haemorrhagic icterus form.

A person's chances of becoming infected can be reduced by taking measures to decrease contact with mosquitoes and other bloodsucking insects through the use of mosquito repellents and bednets. Avoiding exposure to blood or tissues of animals that may potentially be infected is an important protective measure for persons working with animals in RVF-endemic areas.

Prevention

Awareness and use of PPE, good hygiene and other avoidance practices used for other zoonotic diseases should be used.

Nipah and Hendra Viruses

Nipah virus is a newly recognized zoonotic virus. The virus was 'discovered' in 1999. It has caused disease in animals and in humans, through contact with infectious animals. The virus is named after the location where it was first detected in Malaysia.

Nipah is closely related to another newly recognized zoonotic virus (1994), called **Hendra** virus, named after the town where it first appeared in Australia. Both Nipah and Hendra are members of the virus family *Paramyxoviridae.* Although members of this group of viruses have only caused a few focal outbreaks, the biologic property of these viruses to infect a wide range of hosts and to produce a disease causing significant mortality in humans has made this emerging viral infection a public heath concern.

Natural Host

It is currently believed that certain species of fruit bats are the natural hosts of both Nipah and Hendra viruses. They are distributed across an area encompassing northern, eastern and south-eastern areas of Australia, Indonesia, Malaysia, the Philippines and some of the Pacific Islands. The bats appear to be susceptible to infection with these viruses, but do not themselves become ill. It is not known how the virus is transmitted from bats to animals.

Transmission

The mode of transmission from animal to animal, and from animal to human is uncertain, but appears to require close contact with contaminated tissue or body fluids from infected animals. Nipah antibodies have been detected in pigs, other domestic and wild animals. The role of species other than pigs in transmitting infection to other animals has not yet been determined.

It is unlikely that Nipah virus is easily transmitted to man, although previous outbreak reports suggest that Nipah virus is transmitted from animals to humans more readily than Hendra virus. Despite frequent contact between fruit bats and humans there is no serological evidence of human infection among bat carers. Pigs were the apparent source of infection among most human cases in the Malaysian outbreak of Nipah, but other sources, such as infected dogs and cats, cannot be excluded. Human-to-human transmission of Nipah virus has not been reported.

Clinical Features

Nipah Virus - The incubation period is between 4 and 18 days. In many cases the infection is mild or inapparent (sub-clinical). In symptomatic cases, the onset is usually with "influenza-like" symptoms, with high fever and muscle pains (myalgia). The disease may progress to

inflammation of the brain (encephalitis) with drowsiness, disorientation, convulsions and coma. Fifty percent of clinically apparent cases die.

Hendra Virus - respiratory illness with severe flu-like signs and symptoms

Protection

The risk of transmission of Nipah and virus from sick animals to humans is thought to be low, and transmission from person-to-person has not yet been documented, even in the context of a large outbreak. Therefore, the risk of transmission of Nipah virus to health care workers is thought to be low. However, transmission without percutaneous exposure (through a break in the skin barrier) is theoretically possible, as respiratory secretions contain the virus. This is why it has been categorized as a biohazardous agent that should be managed in a high-level biosecurity laboratory. It is recommended that close contact with body fluids and infected tissues be avoided if Nipah or hendra virus infection is suspected.

Bird and Bat Borne or Enhanced Diseases

See also under Molds and Fungus

Psittacosis

Psittacosis is a disease caused by a bacteria that is found in bird droppings and other secretions (often carried by pet birds). The bacteria is found worldwide.

Symptoms of psittacosis infection may include a low-grade fever that often becomes worse as the disease progresses, including anorexia, sore throat, light sensitivity, and a severe headache.

Ammonia and sodium hypochlorite based disinfectants are effective disinfectants for Psittacossis.

Where it is necessary to remove bat droppings from buildings prior to renovation or demolition it is prudent to assume infection and use the following precautions:

- Avoid areas that may harbor the bacteria, e.g., accumulations of bird or bat droppings.

- Areas known or suspected of being contaminated by *the organisms causing* Psittacosis such as bird roosts, attics, or even entire buildings that contain accumulations of bat or bird manure, should be posted with signs warning of the health risk. The building or area should be secured

- Before an activity is started that may disturb any material that might be contaminated by Psittacosis, workers should be informed in writing of the personal risk factors that increase an individual's chances of developing these diseases. Such a written communication should include a warning that individuals with weakened immune systems are at the greatest risk of developing severe forms of these diseases become infected. These people should seek advice from their health care provider about whether they should avoid exposure to materials that might be contaminated with these organisms.

The best way to prevent exposure is to avoid situations where material that might be contaminated can become aerosolized and subsequently inhaled. A brief inhalation exposure to highly contaminated dust may be all that is needed to cause infection and subsequent development of psittacosis. Therefore, work practices and dust control measures that eliminate or reduce dust generation during the removal of bat manure from a building will also reduce risks of infection and subsequent development of disease. For example, instead of shoveling or sweeping dry, dusty material, carefully wetting it with a water spray can reduce the amount of dust aerosolized during an activity. Adding a surfactant or wetting agent to the water might reduce further the amount of aerosolized dust.

Once the material is wetted, it can be collected in double, heavy-duty plastic bags, a 55-gallon drum, or some other secure container for immediate disposal. An alternative method is use of an

industrial vacuum cleaner with a high-efficiency filter to *bag* contaminated material. Truck-mounted or trailer-mounted vacuum systems are recommended for buildings with large accumulations of bat or bird manure. These high-volume systems can remove tons of contaminated material in a short period. Using long, large-diameter hoses, such a system can also remove contaminated material located several stories above its waste hopper. This advantage eliminates the risk of dust exposure that can happen when bags tear accidentally or containers break during their transfer to the ground.

The removal of all material that might be contaminated from a building and immediate waste disposal will eliminate any further risk that someone might be exposed to aerosolized spores. Air sampling, surface sampling, or the use of any other method intended to confirm that no infectious agents remain following removal of bat manure is unnecessary in most cases. However, before a removal activity is considered finished, the cleaned area should be inspected visually to ensure that no residual dust or debris remains.

Spraying 1:10 bleach to water mixture on droppings and allowing it to dry is also a recommended practice for the psittacosis organisms.

Because work practices and dust control measures to reduce worker exposures to these organisms have not been fully evaluated, using personal protective equipment is still necessary during some activities. During removal of an accumulation of bat or bird manure from an enclosed area such as an attic, dust control measures should be used, but wearing a NIOSH-approved respirator and other items of personal protective equipment is also recommended to reduce further the risk of exposure to the organisms that cause Psittacosis.

Treatment

Psittacosis is often hard to diagnoses and while a concern, it does not occur with great frequency. Knowledge of the symptoms and of potential exposure is important when seeking medical follow-up for potential exposure.

There are various medical treatments for psittacosis based on extent of infection. The sooner the disease is diagnosed and treatment is begun the more effective the treatment will be.

APPENDIX A
Dangerous Animals - Wildlife Hazard Recognition and Protection

GENERAL

Work in remote areas inhabited by wild animals that have been known to cause injury and kill human beings, requires that companies working in these areas carefully plan for wildlife encounters. This procedure outlines actions that when properly implemented should provide a high degree of protection for employees and wildlife.
These procedures apply to employees who prepare Health and Safety Plans or perform fieldwork in environments in which wild animals may be encountered. However, due to the unpredictable nature of wild animals this single document cannot possibly cover all potential risks or protective measures. Therefore, prior to entering remote areas inhabited by dangerous wildlife, contact local wildlife agencies to gather additional information concerning local risks and protective measures.

REFERENCES

Alaska Administrative Code 5 AAC 92.230 and 5 AAC 92.410.
Alaska Department of Fish and Game, Division of Wildlife Conservation.
http://www.state.ak.us/adfg/adfghome.htm
State of Washington Fish and Wildlife, Living with Wildlife.
http://www.wa.gov/wdfw/wildlife.htm

ATTACHMENTS

Attachments 1 through 4 outline behavioral characteristics of and outline controls that will minimize human injury, loss of property, and unnecessary destruction of wildlife, while ensuring a safe work environment. Attachment 5 provides the Project Specific Exemption for Firearms request form.

RESPONSIBILITIES

The responsibilities of personnel involved in Wildlife Hazard Recognition and Protection are:

- The Corporate EHS Manager (EHS Manager) review and approval of site health and safety plans (HSP) that require the Project Specific Exemption for Firearms.
- Project Manager / Site Manager: In addition to the safety responsibilities described in the Safety Program Implementation Plan, the Project Manager (PM) or Site Manager (SM) are responsible for ensuring that the Health and Safety Plan (HSP) addresses hazards associated with wild animal encounters, as appropriate and ensuring that persons designated to carry firearms meet the criteria outlined in this procedure. Additionally, if other approvals are necessary for carrying firearms, the PM must ensure that adequate time is allotted for the approval process.

WILDLIFE AVOIDANCE AND BASIC PROTECTIVE MEASURES

The best protective measure is simply avoidance. Large numbers of humans present deterrence to wild animals; therefore, whenever possible teams in the field should work together in groups of four or more. Whenever practical, fieldwork should be scheduled around the seasonal cycles of wildlife in the area. When wild animal avoidance cannot be achieved through scheduling,

personnel involved in field activities in which encounters with wild animals may result, will take the following steps and will be equipped and trained, as set forth below.

CLEAR THE AREA

Evaluate and control the area before entry by

- Determine areas of recent sightings through local Fish and Game, state troopers, etc.;
- Conduct a site observation from an off-site elevated point, if possible;
- Conduct a controlled walk through in the area by a trained observer;
- Arrange a briefing by a local specialist, e. g., Fish and Game, etc.; and
- Utilizing appropriate noisemakers.

BASIC EQUIPMENT

Employees entering an environment where encounters with wild animals are possible should be provided, as a minimum:

- Noisemakers, such as air horns, bells, etc.; and
- Bear spray of not less than 16-ounce capacity (with holster), equivalent to capsicum pepper (red pepper extract), which is capable of spraying at least 15 feet. (Notes: Normally cannot be transported in side aircraft passenger compartments and may be considered a hazardous material, check with airlines and hazardous material shippers for current information).

TRAINING

Prior to entering and / or working in areas inhabited by dangerous wildlife each employee should receive training as outlined in this procedure. At a minimum, training must include information related to:

- Wildlife present, habitat, behavior patterns, including when wild animals are most active, etc.
- Warning signs, such as tracks, bedding areas, scat, claw marks, offspring, paths, etc.,
- Avoidance measures
- Other hazards, precautions, and protective measures as outlined in the Attachments,
- (At the jobsite) spray demonstration and safety instructions which include location of and persons designated as “bear watch”

An outline of the training content should be reviewed and approved by the Divisional EHS manager and should be documented. A record of the training will be maintained at the job site, filed with the SSHSP and in the employee’s training records.

SUPPLEMENTAL PROTECTION

In some areas it may be necessary (or preferred) to employ professional hunting guide services where significant possibility of encounters with wildlife exist. The PM and DSM will evaluate the need for supplemental protection. In addition to Weston’s standard minimum qualifications for subcontractors, prospective bear and wild animal protection contractors must be able to provide evidence of competency. This evidence shall include:

- Proof of firearm safety training and;
- Proficiency with firearms and;
- Should have three or more years experience providing similar services.

In addition to the above, project managers should review insurance coverage with the Risk Management office to determine whether or not additional insurances should be required.

FIREARMS USE BY WESTON PERSONNEL OR SUBCONTRACTOR EMPLOYEES

In some situations, the Project Manager (with approved exemption) and client agreement may authorize selected employees or subcontractor employees to carry firearms.

Employees designated to carry firearms must demonstrate proficiency in firearm safety marksmanship through successful completion of a firearm safety training class administered by a Fish and Game Department, a local firearm range instructor, or other approved trainer. Personnel designated to carry firearms must not have been convicted of a crime that has resulted in their loss of the privilege to bear arms; therefore, they must submit to a background check through the NCIC.

Training will be documented and records of training will be maintained on site. At a minimum training must include:

- Animal behavior,
- Firearm handling and safety,
- Demonstrated marksmanship skills, and
- Safe storage of firearms and ammunition.

FIREARMS AUTHORIZED FOR SITE USE

- **Will not** be carried with a round in the chamber until a dangerous encounter is eminent, such as when a bear has been sited in the immediate area, and
- **Must** be unloaded with a trigger lock installed when not actively being used for protection to prevent unauthorized persons from using the firearm.
- **Will** be stored in a locked cabinet when not required for use. Only persons qualified to use firearms will have keys to the cabinet.

Military installations require the approval of their security forces before allowing a firearm to be brought onto a military installation. In addition to base requirements, some clients (e.g. AFCEE) may require their approval. The PM must determine with sufficient lead-time whether firearm protection of employees from wild animals will be required. If such is determined to be necessary, the PM must submit a requests for authorization to the EHS Manager with sufficient lead-time to permit training and other steps required prior to departure for the field.

All firearms and firearm-carrying personnel shall be registered and approved by the EHS Manager in accordance with the project exemption. Copies of the approved exemption will be maintained in the supporting office. Incomplete requests for exemption will be returned to the project manager without action; therefore, thorough planning at the project level is required to ensure that the project schedule is not impacted.

APPROPRIATE FIREARMS

Advantages and disadvantages of the firearms are discussed in Attachment 1. Firearms that are appropriate for protection against large animals include:

- A .30 caliber-magnum ("300 magnum") or larger rifle, or
- A 12-guage shotgun with rifled slugs.
- Other firearms, such as large bore handguns, will be considered on their individual merits.

AMMUNITION

The type of ammunition to be used is best determined through consultation with local fish and game agencies or professional guide services.

- The number of rounds and type of ammunition brought to job sites shall be registered with the on-site SSHO.
- When not in use, ammunition and firearms will be effectively secured/locked up in a vehicle, cabinet, etc.

PROTECTIVE MEASURES OF LAST RESORT

When non-lethal methods of deterrence have been used and / or immediate danger to an individual exists, the wild animal may have to be killed. During project planning consult local provisions of the Defense of Life or Property Regulation in your state. In Alaska, refer to 5 AAC 92.410. After contacting the appropriate fish and game agency, the SSO must submit an incident report to the Division EHS Manager. The individual who shot the animal will make the report. In the state of Alaska, the head and the hide must be salvaged and delivered the Alaska Department of Fish and Game.

VEHICLE SAFETY

Use extreme caution, particularly in darkness, when operating vehicles in areas where wild animals may be present. Collisions with large animals have been known to cause significant property damage and personal injuries to vehicle passengers, including fatalities.

ATTACHMENT 1

BEAR SAFETY – HAZARD RECOGNITION AND PRECAUTIONS

On occasion fieldwork may be conducted in a location where bears may be encountered. The following technical information, precautions, and guidelines for operations in which bears could be encountered is based on experience and conditions for field work in the state of Alaska. Bears are intelligent, wild animals and are potentially dangerous, and would rather be left alone. The more bears are understood the less they will be feared. This attachment is intended to provide information that will enable Weston to plan for bear encounters and to properly address face-to-face encounters.

Bear Life History

Although bears are creatures of habit, they are also intelligent, and each has its own personality. The way a bear reacts is often dictated by what it has learned from its mother, the experience it has had on its own, and the instincts nature has provided. Like other intelligent animals, we can make general statements about bears, but few people can accurately predict their behavior.

Bears have an incredible sense of smell, and seem to trust it more than any other sense. Hearing and sight are also important, but to a lesser degree. A bear's hearing is probably better than ours, but not as keen as a dog's hearing. Their sight is probably comparable to that of a human. Both black and brown bears have similar life styles, although they do not usually get along with each other. Where both species occur in the same area, black bears tend to favor forested habitats while brown bears favor open areas. Since the likelihood of encountering a polar bear is remote, this procedure addresses only black and brown bears. If the project site is in an area where polar bear encounters are a possibility, consult the fish and game department for assistance in planning for encounters.

Bears are opportunists, relying on their intelligence and their senses to find food. They use different habitats throughout the year, depending on the availability of food and other necessities. The area a bear covers in a given year is partially dependent on how far it has to go to satisfy these basic needs. In some areas, individual bears have home ranges of less than a square mile; in other areas ranges can encompass hundreds of square miles. Males usually range over larger areas than females.

In spring, bears begin coming out of hibernation. Males are usually the first bears to emerge, usually in April, and females with new cubs are usually the last, sometimes as late as late June. When bears emerge from their dens, they are lethargic for the first few days, frequently sleeping near their dens and not eating. When they do start eating, they seek carrion (dead moose, caribou, sea mammals, deer, etc.), roots, and emerging vegetation. In coastal areas, beaches become travel corridors as bears seek these foods. In early summer, bears eat new grasses and forage as they develop in higher elevations. Moose and caribou calves are also important foods where they are available. In coastal areas, salmon are the most important food from June through September. This period is one of the few times that bears are found in large groups, and it is the time that most people see bears. Bears often travel, eat, and sleep along streams for weeks at a time.

Other summer foods for bears include salmonberries, grasses, forbs, ground squirrels, and occasionally, adult moose and caribou. When bears kill or scavenge large prey, they commonly cover the portions they cannot eat with sticks and duff. A bear may remain near a food cache for days and it will defend it from intruders.
During the late summer and early fall, bears move inland and consume large amounts of blueberries, elderberries, soapberries, and other succulent fruits. As the seasons progress towards winter, a bear's diet becomes more varied. This is the time that bears are adding final deposits of fat before their long winter naps.

In October and November, bears move into their denning areas and begin preparing a suitable den. Black bears usually den in holes under large trees or rock outcrops, or in small natural cavities. Brown bears usually dig their dens in steep alpine areas. Dens are just large enough for the bears to squeeze into. Bears rarely eat, drink, urinate, or defecate while they are denning. They sleep deeply, but do not truly hibernate, and they can be awakened by loud noises or disturbances.

Cubs are born in the den, usually in January. Black bear cubs usually stay with their mothers for a year and a half, and brown bear cubs usually stay with their mothers for 2.5 to 3.5 years. Black bears are sexually mature at age 2 and brown bears are sexually mature at age 4 – 8. Mating season is in the spring (May or June) and both species are polygamous (multiple mates). Both black and brown bears can live for 25 – 30 years, although most live less than 20 years.

BEAR AND HUMAN INTERACTIONS

Bears generally prefer to be left alone, but they share their homes with other creatures, including humans, who intrude on virtually every aspect of the bear's life. Bears are normally tolerant of these activities and generally find a secure way to avoid them. Humans can help bears make a graceful retreat and avoid many close encounters by letting them know we are coming. Walking in groups, talking, and wearing noise making devices, such as bear bells, all serve to warn a bear of your approach. When possible, avoid hiking and camping in areas where bears are common, such as bear trails through heavy brush or along salmon streams. Always keep an eye out for bears and bear signs. If you happen upon a dead animal, especially one that is covered with sticks and duff (a bear cache), immediately retreat the way you came, but do not run, and make a detour around the area. If you see a cub up a tree or a small bear walking alone, immediately retreat and detour around the area. Like all young animals, cubs wander away from their mothers, but females are furiously protective when they believe their cubs are threatened. Even if we do everything possible to avoid meeting a bear, sometimes bears come to us.

Bears are both intelligent and opportunistic, and they express these qualities through their curiosity. This curiosity frequently brings them into "human habitat." When this happens, we often feel vulnerable, and the bear is sometimes viewed as a threat or nuisance. In most cases, a curious bear will investigate a "human sign," perhaps test it out (chew on a raft, bite into some cans, etc.), and leave, never to return. If the bear was rewarded during his investigation by finding something to eat, it is hard to stop them from returning once they have had a food-reward. That is why we emphasize the importance of keeping

human food and garbage away from bears. When in bear country, always think about the way you store, cook, and dispose of your food. **Never feed bears!** This is both illegal and foolish. Food should be stored in airtight containers, preferably away from living and sleeping areas. Garbage should be thoroughly incinerated as soon as possible. Fish and game should be cleaned well away from camp, and clothing that smells of fish and game should be stored away from sleeping areas. Menstruating women should take extra precautions to keep themselves as clean as possible, and soiled tampons and pads should be treated as another form of organic garbage. Once a bear has obtained food from people, it may continue to frequent areas occupied by people. If a bear does not find food or garbage after the next few tries, it may give up and move back into a more natural feeding pattern. Occasionally, though, the bear will continue to seek human foods and can become a "problem bear." Some bears become bold enough to raid campsites and break into cabins to search for human food. Shooting bears in the rump with cracker shells, flares, rubber bullets, and birdshot are common methods of "aversive conditioning." These are also very dangerous techniques, because they may seriously injure a bear if not done properly and/or they may cause a bear to attack the shooter.

TYPES OF BEARS

The three most prevalent species of are bears are the black bear, the brown (grizzly) bear, and the polar bear. Each has a different life-style and somewhat different behavior pattern.

Black Bear Identification: Black bears are the smallest and most abundant of the bear species in Alaska. They are five to six feet long and stand about two to three feet high at the shoulders. They weigh from 200 to 500 pounds. While they are most commonly black, other color phases include brown (cinnamon), and, rarely, gray (blue), and white. Muzzles are usually brown. Black bears can be distinguished from brown bears by:

- Their head shape (a black bear's nose is straight in profile, a brown bear's is dished);
- Their claws (black bear's claws are curved and smaller, brown bears are relatively straight and longer);
- Their body shape (when standing, a black bear's rump seems to be higher than its shoulders; a brown bear's shoulders are usually higher than its rump); and
- By their ears (a black bear's ears are more prominent than a brown bear's ears). Range in Alaska Black bears live throughout Alaska, except on Kodiak Islands, the Alaska Peninsula, some islands, and the extreme northern and western portion of the state.

Typical Habitat: Black bears occupy a wide range of habitats, but seem to be most common in forested areas. Black bears are not uncommon in and around human settlements in Alaska.

Brown Bear Identification: Brown and grizzly bears are the same species. They can be over eight feet long and stand five feet high at the shoulder. Weights are typically 600 to 800 pounds, but can reach 1500 pounds. Colors range from blonde to dark brown. Coastal bears (referred to as brown bears) are the largest land carnivores and are usually medium-to-dark brown in color. Interior bears (referred to as grizzly bears) are smaller

and usually have light tips on their hair, giving them a grizzled appearance. A brown bear's muzzle is the same color as its body. Cubs frequently have a white collar around their neck and shoulders. The dished-face and large shoulder hump are distinguishing features of the brown bear.

Range in Alaska: Brown bears live throughout Alaska, except for the southern portion of the panhandle in southeastern Alaska, and on the Aleutians, and some other islands. Biologists estimate that there are from 30,000 and 45,000 brown bears in the state, and in most areas the numbers are stable. Highest densities occur on Admiralty Island, the Kodiak Islands, and the Alaska Peninsula.

Typical Habitat: Brown bears can, and do, use virtually every type of habitat. Although they are less common around human settlements than black bears, brown bears can live in close proximity to people. Polar Bear Identification

Polar Bear Identification: Polar bears are about the same size as coastal brown bears. Colors range from white to yellow. Black nose is prominent. Head shape is similar to that of a black bear, but their long tapering necks make polar bears' heads appear to be small in relation to their body size.

Range in Alaska: Polar bears are found in coastal Alaska and offshore waters from Bristol Bay to the Arctic. Ice conditions dictate local polar bear abundance.

Typical Habitat: Islands, coastlines, and waters near pack ice and ice floes, rarely occurring far inland, except for denning females, are typical habitat.

AVOIDING BEAR ENCOUNTERS WHEN

- The Bear sees you but you do not know the bear is around: The bear will likely avoid detection people and will simply move away when they sense a human.
- You see a bear and it does not know you are there: Move away slowly. Avoid intercepting the bear if it is walking. If possible, detour around the bear. If the bear is close to you, stand where you are or back away slowly. Do not act threateningly toward the bear, it may know you are there but it has chosen to ignore you as long as you are not a threat.
- You see the bear and the bear sees you: Do not act threateningly, but let the bear know you are human. Wave your arms slowly, talk in a calm voice, and walk away slowly in a lateral direction, keeping an eye on the bear. Unless you are very close to a car or a building, never run from bears. In a bear's world, when something runs it is an open invitation to chase it. Bears will chase a running object even if they have no previous intention of catching it. Bears can run as fast as a racehorse, so humans have little or no chance of outrunning a bear.
- You see a bear; the bear sees you and stands on its hind legs: This means that the bear is seeking more information. Bears stand on their hind legs to get a better look, or smell, at something they are uncertain of. It is your cue to help it figure out what you are. Help the bear by waving your arms slowly and talking to it. Standing is not a precursor to an attack. Bears do not attack on their hind legs. It is also important to remember that when a bear goes back down on all fours from a standing position, it may come towards you a few steps. This is normal, and probably not an aggressive act.

- The bear sees you, recognizes you as a human, but continues to come towards you slowly: This may mean several things, depending on the bear and the situation. It may mean that the bear does not see you as a threat, and just wants to get by you (especially if the bear is used to humans, as in a National Park); the bear wants to get food from you (if it has gotten food from people before); the bear wants to test your dominance (it views you as another bear); or may be stalking you as food (more common with black bear, but a rare occurrence). In all cases, your reaction should be to back off the trail very slowly, stand abreast if you are in a group, talk loudly, and/or use a noise-making device. If the bear continues to advance, you should stop. At this point, it is important to give the bear the message that if he continues to advance it will cost him. Continue to make loud noises and present a large visual image to the bear (standing abreast, open your coat). In bear language, bears assert themselves by showing their size. If an adult brown bear continues to come at you, climbing 20 feet or higher up a tree may also be an option if one is next to you (remember, never run from bears). Keep in mind, though, brown bear cubs and black bears can climb trees, and adult brown bears can reach 10 – 15 feet.
- The bear recognizes you as a human and acts nervous or aggressive: When bears are nervous or stressed they can be extremely dangerous. This is when it is important to try to understand what is going on in the bears mind. Nervous bears growl, woof, make popping sounds with their teeth, rock back and forth on their front legs, and often stand sideways to their opponent. A universal sign of a nervous bear is excessive salivation (sometimes it looks like they have white lips). When a bear shows any of these signs, stand where you are and talk in a calm voice. Do not try to imitate bear sounds, this may only serve to confuse and further agitate the bear. If you are in a group, stand abreast. If you have a firearm available, be prepared to use it.
- The bear charges: If all other signals fail, a bear will charge. Surprisingly, most bear charges are just another form of their language. The majority of these are "bluff charges," that is; the bear stops before making contact with their opponent. There are many different types of bluff charges ranging from a loping uncertain gait to a full-blown charge. If a bear charges, stand still. If you have a firearm, take appropriate action, but remember, if a bear is wounded, a bluff charge may immediately turn into a real charge as the bear's mind shifts from an offensive mode to a defensive mode.
- The bear attacks: When all else fails, a bear may attack. Attacks may be preceded by all of the behaviors previously described or they may be sudden. Seemingly unprovoked attacks are often the result of a bear being surprised (and feeling threatened), a bear defending its food cache, or a female defending her cubs. When a bear attacks, it typically runs with its body low to the ground, legs are stiff, ears are flattened, hair on the nape of the neck is up, and the bear moves in a fast, determined way. Front paws are often used to knock the opponent down and jaws are used to subdue it.

AFTER A BEAR ENCOUNTER

If a bear attacks you, your reaction depends on the type of bear that is attacking. If it is a black bear, fight vigorously, for your life may depend on it. Black bears have been known to view humans as prey, and if you struggle with the attacking black bear, it will probably go elsewhere for its meal.

Brown bears are a completely different story. Brown bears attack because they feel threatened, and they will continue to press the attack until the threat has been neutralized. If you fight and struggle, the bear will continue to fight, and a human has little or no chance to defeat a brown bear in battle. Lie on your face and stomach, place your hands behind your neck, and lie still when you are attacked. A brown bear will no longer see you as a threat and may stop the attack. Although it sounds foolish to play dead while being attacked by a bear, this has been proven to be the best way to survive a brown bear attack. It should be noted that if you fall down and play dead before a bear actually makes contact, the bear might come over to determine what is going on. Actual maulings by bears are very rare. Alaska has more bears than anywhere else in the world, and there are hundreds of thousands of people living, working, and playing in these bears' back yard. Yet, since 1900, there have only been an average of about two people per year mauled by bears in the state, and very few of those instances have resulted in death.

As a last resort, a bear may have to be shot. When this is the only option, it will likely be in a situation that has a sudden onset. Therefore, it is important that you are familiar and comfortable with whatever firearm you decide to carry. Remember that if you wound a bear, you make the situation worse. There is an on-going debate as to what is the best firearm to use for protection from bears. The following are a few of the pros and cons for some of the more popular firearms:

- Pistols: Convenient to carry, always with the person, can be used in close quarters during an attack, rapid-fire is possible. However, are dangerous to humans (accidents), much practice is needed to be proficient; may not be powerful enough to stop a large bear.
- Shotguns: Can be loaded with a variety of projectiles, effective at close range in brushy situations, rapid-fire is possible, easy to use. They are however inaccurate and ineffective at medium to long range, heavy to carry, potentially dangerous to humans, may not be powerful enough to stop a large bear.
- Rifles: Very powerful calibers are available, accurate at both close and long range. However, practice is required for accuracy in an emergency, range of bullet makes it dangerous to humans, heavy and awkward to carry, rapid fire is difficult with bolt action rifles.

There are different thoughts as to the best place to shoot a charging bear. In reality, a person usually has little time to contemplate shot placement in a true bear attack. If you have a choice, it is best to aim at the shoulder and chest area. Bear's skulls are thick and covered with large muscles, so headshots may not be effective. Once you have made the decision to shoot a bear, you have a responsibility to finish the job you have started. Keep firing until you are out of bullets or you are positive the bear is dead. A wounded bear can be dangerous to you and anyone else who comes into the area.

- Bear Sprays: Are easy to carry and use, little risk of permanent damage to bears and humans, effective in many situations. However, using a spray may change a false charge into a real charge, they are ineffective at ranges greater than 20 feet, ineffective in windy conditions, dangerous if accidentally discharged in a closed area such as an aircraft cockpit.

Regardless of the firearm you choose, it is imperative that you realize that the most effective tool you have against an attacking bear is your brain. Although bears are intelligent animals, we are smarter and can often think our way out of a bad situation if we try. We must never let the firearm we carry become a replacement for common sense.

LAWS CONCERNING BEAR/HUMAN INTERACTIONS IN ALASKA

There are two regulations governing bear and human interactions in Alaska. The first, ACC 92.230, prohibits feeding bears or leaving garbage that attracts them. The other, 5 ACC 92.410, sets guidelines for taking a bear in defense of your life or property (DLP). These DLP provisions specifically state that a bear cannot be killed legally if the problem is caused by the improper disposal of garbage or some other attractive nuisance, or if it is brought about by harassment or provocation of the animal or an unreasonable invasion of its habitat.

The regulation also defines what is considered "property." If a bear is killed under the DLP provisions, the hide and skull are the property of the state and must be turned over to Fish and Game as soon as possible. The person who shot the bear is also required to submit a written incident report within 15 days. (Obtain a paper copy of this attachment through Corporate Health, Safety, and Environment.).

ATTACHMENT 2

HAZARDS AND PRECAUTIONS – MOOSE, ELK, AND DEER

On occasion fieldwork may be conducted in a location where moose may be encountered. The following technical information, precautions, and guidelines for operations in which Moose, Elk, or Deer may be encountered is based on experience and conditions for field work in the state of Alaska. The more these species are understood, the easier it will be to avoid contact with them thus preventing injury to ourselves and to the animals. All big game species are unpredictable and can be dangerous under certain conditions. This attachment is intended to provide information that will enable Weston to plan for encounters and to properly address face-to-face encounters.

MOOSE

Moose are the world's largest members of the deer family. The Alaska race is the largest of all the moose. Moose are generally associated with northern forest in North America, Europe, and Russia. In Alaska, they occur in suitable habitat from the Stikine River in the Panhandle to the Colville River on the Arctic Slope, and as far south on the Alaska Peninsula as Herendeen bay. They are most abundant in recently burned areas that contain willow and birch shrubs, on timberline plateaus, and along the major rivers of South-central and interior Alaska. General Description
Moose are long-legged and heavy-bodied with a drooping nose, with a "bell" or dewlap under the chin, and a small tail. Their color ranges from golden brown to almost black, depending on the season and the age of the animal. The hair of newborn calves is generally red-brown, fading to a lighter rust color within a few weeks. Newborn calves weigh 28 to 35 pounds and within five months grow to over 300 pounds. Males in prime condition weigh from 1,200 to 1,600 pounds. Adult females weigh 800 to 1,300 pounds. Only the bull has antlers.

Life History: Cow moose generally breed at 28 months, though some may breed as young as 16 months. Calves are born anytime from mid-May to early June. Cows give birth to twins 15 to 75 percent of the time, and triplets may occur once in every 1,000 births. The incidence of twinning is directly related to range conditions. A cow moose defends her newborn calf vigorously. Calves begin taking solid food a few days after birth. They are weaned in the fall at the time the mother is breeding again. The maternal bond is generally maintained until calves are 12 months old at which time the mother aggressively chases her offspring from the immediate area just before she gives birth. By late October, adult males have exhausted their summer accumulation of fat and their desire for female company. Once again, they begin feeding. Antlers are shed as early as November, but mostly in December and January.

Food Habits: During fall and winter, moose consume large quantities of willow, birch, and aspen twigs. In some areas, moose actually establish a "hedge" or browse line six to eight feet above the ground by clipping most of the terminal shoots of favored food species. Spring is the time of grazing as well as browsing. Horsetail, pond weeds, and grasses. During summer, moose feed on vegetation in shallow ponds, forbs, and leaves of birch, willow, and aspen.

Movement: Most moose make seasonal movements to calving, rutting, and wintering areas. They travel from only a few miles to as many as 60 miles during these transitions.

WORKING SAFELY AROUND MOOSE

Every year someone is injured by a moose and in some cases fatalities are caused by moose attacks. Most cases of moose attack are from cows defending their calves and they are well equipped to do so. Cow moose attack with their front feet and sharp hooves; they can kill wolves and in some cases drive grizzly bears away from their offspring. Bull moose attack with their massive antlers and can do great damage in a short amount of time. One should always be alert when working in moose country. If you encounter a moose, never approach too closely. Moose will generally declare their displeasure of your presence by lowering their ears and raising their hackles (the long hair on their neck and back). Immediately retreat if you see a moose displaying this behavior. If you are about to be attacked by a moose and there are trees present, stay behind the tree. A human can move around a tree faster than a moose can. Use common sense. Avoid contact with any wild animal. Most have the ability injure a human. Never play dead if attacked by a moose. Put something substantial between you and the moose.

ROOSEVELT ELK

Roosevelt Elk are larger, slightly darker in color, and have shorter, less symmetrical yet more massive antlers than the Rocky Mountain Elk found east of the Cascade Mountains in Canada and the United States.

General Description: Elk are members of the deer family and share many physical traits with deer, moose, and caribou. They are much larger than deer, but not as large as moose, which occur in Alaska. Distinguishing features include a large yellowish rump patch, a grayish to brownish body, and dark brown legs and neck. Unlike some members of the deer family, both sexes have upper canine teeth. The males have antlers, which in prime bull are very large, sweeping gracefully back over the shoulders with spikes pointing forward. Alaska elk antlers have a tendency toward crowning, the formation of the three points at the end of each antler. Elk shed their antlers during the winter each year and grow new ones the following summer. The soft growing antler is covered with velvet, which is scraped off by rubbing and jousting after the antlers harden in the fall. Bull elk on Afognak Island are estimated to weigh up to 1,300 pounds. Cow elk are similar in appearance to the bulls, but are smaller and have no antlers.

Life History: Elk calves are born in late May or early June when abundant food is available for the mother and the mild weather increases the calves' chances for survival. Birth usually occurs under the cover of dense spruce forest, hidden from predators and protected from the elements. Calves are born with protective coloration (light spotted areas on the back, which act as camouflage). A few days after giving birth, the mother joins other cow elk with calves. A single cow will often "baby-sit" with the calves while the remaining cows seek food. As summer progresses, elk bands move above timberline and feed on the alpine slopes where breezes keep biting insects at bay and young plants are highly nutritious. By July, the calves, although still nursing, begin feeding on succulent forbs.

Beginning in August, bands of elk congregate and form herds consisting of cows, calves, yearlings, and an occasional mature bull. Nearby, but separate from the heard mature bulls can be found. During September, the bulls join the main herds and mating activities (the rut) begin. Large herds are scenes of vigorous activity as mature bull challenge each other vocally, emitting a high-pitched whistle or bugle, an eerie but thrilling sound. Occasionally, pushing and shoving matches are initiated as the mature bull attempt to take advantage of the larger bull's preoccupation and run past them to win the favors of a female. By mid-October most breeding activities have ceased. Herds may begin to disperse into smaller bands as they move into wintering areas. Winter months are spent in lower valleys and in the dense spruce forest and small openings near the coastline searching for food.

Food: Elk are hardy animals whose large body size and herding tendencies require tremendous amounts of food. From late spring to early fall, with a wide variety of food available, elk are mainly grazers, using grasses, forbs, and other leafy vegetation. By late fall they become browsers, feeding on sprouts and branches of shrubs and trees.
Population: From the original eight transplanted animals, Afognak elk have expanded to about 1,200.

WORKING SAFELY AROUND ELK

Although elk are not as widely distributed as moose in Alaska, they are large and potentially dangerous when the bulls are in the rut and when you may be near cows with young calves. Follow the same precautions as set forth above for moose. Elk bulls have a tendency to be more aggressive during the rut (September & October) than either moose or deer, and caution should be used when working near bulls during this time of year. Aggressive cows with calves should be avoided as well, since they attack in the same manner as cow moose.

SITKA BLACK-TAILED DEER, MULE DEER, AND WHITE-TAILED DEER

The Sitka black-tailed deer is native to the wet coastal rain forest of Southeast Alaska and north coastal British Columbia. Transplants have expanded its range and established population now also exist near Yakutat, in Prince William Sound, as well as Kodiak, and Afognak, and Raspberry Islands.

General Description: The Sitka black tailed deer is smaller, stockier, and has a shorter face than other members of the black-tailed group. Fawns are born in early June and weigh six to eight pounds at birth. The average October live weight of adults is about 80 pounds for does and 120 pounds for bucks, although dressed weight bucks of over 200 pounds have been reported. The summer coat of reddish brown is replaced by dark brownish gray in winter. Antlers are dark brown with typical black tailed branching. Normal adult antler development is three points on each side. Average life span is about 10 years, but a few are known to have attained an age of at least 15.

Life History: Fawns are born in late spring. After the winter snow pack recedes, deer disperse; migratory deer move to high elevation alpine/sub-alpine habitats while resident deer remain at lower elevations throughout the forest. Summer and early fall are periods

of active foraging as deer accumulate fat reserves, which will help them through the winter and early spring. With the first heavy frost, deer in the higher alpine and sub-alpine areas descend to the upper forest. The breeding season (or rut) peaks during late November. Breeding bucks spend little time foraging and by late November have used up much of their fat reserve. Does, however, generally enter December in prime condition. Does breed during their second year of life and continue producing fawns annually until they are 10 or 12 years of age. Reproductive success decreases rapidly beyond 10 to 12 years and by age 15, which is probably the maximum life expectancy, reproduction has essentially ceased. Prime age does (5 to 10 years) typically produce two fawns annually.

Throughout the rest of the winter and early spring, deer are generally restricted to uneven-aged old growth forest below 1,500 feet in elevation. The old growth forest provides optimal winter habitat because the high broken canopy intercept much snow but still provides enough light for the growth of forage plants used by deer. During winter, the distribution of deer at various elevations is influenced by changing snow depth. During extreme snow accumulations, many deer congregate in heavily timbered stands at lower elevations, and some may even move into the beach. Spring is a critical period for deer, and if winters are deep and persistent, many deer die of starvation. As snow melts in mid to late spring, deer begin to disperse, and by late spring and early summer they start rebuilding some of the fat reserves lost during winter.

Home Range: Summer and winter home range areas vary from 30 to 1,200 acres and average about 200 acres for radio-collared deer on Admiralty Island. Migratory deer have larger annual home ranges than resident deer. The average distance between summer and winter home ranges is five miles for migratory deer and half a mile for resident deer. Movement of deer between watersheds appears to be minimal during winter.

Food Habits: During summer, deer generally feed on herbaceous vegetation and the green leaves of shrubs. During winter, they are restricted to evergreen forbs and woody browse. When snow is not a problem, evergreen forbs such as bunchberry and trailing bramble are preferred. During periods of deep snow, woody browse such as blueberry, yellow cedar and hemlock, and arboreal lichens are used. Woody browse alone, however, is not an adequate diet and deer rapidly deplete their energy reserves when restricted to such forage.

Populations: Deer populations in Alaska are dynamic and fluctuate considerably with the severity of the winters. When winters are mild, deer numbers generally increase. Periodically, however, a severe winter will cause a major decline in the population. Deer have a high reproductive potential, and depressed populations normally recover rapidly. In some cases, however, predation may speed deer decline, as well as slow recovery to higher levels. The wolf, which occurs on the mainland and islands south of Frederick Sound, is considered the major predator of deer in Southeast Alaska. Both black and brown bears also prey on deer to some degree.

WORKING SAFELY AROUND DEER

The White-tailed deer found thought the eastern and western part of the United States have been known to attack people on many occasions. It is unknown whether Black-tailed deer have made any such attacks, but it is possible for someone to be injured by an irate buck in the breeding season (late fall). Deer are well equipped to injure humans. They are very fast. Bucks have sharp antlers and can clear amazingly high obstacles with graceful, arching leaps. They can run with remarkable speed, even in dense cover, and have excellent camouflage. When working in areas populated with deer, whether it be White-tailed, Black-tailed, or Mule deer, it is just common sense not to approach any large wild animal too closely. It is unlikely that an attack from a deer would be fatal but it is possible and serious injury is likely.

ATTACHMENT 3

AMERICAN BISON AND FERAL WILD CATTLE – HAZARD RECOGNITION AND PRECAUTIONS

American Bison (Bison), which shaped the lifestyle of the plains Indians and figured prominently in American history before they were brought to near extinction, were transplanted to Alaska from Montana in 1928. While bison were the most common large land mammal in Alaska thousands of years ago, all of Alaska's wild bison came from 20 animals released near Delta Junction. Natural emigration and transplants have now created additional herds at Copper River, Chitina River, and Farewell. Small domestic herds are located at Healy, Kodiak Island, and on Provo Island. There were approximately 700 wild bison in the state in mid-1985.

General Description: The bison is the largest native land mammal in North America. A full-grown bull stands six feet at the shoulder, is up to 10 feet long, and can weigh more than a ton. Full-grown cows are smaller, but have been known to weigh over 1,200 pounds. A bison's head and forequarters are massive and seem out of proportion to the smaller hind parts. Bison have vertebrae, which begins just ahead of the hips and reaches its maximum height above the front shoulder. From above the shoulder, the hump drops almost straight down to the neck. The bison's horns curve upward. The horns of the bull are larger and heavier than the horns of the cow. As winter progresses, their coats change color and are much paler by spring. When the weather warms, the hair loosens and hangs in patches until it is completely shed and replaced with new hair by late spring. Hair on the chin resembles a goatee. Older animals tend to have more hair on their heads.

Life History: Most bison young are born in May, but calves are born from April to August or even later. Newly born calves have a reddish coat. They are able to stand when only 30 minutes old; within three hours of birth, they can run and kick their hind legs in the air. At about 6 days of age, calves start grazing. Their reddish-orange coat begins to darken at about 10 weeks, with the molt to dark brown complete about five weeks later. Cows are sexually mature at two years of age and give birth to single calves twice in three years. The gestation period is approximately 270 days. On rare occasions, a mostly white or even albino calf has been born in the Delta herd, but none has reached maturity. Bison in Alaska have been known to live to a relatively great age compared to other hoofed animals (ungulates). One tagged bull killed in the Copper River area was over 20 years old. Bison are migratory animals by nature. Alaska's wild bison do not remain in single herds, but scatter alone or in-groups ranging up to 50 animals or more. In the Delta Junction area, they move far up the Delta River in early spring to secluded meadows where they calve. Around August they travel back downstream, eventually moving on the Delta Junction Bison Range, and finally in late fall, onto farms where they remain throughout the winter. Here they sometimes cause damage to un-harvested crops. Alaska's other wild bison herds also have seasonal movement patterns. Bison move slowly while feeding and appear to be quite clumsy. This is pure deception, for when pursued, the bison is fleet of foot and has great endurance. A mature bull eventually captured at Delta Junction jumped a seven-foot log fence from a standing position.

Food Habits: Bison are grazing animals and in Alaska find only limited amounts of food along rivers, in recent burns, and sedge potholes. Their diet is made up mainly of various grasses and forbs like vetch, a favored summer food found on gravel bars. Sedges, silverberry, willow, and ground birch are also eaten.

Working Safely Around Bison: When working in areas where bison are present, follow the same precautions as stated above for other large potentially dangerous wild animal. Generally, where bison are present there also will be moose and Brown (Grizzly) bears sharing the same area. Partially due to the relatively sparse population, bison injure fewer people than Brown Bears or moose. Never approach bison and use caution when working near bison as they are unpredictable and can cover a lot of ground in a short amount of time. Bison can be found in timbered areas. If approached by a bison and you cannot make it to a vehicle, keep a large tree between you and the bison. You can move around the tree faster than the bison. If a single bison or heard of bison approach you or your crew, retreat to your vehicle and leave the area. Do not attempt to "drive" the bison from your area while in your vehicle. Bison have no respect for cars and could charge and damage your vehicle and the occupants. The best way to avoid contact is to use your head and give the bison the right of way.

FERAL OR WILD CATTLE

Feral or wild cattle are only found in a few remote locations in Alaska. A population exists on Sitkinak Island on the south end of Kodiak Island, Long Island, Harvester Island, and Chirikof Island. The same caution should be used when working in areas with a population of wild cattle that would be used when working around any of Alaska's dangerous wildlife. Never approach too closely and if they begin to approach you, clear the area as fast as possible. If you arrive at your work site and there are wild cattle close by, stay in you vehicle and remain there until they leave the area. If it is necessary to destroy a wild cow, you must notify the Department of Fish & Game. The same Defense of Life and Property (DLP) law that applies to big game species does not apply to wild domestic cattle, but you will be required to salvage the meat and make the report. Cattle reside on leased ground, and the owner of the leases must also be notified. It may also be necessary to compensate the landowner.

Wild Feral Cattle can be dangerous, and there are reports of injuries to people. Although they may look domestic cattle, they are wild and have no fear or respect for humans. Give them the right a way, use common sense, and maintain a safe distance when working where wild Feral Cattle inhabit the area.

ATTACHMENT 4

MOUNTAIN LIONS (COUGARS) – HAZARD RECOGNITION AND PRECAUTIONS

Mountain lions range throughout the Western United States and are the largest cat in North America, weighing considerably more than its cousins — the lynx, bobcat and domestic cat. Sleek and graceful, the cougar is a solitary and secretive animal rarely seen in the wild. However, in many areas humans are encroaching on wildlife habitat and cougar numbers are rebounding, the number of cougar sightings in suburban areas is on the rise

COUGAR COUNTRY

Cougars prefer rocky terrain, dense brush and semi-open forests. The other essential ingredient, of course, is deer and elk, the cougar's main prey. Traditionally, cougars were associated almost exclusively with deer and elk herds, but as cougar have expanded their range and adapted to semi-urban areas, smaller mammals like raccoons, coyotes and opossums supplement their diet.

Cougars are territorial animals and maintain home ranges of up to 100 square miles. The lions mark their territories with "scratch hills" or scrapes — leaves, grasses and dirt they rake together into small piles and urinate on. Most active at dawn and dusk, cougars are lone hunters designed for short bursts of speed. They prefer to ambush their prey and often drag their kills to secluded spots where they will eat it and then cover, or cache, the remains for later.

General Description: Cougar, mountain lion, puma, panther, and catamount are common names of this large predator. The cougar is a member of the cat family and have short faces, relatively small rounded ears, and retractable claws. An adult cougar's body length ranges from 42-54 inches with tails nearly 3 feet long (a third of the lion's total length). Adults range from 26-31 inches tall at the shoulder. Adult males can weigh up to 200 pounds, adult females up to 120 pounds. Cougars vary in color from reddish-brown to tawny to gray with a black tip on their tail. Kittens have black spots.

Range/Habitat: Cougars prefer rocky terrain, steep slopes and cliffs, rim rock, dense brush and semi-open forests — essentially the same general range as its prey species, the deer, elk, mountain goat and wild sheep. Over 20,000 cougars are thought to live in the Western United States.

Cougars are primarily crepuscular (active at dawn and dusk) and secretive animals. Adults, particularly the males, roam widely often covering a home range of 75-100 square miles. The lions are territorial and will "mark" their territories by urinating on scratch piles. They den in rock outcroppings, dense thickets and under uprooted trees.

Food: Cougars are carnivores, meaning they eat mainly meat. Their diet consists primarily of deer and elk. Mountain goat, wild sheep, moose, coyotes, porcupine, raccoons, beaver, hares, rodents, and occasionally, domestic animals all supplement their diet. Cougars will cache uneaten portions of their kill or cover it for later consumption, but will not eat spoiled meat, as bears will.

Life span: Cougars 8-12 years are considered old, yet they may live up to 20 years. Cougars breed for the first time between 2 and 3 years of age. They are polygamous, meaning individuals may breed with several different cougars. The bond between male and female is short-lived and the male cougar plays no role in raising the kittens. A female's gestation period is 88-97 days (about 3 months). The animals normally breed every other year and during no particular breeding season. Females usually give birth to two kittens, but litters may range from one to six kittens, and may be born any month of the year. Newborns are 8-12 inches long and weigh less than a pound. Kittens remain with their mother for a year and a half.

COUGARS: CLOSE ENCOUNTERS

Cougar attacks on humans are extremely rare. In North America, fewer than 20 fatalities and 75 non-fatal attacks have been reported during the past 100 years. However, more cougar attacks have been reported in the western United States and Canada over the past 20 years than in the previous 80. In Washington, of the one fatality and five non-fatal attacks reported since 1924, four attacks have occurred during the 1990's. As cougar numbers increase in Washington and habitat dwindles, the more likely you are to encounter a lion. Young, newly independent cougars of 1 or 2 years of age, presumably having difficulty finding food for themselves, account for the majority of the cougar/human interactions reported in Washington.

IN COUGAR COUNTRY (ESPECIALLY WOODED FOOTHILLS):

- Keep pets indoors or in secure kennels at night for safety.
- If practical, bring farm animals into enclosed sheds or barns at night, especially during calving or lambing seasons.
- Do not leave pet food or food scraps outside.
- Store garbage in cans with tight-fitting lids so odors do not attract small mammals.
- When children are playing outdoors, closely supervise them and be sure they are indoors by dusk.
- Light walkways and remove any heavy vegetation or landscaping near the house.
- Avoid feeding wildlife or landscaping with shrubs and plants that deer prefer to eat. Remember, predators follow prey.

While recreating or working in cougar country you can avoid close encounters by taking the following precautions:

- Work or hike in small groups and make enough noise to prevent surprising a cougar. Avoid hiking alone.
- Keep small children close to the group, preferably in plain sight just ahead of you.
- Do not approach dead animals, especially recently killed or partially covered deer and elk.
- Be aware of your surroundings, particularly when hiking in dense cover or when sitting, crouching or lying down. Look for tracks, scratch piles, and partially covered droppings.

- Keep a clean camp. Reduce odors that may attract small mammals like raccoons, which in turn attract cougars. Store meat, other foods, pet food, and garbage in double plastic bags.
- Do not leave your pet tied at a campsite, which may also attract cougars. Better yet, leave "Rover" at home when camping or hiking.

WHEN AN ENCOUNTER OCCURS

If you do come face to face with a cougar, your actions can either help or hinder a quick retreat by the lion. Here are some tips.

- Stop, stand tall and don't run. Pick up small children immediately. Running and rapid movements may trigger an attack. Remember, a cougar's instinct is to chase.
- Face the cougar, talk to it firmly and slowly back away. Always leave the animal an escape route.
- Try to appear larger than the cougar by getting above it. (E.g., stepping up onto a stump). If wearing a jacket, hold it open to further increase your size.
- Do not take your eyes off the animal or turn your back. Do not crouch down or try to hide.
- Never approach the animal, especially if it is near a kill or with kittens. Never corner the animal or offer it food.
- If the animal does not flee and shows signs of aggression (crouches with ears back, teeth bared, hissing, tail twitching, and hind feet pumping in preparation to jump), be more assertive. Shout, wave your arms and throw rocks. The idea is to convince the cougar that you are not prey, but a potential danger.

If the cougar attacks, fight back aggressively and try to stay on your feet. Cougars have been driven away by people who have fought back using anything within reach, including sticks, rocks, shovels, backpacks, and clothing — even your bare hands. Generally, if you are aggressive enough, a cougar will flee, realizing it has made a mistake.

ATTACHMENT 5

PROJECT SPECIFIC EXEMPTION FOR FIREARMS

Weston Corporate policy (insert OP#) specifically prohibits firearms on Weston premises or project sites. However, in some remote locations firearms may be necessary to ensure a safe work environment. When the project manager has determined that firearms are necessary the Policy # ____ Project Specific Exemption for Firearms form (attached) must be completed and submitted with the SSHP. The Corporate EHS Manager (or designated representative in his absence) is authorized to grant a project specific exemption.

The project specific exemption applies only to projects where firearms are required and should be omitted when other controls are deemed appropriate. To obtain an exemption, complete the attached form and submit it along with the HSP to the Corporate EHS for approval.

Project Specific Exemption for Firearms

Project Name:	End Date:
Location:	Start Date:
Contract Number:	WO No.:
Wildlife Species of Concern:	
Project Narrative (Brief description of the scope of work):	
Justification (Brief narrative supporting firearm exemption):	

The following named personnel have demonstrated proficiency in wildlife protection through training and experience (Attach copies of training documents), have voluntarily submitted to a check through the National Criminal Information Computer (NCIC) and have no convictions that prevent them from possessing firearms, have agreed to perform the duties as outlined in the HSP; therefore granted an exemption and permitted to possess firearms on the project site for the express purpose of wildlife protection.

Employee Name	SSAN	Company	Title	NCIC
				Pass / Fail
				Pass / Fail
				Pass / Fail
				Pass / Fail

This document grants an exception to Roy F. Weston, Inc.'s Policy # ____ and permits firearms on this project for the express purpose of protection from Wildlife. All persons either employed by or subcontracted to Weston must adhere to the requirements for safe handling of firearms and other restrictions as outlined by this Field Operating Procedure ____ and those that may be required by the client, airline companies, and any other concerned agencies or organizations. These restrictions must be stated in the HSP.

Approvals:

Title	Name (print or type)	Signature	Date	Approved
Project Manager				Yes / No
OU Manager				Yes / No
Safety Officer				Yes / No

Statement of Compliance: The above persons approving this document have reviewed the requirements of the project and agree that the possession and use of firearms is necessary to ensure that Weston is able to ensure a safe work environment on the stated project. Only those persons named herein shall be permitted to possess firearms.

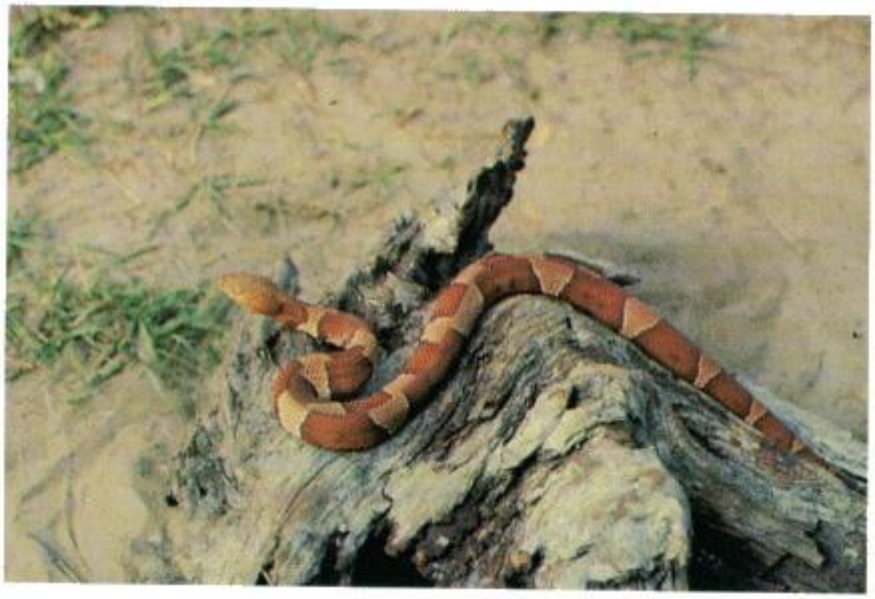
Title	Name (print or type)	Signature	Date	Approved
Division EHS Manager				Yes / No
Corporate EHS Manager				Yes / No

The Division and Corporate safety managers have reviewed this request and hereby grant a project specific waiver.

Approval Comments: (Write comments as appropriate)
This exemption does not permit or allow possession of firearms on or in vicinity of, the project location for any purpose other than protection from wildlife.

APPENDIX B - PICTURES OF POISONOUS SNAKES AND LIZARDS

Americas



American copperhead

Coral Snakes – Western, Eastern and Texas – Southern US

Cotton Mouth – East and Southeast US

Eastern Diamondback Rattlesnake - Southeast US

Timber Rattlesnake – Eastern US

Dusky Pygmy Rattlesnake - SE US

Mojave Rattlesnake – Southwest US Mexico

Western Diamondback Rattlesnake – SW US

Speckled Rattlesnake - SW US

Massasaug – North and South Central US

Black-tailed Rattlesnake – South Central US and Mexico

Tiger Rattlesnake – Southwest US and Mexico

Sidewinder – Southwest US

Bush Master – Central and South America, Caribbean

Eyelash Pit Viper

Fer-de-Lance – Central & South America

Jumping Viper – Central America

Tropical rattlesnake - Southern Mexico, Central America, and South America.

Lizards

Gila Monster – SW US

Mexican Bearded Lizard – Mexico and Central America

Europe

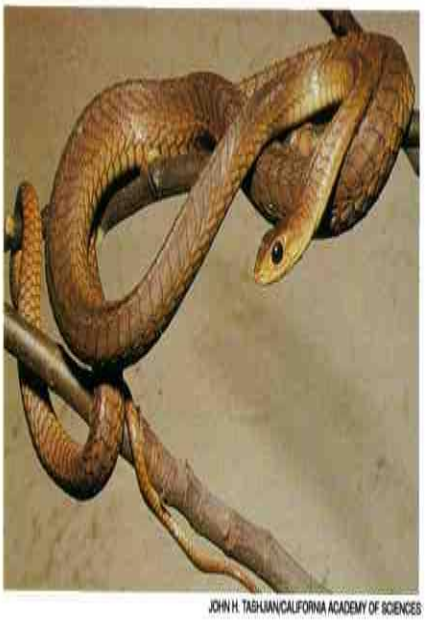
Common Adder - Throughout Europe

Long nosed Adder - Italy, Yugoslavia, northern Albania, and Romania

Pellas Viper - Throughout southeastern Europe.

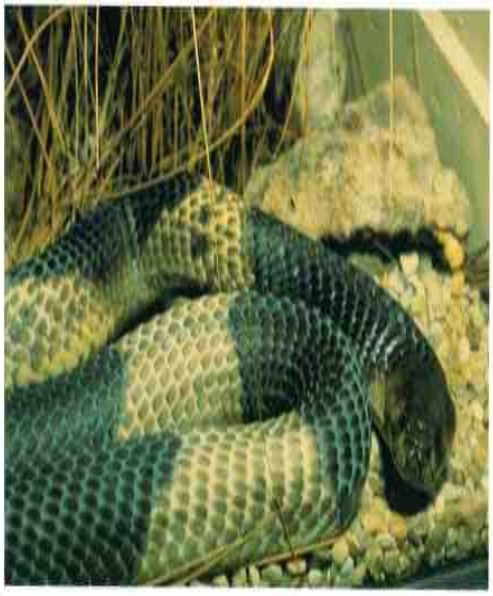
Ursini Viper - Most of Europe, Greece, Germany, Yugoslavia, France, Italy, Hungary, Romania, Bulgaria, and Albania.

Africa and Asia



Boomslang - sub-Saharan Africa

Bush Viper - Most of Africa, Angola, Cameroon, Uganda, Kenya, and Zaire



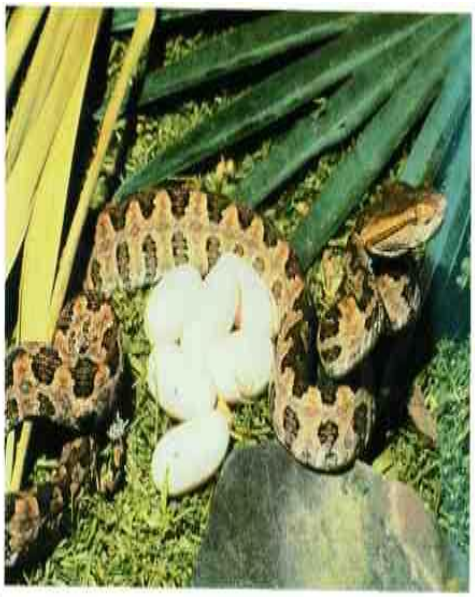
Africa, Iraq, Syria, and Saudi Arabia

Gaboon viper - Most of Africa

Green Mamba - Most of Africa.

Rhinoceros viper or river jack – Equatorial Africa

Green Tree Pit Viper - India, Burma, Malaya, Thailand, Laos, Cambodia, Vietnam, China, Indonesia, and Formosa.



Habu pit viper - Okinawa and neighboring islands and Kyushu

Mole or Burrowing Viper
Sudan, Ethiopia, Somaliland, Kenya, Tanganyika, Uganda, Cameroon, Niger, Congo, and Urundi.

Middle East

Puff Adder - Most of Africa, Saudi Arabia, Iraq, Lebanon, Israel, and Jordan

Sand Viper - Northern Sahara, Algeria, Egypt, Sudan, Nigeria, Chad, Somalia, and central Africa.

JOHN H. TASHJIAN/FORT WORTH ZOO

Saw Scaled Viper - Asia, Syria, India, Africa, Iraq, Iran, Saudi Arabia, Pakistan, Jordan, Lebanon, Sri Lanka, Algeria, Egypt, and Israel.

Field's horned viper, False Eye-horned viper - Middle East and as far east as Pakistan

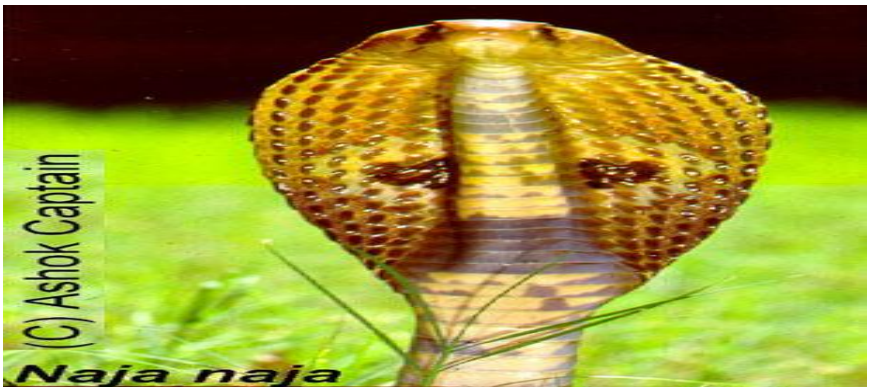
Horned Asp, (true) Desert Horned/Eye-Horn Viper,
desert horned sidewinder Northern Africa and parts of the Middle East.

Desert Cobra, Desert Black Snake

Palestinian Viper - Turkey, Syria, Palestine, Israel, Lebanon, and Jordan

Levant viper or Levant adder, aka: desert or mountain adder, 'kufi' - Greece, Iraq, Syria, Lebanon, Turkey, Afghanistan, lower portion of the former USSR, and Saudi Arabia.

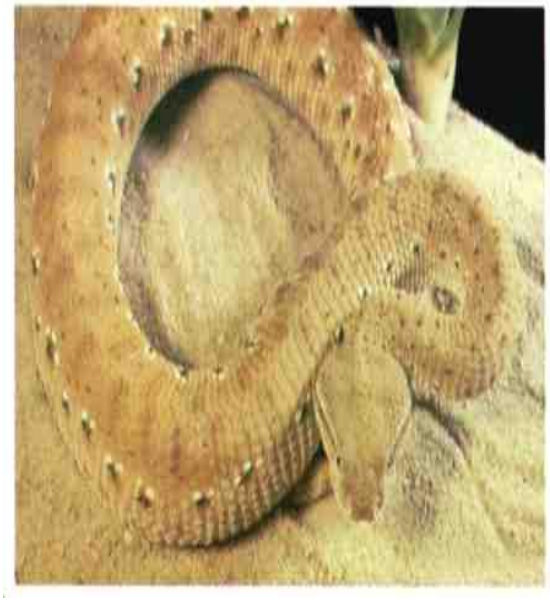
India



Cobra

Common Krait -
India, Sri Lanka, and Pakistan.

Malayan Pit Viper - Thailand, Laos, Cambodia, Java, Sumatra, Malaysia, Vietnam, Burma, and China



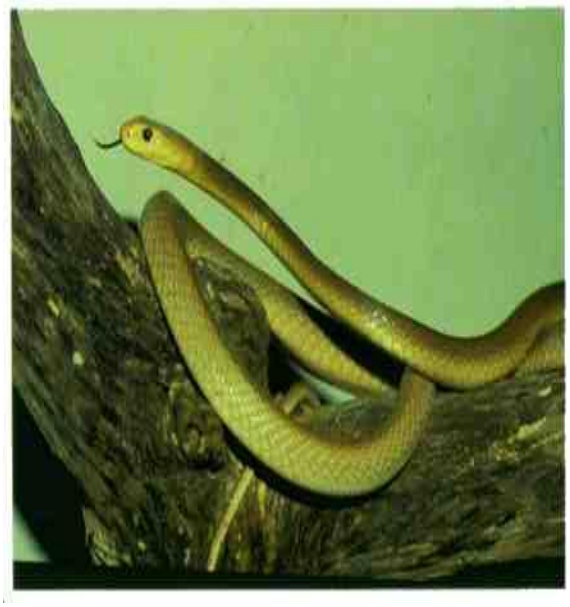
McMahon's Viper- West Pakistan and Afghanistan.

Russell's Viper - Sri Lanka, south China, India, Malaysian Peninsula, Java, Sumatra, Borneo, and surrounding islands.

Wagler's pit viper or temple viper - Malaysian Peninsula and Archipelago, Indonesia, Borneo, the Philippines, and Ryuku Islands.

Australasia

Australian Copperhead - Tasmania, South Australia, Queensland, and Kangaroo Island.



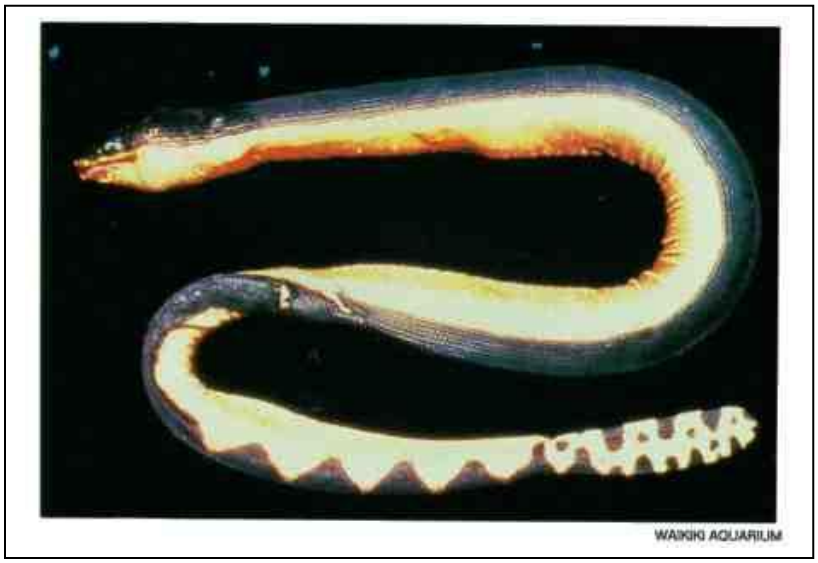
Death Adder Australia, New Guinea, and Moluccas

Taipan - Northern Australia and southern New Guinea

Tiger Snake - Australia, Tasmania, Bass Strait islands, and New Guinea.

Sea Snakes

Banded Sea Snake Coastal waters of New Guinea, Pacific islands, the Philippines, Southeast Asia, Sri Lanka, and Japan.



Yellow Bellied Sea Snake - Throughout the Pacific Ocean from many of the Pacific islands to Hawaii and to the coast of Costa Rica and Panama.

FLD 43 B INSECTS

Sting and Biting Insects

Contact with stinging insects may result in site personnel experiencing adverse health affects that range from being mildly uncomfortable to being life threatening. Therefore, stinging insects present a serious hazard to site personnel and extreme caution must be exercised whenever site and weather conditions increase the risk of encountering stinging insects. These include the following:

- Bees ("Killer" bees, honeybees, bumble bees, wasps, and hornets and wingless wasps)
- Scorpions
- Fire ants
- Spiders

Bees, Wasps, Hornets and Yellow Jackets

The severity of an insect sting reaction varies from person to person. A normal reaction will result in pain, swelling and redness confined to the sting site. Simply disinfect the area (washing with soap and water will do) and apply ice to reduce the swelling.

A large local reaction will result in swelling that extends beyond the sting site. For example, a sting on the forearm could result in the entire arm swelling twice its normal size.

Although alarming in appearance, this condition is often treated the same as a normal reaction. An unusually painful or very large local reaction may need medical attention. Because this condition may persist for two to three days, antihistamines and corticosteroids are sometimes prescribed to lessen the discomfort.

Yellow jackets, hornets and wasps can sting repeatedly. Honeybees have barbed stingers that are left behind in their victim’s skin. These stingers are best removed by a scraping action, rather than a pulling motion, which may actually squeeze more venom into the skin.

Personnel should be very cautious of "killer" bees. They have the appearance of the typical honeybee, however, they are very aggressive. These Africanized honeybees (AHB) defend their colonies much more vigorously than typical bees. The colonies are easily disturbed (sometimes just by being nearby). When they do sting, many more bees may participate, so there is a danger of receiving more stings. This can make them life threatening, especially to people allergic to stings, or with limited capacity to escape (the young, old, and handicapped).

Scorpions

Scorpion stings are a major public health problem in many underdeveloped tropical countries. For every person killed by a poisonous snake, 10 are killed by a poisonous scorpion. In Mexico, 1000 deaths from scorpion stings occur per year. In the United States, only 4 deaths in 11 years have occurred as a result of scorpion stings. Furthermore, scorpions can be found outside their

normal range of distribution, ie, when they accidentally crawl into luggage, boxes, containers, or shoes and are unwittingly transported home via human travelers.

Out of 1500 scorpion species, 50 are dangerous to humans. Scorpion stings cause a wide range of conditions, from severe local skin reactions to neurologic, respiratory, and cardiovascular collapse.

Almost all of these lethal scorpions, except the *Hemiscorpius* species, belong to the scorpion family called the Buthidae. The Buthidae family is characterized by a triangular-shaped sternum, as opposed to the pentagonal-shaped sternum found in the other 5 scorpion families. In addition to the triangular-shaped sternum, poisonous scorpions also tend to have weak-looking pincers, thin bodies, and thick tails, as opposed to the strong heavy pincers, thick bodies, and thin tails seen in nonlethal scorpions. The lethal members of the Buthidae family include the genera of *Buthus, Parabuthus, Mesobuthus, Tityus, Leiurus, Androctonus,* and *Centruroides*. These lethal scorpions are found generally in the given distribution:

Centruroides - Southwest USA, Mexico, Central America	*Tityus* - Central and South America, Caribbean
Buthus - Mediterranean area	*Androctonus* - Northern Africa to Southeast Asia
Leiurus - Northern Africa and Middle East	*Mesobuthus* - Asia
Parabuthus - Western and Southern Africa	

A scorpion has a flattened elongated body and can easily hide in cracks. It has 4 pairs of legs, a pair of claws, and a segmented tail that has a poisonous spike at the end. Scorpions vary in size from 1-20 cm in length.

However, scorpions may be found outside their habitat range of distribution when inadvertently transported with luggage and cargo.

Centruroides (Southwest USA, Mexico)

Hemiscorpious (Middle East) cytotoxic

Fat Tail Scorpion (Middle East) neurotoxic

Death Stalker *Leiurus quinquestriatuS* **(Africa Southwest and North) neurotoxic**

Black Scorpion (Middle East) deadly neurotoxin

Prevention

Preventive measures include awareness of scorpions, shaking out clothing and boots before putting them on looking before reaching into likely hiding places and wearing gloves, long sleeved shirts and pants.

Symptoms

In mild cases, the only symptom may be a mild tingling or burning at site of sting.

In severe cases, symptoms may include:

- Eyes and ears - Double vision
- Lungs - Difficulty breathing, No breathing, Rapid breathing,
- Nose, mouth, and throat – Drooling, Spasm of the voice box, Thick-feeling tongue
- Heart and blood - High blood pressure, Increased or decreased heart rate, Irregular heartbeat
- Kidneys and bladder Urinary incontinence, Urine output, decreased
- Muscles and joints - Muscle spasms
- Nervous system – Paralysis, Random movements of head, eye, or neck, Restlessness, Seizures, Stiffness
- Stomach and intestinal tract - Abdominal cramps, Fecal incontinence
- Other -Convulsions

Treatment

1. Recognize scorpion sting symptoms:
2. Wash the area with soap and water.
3. Apply a cool compress on the area of the scorpion sting. Ice (wrapped in a washcloth or other suitable covering) may be applied to the sting location for 10 minutes. Remove compress for 10 minutes and repeat as necessary.
4. Call the Poison Control Center. If you develop symptoms of a poisonous scorpion sting, go to the nearest emergency care facility.
5. Keep your tetanus shots and boosters current.

Fire Ants

Fire ants are aggressive, reddish-brown to black ants that are 1/8 inch to 1/4 inch long. They construct nests, which are often visible as dome-shaped mounds of soil, sometimes as large as 3 feet across and 1 1/2 feet in height. In sandy soils, mounds are flatter and less visible. Fire ants usually build mounds in sunny, open areas such as lawns, pastures, cultivated fields and meadows, but they are not restricted to these areas. Mounds or nests may be located in rotting logs, around trees and stumps, under pavement and buildings, and occasionally indoors.

Fire ants use their stingers to immobilize or kill prey and to defend ant mounds from disturbance by larger animals, such as humans. Any disturbance sends hundreds of workers out to attack anything that moves. The ant grabs its victim with its mandibles (mouthparts) and then inserts its stinger. The process of stinging releases a chemical, which alerts other ants, inducing them to sting. In addition, one ant can sting several times without letting go with its mandibles.

Once stung, humans experience a sharp pain that lasts a couple of minutes, then after a while the sting starts itching and a welt appears. Fire ant venom contains alkaloids and a relatively small amount of protein. The alkaloids kill skin cells; this attracts white blood cells, which form a pustule within a few hours of being stung. The fluid in the pustule is sterile, but if the pustule is broken, the wound may become infected. The protein in the venom can cause allergic reactions that may require medical attention.

Some of the factors related to stinging insects that increase the risk associated with accidental contact are:

- The nests for these insects are frequently found in remote wooded or grassy areas and hidden in cavities
- The nests can be situated in trees, rocks, bushes or in the ground, and are usually difficult to see
- Accidental contact with these insects is highly probable, especially during warm weather conditions when the insects are most active
- If a site worker accidentally disturbs a nest, the worker may be inflicted with multiple stings, causing extreme pain and swelling which can leave the worker incapacitated and in need of medical attention
- Some people are hypersensitive to the toxins injected by a sting, and when stung, experience a violent and immediate allergic reaction resulting in a life-threatening condition known as anaphylactic shock
- Anaphylactic shock manifests itself very rapidly and is characterized by extreme swelling of the body, eyes, face, mouth and respiratory passages
- The hypersensitivity needed to cause anaphylactic shock, can in some people, accumulate over time and exposure, therefore, even if someone has been stung previously, and not experienced an allergic reaction, there is no guarantee that they will not have an allergic reaction if they are stung again

With these things in mind, and with the high probability of contact with stinging insects, use the following safe work practices:

- If a worker knows that he is hypersensitive to bee, wasp or hornet stings, inform the site Safety officer of this condition prior to participation in site activities
- All site personnel will be watchful for the presence of stinging insects and their nests, and will advise the Site Safety officer if a stinging insect nest is located or suspected in the area
- Any nests located on site will be flagged off and site personnel will be notified of its presence
- If attacked, site personnel will immediately seek shelter and stay there. Do not jump in water (bees will still be in the area when you come up). Once safe, remove stings from your skin, it does not matter how you do it, but do it as quickly as possible to reduce the amount of venom they inject. Obtain first aid treatment and contact the safety officer who will observe for signs of allergic reaction

Treatment for fire ant stings is aimed at preventing secondary bacterial infection, which may occur if the pustule is scratched or broken. Clean the blisters with soap and water to prevent secondary infection. Do not break the blister. Topical corticosteroid ointments and oral antihistamines may relieve the itching associated with these reactions.

Site personnel with a known hypersensitivity to stinging insects will keep required emergency medication on or near their person at all times

Spiders

A large variety of spiders may be encountered during site activities. Extreme caution must be used when lifting logs and debris, since spiders are typically found in these areas.

While most spider bites merely cause localized pain, swelling, reddening, and in some cases, tissue damage, there are a few spiders that, due to the severity of the physiological affects caused by their venom, are dangerous. The UXOSO will brief site personnel as to the identification and avoidance of these dangerous spiders. These species include the black widow and the brown or violin spiders.

The black widow is a coal-black bulbous spider 3/4 to 1 1/2 inches in length, with a bright red hourglass on the under side of the abdomen. The black widow is usually found in dark moist locations, especially under rocks, rotting logs and may even be found in outdoor toilets where they inhabit the underside of the seat. Victims of a black widow bite may exhibit the following signs or symptoms:

- Sensation of pinprick or minor burning at the time of the bite
- Appearance of small punctures (but sometimes none are visible)
- After 15 to 60 minutes, intense pain is felt at the site of the bite which spreads quickly, and is followed by profuse sweating, rigid abdominal muscles, muscle spasms, breathing difficulty, slurred speech, poor coordination, dilated pupils and generalized swelling of face and extremities

The brown or violin spider is brownish to tan in color, rather flat, and 1/2 to 5/8 inches long. However, unlike the typical species, this spider has been encountered without a violin or “fiddle” shaped mark on the top of the head. Of the brown spider, there are three varieties found in the United States that present a problem to site personnel. These are the brown recluse, the desert violin and the Arizona violin. These

spiders may be found in a variety of locations including trees, rocks or in dark locations. Victims of a brown or violin spider bite may exhibit the following signs or symptoms:

- Blistering at the site of the bite, followed by a local burning at the site 30 to 60 minutes after the bite
- Formation of a large, red, swollen, postulating lesion with a bull's-eye appearance
- Systemic affects may include a generalized rash, joint pain, chills, fever, nausea and vomiting
- Pain may become severe after 8 hours, with the onset of tissue necrosis

There is no effective first aid treatment for either of these bites. Except for very young, very old or weak victims, spider bites are not considered to be life threatening. However, medical treatment must be sought to reduce the extent of damage caused by the injected toxins.

Brown Recluse Spider

Black Widow Spider

First aid should include:

- If possible, catch the spider to confirm its identity. Even if the body is crushed, save it for identification
- Clean the bitten area with soap and water or rubbing alcohol
- To relieve pain, place an ice pack over the bite
- Keep the victim quiet and monitor breathing

Seek immediate medical attention

Sensitivity Reaction to Insect Stings or Bites

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.

Site personnel must be questioned regarding their allergic reaction to insect bites. Anyone knowingly allergic should be required to carry and know how to use a response kit. First aid providers must be instructed on how to use the kit also. The kit must be inspected to ensure it is updated.

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.

Insect Borne Diseases

Diseases that are spread by insects include the following: Rocky Mountain Spotted Fever or Lyme Disease (tick); Bubonic and other forms of Plaque (fleas); Malaria, West Nile Virus and Equine Encephalitis (mosquito) and Leshmaniasis (Sand Flies)

Tick Borne Diseases

Lyme disease is the second most rapidly spreading disease in the U.S.

Lyme Disease

1. Facts

Definition:

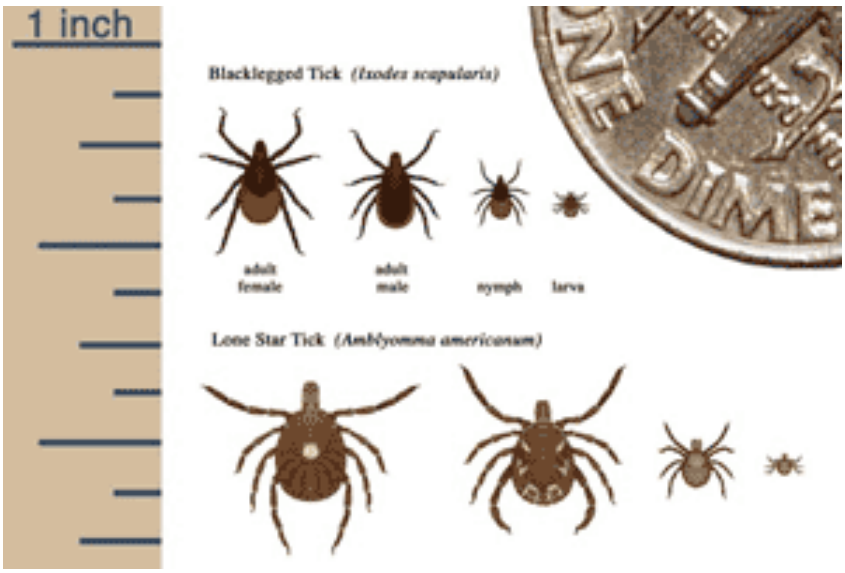
- Bacterial infection transmitted by the bite of an infected black-legged tick more popularly known as the deer tick.

- Prevalence (nationwide and other countries).

- Three stages/sizes of deer ticks:
    - Larvae
    - Nymph
    - Adult

Tick season is May through October.

Not all ticks transmit Lyme disease (Black legged or deer tick [upper] compared to the Lone Star tick [lower])



- 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.

2. Prevention and Protection:

- Wear light-colored, tight-knit clothing.
- Wear long pants and long-sleeved shirts.
- Tuck pant legs into shoes or boots.
- Wear a hat.
- Use insect repellant containing DEET ((follow manufacturer's instructions for use).
- Check yourself daily for ticks after being in grassy, wooded areas.
- Request information from the Health and Safety Medical Section regarding Lyme Disease.

3. 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.

4. Symptoms:

Early Signs (may vary from person to person)

- Expanding skin rash.

- Flu-like symptoms during summer or early fall that include the following:
  - Chills, fever, headache, swollen lymph nodes.
  - Stiff neck, aching joints, and muscles.
  - Fatigue.

- Later signs
  - Nervous system problems.
  - Heart problems.
  - Arthritis, especially in knees.

5. Upon Onset of Symptoms:

- Notify your Safety Officer (SO) and your supervisor.

Rocky Mountain Spotted Fever

The Center for Disease Control (CDC) has noted the increase of Rocky Mountain Spotted Fever (RMSF) which is caused by bites from infected ticks that live in and near wooded areas, tall grass and brush.

RMSF has occurred in 36 states, with the heaviest concentrations in Oklahoma, North Carolina, South Carolina, and Virginia. Rocky Mountain spotted fever is the most severe and most frequently reported rickettsial illness in the United States. It also occurs in Mexico and in Central and South America.It is caused by Rocky Mountain Wood Ticks and Dog Ticks that have become infected with rickettsia. Both are black in color.

The disease is caused by *Rickettsia rickettsii*, a species of bacteria that is spread to humans by ixodid (hard) ticks.

Initial signs and symptoms of the disease include sudden onset of fever, headache, and muscle pain, followed by development of rash. The disease can be difficult to diagnose in the early stages, and without prompt and appropriate treatment it can be fatal.

Prevention procedures are the same as for Lyme disease.

Ehrlichiosis

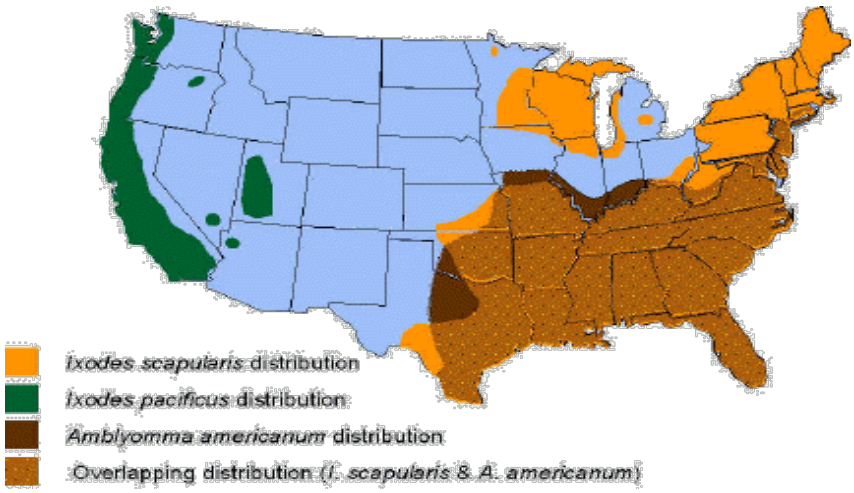
Ehrlichiosis is the general name used to describe several bacterial diseases that affect animals and humans. These diseases are caused by the organisms in the genus *Ehrlichia*. Worldwide, there are currently four ehrlichial species that are known to cause disease in humans.

In the United States, ehrlichiae are transmitted by the bite of an infected tick. The lone star tick (*Amblyomma americanum*), the blacklegged tick (*Ixodes scapularis*), and the western blacklegged tick (*Ixodes pacificus*) are known vectors of ehrlichiosis in the United States. *Ixodes ricinus* is the primary vector in Europe.

The symptoms of ehrlichiosis may resemble symptoms of various other infectious and non-infectious diseases. These clinical features generally include fever, headache, fatigue, and muscle aches. Other signs and symptoms may include nausea, vomiting, diarrhea, cough, joint pains, confusion, and occasionally rash. Symptoms typically appear after an incubation period of 5-10 days following the tick bite. It is possible that many individuals who become infected with ehrlichiae do not become ill or they develop only very mild symptoms.

Most cases of ehrlichiosis are reported within the geographic distribution of the vector ticks (see map below). Occasionally, cases are reported from areas outside the distribution of the tick vector. In most instances, these cases have involved persons who traveled to areas where the diseases are endemic, and who had been bitten by an infected tick and developed symptoms after returning home. Therefore, if you traveled to an ehrlichiosis-endemic area 2 weeks prior to becoming ill, you should tell your doctor where you traveled.

Figure 20. Areas where human ehrlichiosis may occur based on approximate distribution of vector tick species



A diagnosis of ehrlichiosis is based on a combination of clinical signs and symptoms and confirmatory laboratory tests. Blood samples can be sent to a reference laboratory for testing. However, the availability of the different types of laboratory tests varies considerably. Other laboratory findings indicative of ehrlichiosis include low white blood cell count, low platelet count, and elevated liver enzymes.

Ehrlichiosis is treated with a tetracycline antibiotic, usually doxycycline.

Very little is known about immunity to ehrlichial infections. Although it has been proposed that infection with ehrlichiae confers long-term protection against reinfection, there have been occassional reports of laboratory-confirmed reinfection. Short-term protection has been described in animals infected with some *Ehrlichia* species and this protection wanes after about 1 year. Clearly, more studies are needed to determine the extent and duration of protection against reinfection in humans.

Limiting exposure to ticks reduces the likelihood of infection in persons exposed to tick-infested habitats. Prompt careful inspection of your body and removal of crawling or attached ticks is an important method of preventing disease. It may take 24–48 hours of attachment before microorganisms are transmitted from the tick to you.

Preventive measures - Follow protection protocols for Lyme disease

Babesiosis

Babesiosis is an intraerythrocytic parasitic infection caused by protozoa of the genus *Babesia* and transmitted through the bite of the *Ixodes* tick, the same vector responsible for transmission of Lyme disease. While most cases are tick-borne, transfusion and transplacental transmission have been reported. In the United States, babesiosis is usually an asymptomatic infection in healthy individuals. Several groups of patients become symptomatic, and, within these subpopulations, significant morbidity and mortality occur. The disease most severely affects patients who are elderly, immunocompromised, or asplenic. Among those symptomatically infected, the mortality rate is 10% in the United States and 50% in Europe.

The primary vectors of the parasite are ticks of the genus *Ixodes*. In the United States, the black-legged tick, *Ixodes scapularis* (also known as *Ixodes dammini*) is the primary vector for the parasite; in Europe, *Ixodes ricinus* appears to be the primary tick vector. In each location, the *Ixodes* tick vector for *Babesia* is the same vector that locally transmits *Borrelia burgdorferi*, the agent implicated in Lyme disease. The primary US animal reservoir is the white-footed mouse, *Peromyscus leucopus*. Additionally, white-tailed deer serve as transport hosts for the adult tick vector, *I scapularis*. In Europe, the primary animal reservoir is cattle.

The Ixodid ticks ingest *Babesia* during feeding from the host, multiply the protozoa in their gut wall, and concentrate it in their salivary glands. The tick inoculates a new host when feeding again. The parasite then infects red blood cells (RBCs) and differentiated and undifferentiated trophozoites are produced. The former produce 2-4 merozoites that disrupt the RBC and go on to invade other RBCs. This leads to hemolytic anemia, thrombocytopenia, and atypical lymphocyte formation. Alterations in RBC membranes cause decreased conformability and increased red cell adherence, which can lead to development of acute respiratory distress syndrome (ARDS) among those severely affected.

The first US case of babesiosis was reported on Nantucket Island in 1966. An increasing trend over the past 30 years may be the result of restocking of the deer population, curtailment of hunting, and an increase in outdoor recreational activities. Between 1968 and 1993, more than 450 cases of *Babesia* infections were confirmed in the United States. However, the actual prevalence of this disease is unknown because most infected patients are asymptomatic.

The first case of human babesiosis was reported in 1957 from the former Yugoslavia in an asplenic farmer. Approximately 40 cases have been reported since then, mostly in Ireland, the United Kingdom, and France. Sporadic case reports of babesiosis in Japan, Korea, China, Mexico, South Africa, and Egypt have also been documented.

The signs and symptoms mimic malaria and range in severity from asymptomatic to septic shock.

Symptoms include: Generalized weakness, fatigue, depression, fever, anorexia and weight loss, CNS - Headache, photophobia, neck stiffness, altered sensorium, pulmonary - Cough, shortness of breath, GI - Nausea, vomiting, abdominal pain, Musculoskeletal - Arthralgia and myalgia and Renal - Dark urine

Prevention

Prevention measures are the same as for Lyme and other insect borne diseases

Tularemia

Tularemia (also known as "rabbit fever") is a serious infectious disease caused by the bacterium *Francisella tularensis*. The disease is endemic in North America, and parts of Europe and Asia. The primary vectors are ticks and deer flies, but the disease can also be spread through other arthropods. Animals such as rabbits, prairie dogs, hares and muskrats serve as reservoir hosts. The disease is named after Tulare County, California.

Depending on the site of infection, tularemia has six characteristic clinical syndromes: ulceroglandular, glandular, oropharyngeal, pneumonic, oculoglandular, and typhoidal.

The disease has a very rapid onset, with headache, fatigue, dizziness, muscle pains, loss of appetite and nausea. Face and eyes redden and become inflamed. Inflammation spreads to the lymph nodes, which enlarge and may suppurate (mimicking bubonic plague). Lymph node involvement is accompanied by a high fever. Death may result.

Francisella tularensis is one of the most infective bacteria known; fewer than ten organisms can cause disease leading to severe illness. The bacteria penetrate into the body through damaged skin and mucous membranes, or through inhalation. Humans are most often infected by tick bite or through handling an infected animal. Ingesting infected water, soil, or food can also cause infection. Tularemia can also be acquired by inhalation; hunters are at a higher risk for this

disease because of the potential of inhaling the bacteria during the skinning process. Tularemia is not spread directly from person to person.
No vaccine is available to the general public The best way to prevent tularemia infection is to wear rubber gloves when handling or skinning rodents or lagomorphs (as rabbits), avoid ingesting uncooked wild game and untreated water sources, and wearing long-sleeved clothes and using an insect repellant to prevent tick bites.

Prevention

No vaccine is available to the general public The best way to prevent tularemia infection is to wear rubber gloves when handling or skinning rodents or lagomorphs (as rabbits), avoid ingesting uncooked wild game and untreated water sources, and wearing long-sleeved clothes and using an insect repellant to prevent tick bites.

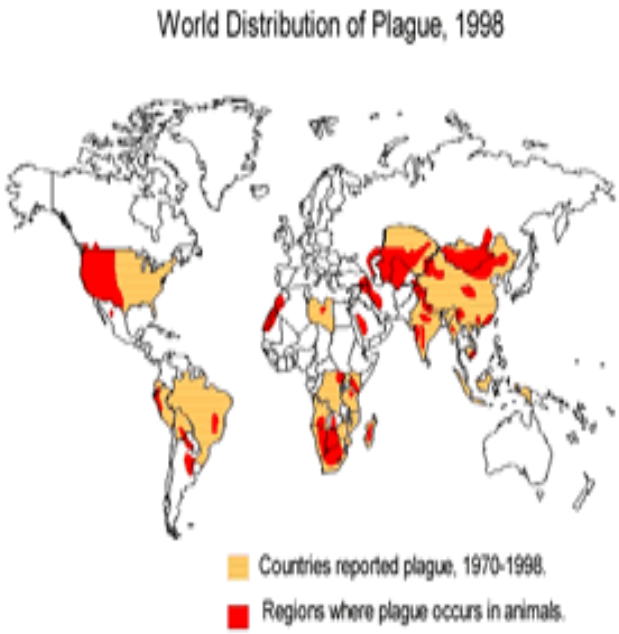
Flea Borne Diseases

Plague

- **Bubonic plague**: enlarged, tender lymph nodes, fever, chills and prostration
- **Septicemic plague**: fever, chills, prostration, abdominal pain, shock and bleeding into skin and other organs
- **Pneumonic plague**: fever, chills, cough and difficulty breathing; rapid shock and death if not treated early

Introduction: Plague is an infectious disease of animals and humans caused by a bacterium named *Yersinia pestis*.

People usually get plague from being bitten by a rodent flea that is carrying the plague bacterium or by handling an infected animal. Millions of people in Europe died from plague in the Middle Ages, when human homes and places of work were inhabited by flea-infested rats. Today, modern antibiotics are effective against plague, but if an infected person is not treated promptly, the disease is likely to cause illness or death.



Risk: Wild rodents in certain areas around the world are infected with plague. Outbreaks in people still occur in rural communities or in cities. They are usually associated with infected rats and rat fleas that live in the home. In the United States, the last urban plague epidemic occurred in Los Angeles in 1924-25. Since then, human plague in the United States has occurred as mostly scattered cases in rural areas (an average of 10 to 15 persons each year). Globally, the

World Health Organization reports 1,000 to 3,000 cases of plague every year. In North America, plague is found in certain animals and their fleas from the Pacific Coast to the Great Plains, and from southwestern Canada to Mexico. Most human cases in the United States occur in two regions: 1) northern New Mexico, northern Arizona, and southern Colorado; and 2) California, southern Oregon, and far western Nevada. Plague also exists in Africa, Asia, and South America (see map).

Diagnosis: The typical sign of the most common form of human plague is a swollen and very tender lymph gland, accompanied by pain. The swollen gland is called a "bubo." Bubonic plague should be suspected when a person develops a swollen gland, fever, chills, headache, and extreme exhaustion, and has a history of possible exposure to infected rodents, rabbits, or fleas.

A person usually becomes ill with bubonic plague 2 to 6 days after being infected.
When bubonic plague is left untreated, plague bacteria invade the bloodstream. As the plague bacteria multiply in the bloodstream, they spread rapidly throughout the body and cause a severe and often fatal condition. Infection of the lungs with the plague bacterium causes the pneumonic form of plague, a severe respiratory illness. The infected person may experience high fever, chills, cough, and breathing difficulty and may expel bloody sputum. If plague patients are not given specific antibiotic therapy, the disease can progress rapidly to death. About 14% (1 in 7) of all plague cases in the United States are fatal.

Prevention and Control

Risk reduction: Attempts to eliminate fleas and wild rodents from the natural environment in plague-infected areas are impractical. However, controlling rodents and their fleas around places where people live, work, and play is very important in preventing human disease. Therefore, preventive measures are directed to home, work, and recreational settings where the risk of acquiring plague is high. A combined approach using the following methods is recommended: environmental sanitation educating the public on ways to prevent plague exposures preventive antibiotic therapy

Environmental Sanitation: Effective environmental sanitation reduces the risk of persons being bitten by infectious fleas of rodents and other animals in places where people live, work, and recreate. It is important to remove food sources used by rodents and make homes, buildings, warehouses, or feed sheds rodent-proof. Applying chemicals that kill fleas and rodents is effective but should usually be done by trained professionals. Rats that inhabit ships and docks should also be controlled by trained professionals who can inspect and, if necessary, fumigate cargoes.

Public Health Education: In the western United States, where plague is widespread in wild rodents, people living, working, or playing where the infection is active face the greatest threat. Educating the general public and the medical community about how to avoid exposure to disease-bearing animals and their fleas is very important and should include the following preventive recommendations:

- Watch for plague activity in rodent populations where plague is known to occur. Report any observations of sick or dead animals to the local health department or law enforcement officials.

- Eliminate sources of food and nesting places for rodents around homes, work places, and recreation areas; remove brush, rock piles, junk, cluttered firewood, and potential-food supplies, such as pet and wild animal food. Make your home rodent-proof.

- If you anticipate being exposed to rodent fleas, apply insect repellents to clothing and skin, according to label instructions, to prevent flea bites. Wear gloves and tyvek coveralls when handling potentially infected animals.

- If you live in areas where rodent plague occurs, treat pet dogs and cats for flea control regularly and not allow these animals to roam freely.

- Health authorities may use appropriate chemicals to kill fleas at selected sites during animal plague outbreaks.

Prophylactic (preventive) antibiotics: Health authorities advise that antibiotics be given for a brief period to people who have been exposed to the bites of potentially infected rodent fleas (for example, during a plague outbreak) or who have handled an animal known to be infected with the plague bacterium. Such experts also recommend that antibiotics be given if a person has had close exposure to a person or an animal (for example, a house cat) with suspected plague pneumonia.

Persons who must be present in an area where a plague outbreak is occurring can protect themselves for 2 to 3 weeks by taking antibiotics. The preferred antibiotics for prophylaxis against plague are the tetracyclines or the sulfonamides.

Other diseases primarily transmitted by Arthropods (Ticks, mites, lice etc.)

Rickettsial Infections

Description

Many species of Rickettsia can cause illnesses in humans (Table below). The term “rickettsiae” conventionally embraces a polyphyletic group of microorganisms in the class Proteobacteria, comprising species belonging to the genera *Rickettsia, Orientia, Ehrlichia, Anaplasma, Neo-rickettsia, Coxiella*, and *Bartonella*. These agents are usually not transmissible directly from person to person except by blood transfusion or organ transplantation, although sexual and placental transmission has been proposed for *Coxiella*. Transmission generally occurs via an infected arthropod vector or through exposure to an infected animal reservoir host.

Some of the diseases transmitted in this manner (Typhus, Rocky Mountain Spotted Fever, Q Fever, Ehrlichosis:) are discussed in detail in this and other Biological Hazard FLDs. A summary of these diseases is included in Attachment 1.

Thyphus (Not to be confused with Typhoid Fever [discussed in these FLDs])

For the unrelated disease caused by Salmonella typhi, see Typhoid fever. For the unrelated disease caused by Salmonella paratyphi, please refer to Paratyphoid fever. For the monster of Greek mythology, see Typhus (monster).

Typhus is any one of several similar diseases caused by louse-borne bacteria. The name comes from the Greek *typhos*, meaning smoky or lazy, describing the state of mind of those affected with typhus. *Rickettsia* is endemic in rodent hosts, including mice and rats, and spreads to humans through mites, fleas and body lice. The arthropod vector flourishes under conditions of poor hygiene, such as those found in prisons or refugee camps, amongst the homeless, or until the middle of the 20th century, in armies in the field. In tropical countries, typhus is often mistaken for dengue fever

Epidemic typhus

Epidemic typhus (also called "Jail Fever", "Hospital Fever", "Ship fever", "Famine fever", "Petechial Fever", and "louse-borne typhus") is so named because the disease often causes epidemics following wars and natural disasters. The causative organism is Rickettsia prowazekki, transmitted by the human body louse (*Pediculus humanus corporis*). Feeding on a human who carries the bacillus infects the louse. *R. prowazekii* grows in the louse's gut and is excreted in its feces. The disease is then transmitted to an uninfected human who scratches the louse bite (which itches) and rubs the feces into the wound. The incubation period is one to two weeks. *R. prowazekii* can remain viable and virulent in the dried louse feces for many days. Typhus will eventually kill the louse, though the disease will remain viable for many weeks in the dead louse.

The symptoms set in quickly, and are among the most severe of the typhus family. They include severe headache, a sustained high fever, cough, rash, severe muscle pain, chills, falling blood pressure, stupor, sensitivity to light, and delirium. A rash begins on the chest about five days after the fever appears, and spreads to the trunk and extremities but does not reach the palms and soles. A symptom common to all forms of typhus is a fever which may reach 39°C (102°F).

The infection is treated with antibiotics. Intravenous fluids and oxygen may be needed to stabilize the patient. The mortality rate is 10% to 60%, but is vastly lower if antibiotics such as tetracycline are used early. Infection can also be prevented via vaccination. Brill-Zinsser disease is a mild form of epidemic typhus which recurs in someone after a long period of latency (similar to the relationship between chickenpox and shingles). This type of recurrence can also occur in immunosuppressed patients.

Endemic typhu

Endemic typhus (also called "flea-borne typhus" and "murine typhus" or "rat flea typhus") is caused by the bacteria *Rickettsia typhi*, and is transmitted by the fleas that infest rats. Less often, endemic typhus is caused by *Rickettsia felis* and transmitted by fleas carried by cats or possums.

Symptoms of endemic typhus include headache, fever, chills, myalgia, nausea, vomiting, and cough.

Endemic typhus is highly treatable with antibiotics. Most people recover fully, but death may occur in the elderly, severely disabled or patients with a depressed immune system.

Scrub typhus

Scrub typhus (also called "chigger-borne typhus") is caused byOrientia tsutsugamushi and transmitted by chiggers, which are found in areas of heavy scrub vegetation. Symptoms include fever, headache, muscle pain, cough, and gastrointestinal symptoms. More virulent strains of *O. tsutsugamushi* can cause hemorrhaging and intravascular coagulation.

Prevention

Limiting exposures to vectors or animal reservoirs remains the best means for reducing the risk for disease. Travelers and persons working in areas where organisms may be present should implement prevention based on avoidance of vector-infested habitats, use of repellents and protective clothing, prompt detection and removal of arthropods from clothing and skin, and attention to hygiene.

Typhus fever was categorized by the Center for Disease Control (CDC) as a Category B biological weapons agent. Rickettsia prowazekii is highly infectious and could be fatal but cannot be passed from person to person.

Encephalitis Arboviral Encephalitides

Perspectives

Arthropod-borne viruses, i.e., arboviruses, are viruses that are maintained in nature through biological transmission between susceptible vertebrate hosts by blood feeding arthropods (mosquitoes, psychodids, ceratopogonids, and ticks). Vertebrate infection occurs when the infected arthropod takes a blood meal. The term 'arbovirus' has no taxonomic significance. Arboviruses that cause human encephalitis are members of three virus families: the *Togaviridae* (genus Alphavirus, *Flaviviridae*, and *Bunyaviridae*.

All arboviral encephalitides are zoonotic, being maintained in complex life cycles involving a nonhuman primary vertebrate host and a primary arthropod vector. These cycles usually remain undetected until humans encroach on a natural focus, or the virus escapes this focus via a secondary vector or vertebrate host as the result of some ecologic change. Humans and domestic animals can develop clinical illness but usually are "dead-end" hosts because they do not produce significant viremia, and do not contribute to the transmission cycle. Many arboviruses that cause encephalitis have a variety of different vertebrate hosts and some are transmitted by more than one vector. Maintenance of the viruses in nature may be facilitated by vertical transmission (e.g., the virus is transmitted from the female through the eggs to the offspring).

Arboviral encephalitides have a global distribution, but there are four main virus agents of encephalitis in the United States: eastern equine encephalitis (EEE), western equine encephalitis (WEE), St. Louis encephalitis (SLE) and La Crosse (LAC) encephalitis, all of which are transmitted by mosquitoes. Another virus, Powassan, is a minor cause of encephalitis in the northern United States, and is transmitted by ticks. A new Powassan-like virus has recently been isolated from deer ticks. Its relatedness to Powassan virus and its ability to cause disease has not been well documented. Most cases of arboviral encephalitis occur from June through September, when arthropods are most active. In milder (i.e., warmer) parts of the country, where arthropods are active late into the year, cases can occur into the winter months.

There is expanded discussion of several of these diseases (West Nile and Eastern Equien Encephalitis elsewhere in this document. A more general discussion is found in Attachment 2.

Mosquito Borne Diseases

Malaria

Malaria is a mosquito-borne disease caused by a parasite. Four kinds of malaria parasites can infect humans: *Plasmodium falciparum, P. vivax, P. ovale,* and *P. malariae*.

People with malaria often experience fever, chills, and flu-like illness. Left untreated, they may develop severe complications and die. Each year 350-500 million cases of malaria occur worldwide, and over one million people die, most of them young children in sub-Saharan Africa. Infection with any of the malaria species can make a person feel very ill; infection with *P. falciparum*, if not promptly treated, may be fatal. Although malaria can be a fatal disease, illness and death from malaria are largely preventable.

This sometimes fatal disease can be prevented and cured. Bed nets, insecticides, and anti-malarial drugs are effective tools to fight malaria in areas where it is transmitted. Travelers to a malaria-risk area should avoid mosquito bites and take a preventive anti-malarial drug. Malaria was eradicated from the United States in the early 1950s. However, malaria is common in many developing countries and travelers who visit these areas risk getting malaria.

Returning travelers and arriving immigrants could also reintroduce the disease in the United States if they are infected with malaria when they return. The mosquito that transmits malaria, *Anopheles*, is found throughout much of the United States. If local mosquitoes bite an infected person, those mosquitoes can, in turn, infect local residents (*introduced malaria*).

Because the malaria parasite is found in red blood cells, malaria can also be transmitted through blood transfusion, organ transplant, or the shared use of needles or syringes contaminated with blood. Malaria may also be transmitted from a mother to her fetus before or during delivery ("congenital" malaria).

Malaria is not transmitted from person to person like a cold or the flu. You cannot get malaria from casual contact with malaria-infected people.

Prevention and control

You can prevent malaria by:

- keeping mosquitoes from biting you, especially at night
- taking anti-malarial drugs to kill the parasites
- eliminating places where mosquitoes breed
- spraying insecticides on walls to kill adult mosquitoes that come inside
- sleeping under bed nets - especially effective if they have been treated with insecticide,
- wearing insect repellent and long-sleeved clothing if out of doors at night

The surest way for you and your health-care provider to know whether you have malaria is to have a diagnostic test where a drop of your blood is examined under the microscope for the presence of malaria parasites. If you are sick and there is any suspicion of malaria (for example, if you have recently traveled in a malaria-risk area) the test should be performed without delay.

The disease should be treated early in its course, before it becomes severe and poses a risk to the patient's life. Several good anti-malarial drugs are available, and should be administered early on. The most important step is to think about malaria, so that the disease is diagnosed and treated in time.

West Nile Virus

West Nile virus (WNV) is a potentially serious illness. Experts believe WNV is established as a seasonal epidemic in North America that flares up in the summer and continues into the fall. This fact sheet contains important information that can help you recognize and prevent WNV.

The easiest and best way to avoid WNV is to prevent mosquito bites.

- When you are outdoors, use insect repellent containing an EPA-registered active ingredient. Follow the directions on the package.

- Many mosquitoes are most active at dusk and dawn. Be sure to use insect repellent and wear long sleeves and pants at these times or consider staying indoors during these hours.

- Make sure you have good screens on your windows and doors to keep mosquitoes out.

- Get rid of mosquito breeding sites by emptying standing water from buckets, barrels and drainage ditches.

About one in 150 people infected with WNV will develop severe illness. The severe symptoms can include high fever, headache, neck stiffness, stupor, disorientation, coma, tremors, convulsions, muscle weakness, vision loss, numbness and paralysis. These symptoms may last several weeks, and neurological effects may be permanent.

Up to 20 percent of the people who become infected have symptoms such as fever, headache, and body aches, nausea, vomiting, and sometimes swollen lymph glands or a skin rash on the

chest, stomach and back. Symptoms can last for as short as a few days, though even healthy people have become sick for several weeks.

Approximately 80 percent of people (about 4 out of 5) who are infected with WNV will not show any symptoms at all.
Most often, WNV is spread by the bite of an infected mosquito. Mosquitoes become infected when they feed on infected birds. Infected mosquitoes can then spread WNV to humans and other animals when they bite.

In a very small number of cases, WNV also has been spread through blood transfusions, organ transplants, breastfeeding and even during pregnancy from mother to baby.

WNV is not spread through casual contact such as touching or kissing a person with the virus.

Symptoms typically develop between 3 - 14 days after being bitten by an infected mosquito.

There is no specific treatment for WNV infection. In cases with milder symptoms, people experience symptoms such as fever and aches that pass on their own, although even healthy people have become sick for several weeks. In more severe cases, people usually need to go to the hospital where they can receive supportive treatment including intravenous fluids, help with breathing and nursing care.

Milder WNV illness improves on its own, and people do not necessarily need to seek medical attention for this infection though they may choose to do so. If you develop symptoms of severe WNV illness, such as unusually severe headaches or confusion, seek medical attention immediately. Severe WNV illness usually requires hospitalization. Pregnant women and nursing mothers are encouraged to talk to their doctor if they develop symptoms that could be WNV. People over the age of 50 are more likely to develop serious symptoms of WNV if they do get sick and should take special care to avoid mosquito bites.

The more time you're outdoors, the more time you could be bitten by an infected mosquito. Pay attention to avoiding mosquito bites if you spend a lot of time outside, either working or playing.

All donated blood is checked for WNV before being used. The risk of getting WNV through blood transfusions and organ transplants is very small, and should not prevent people who need surgery from having it. If you have concerns, talk to your doctor.

Equine Encephalitis

Eastern equine encephalitis (EEE) is a mosquito-borne viral disease. EEE virus (EEEV) occurs in the eastern half of the United States where it causes disease in humans, horses, and some bird species. Because of the high mortality rate, EEE is regarded as one of the most serious mosquito-borne diseases in the United States.

EEEV is transmitted to humans through the bite of an infected mosquito. It generally takes from

3 to 10 days to develop symptoms of EEE after being bitten by an infected mosquito. The main EEEV transmission cycle is between birds and mosquitoes.

Many species of mosquitoes can become infected with EEEV. The most important mosquito species in maintaining the bird-mosquito transmission cycle is *Culiseta melanura*, which reproduces in freshwater hardwood swamps. *Culiseta melanura*, however, is not considered to be an important vector of EEEV to horses or humans because it feeds almost exclusively on birds.

Transmission to horses or humans requires mosquito species capable of creating a "bridge" between infected birds and uninfected mammals such as some *Aedes*, *Coquillettidia*, and *Culex* species.

Horses are susceptible to EEE and some cases are fatal. EEEV infections in horses, however, are not a significant risk factor for human infection because horses are considered to be "dead-end" hosts for the virus (i.e., the amount of EEEV in their bloodstreams is usually insufficient to infect mosquitoes).

Eastern equine encephalitis virus is a member of the family Togaviridae, genus *Alphaviru c*losely related to Western equine encephalitis virus and Venezuelan equine encephalitis virus

Many persons infected with EEEV have no apparent illness. In those persons who do develop illness, symptoms range from mild flu-like illness to inflammation of the brain, coma and death.

The mortality rate from EEE is approximately one-third, making it one of the most deadly mosquito-borne diseases in the United States.

There is no specific treatment for EEE; optimal medical care includes hospitalization and supportive care (for example, expert nursing care, respiratory support, prevention of secondary bacterial infections, and physical therapy, depending on the situation).

Approximately half of those persons who survive EEE will have mild to severe permanent neurologic damage.

Incidence rate includes:

- Approximately 220 confirmed cases in the US 1964-2004, Average of 5 cases/year, with a range from 0-15 cases

- States with largest number of cases are Florida, Georgia, Massachusetts, and New Jersey.

- EEEV transmission is most common in and around freshwater hardwood swamps in the Atlantic and Gulf Coast states and the Great Lakes region.

- Human cases occur relatively infrequently, largely because the primary transmission cycle takes place in and around swampy areas where human populations tend to be limited.

Risk Groups:

- Residents of and visitors to endemic areas (areas with an established presence of the virus)
- People who engage in outdoor work and recreational activities in endemic areas.
- Persons over age 50 and younger than age 15 seem to be at greatest risk for developing severe EEE when infected with the virus.

Prevention

- A vaccine is available to protect equines.
- People should avoid mosquito bites by employing personal and workplace protection measures, such as using an EPA-registered repellent according to manufacturers' instructions, wearing protective clothing, avoiding outdoor activity when mosquitoes are active (some bridge vectors of EEEV are aggressive day-biters), and removing standing water that can provide mosquito breeding sites.
- There are laboratory tests to diagnosis EEEV infection including serology, especially IgM testing of serum and cerebrospinal fluid (CSF), and neutralizing antibody testing of acute- and convalescent-phase serum.

Yellow Fever

Yellow fever is an acute viral disease It is an important cause of hemorrhagic illness in many African and South American countries despite existence of an effective vaccine. The *yellow* refers to the jaundice symptoms that affect some patients.

Yellow fever is caused by an arbovirus of the family Flaviviridae, a positive single-stranded RNA virus. Human infection begins after deposition of viral particles through the skin in infected arthropod saliva. The mosquitos involved are *Aedes simpsaloni*, *A. africanus*, and *A. aegypti* in Africa, the Haemagogus genus in South America.

The virus remains silent in the body during an incubation period of three to six days. There are then two disease phases. While some infections have no symptoms the first, *acute* phase is normally characterized by fever, muscle pain (with prominent backache), headache, shivers, loss of appetite, and nausea or vomiting. The high fever is often paradoxically associated with a slow pulse (known as Faget's sign). After three or four days most patients improve and their symptoms disappear.

Fifteen percent of patients, however, enter a *toxic phase* within 24 hours. Fever reappears and several body systems are affected. The patient rapidly develops jaundice and complains of abdominal pain with vomiting. Bleeding can occur from the mouth, nose, eyes, and stomach. Once this happens, blood appears in the vomit and feces. Kidney function deteriorates; this can range from abnormal protein levels in the urine (proteinuria) to complete kidney failure with no

urine production (anuria). Half of the patients in the "toxic phase" die within fourteen days. The remainder recover without significant organ damage.

Yellow fever is difficult to recognize, especially during the early stages. It can easily be confused with malaria, typhoid, rickettsial diseases, haemorrhagic viral fevers (e.g. Lassa), arboviral infections (e.g. dengue), leptospirosis, viral hepatitis and poisoning (e.g. carbon tetrachloride). A laboratory analysis is required to confirm a suspect case.

Prevention

There is a vaccine for yellow fever that gives a ten-year or more immunity from the disease and effectively protects people traveling to affected areas. The vaccination may be required for entry to some countries, however, the vaccine may be contra-indicated for person over 60 years of age.

Use precautions as for other mosquito borne diseases. Avoid mosquito bites by employing personal and workplace protection measures, such as using an EPA-registered repellent according to manufacturers' instructions, wearing protective clothing, avoiding outdoor activity when mosquitoes are active and removing standing water that can provide mosquito breeding sites.

Meningitis

Meningitis is a viral disease that can affect the central nervous system.

Meningitis is encountered in agricultural regions of Asia.

Meningitis is transmitted through the bite from an infected mosquito.

Symptoms can be nonexistent or severe and flu-like, with fever, chills, tiredness, headache, nausea and vomiting. If not treated promptly the disease can be fatal.

Prevention

- A vaccine is available. It's 80% effective after a single dose and 97.5% effective after a second dose.

  Use precautions as for other mosquito borne diseases. Avoid mosquito bites by employing personal and workplace protection measures, such as using an EPA-registered repellent according to manufacturers' instructions, wearing protective clothing, avoiding outdoor activity when mosquitoes are active and removing standing water that can provide mosquito breeding sites.

Sand Flies

Leishmaniasis

Sand Fly and Mosquito

Sand Fly

Leishmaniasis (LEASH-ma-NIGH-a-sis) is a parasitic disease spread by the bite of infected sand flies. There are several different forms of leishmaniasis. The most common forms are **cutaneous leishmaniasis,** which causes skin sores, and **visceral leishmaniasis**, which affects some of the internal organs of the body (for example, spleen, liver, bone marrow).

People who have cutaneous leishmaniasis have one or more sores on their skin. The sores can change in size and appearance over time. They often end up looking somewhat like a volcano, with a raised edge and central crater. Some sores are covered by a scab. The sores can be painless or painful. Some people have swollen glands near the sores (for example, under the arm if the sores are on the arm or hand).

People who have visceral leishmaniasis usually have fever, weight loss, and an enlarged spleen and liver (usually the spleen is bigger than the liver). Some patients have swollen glands. Certain blood tests are abnormal. For example, patients usually have low blood counts, including a low red blood cell count (anemia), low white blood cell count, and low platelet count.

The number of new cases of cutaneous leishmaniasis each year in the world is thought to be about 1.5 million. The number of new cases of visceral leishmaniasis is thought to be about 500,000.

Leishmaniasis is found in parts of about 88 countries. Approximately 350 million people live in these areas. Most of the affected countries are in the tropics and subtropics. The settings in which leishmaniasis is found range from rain forests in Central and South America to deserts in West Asia. More than 90 percent of the world's cases of visceral leishmaniasis are in India, Bangladesh, Nepal, Sudan, and Brazil.

Leishmaniasis is found in some parts of the following areas:

- in Mexico, Central America, and South America -- from northern Argentina to Texas (not in Uruguay, Chile, or Canada)
- southern Europe (leishmaniasis is not common in travelers to southern Europe)
- Asia (not Southeast Asia)
- the Middle East
- Africa (particularly East and North Africa, with some cases elsewhere)

Leishmaniasis is not found in Australia or Oceania (that is, islands in the Pacific, including Melanesia, Micronesia, and Polynesia).

It is possible but very unlikely that you would get leishmaniasis in the United States. Very rarely, people living in Texas have developed skin sores from cutaneous leishmaniasis.

No cases of visceral leishmaniasis are known to have been acquired in the United States.

Leishmaniasis is spread by the bite of some types of phlebotomine sand flies. Sand flies become infected by biting an infected animal (for example, a rodent or dog) or person. Since sand flies do not make noise when they fly, people may not realize they are present. Sand flies are very small and may be hard to see; they are only about one-third the size of typical mosquitoes. Sand flies usually are most active in twilight, evening, and night-time hours (from dusk to dawn). Sand flies are less active during the hottest time of the day. However, they will bite if they are disturbed, such as when a person brushes up against the trunk of a tree where sand flies are resting. Rarely, leishmaniasis is spread from a pregnant woman to her baby. Leishmaniasis also can be spread by blood transfusions or contaminated needles.

People of all ages are at risk for leishmaniasis if they live or travel where leishmaniasis is found. Leishmaniasis usually is more common in rural than urban areas; but it is found in the outskirts of some cities. The risk for leishmaniasis is highest from dusk to dawn because this is when sand flies are the most active. All it takes to get infected is to be bitten by one infected sand fly. This is more likely to happen the more people are bitten, that is, the more time they spend outside in rural areas from dusk to dawn.

People with cutaneous leishmaniasis usually develop skin sores within a few weeks (sometimes as long as months) of when they were bitten.

People with visceral leishmaniasis usually become sick within several months (rarely as long as years) of when they were bitten.

The skin sores of cutaneous leishmaniasis will heal on their own, but this can take months or even years. The sores can leave ugly scars. If not treated, infection that started in the skin rarely spreads to the nose or mouth and causes sores there (**mucosal leishmaniasis**). This can happen with some of the types of the parasite found in Central and South America. Mucosal leishmaniasis might not be noticed until years after the original skin sores healed. The best way to prevent mucosal leishmaniasis is to treat the cutaneous infection before it spreads.

If not treated, visceral leishmaniasis can cause death. It is very rare for travelers to get visceral leishmaniasis.

If you think you might have leishmaniasis, report to your Safety Officer to ensure appropriate follow-up. The first step is to find out if you have traveled to a part of the world where leishmaniasis is found. The health care provider will ask you about any signs or symptoms of leishmaniasis you may have, such as skin sores that have not healed. If you have skin sores, the health care provider will likely want to take some samples directly from the sores. These samples can be examined for the parasite under a microscope, in cultures, and through other means. A blood test for detecting antibody (immune response) to the parasite can be helpful, particularly for cases of visceral leishmaniasis. However, tests to look for the parasite itself should also be done. Diagnosing leishmaniasis can be difficult. Sometimes the laboratory tests are negative even if a person has leishmaniasis.

The health care provider can talk with CDC staff about whether a case of leishmaniasis should be treated, and, if so, how. Most people who have cutaneous leishmaniasis do not need to be hospitalized during their treatment.

Prevention

The best way prevent leishmaniasis is by protecting against sand fly bites. Vaccines and drugs for preventing infection are not yet available. To decrease risk of being bitten:

- Stay in well-screened or air-conditioned areas as much as possible. Avoid outdoor activities, especially from dusk to dawn, when sand flies are the most active.

- When outside, wear long-sleeved shirts, long pants, and socks. Tuck your shirt into your pants.

- Apply insect repellent on uncovered skin and under the ends of sleeves and pant legs. Follow the instructions on the label of the repellent. The most effective repellents are those that contain the chemical DEET (N,N-diethylmetatoluamide). The concentration of DEET varies among repellents. Repellents with DEET concentrations of 30-35% are quite effective, and the effect should last about 4 hours. Lower concentrations should be used for children (no more than 10% DEET). Repellents with DEET should be used sparingly on children from 2 to 6 years old and not at all on children less than 2 years old.

- Spray clothing with permethrin-containing insecticides. The insecticide should be reapplied after every five washings.

- Spray living and sleeping areas with an insecticide to kill insects.

- If you are not sleeping in an area that is well screened or air-conditioned, use a bed net and tuck it under your mattress. If possible, use a bed net that has been soaked in or sprayed with permethrin. The permethrin will be effective for several months if the bed net is not washed. Keep in mind that sand flies are much smaller than mosquitoes and therefore can get through

smaller holes. Fine-mesh netting (at least 18 holes to the inch; some sources say even finer) is needed for an effective barrier against sand flies. This is particularly important if the bed net has not been treated with permethrin. However, it may be uncomfortable to sleep under such a closely woven bed net when it is hot.

NOTE: Bed nets, repellents containing DEET, and permethrin may need to be purchased before traveling and can be found in hardware, camping, and military surplus stores.

Deer Flies (See Tularemia above)

ATTACHMENT 1

RICKETTSIAL INFECTIONS

Rickettsial Infections

Description

Many species of Rickettsia can cause illnesses in humans (Table below). The term "rickettsiae" conventionally embraces a polyphyletic group of microorganisms in the class Proteobacteria, comprising species belonging to the genera *Rickettsia*, *Orientia*, *Ehrlichia*, *Anaplasma*, *Neorickettsia*, *Coxiella*, and *Bartonella*. These agents are usually not transmissible directly from person to person except by blood transfusion or organ transplantation, although sexual and placental transmission has been proposed for *Coxiella*. Transmission generally occurs via an infected arthropod vector or through exposure to an infected animal reservoir host. However, sennetsu fever is acquired following consumption of raw fish products. The clinical severity and duration of illnesses associated with different rickettsial infections vary considerably, even within a given antigenic group. Rickettsioses range in severity from diseases that are usually relatively mild (rickettsialpox, cat scratch disease, and African tick-bite fever) to those that can be life-threatening (epidemic and murine typhus, Rocky Mountain spotted fever, scrub typhus and Oroya fever), and they vary in duration from those that can be self-limiting to chronic (Q fever and bartonelloses) or recrudescent (Brill-Zinsser disease). Most patients with rickettsial infections recover with timely use of appropriate antibiotic therapy.

Travelers may be at risk for exposure to agents of rickettsial diseases if they engage in occupational or recreational activities which bring them into contact with habitats that support the vectors or animal reservoir species associated with these pathogens.

The geographic distribution and the risks for exposure to rickettsial agents are described below and in the Table below.

Epidemic Typhus and Trench Fever

Epidemic typhus and trench fever, which are caused by *Rickettsia prowazkeii* and *Bartonella quintanta*, respectively, are transmitted from one person to another by the human body louse. Contemporary outbreaks of both diseases are rare in most developed countries and generally occur only in communities and populations in which body louse infestations are frequent, especially during the colder months when louse-infested clothing is not laundered. Foci of trench fever have also been recognized among homeless populations in urban centers of industrialized countries. Travelers who are not at risk of exposure to body lice or to persons with lice are unlikely to acquire these illnesses. However, health-care workers who care for these patients may be at risk for acquiring louse-borne illnesses through inhalation or inoculation of infectious louse feces into the skin or conjunctiva. In the eastern United States, campers, inhabitants of wooded areas, and wildlife workers can acquire sylvatic epidemic typhus if they come in close contact with flying squirrels, their ectoparasites, or their nests, which can be made in houses, cabins, and tree-holes.

Murine Typhus and Cat-Flea Rickettsiosis

Murine typhus, which is caused by infection with *Rickettsia typhi*, is transmitted to humans by rat fleas, particularly during exposure in rat-infested buildings (3). Flea-infested rats can be found throughout the year in humid tropical environments, especially in harbor or riverine environments. In temperate regions, they are most common during the warm summer months. Similarly, cat-flea rickettsiosis, which is caused by infection with *Rickettsia felis*, occurs worldwide from exposure to flea-infested domestic cats and dogs, as well as peridomestic animals, and is responsible for a murine typhus-like febrile disease in humans.

Scrub Typhus

Mites ("chiggers") transmit *Orientia tsutsugamushi*, the agent of scrub typhus, to humans. These mites occur year-round in a large area from South Asia to Australia and in much of East Asia, including Japan, China, Korea, Maritime Provinces and Sakhalin Island of Russia, and Tajikistan. Their prevalence, however, fluctuates with temperature and rainfall. Infection may occur on coral atolls in both the Indian and Pacific Oceans, in rice paddies and along canals and fields, on oil palm plantations, in tropical to desert climates and in elevated river valleys. Humans typically encounter the arthropod vector of scrub typhus in recently disturbed habitat (e.g., forest clearings) or other persisting mite foci infested with rats and other rodents.

Tick-Borne Rickettsioses

Tick-borne rickettsial diseases are most common in temperate and subtropical regions. These diseases include numerous well-known classical spotted fever rickettsioses and an expanding group of newly recognized diseases (Table belwo). In general, peak transmission of tick-borne rickettsial pathogens occurs during spring and summer months. Travelers who participate in outdoor activities in grassy or wooded areas (e.g., trekking, camping, or going on safari) may be at risk for acquiring tick-borne illnesses, including those caused by *Rickettsia*, *Anaplasma*, and *Ehrlichia* species (see below).

TABLE Epidemiologic features and symptoms of rickettsial diseases

ANTIGENIC GROUP	DISEASE	AGENT	PREDOMINANT SYMPTOMS*	VECTOR OR ACQUISITION MECHANISM	ANIMAL RESERVOIR	GEOGRAPHIC DISTRIBUTION OUTSIDE THE US
Typhus fevers	Epidemic typhus, Sylvatic typhus	*Rickettsia prowazekii*	Headache, chills, fever, prostration, confusion, photophobia, vomiting, rash (generally starting on trunk)	Human body louse, squirrel flea and louse	Humans, flying squirrels (US)	Cool mountainous regions of Africa, Asia, and Central and South America
	Murine typhus	*R. typhi*	As above, generally less severe	Rat flea	Rats, mice	Worldwide
Spotted fevers	African tickbite fever	*R. africae*	Fever, eschar(s), regional adenopathy,	Tick	Rodents	Sub-Saharan Africa

ANTIGENIC GROUP	DISEASE	AGENT	PREDOMINANT SYMPTOMS*	VECTOR OR ACQUISITION MECHANISM	ANIMAL RESERVOIR	GEOGRAPHIC DISTRIBUTION OUTSIDE THE US
			maculopapular or vesicular rash subtle or absent			
	Aneruptive fever	*R. helvetica*	Fever, headache, myalgia	Tick	Rodents	Old World
	Australian spotted fever	*R. marmionii*	Fever, eschar, maculopapular or vesicular rash, adenopathy	Tick	Rodents, reptiles	Australia
	Cat flea rickettsiosis	*R. felis*	As murine typhus, generally less severe	Cat and dog fleas	Domestic cats, opossums	Europe, South America
	Far Eastern spotted fever	*R. heilongjiangensis*	Fever, eschar, macular or maculopapular rash, lymphadenopathy, enlarged lymph nodes	Tick	Rodents	Far East of Russia, Northern China
	Flinders Island spotted fever, Thai tick typhus	*R. honei*	Mild spotted fever, eschar and adenopathy are rare	Tick	Not defined	Australia, Thailand
	Lymphangitis associated rickettsiosis	*R. sibirica* subsp. *mongolotimonae*	Fever, multiple eschars, regional adenopathy and lymphangitis, maculopapular rash	Tick	Rodents	Southern France, Portugal, Asia, Africa
	Maculatum infection	*R. parkeri*	Fever, eschar, rash maculopapular to vesicular	Tick	Rodents	Brazil, Uruguay
	Mediterranean spotted fevers‡	*R. conorii*	Fever, eschar, regional adenopathy, maculopapular rash on extremities	Tick	Dogs, rodents	Africa, India, Europe, Middle East, Mediterranean
	North Asian tick typhus	*R. sibirica*	Fever, eschar(s), regional adenopathy, maculopapular rash	Tick	Rodents	Russia, China, Mongolia
	Oriental spotted fever	*R. japonica*	As above	Tick	Rodents	Japan
	Queensland tick	*R. australis*	Fever, eschar,	Tick	Not defined	Australia,

ANTIGENIC GROUP	DISEASE	AGENT	PREDOMINANT SYMPTOMS*	VECTOR OR ACQUISITION MECHANISM	ANIMAL RESERVOIR	GEOGRAPHIC DISTRIBUTION OUTSIDE THE US
	typhus		regional adenopathy, rash on extremities			Tasmania
	Rickettsialpox	*R. akari*	Fever, eschar, adenopathy, disseminated vesicular rash	Mite	House mice	Russia, South Africa, Korea, Turkey, Balkan countries
	Rocky Mountain spotted fever, Sao Paulo exanthematic typhus, Minas Gerais exanthematic typhus, Brazilian spotted fever	*R. rickettsii*	Headache, fever, abdominal pain, macular rash progressing into papular or petechial (generally starting on extremities)	Tick	Rodents	Mexico, Central, and South America
	Tick-borne lymphadenopathy (TIBOLA), Dermacentor-borne necrosis and lymphadenopathy (DEBONEL)	*R. slovaca*	Necrosis erythema, cervical lymphadenopathy and enlarged lymph nodes, rare maculopapular rash	Tick	Lagomorphs, rodents	Europe, Asia
	Unnamed rickettsiosis	*R. aeschlimannii*	Fever, eschar, maculopapular rash	Tick	Domestic and wild animals	Africa
Orientia	Scrub typhus	*Orientia tsutsugamushi*	Fever, headache, sweating, conjunctival injection, adenopathy, eschar, rash (starting on trunk), respiratory distress	Mite	Rodents	South, Central, Eastern, and Southeast Asia and Australia
Coxiella	Q fever	*Coxiella burnetii*	Fever, headache, chills, sweating, pneumonia, hepatitis, endocarditis	Most human infections are acquired by inhalation of infectious aerosols; tick	Goats, sheep, cattle, domestic cats, other	Worldwide

ANTIGENIC GROUP	DISEASE	AGENT	PREDOMINANT SYMPTOMS*	VECTOR OR ACQUISITION MECHANISM	ANIMAL RESERVOIR	GEOGRAPHIC DISTRIBUTION OUTSIDE THE US
Bartonella	Cat-scratch disease	*Bartonella henselae*	Fever, adenopathy, neuroretinitis, encephalitis	Cat flea	Domestic cats	Worldwide
	Trench fever	*B. quintana*	Fever, headache, pain in shins, splenomegaly, disseminated rash	Human body louse	Humans	Worldwide
	Oroya fever	*B. bacilliformis*	Fever, headache, anemia, shifting joint and muscle pain, nodular dermal eruption	Sand fly	Unknown	Peru, Ecuador, Colombia
Ehrlichia	Ehrlichosis	*Ehrlichia chaffeensis*#	Fever, headache, nausea, occasionally rash	Tick	Various large and small mammals, including deer and rodents	Worldwide
Anaplasma	Anaplasmosis	*Anaplasma phagocytophilum*#	Fever, headache, nausea, occasionally rash	Tick	Small mammals, and rodents	Europe, Asia, Africa
Neorickettsia	Sennetsu fever	*Neorickettsia sennetsu*	Fever, chills, headache, sore throat, insomnia	Fish, fluke	Fish	Japan, Malaysia

This represents only a partial list of symptoms. Patients may have different symptoms or only a few of those listed.

‡ Includes 4 different subspecies that can be distinguished serologically and by PCR assay, and respectively are the etiologic agents of Boutonneuse fever and Mediterranean tick fever in Southern Europe and Africa (*R. conorii* subsp. *conorii*), Indian tick typhus in South Asia (*R. conorii* subsp. *indica)*, Israeli tick typhus in Southern Europe and Middle East (*R. conorii* subsp. *israelensis*), and Astrakhan spotted fever in the North Caspian region of Russia (*R. conorii* subsp. *caspiae*).
# Organisms antigenically related to these species are associated with ehrlichial diseases outside the continental United States.

Rickettsialpox

Rickettsialpox is generally an urban, mite-vectored disease associated with *R. akari*-infected house mice, although feral rodent-mite reservoirs also have been described (3). Outbreaks of this illness have occurred shortly after rodent extermination programs or natural viral infections that depleted rodent populations and caused the mites to seek new hosts. *R. akari*-infected rodents have been found in urban centers in the former Soviet Union, South Africa, Korea, Croatia, and the United States. Travelers may be at risk for exposure to rodent mites when staying in old urban hostels and cabins.

Anaplasmosis aznd Ehrlichiosis

Human ehrlichiosis and anaplasmosis are acute tick-borne diseases, associated with the lone star tick, *Amblyomma americanum*, and *Ixodes* ticks, respectively. Because one tick may be infected with more than one tick-borne pathogen (e.g. *Borrelia burgdorferi*, the causative agent of Lyme disease, or various *Babesia* species, agent of human babesiosis), patients may present with atypical clinical symptoms that complicate treatment. Ehrlichioses and anaplasmosis are characterized by infection of different types of leukocytes, where the causative agent multiplies in cytoplasmic membrane-bound vacuole called morulae. Morulae can sometimes be detected in Giemsa-stained blood smears.

Q FEVER

Q fever occurs worldwide, most often in persons who have contact with infected goat, sheep, cat and cattle, particularly parturient animals (especially farmers, veterinarians, butchers, meat packers, and seasonal workers). Travelers who visit farms or rural communities can be exposed to *Coxiella burnetii*, the agent of Q fever, through airborne transmission (via animal-contaminated soil and dust) or less commonly through consumption of unpasteurized milk products or by exposure to infected ticks. These infections may initially result in only mild and self-limiting influenza-like illnesses, but if untreated, infections may become chronic, particularly in persons with preexisting heart valve abnormalities or with prosthetic valves. Such persons can develop chronic and potentially fatal endocarditis.

Cat-Scratch Disease and Oroya Fever

Cat-scratch disease is contracted through scratches and bites from domestic cats, particularly kittens, infected with *Bartonella henselae*, and possibly from their fleas (3,4). Exposure can therefore occur wherever cats are found. Oroya fever is transmitted by sandflies infected with *B. bacilliformis*, which is endemic in the Andean highlands.

Symptoms

Clinical presentations of rickettsial illnesses vary (Table above), but common early symptoms, including fever, headache, and malaise, are generally nonspecific. Illnesses resulting from infection with rickettsial agents may go unrecognized or are attributed to other causes. Atypical presentations are common and may be expected with poorly characterized non-indigenous agents, so appropriate samples for examination by specialized reference laboratories should be obtained. A diagnosis of rickettsial diseases is based on two or more of the following: 1) clinical symptoms and an epidemiologic history compatible with a rickettsial disease, 2) the development of specific convalescent-phase antibodies reactive with a given pathogen or antigenic group, 3) a positive polymerase chain reaction test result, 4) specific immunohistologic detection of rickettsial agent, or 5) isolation of a rickettsial agent. Ascertaining the likely place and the nature of potential exposures is particularly helpful for accurate diagnostic testing.

Prevention

With the exception of the louse-borne diseases described above, for which contact with infectious arthropod feces is the primary mode of transmission (through autoinoculation into a wound, conjunctiva, or inhalation), travelers and health-care providers are generally not at risk for becoming infected via exposure to an ill person. Limiting exposures to vectors or animal reservoirs remains the best means for reducing the risk for disease. Travelers and persons working in areas where organisms may be present should implement prevention based on avoidance of vector-infested habitats, use of repellents and protective clothing, prompt detection and removal of arthropods from clothing and skin, and attention to hygiene.

Q fever and *Bartonella* group diseases may pose a special risk for persons with abnormal or prosthetic heart valves, and *Rickettsia, Ehrlichia*, and *Bartonella* for persons who are immuno-compromised.

ATTACHMENT 2

ENCEPHALITIS ARBOVIRAL ENCEPHALITIDES

Encephalitis Arboviral Encephalitides

Perspectives

Arthropod-borne viruses, i.e., arboviruses, are viruses that are maintained in nature through biological transmission between susceptible vertebrate hosts by blood feeding arthropods (mosquitoes, psychodids, ceratopogonids, and ticks). Vertebrate infection occurs when the infected arthropod takes a blood meal. The term 'arbovirus' has no taxonomic significance. Arboviruses that cause human encephalitis are members of three virus families: the *Togaviridae* (genus Alphavirus, *Flaviviridae*, and *Bunyaviridae*.

All arboviral encephalitides are zoonotic, being maintained in complex life cycles involving a nonhuman primary vertebrate host and a primary arthropod vector. These cycles usually remain undetected until humans encroach on a natural focus, or the virus escapes this focus via a secondary vector or vertebrate host as the result of some ecologic change. Humans and domestic animals can develop clinical illness but usually are "dead-end" hosts because they do not produce significant viremia, and do not contribute to the transmission cycle. Many arboviruses that cause encephalitis have a variety of different vertebrate hosts and some are transmitted by more than one vector. Maintenance of the viruses in nature may be facilitated by vertical transmission (e.g., the virus is transmitted from the female through the eggs to the offspring).

Arboviral encephalitides have a global distribution, but there are four main virus agents of encephalitis in the United States: eastern equine encephalitis (EEE), western equine encephalitis (WEE), St. Louis encephalitis (SLE) and La Crosse (LAC) encephalitis, all of which are transmitted by mosquitoes. Another virus, Powassan, is a minor cause of encephalitis in the northern United States, and is transmitted by ticks. A new Powassan-like virus has recently been isolated from deer ticks. Its relatedness to Powassan virus and its ability to cause disease has not been well documented. Most cases of arboviral encephalitis occur from June through September, when arthropods are most active. In milder (i.e., warmer) parts of the country, where arthropods are active late into the year, cases can occur into the winter months.

The majority of human infections are asymptomatic or may result in a nonspecific flu-like syndrome. Onset may be insidious or sudden with fever, headache, myalgias, malaise and occasionally prostration. Infection may, however, lead to encephalitis, with a fatal outcome or permanent neurologic sequelae. Fortunately, only a small proportion of infected persons progress to frank encephalitis.

Experimental studies have shown that invasion of the central nervous system (CNS), generally follows initial virus replication in various peripheral sites and a period of viremia. Viral transfer from the blood to the CNS through the olfactory tract has been suggested. Because the arboviral encephalitides are viral diseases, antibiotics are not effective for treatment and no effective antiviral drugs have yet been discovered.

Prevention

Arboviral encephalitis can be prevented in two major ways: personal protective measures and public health measures to reduce the population of infected mosquitoes. Personal measures include reducing time outdoors particularly in early evening hours, wearing long pants and long sleeved shirts and applying mosquito repellent to exposed skin areas. Public health measures often require spraying of insecticides to kill juvenile (larvae) and adult mosquitoes.

Selection of mosquito control methods depends on what needs to be achieved; but, in most emergency situations, the preferred method to achieve maximum results over a wide area is aerial spraying. In many states aerial spraying may be available in certain locations as a means to control nuisance mosquitoes. Such resources can be redirected to areas of virus activity. When aerial spraying is not routinely used, such services are usually contracted for a given time period. Financing of aerial spraying costs during large outbreaks is usually provided by state emergency contingency funds. Federal funding of emergency spraying is rare and almost always requires a federal disaster declaration. Such disaster declarations usually occur when the vector-borne disease has the potential to infect large numbers of people, when a large population is at risk and when the area requiring treatment is extensive. Special large planes maintained by the United States Air Force can be called upon to deliver the insecticide(s) chosen for such emergencies. Federal disaster declarations have relied heavily on risk assessment by the CDC.

There are no commercially available human vaccines for these U.S. diseases. There is a Japanese encephalitis vaccine available in the U.S. A tick-borne encephalitis vaccine is available in Europe. An equine vaccine is available for EEE, WEE and Venezuelan equine encephalitis (VEE).

La Crosse Encephalitis

La Crosse (LAC) encephalitis was discovered in La Crosse, Wisconsin in 1963. Since then, the virus has been identified in several Midwestern and Mid-Atlantic states. During an average year, about 75 cases of LAC encephalitis are reported to the CDC. Most cases of LAC encephalitis occur in children under 16 years of age. LAC virus is a Bunyavirus and is a zoonotic pathogen cycled between the daytime-biting treehole mosquito, *Aedes triseriatus*, and vertebrate amplifier hosts (chipmunks, tree squirrels) in deciduous forest habitats. The virus is maintained over the winter by transovarial transmission in mosquito eggs. If the female mosquito is infected, she may lay eggs that carry the virus, and the adults coming from those eggs may be able to transmit the virus to chipmunks and to humans.

Historically, most cases of LAC encephalitis occur in the upper Midwestern states (Minnesota, Wisconsin, Iowa, Illinois, Indiana, and Ohio). Recently, more cases are being reported from states in the mid-Atlantic (West Virginia, Virginia and North Carolina) and southeastern (Alabama and Mississippi) regions of the country. It has long been suspected that LAC encephalitis has a broader distribution and a higher incidence in the eastern United States, but is under-reported because the etiologic agent is often not specifically identified.

LAC encephalitis initially presents as a nonspecific summertime illness with fever, headache, nausea, vomiting and lethargy. Severe disease occurs most commonly in children under the age of 16 and is characterized by seizures, coma, paralysis, and a variety of neurological sequelae after recovery. Death from LAC encephalitis occurs in less than 1% of clinical cases. In many clinical settings, pediatric cases presenting with CNS involvement are routinely screened for herpes or enteroviral etiologies. Since there is no specific treatment for LAC encephalitis, physicians often do not request the tests required to specifically identify LAC virus, and the cases are reported as aseptic meningitis or viral encephalitis of unknown etiology.
Also found in the United States, Jamestown Canyon and Cache Valley viruses are related to LAC, but rarely cause encephalitis.

Eastern Equine Encephalitis

Eastern equine encephalitis (EEE) is also caused by a virus transmitted to humans and equines by the bite of an infected mosquito. EEE virus is an alphavirus that was first identified in the 1930's and currently occurs in focal locations along the eastern seaboard, the Gulf Coast and some inland Midwestern locations of the United States. While small outbreaks of human disease have occurred in the United States, equine epizootics can be a common occurrence during the summer and fall.

It takes from 4-10 days after the bite of an infected mosquito for an individual to develop symptoms of EEE. These symptoms begin with a sudden onset of fever, general muscle pains, and a headache of increasing severity. Many individuals will progress to more severe symptoms such as seizures and coma. Approximately one-third of all people with clinical encephalitis caused by EEE will die from the disease and of those who recover, many will suffer permanent brain damage with many of those requiring permanent institutional care.

In addition to humans, EEE virus can produce severe disease in: horses, some birds such as pheasants, quail, ostriches and emus, and even puppies. Because horses are outdoors and attract hordes of biting mosquitoes, they are at high risk of contracting EEE when the virus is present in mosquitoes. Human cases are usually preceded by those in horses and exceeded in numbers by horse cases which may be used as a surveillance tool.

EEE virus occurs in natural cycles involving birds and *Culiseta melanura*, in some swampy areas nearly every year during the warm months. Where the virus resides or how it survives in the winter is unknown. It may be introduced by migratory birds in the spring or it may remain dormant in some yet undiscovered part of its life cycle. With the onset of spring, the virus reappears in the birds (native bird species do not seem to be affected by the virus) and mosquitoes of the swamp. In this usual cycle of transmission, virus does not escape from these areas because the mosquito involved prefers to feed upon birds and does not usually bite humans or other mammals.

For reasons not fully understood, the virus may escape from enzootic foci in swamp areas in birds or bridge vectors such as *Coquilletidia perturbans* and *Aedes sollicitans*. These species feed on both birds and mammals and can transmit the virus to humans, horses, and other hosts. Other mosquito species such as *Ae. vexans* and *Culex nigripalpus* can also transmit EEE virus.

When health officials maintain surveillance for EEE virus activity, this movement out of the swamp can be detected, and if the level of activity is sufficiently high, can recommend and undertake measures to reduce the risk to humans.

Western Equine Encephalitis

The alphavirus western equine encephalitis (WEE) was first isolated in California in 1930 from the brain of a horse with encephalitis, and remains an important cause of encephalitis in horses and humans in North America, mainly in western parts of the USA and Canada. In the western United States, the enzootic cycle of WEE involves passerine birds, in which the infection is inapparent, and culicine mosquitoes, principally *Cx. tarsalis*, a species that is associated with irrigated agriculture and stream drainages. The virus has also been isolated from a variety of mammal species. Other important mosquito vector species include *Aedes melanimon* in California, *Ae. dorsalis* in Utah and New Mexico and *Ae. campestris* in New Mexico.

Expansion of irrigated agriculture in the North Platte River Valley during the past several decades has created habitats and conditions favorable for increases in populations of granivorous birds such as the house sparrow, *Passer domesticus*, and mosquitoes such as *Cx. tarsalis*, *Aedes dorsalis* and *Aedes melanimon.* All of these species may play a role in WEE virus transmission in irrigated areas. In addition to *Cx. tarsalis, Ae. dorsalis and Ae. melanimon*, WEE virus also has been isolated occasionally from some other mosquito species present in the area. Two confirmed and several suspect cases of WEE were reported from Wyoming in 1994. In 1995, two strains of WEE virus were isolated from *Culex tarsalis* and neutralizing antibody to WEE virus was demonstrated in sera from pheasants and house sparrows. During 1997, 35 strains of WEE virus were isolated from mosquitoes collected in Scotts Bluff County, Nebraska.

Human WEE cases are usually first seen in June or July. Most WEE infections are asymptomatic or present as mild, nonspecific illness. Patients with clinically apparent illness usually have a sudden onset with fever, headache, nausea, vomiting, anorexia and malaise, followed by altered mental status, weakness and signs of meningeal irritation. Children, especially those under 1 year old, are affected more severely than adults and may be left with permanent sequelae, which is seen in 5 to 30% of young patients. The mortality rate is about 3%.

St. Louis Encephalitis

In the United States, the leading cause of epidemic flaviviral encephalitis is St. Louis encephalitis (SLE) virus. SLE is the most common mosquito-transmitted human pathogen in the U.S. While periodic SLE epidemics have occurred only in the Midwest and southeast, SLE virus is distributed throughout the lower 48 states. Since 1964, there have been 4,437 confirmed cases of SLE with an average of 193 cases per year (range 4 - 1,967). However, less than 1% of SLE viral infections are clinically apparent and the vast majority of infections remain undiagnosed. Illness ranges in severity from a simple febrile headache to meningoencephalitis, with an overall case-fatality ratio of 5-15 %. The disease is generally milder in children than in adults, but in those children who do have disease, there is a high rate of encephalitis. The elderly are at highest risk for severe disease and death. During the summer season, SLE virus is maintained in a mosquito-bird-mosquito cycle, with periodic amplification by peridomestic birds and *Culex*

mosquitoes. In Florida, the principal vector is *Cx. nigripalpus*, in the Midwest, *Cx. pipiens pipiens* and *Cx. p. quinquefasciatus* and in the western United States, *Cx. tarsalis* and members of the *Cx. pipiens* complex.

Powassan Encephalitis

Powassan (POW) virus is a flavivirus and currently the only well documented tick-borne transmitted arbovirus occurring in the United States and Canada. Recently a Powassan-like virus was isolated from the deer tick, *Ixodes scapularis*. Its relationship to POW and its ability to cause human disease has not been fully elucidated. POW's range in the United States is primarily in the upper tier States. In addition to isolations from man, the virus has been recovered from ticks *(Ixodes marxi, I. cookei* and *Dermacentor andersoni*) and from the tissues of a skunk (*Spiligale putorius*). It is a rare cause of acute viral encephalitis. POW virus was first isolated from the brain of a 5-year-old child who died in Ontario in 1958. Patients who recover may have residual neurological problems.

Venezuelan Equine Encephalitis

Like EEE and WEE viruses, Venezuelan equine encephalitis (VEE) is an alphavirus and causes encephalitis in horses and humans and is an important veterinary and public health problem in Central and South America. Occasionally, large regional epizootics and epidemics can occur resulting in thousands of equine and human infections. Epizootic strains of VEE virus can infect and be transmitted by a large number of mosquito species. The natural reservoir host for the epizootic strains is not known. A large epizootic that began in South America in 1969 reached Texas in 1971. It was estimated that over 200,000 horses died in that outbreak, which was controlled by a massive equine vaccination program using an experimental live attenuated VEE vaccine. There were several thousand human infections. A more recent VEE epidemic occurred in the fall of 1995 in Venezuela and Colombia with an estimated 90,000 human infections. Infection of man with VEE virus is less severe than with EEE and WEE viruses, and fatalities are rare. Adults usually develop only an influenza-like illness, and overt encephalitis is usually confined to children. Effective VEE virus vaccines are available for equines.

Enzootic strains of VEE virus have a wide geographic distribution in the Americas. These viruses are maintained in cycles involving forest dwelling rodents and mosquito vectors, mainly *Culex* (*Melanoconion*) species. Occasional cases or small outbreaks of human disease are associated with there viruses, the most recent outbreaks were in Venezuela in 1992, Peru in 1994 and Mexico in 1995-96.

Other Arboviral Encephalitides

Many other arboviral encephalitides occur throughout the world. Most of these diseases are problems only for those individuals traveling to countries where the viruses are endemic.

Japanese Encephalitis

Japanese encephalitis (JE) virus is a flavivirus, related to SLE, and is widespread throughout Asia. Worldwide, it is the most important cause of arboviral encephalitis with over 45,000 cases reported annually. In recent years, JE virus has expanded its geographic distribution with outbreaks in the Pacific. Epidemics occur in late summer in temperate regions, but the infection is enzootic and occurs throughout the year in many tropical areas of Asia. The virus is maintained in a cycle involving culicine mosquitoes and waterbirds. The virus is transmitted to man by *Culex* mosquitoes, primarily *Cx. tritaeniorhynchus*, which breed in rice fields. Pigs are the main amplifying hosts of JE virus in peridomestic environments.

The incubation period of JE is 5 to 14 days. Onset of symptoms is usually sudden, with fever, headache and vomiting. The illness resolves in 5 to 7 days if there is no CNS involvement. The mortality in most outbreaks is less than 10%, but is higher in children and can exceed 30%. Neurologic sequelae in patients who recover are reported in up to 30% of cases. A formalin-inactivated vaccine prepared in mice is used widely in Japan, China, India, Korea, Taiwan and Thailand. This vaccine is currently available for human use in the United States, for individuals who might be traveling to endemic countries.

Tick-Borne Encephalitis

Tick-borne encephalitis (TBE) is caused by two closely related flaviviruses which are distinct biologically. The eastern subtype causes Russian spring-summer encephalitis (RSSE) and is transmitted by *Ixodes persulcatus*, whereas the western subtype is transmitted by *Ixodes ricinus* and causes Central European encephalitis (CEE). The name CEE is somewhat misleading, since the condition can occur throughout much of Europe. Of the two subtypes, RSSE is the more severe infection, having a mortality of up to 25% in some outbreaks, whereas mortality in CEE seldom exceeds 5%.

The incubation period is 7 to 14 days. Infection usually presents as a mild, influenza-type illness or as benign, aseptic meningitis, but may result in fatal meningoencephalitis. Fever is often biphasic, and there may be severe headache and neck rigidity, with transient paralysis of the limbs, shoulders or less commonly the respiratory musculature. A few patients are left with residual paralysis. Although the great majority of TBE infections follow exposure to ticks, infection has occurred through the ingestion of infected cows' or goats' milk. An inactivated TBE vaccine is currently available in Europe and Russia.

West Nile Encephalitis

Discussed elsewhere in this document

FLD 48 FEDERAL, STATE, LOCAL REGULATORY AGENCY INSPECTIONS

This FLD provides guidance on Federal, State, or local regulatory agency inspections conducted at Weston Solutions, Inc. (WESTON) project sites and office locations.

Occupational Safety and Health Administration (OSHA), Federal Aviation Administration (FAA), U.S. Department of Transportation (DOT), U.S. Environmental Protection Agency (EPA) and other regulatory agency inspections occur from time to time. A typical sequence of events is as follows:

- The regulatory agency inspector arrives at the site or office and introduces himself/herself to the manager in charge of the operation.
- The inspector may conduct a pre-inspection conference with the manager and other individuals as determined by the manager or inspector. At that time the scope of the inspection should clearly be described by the inspector.
- The inspector will perform the inspection, which may include a walk-through inspection of the work-site or a targeted file/records review. This inspection may be limited to specific areas of the site or certain records, especially if it was initiated in response to a complaint or a focused compliance inspection program. The inspector may make notes or take pictures to document site conditions.
- The site or office inspection typically ends with a close-out conference during which the inspector may provide tentative findings. In some cases the inspector may forego the close-out conference and issue a written citation after leaving the site. On occasion, inspections may require more than one day.
- Most regulatory agency inspectors seldom issue citations during the inspection, however, if an OSHA or EPA inspector observes an imminent hazard he/she can order a work stoppage. A citation is not considered to have been issued until it is in writing and received by mail or by another appropriate method.

It is WESTON's practice to cooperate with investigations. Information that is requested should be provided.

Requests for copies of documents, health and safety plans, training records, etc. should not be provided without first obtaining approval from WESTON's Law Department. Under no circumstances should any attempt be made to mislead the inspector. If the inspection is on a client site, WESTON will refer to the client's written procedures for handling regulatory agency inspections.

If the client's procedures differ significantly from WESTON's procedures, the Site Manager in consultation and agreement with the Division Environmental Health and Safety Manager (DEHSM) and Corporate Counsel will document site-specific procedures and ensure that site personnel and client contacts are aware of these modifications.

Procedure

Coordination of any regulatory agency inspection is the responsibility of the Site or Office Manager with assistance from the Field Safety Officer (FSO) or Office Safety Officer (OSO). At least one of these individuals will accompany the inspector during all stages of the inspection. The following guidelines will apply:

- Treat the inspector as a professional and with courtesy.
- Ask for the inspector's credentials to verify that he/she is representing a recognized regulatory agency. Personnel who cannot demonstrate their affiliation with a recognized regulatory agency should not be allowed access to the project site or office.
- Ensure that any pre-inspection conference is attended by the site and/or office manager and an EHS representative, at a minimum. If not stated during the pre-inspection conference, ask the nature of the inspection.
- **Contact the client and, in order of priority, one of the following: the DEHSM or Corporate Environmental Health and Safety (CEH&S), prior to taking the inspector on-site or into the office**. The DEHSM, FSO, OSO, or CEH&S will notify the appropriate WESTON personnel including the following:
  - General Counsel
  - CEH&S Director
  - Vice President, Human Resources
  - Vice President, Corporate Quality Leadership
  - Division Manager(s) and other DEHSMs responsible for the project
  - Project Manager and Client Services Manager responsible for the project
  - President and CEO
  - Chief Operating Officer
- If there are any questions during the conference, contact the WESTON CEH&S Department for guidance.
- Note where and what observations are made and write down any comments. If the inspector makes photographs or videotapes, take photographs or video footage that will document the conditions being recorded. If cameras or video recorders are not available at the site, at least document what shots were taken and what conditions existed, such as weather, work activities, etc. Record the names of any individuals to whom the inspector speaks.
- At the end of the inspection, ensure that there is a closing conference. Take full notes of all proceedings. Contact and debrief the DEHSM immediately following the closeout.
- Remember that a subcontractor's conformance with OSHA, EPA, FAA, DOT and other regulations may be considered the general contractor's responsibility. Do not rely on indemnification to protect WESTON. Act at all times in conformance with all regulatory requirements.
- **At the end of the day, complete a WESTON Notice of Incident (NOI) Form - available on the Risk Management Portal Site.** This reporting process must be used to ensure that Senior Management is fully aware of the visit and can make available whatever resources are needed to support the local manager.
- Upon receipt of final reports or Notice of Violation from the inspector, contact and provide copies to the following WESTON personnel:
  - DEHSM
  - CEH&S Director
  - Corporate Counsel

- The inspector is required to follow the same health and safety procedures and OSHA regulations and requirements as any employee or other person (such as hazardous waste operations, confined space, personal protective equipment, etc.).
- All employees are to be reminded that the law and WESTON policy prohibit any retaliation against any person reporting health and safety concerns.

Inspection Follow-Up

- The Project Manager will be responsible for assembling an inspection review and response team consisting of the PM, the appropriate DEHSMs, FSOs, OSOs, the CEH&S Director and other Environmental Health and Safety resources as needed.
- A chronology of events report will be started and any corrective actions deemed appropriate by the team will be taken and documented.
- Some regulatory agencies have up to 6 months to issue a written Notice of Violation. However, most agencies typically will be able to complete a written Notice of Violation within 90 days. The Notice of Violation is not official until it is received. At this point, WESTON may have 15 working days to decide whether to contest any OSHA violations and request an informal conference.
- Other federal or state regulatory agencies may have differing time limits that will be provided along with a copy of any Notice of Violation or citation.
- An abatement plan may be required by OSHA or other regulatory agency. The local project or office team will be responsible for preparing this plan along with any rebuttal of the citation with support from Corporate and Division EHS resources, as well assistance from WESTON's Legal Department.

Inspection Closure

- The chronology report will conclude when any abatement plan has been accepted and/or the regulatory agency indicates, preferably in writing, that any violations have either been vacated or abated.

FLD 49 SAFE STORAGE OF SAMPLES

REFERENCE

DOT Emergency Response Guide (ERG)

To ensure that multi-media samples collected in the course of WESTON work assignments are not stored in a manner that creates undue hazard to WESTON employees or others.

PROCEDURE

Samples that are transported from a WESTON work location must be classified and packaged in compliance with U.S. Department of Transportation (DOT) regulations or alternatively in accordance with International Air Transport Association (IATA) regulations. WESTON's manual of Procedures for Shipping and Transporting Dangerous Goods must be consulted to determine if the samples will be classified as either "environmental" or "hazardous materials" samples.

Environmental Samples

Environmental samples are not subject to DOT or IATA dangerous goods regulations and must be packaged to protect their integrity during transportation and temporary storage and should have appropriate chain-of-custody documentation. These samples may be brought to a WESTON office location or rented space to verify sample documentation and repackaging (e.g., with ice or cold packs). Minor spill clean-up capability is required.

Once secured for shipment, these samples can be temporarily stored for the next day ground or air shipment pick-up. Under no circumstances are samples to be stored beyond the time necessary to arrange for transportation to a laboratory.

Hazardous Materials Samples

These samples are subject to DOT and/or IATA dangerous goods regulations and must be packaged and labeled according to the appropriate regulations, including completed chain-of-custody documentation prior to being transported from the WESTON work site. WESTON drivers must have the documentation for the samples and a DOT Emergency Response Guide (ERG) readily available in the vehicle. The ERG is available on-line at: http://hazmat.dot.gov/pubs/erg/gydebook.htm and appropriate sections can be copied to accompany samples being transported by vehicles driven by WESTON employees.

Under normal circumstances these samples should be shipped from the field and never brought back to a WESTON office location or into a rented space. If it is not possible to ship the samples from the field during the same day they are collected, a properly packaged, labeled, and sealed sample shipping container may be brought back to a WESTON office location for shipment to a laboratory the next business day - provided the temporary storage location is secure from access by any personnel who are not trained in shipping hazardous materials. Under no circumstances are samples to be stored in rented space; if necessary, secure temporary storage in a locked vehicle may be authorized. Note that some office leases do not permit the storage of hazardous materials and the lease will govern whether such materials can be stored overnight.

INSPECTION FOLLOW-UP

Shipping procedures for samples should be included in the site-specific health and safety plan (HASP) and reviewed for compliance with these procedures prior to approval. EHS audits will include a review to sample shipping and storage procedures.

FLD 54 BENZENE EXPOSURE CONTROL PLAN

This Exposure Control Plan will be reviewed annually and updated as appropriate to reflect any changes that may impact WESTON's compliance status.

RELATED PROGRAMS

Personal Protective Equipment Program
Respiratory Protection Program

EXPOSURE MONITORING

General Monitoring Requirements

WESTON will perform exposure monitoring for benzene at any workplace or work operation at a client's location that is covered by OSHA standard 29 CFR 1910.1028. The exposure evaluation will be performed at the earliest possible time when beginning activities at a site or during an operation to ensure the safety of personnel and confirm that effective controls are used.

- Determinations of employee exposure will be made from breathing zone air samples that reflect the monitored employee's regular, daily 8-hour time-weighted average (TWA) exposure to benzene. WESTON will determine if any employee may be exposed to benzene at or above the action level (AL) or the 8-hour TWA.
- 8-hour TWA exposures will be determined for each employee on the basis of one or more personal breathing zone air samples reflecting full shift exposure on each shift, for each job classification in each work area. Where employees perform the same job tasks, in the same job classification, on the same shift, in the same work area, and the length, duration, and level of benzene exposures are similar, WESTON may choose to sample a representative fraction of the employees instead of collecting samples on all employees in order to meet this requirement. When this representative sampling is performed, WESTON will sample the employee(s) expected to have the highest benzene exposures.
- Determinations to evaluate exposures with respect to the short-term exposure limit (STEL) shall be made from 15 minute employee breathing zone samples measured at operations where there is reason to believe exposures are high, such as where tanks are opened, filled, unloaded or gauged; where containers or process equipment are opened. Objective data, such as instantaneous measurements or from short periods, may be used to determine where STEL monitoring is needed.

Initial Monitoring

Initial monitoring will be performed in compliance with the following:

- Except as provided for in the following two paragraphs, WESTON will monitor employee exposures and will base initial determinations concerning controls, personal protective equipment (PPE) and the need for additional monitoring on the initial results. The results will also trigger requirements for re-sampling as defined by OSHA.
- Where WESTON has monitored under conditions that in all important aspects closely resemble those currently prevailing and where that monitoring satisfies all other requirements of this section, including the accuracy and confidence levels of subsection 6 of this section, WESTON

may rely on such earlier monitoring results to satisfy the requirements of potential exposure determination. Data used in this determination must be collected in the previous 12 months.

- Where WESTON has objective data demonstrating that employee exposure to benzene will not exceed the AL or STEL under the expected conditions of processing, use, or handling, WESTON may rely upon such data instead of implementing initial monitoring.
- The review of sampling results and the decision to use objective data will be made by the Division Environmental, Health, and Safety Manager (DEHSM), a Certified Industrial Hygienist, or the Corporate Environmental Health and Safety Director.

Monitoring Frequency (Periodic Monitoring)

- If the initial monitoring or periodic monitoring reveals employee exposures to be at or above the AL but at or below the TWA, WESTON will monitor at least every year.
- If the initial monitoring or periodic monitoring reveals employee exposures to be above the TWA, WESTON will monitor at least every 6 months.
- If the initial monitoring or the periodic monitoring indicates that employee exposures are below the AL and that result is confirmed by the results of another monitoring taken at least 7 days later, WESTON may discontinue the monitoring for those employees whose exposures are represented by such monitoring.
- Monitoring to evaluate the exposures with respect to the STEL will be completed as necessary.

Additional Monitoring

WESTON also will institute the exposure monitoring required in the Initial Monitoring and the Monitoring Frequency sections when there is a change in the production, process, control equipment, personnel or work practices which may result in new or additional exposure to benzene, or when WESTON has any reason to suspect a change which may result in new or additional exposures.

Employee Notification of Monitoring Results

Within 15 working days after the receipt of the results of any monitoring performed under this section, WESTON will notify each affected employee individually in writing of the results. In addition, within the same time period WESTON will post the results of the exposure monitoring at an appropriate location that is accessible to all affected employees.

Wherever monitoring results indicate an employee exposure exceeds the permissible exposure limit (PEL), WESTON will include in the written notice a description of the corrective action being taken by WESTON to reduce employee exposure to or below the PEL.

Accuracy of Measurement

WESTON will use a method of monitoring and analysis with a confidence level of 95% and an accuracy of plus or minus 25%, for airborne concentrations of benzene. OSHA Method 12 is identified in the OSHA standard for air sampling. WESTON will consult a qualified analytical laboratory to confirm the sampling method.

Establishment

WESTON will establish a regulated area at a Client's work site when an employee's exposure to airborne concentrations of benzene exceeds or can reasonably be expected to exceed the PELs, either the 8-hour TWA exposure of 1 ppm or the STEL of 5 ppm for 15 minutes.

Demarcation

Regulated areas will be demarcated from the rest of the workplace in any manner that adequately establishes and alerts employees of the boundaries of the regulated area.

Access

Access to regulated areas will be limited to authorized persons.

Provision of Respirators

Each person entering a regulated area will be supplied with and required to use a respirator, selected in accordance with 29 CFR 1910.134(b) through (d) (except (d)(1)(iii), (d)(3)(iii)(B)(1) and (2), and (f) through (m) and compliant with WESTON's Respiratory Protection Program.

Prohibited Activities

WESTON will ensure that employees do not eat, drink, smoke, chew tobacco or gum, or apply cosmetics in regulated areas, carry the products associated with these activities into regulated areas, or store such products in those areas.

METHODS OF COMPLIANCE

Compliance Hierarchy

WESTON will implement engineering and work practice controls to reduce and maintain employee exposure to benzene at or below the PEL, except to the extent that WESTON can demonstrate that such controls are not feasible.

Wherever engineering and work-practice controls are required and are not sufficient to reduce employee exposure to or below the PEL, WESTON will implement such controls to reduce exposures to the lowest levels achievable. WESTON will supplement such controls with respiratory protection that complies with the requirements of the PEL.

WESTON will not use employee rotation as a method of compliance.

Compliance Program

Where the PEL is exceeded, WESTON will establish and implement a written site-specific compliance program within its Health and Safety Plan (HASP) to reduce employee exposure to or below the PEL by means of engineering and work practice controls, as required by the previous subsection. To the extent that engineering and work-practice controls cannot reduce exposures to or below the PEL, WESTON will include in the written compliance program the use of appropriate respiratory protection to achieve compliance with the PEL.

Written site-specific compliance programs will include at least the following:

- A description of each operation in which benzene is emitted; e.g., machinery used, material processed, controls in place, crew size, employee job responsibilities, operating procedures, and maintenance practices;
- A description of the specific means that will be employed to achieve compliance, including engineering plans and studies to determine the methods to control exposure to benzene, and, where necessary, the use of appropriate respiratory protection to achieve the PEL;
- A report of the technology considered to control exposures below the PEL;
- Air monitoring data that document the sources of benzene emissions;
- A detailed schedule for implementing the program, including documentation such as copies of purchase orders for equipment, construction contracts, etc.;
- A work practice program;
- A written plan for emergency situations; and
- Other relevant information.

The written compliance program will be reviewed and updated at least annually, if the project site duration makes this requirement necessary, or more often, if necessary, to reflect significant changes in WESTON's compliance status.

The written compliance program will be provided upon request for examination and copying to the OSHA Assistant Secretary and/or Director, affected employees, and designated employee representatives.

Respiratory Protection

WESTON maintains a Respiratory Protection Program as required by 29 CFR 1910.134 and substance-specific standards. For employees who use respirators required by this section, WESTON will provide respirators that comply with the requirements of this subsection. Respirators must be used during:

- Periods necessary to install or implement feasible engineering and work-practice controls.
- Maintenance and repair activities, and brief or intermittent operations, where employee exposures exceed the PEL or STEL, and engineering and work-practice controls are not feasible;
- Activities in regulated areas;
- Work operations for which WESTON or the Client has implemented all feasible engineering and work-practice controls and such controls are not sufficient to reduce employee exposures to or below the PEL;
- Work operations for which an employee is exposed to benzene at or above the AL, and the employee requests a respirator;
- Work operations for which an employee is exposed above the PEL and engineering controls are not required by exemption; and
- Emergencies.

No employee will be permitted to use a respirator if, based on their recent medical examination, the examining physician determines that they will be unable to continue to function normally while using a respirator. If the physician determines that the employee must be limited in, or removed from, their

current job because of their inability to use a respirator, the limitation or removal will be in accordance with WESTON's Human Resources policies and practices.

Respirator Selection

WESTON will use the assigned protection factors (APFs) listed in Table 1 to select a respirator that meets or exceeds the required level of employee protection. When using a combination respirator (e.g., airline respirators with an air-purifying filter), WESTON will ensure that the APF is appropriate to the mode of operation in which the respirator is being used. WESTON will select the appropriate respirator from Table 1.

Table 1. -- Assigned Protection Factors[5]

Type of respirator[1], [2]	Quarter mask	Half mask	Full facepiece	Helmet/ hood	Loose-fitting facepiece
1. Air-Purifying Respirator	5	[3]10	50	.....	.....
2. Powered Air-Purifying Respirator (PAPR)	.....	50	1,000	[4]25/1,000	25
3. Supplied-Air Respirator (SAR) or Airline Respirator					
• Demand mode	.....	10	50	.....	.....
• Continuous flow mode	.....	50	1,000	[4]25/1,000	25
• Pressure-demand or other positive-pressure mode	.....	50	1,000	.....	.....
4. Self-Contained Breathing Apparatus (SCBA)					
• Demand mode	.....	10	50	50	.....
• Pressure-demand or other positive-pressure mode (e.g., open/closed circuit)	.....	.....	10,000	10,000	.....

Notes:

[1]Employers may select respirators assigned for use in higher workplace concentrations of a hazardous substance for use at lower concentrations of that substance, or when required respirator use is independent of concentration.

[2]The assigned protection factors in Table 1 are only effective when the employer implements a continuing, effective respirator program as required by this section (29 CFR 1910.134), including training, fit testing, maintenance, and use requirements.

[3]This APF category includes filtering facepieces, and half masks with elastomeric facepieces.

[4]The employer must have evidence provided by the respirator manufacturer that testing of these respirators demonstrates performance at a level of protection of 1,000 or greater to receive an APF of 1,000. This level of performance can best be demonstrated by performing a WPF or SWPF study or equivalent testing. Absent such testing, all other PAPRs and SARs with helmets/hoods are to be treated as loose-fitting facepiece respirators, and receive an APF of 25.

[5]These APFs do not apply to respirators used solely for escape. For escape respirators used in association with specific substances covered by 29 CFR 1910 subpart Z, employers must refer to the appropriate substance-specific standards in that subpart. Escape respirators for other IDLH atmospheres are specified by 29 CFR 1910.134 (d)(2)(ii).

Emergency Situations

WESTON will develop and implement a written plan for dealing with emergency situations involving substantial releases of benzene on a site-specific, as-needed basis. The plan will include provisions for the use of appropriate respirators and PPE. In addition, employees not essential to correcting the emergency situation will be restricted from the area and normal operations halted in that area until the emergency is abated.

Protective Work Clothing and Equipment

Personal protective clothing and equipment shall be worn to prevent eye contact and limit dermal exposure to liquid benzene. Protective clothing and equipment shall be impermeable to liquid benzene and will be provided by WESTON at no cost to the employee. Eye and face protection shall meet the requirements of 29 CFR 1910.133. Protective work clothing and equipment includes, but is not limited to:

- Benzene resistant coveralls or similar full-body work clothing;
- Benzene resistant gloves, head coverings, and boots or foot coverings; and
- Face shields, vented goggles, or other appropriate protective equipment.

Employees shall remove all protective clothing and equipment worn for protection from benzene at the completion of the work shift at identified change areas.

In the event that protective clothing or PPE becomes wetted with benzene or when rips or tears are detected while an employee is working, the protective clothing or equipment will be replaced as soon as possible.

WESTON will arrange for the laundering or disposal of protective clothing and equipment. Employees will not take off the site, protective clothing or equipment contaminated with benzene. WESTON will ensure that the disposal or cleaning of contaminated protective clothing and equipment is done in a manner that prevents the release of airborne benzene in excess of the PEL.

Hygiene Areas and Practices

WESTON will provide hand-washing facilities, showers for personnel to use when leaving the work area and before eating, drinking, smoking, chewing tobacco or gum, or applying cosmetics.

Housekeeping

All spills and sudden releases of material containing benzene will be cleaned up as soon as possible.

Waste, scrap, debris, bags, containers, PPE, and clothing contaminated with benzene and consigned for disposal must be collected and disposed of in sealed impermeable bags or other closed, impermeable containers. These bags and containers will be labeled appropriately.

MEDICAL SURVEILLANCE

WESTON maintains a medical surveillance program for:

- All employees who are or may be exposed to benzene at or above the AL unless WESTON demonstrates that the employee is not, and will not be, exposed at or above the AL 30 or more days per year (12 consecutive months); and
- Employees who might previously have been exposed to benzene at or above the AL while employed by WESTON, unless WESTON demonstrates that the employee did not work for WESTON in jobs with exposure to benzene.

To determine an employee's fitness to use a respirator, WESTON will provide the medical examination to obtain a physician's certification that includes a cardiopulmonary evaluation and a pulmonary function test.

All medical examinations and procedures required by this standard will be performed by or under the supervision of a licensed physician, who has read and is familiar with the health effects of benzene and the requirements detailed in 29 CFR 1910.1028. All laboratory tests will be conducted by an accredited laboratory. These examinations and procedures will be provided without cost to the employee and at a time and place that is reasonable and convenient to employees.

Initial Examination

WESTON will provide an initial (pre-placement) examination to all employees who are or may be exposed to benzene at or above the AL 30 or more days per year, for employees who are or may be exposed to benzene at or above the PELs 10 or more days per year, for employees who have been exposed to more that 10 ppm of benzene for 30 or more days in a year prior to the effective date of the standard when employed by WESTON. The initial (pre-placement) medical examination will include:

- A detailed medical and occupational work history, with emphasis on exposure to benzene or any other hematological toxins;
- A family history of blood dyscrasias including hematological neoplasms;
- A history of blood dyscrasias including genetic hemoglobin abnormalities, bleeding abnormalities, abnormal function of formed blood elements;
- A history of renal or liver dysfunction;
- A history of medicinal drugs routinely taken;
- A history of previous exposure to ionizing radiation;
- Exposure to marrow toxins outside the current work situation;
- A complete physical examination; and
- Laboratory tests as required by the OSHA Standard.

Recent Examination: An initial examination is not required to be provided if adequate records show that the employee has been examined in accordance with the requirements of this subsection within the past twelve months. In that case, such records will be maintained as part of the employee's medical record and the prior exam will be treated as if it were an initial examination for the purposes of the following 2 subsections, "Actions Triggered by Initial Biological Monitoring" and "Periodic Medical Surveillance".

Actions Triggered by Initial Biological Monitoring

If the results of the initial and periodic examination indicate any of the following abnormal conditions exist, then the blood count shall be repeated within 2 weeks.

- The hemoglobin level or the hematocrit falls below the normal limit (outside the 95% confidence interval [C.I.]) as determined by the laboratory for the particular geographic area and/or these indices show a persistent downward trend from the individual pre-exposure norms; provided these findings cannot be explained by other medical reasons.
- The thrombocyte (platelet) count varies more than 20 percent below the employee's most recent values or falls outside the normal limit (95% C.I.) as determined by the laboratory.
- The leukocyte count is below 4,000 per mm^3 or there is an abnormal differential count.

If the abnormality persists, the examining physician shall refer the employee to a hematologist or an internist for further evaluation unless the physician has good reason to believe such referral is unnecessary. If the hematologist's or internist's evaluation determines the need for additional tests, WESTON shall ensure that these tests are provided.

Periodic Medical Surveillance

For each employee who is covered under "Medical Surveillance" subsection, WESTON will provide at least the minimum level of periodic medical surveillance, which consists of periodic medical examinations and periodic biological monitoring. A periodic medical examination will be provided within one year after the initial examination required by the Initial Examination subsection and thereafter at least yearly. Biological sampling will be provided at least annually, either as part of a periodic medical examination or separately as periodic biological monitoring.

The periodic medical examination will include:

- A brief history regarding any new exposure to potential marrow toxins, changes in medical drug use; and the appearance of physical signs relating to blood disorders.
- A complete blood count including a leukocyte count with differential, quantitative thrombocyte count, hemoglobin, hematocrit, erythrocyte count and erythrocyte indices (mean corpuscular volume [MCV], mean corpuscular hemoglobin [MCH], mean corpuscular hemoglobin concentration [MCHC]); and
- Appropriate additional tests as necessary, in the opinion of the examining physician, in consequence of alterations in the components of the blood or other signs which may be related to benzene exposure.

Where the employees develops signs and symptoms commonly associated with toxic exposure to benzene, WESTON shall provide the employee with an additional medical examination which shall include those elements considered appropriate by the examining physician.

For persons required to use respirators for at least 30 days a year, a pulmonary function test shall be performed every 3 years. A specific evaluation of the cardiopulmonary system shall be made at the time of the pulmonary function test.

Emergency Examinations

In addition to the medical surveillance required in this Medical Surveillance section, WESTON will provide a medical examination as soon as possible to any employee who may have been acutely exposed to benzene because of an emergency.

The examination will be coordinated through the WESTON medical provider. At a minimum the test will involve having the employee provide a urine sample at the end of the employee's shift and having a urinary phenol test performed within 72 hours. Based on the results for this sample, the medical provider will determine the need for additional testing, for example a complete blood count including an erythrocyte count, leukocyte count with differential and thrombocyte count at monthly intervals for a 3-month duration following the emergency.

Information Provided to the Physician

WESTON will provide the following information to any examining physician, including hematologists or internists:

- A copy of OSHA's Benzene Standard (29 CFR 1910.1028) and appendices;
- A description of the affected employee's former, current, and anticipated duties as they relate to the employee's occupational exposure to benzene;
- The employee's former, current, and anticipated future levels of occupational exposure to benzene;
- Relevant results of previous biological monitoring and medical examinations.

Physician's Written Medical Opinion

WESTON will promptly obtain a written, signed medical opinion from the examining physician and provide a copy of the document to the employee within 15 days of the examination. This written opinion will contain:

- The physician's diagnosis based on occupationally pertinent results of the medical examination and tests;
- The physician's opinion as to whether the employee has any detected medical condition(s) that would place the employee at increased risk of material impairment to health from further exposure to benzene;
- Any recommended limitations on the activities or duties of the employee and exposure to benzene or on the employee's use of PPE, clothing, and respirators;
- A statement that the physician has clearly and carefully explained to the employee the results of the medical examination, including all biological monitoring results, and any medical conditions related to benzene exposure that require further evaluation or treatment.

WESTON will instruct the physician not to reveal orally or in the written medical opinion given to WESTON specific findings or diagnoses unrelated to occupational exposure to benzene.

Medical Removal Plan

WESTON will temporarily remove an employee from work where there is excess exposure to benzene on each occasion that medical removal is required, such as when a physician makes a referral to a hematologist/internist, and until the physician determines the employee can safely return to work.

Following the examination and evaluation by the hematologist/internist, a decision to remove an employee from areas where benzene exposure is above the AL or to allow the employee to return to areas where benzene exposure is above the AL shall be made by the physician in consultation with the hematologist/internist. The physician will communicate the decision in writing to WESTON and the employee. In the case of removal, the physician shall state the required probable duration of removal from occupational exposure to benzene above the AL and the requirements for future medical examinations to review the decision.

When an employee is medically removed, WESTON shall provide a follow-up examination. The physician, in consultation with the hematologist/internist, shall make a decision within 6 months of the

date the employee was removed concerning whether the employee shall be returned to the usual job or whether the employee should be removed permanently.

Whenever an employee is medically removed under this subsection, WESTON will transfer the removed employee to a job where the exposure to benzene is less than the AL and will meet the OSHA requirements with respect to medical removal protection benefits.

Reporting

In addition to other medical events that are required to be reported on the OSHA Form No. 300, WESTON will report any abnormal condition or disorder caused by occupational exposure to benzene associated with employment.

COMMUNICATION OF BENZENE HAZARDS TO EMPLOYEES

As required by OSHA, WESTON's Hazard Communication Program transmits information on the hazards of chemicals to employees. The Hazard Communication Program has been established as part of the Corporate EHS Program available on-line or as hard copy to all WESTON employees. Additionally, WESTON transmits the following communications specific to benzene.

Warning Signs

Warning signs will be provided and displayed in regulated areas and at all approaches to regulated areas. Where warning signs are posted, employees must take necessary protective steps before entering the area. The warning signs will include the following information:

DANGER
BENZENE
CANCER HAZARD
FLAMMABLE – NO SMOKING
AUTHORIZED PERSONNEL ONLY
RESPIRATOR REQUIRED

WESTON will ensure that signs required by this subsection are illuminated, cleaned, and maintained as necessary so that the legend is readily visible.

Warning Labels

Warning labels or other appropriate forms of warning will be provided for containers of benzene within the workplace. There is no requirement to label pipes. The label shall comply with the requirements of 29 CFR 1900.1200(f) and in addition shall include the following information:

DANGER
CONTAINS BENZENE
CANCER HAZARD

WESTON will ensure that labels required by this subsection are cleaned and maintained as necessary so that the labels are readable.

Employee Information and Training

WESTON will provide employees with information and training at the time of initial assignment to a work area where benzene is present, and will provide training at least annually thereafter if exposures are above the AL. WESTON will ensure employee participation in the program and maintain a record of the contents of such program.

The training shall be in accordance with the requirements of the Hazard Communication Standard [29 CFR 1910.1200(h)(1) and (2)] and will include:

- Reviewing benzene material safety data sheets;
- Providing the employees with an explanation of the contents of 29 CFR 1910.1028 and a description of the medical surveillance program requirements. The following appendices of 29 CFR 1910.1028 will also be provided and requirements explained:
  - Appendix A – Benzene Substance Safety Data Sheet (reprinted as part of this FLD)
  - Appendix B – Benzene Substance Technical Guidelines (reprinted as part of this FLD)
  - Appendix C – Medical Surveillance Guidelines for Benzene
- Informing personnel where the standard and appendices can be found.

RECORDKEEPING

Exposure Monitoring Records

WESTON will establish and keep an accurate record of all air monitoring for benzene in the workplace. WESTON will maintain this record for at least 30 years, in accordance with OSHA requirements. This record will include at least the following information:

- The monitoring date, number, duration, and results for each sample taken, including a description of the procedures used to determine representative employee exposures;
- The name, social security number, and job classification of the employees monitored and of all other employees whose exposures the monitoring is intended to represent;
- A description of the sampling and analytical methods used and evidence of their accuracy;
- The type of respiratory protective device, if any, worn by the monitored employee;
- A notation of any other conditions that might have affected the monitoring results.

Medical Surveillance Records

WESTON will establish and maintain an accurate record for each employee covered by medical surveillance. WESTON will ensure that this record is maintained for the duration of employment plus 30 years. The record will include at least the following information about the employee:

- Name, social security number, and description of the duties;
- A copy of the physician's written opinions on the initial, periodic, and special examinations including results of medical examinations and all tests, opinions, and recommendations.
- Any employee medical complaints related to exposure to benzene;

- A copy of the medical and work history related to benzene exposure or any other hematologic toxins; and
- A copy of the information provided to the physician.

Availability

WESTON will ensure that all required records are maintained in accordance with current OSHA requirements and made available upon request to the Assistant Secretary and the Director for examination and copying.

WESTON will provide required employee exposure monitoring records upon request for examination and copying to employees, employee representatives, and the Assistant Secretary.

WESTON will provide required employee medical records upon request for examination and copying to the subject employee and anyone having specific written consent of the subject employee, and the Assistant Secretary.

Transfer of Records

If WESTON ceases to do business and there is no successor employer to receive and retain records, WESTON will notify the Director at least 3 months prior to disposal and will transmit them to the Director if required by the Director, within that period.

OBSERVATION OF MONITORING

Employee Observation

WESTON will provide affected employees or their designated representatives an opportunity to observe any monitoring of employee exposure to benzene.

Observation Procedures

When observation or monitoring requires entry into an area where the use of protective clothing or equipment is required, WESTON will provide the observer with that clothing and equipment and will ensure that the observer uses such clothing and equipment and complies with all other applicable safety and health procedures.

DEFINITIONS

Action level (AL): An airborne concentration of benzene of 0.5 parts per million (ppm) calculated as an 8-hour time-weighted average (TWA).

Assistant Secretary: The Assistant Secretary of Labor for Occupational Safety and Health, U.S. Department of Labor, or designee.

Authorized Person: Any person specifically authorized by the employer whose duties require the person to enter a regulated area, or any person entering such an area as designated representative of employee for the purpose of exercising the right to observe monitoring.

Benzene (CAS Registry No 71-43-2): Liquefied or gaseous benzene. It includes benzene contained in liquid mixture and the benzene vapors released by these liquids. It does not include trace amount of unreacted benzene contained in solid materials.

Container: Any barrel, bottle, can, cylinder, drum, reaction vessel, storage tank, or the like, but does not include piping system.

Day: Any part of the calendar day.

Emergency: Any occurrence such as, but not limited to, equipment failure, rupture of containers, or failures of control equipment which may or does result in an unexpected significant release of benzene.

Employee exposure: Exposure to airborne benzene which would occur if the employee were not using respiratory protective equipment.

Final medical determination: The written medical opinion of the employee's health status by the examining physician.

High-efficiency particulate air (HEPA) filter: A filter capable of trapping and retaining at least 99.97% of mono-dispersed particles of 0.3 micrometers in diameter.

Permissible exposure limit (PEL): The OSHA regulatory limit as a TWA limit is one part of benzene per million parts of air (1 ppm). WESTON will ensure that no employee is exposed to an airborne concentration of benzene in excess of 1 ppm as an 8-hour TWA.

Regulated area: Any area where airborne concentrations of benzene exceed or can reasonably be expected to exceed the PELs, either the 8-hour TWA exposure of 1 ppm or the short-term exposure limit of 5 ppm for 15 minutes.

Short-term exposure limit (STEL): The OSHA regulatory limit over a 15-minute period is 5 ppm. WESTON will ensure that no employee is exposed to an airborne concentration of benzene in excess of 5 ppm as averaged over any 15-minute period.

Vapor control system: Any equipment used for containing the total vapors displaced during the loading of gasoline, motor fuel, or other fuel tank trucks and the displacing of these vapors through a vapor processing system or balancing the vapor with the storage tank.

29 CFR 1910.1028, Appendix A
Substance Safety Data Sheet
(Verified against Standard January 2008)

I. Substance Identification

A. Substance: Benzene.

B. Permissible Exposure: Except as to the use of gasoline, motor fuels and other fuels subsequent to discharge from bulk terminals and other exemptions specified in 1910.1028(a)(2):

1. Airborne: The maximum time-weighted average (TWA) exposure limit is 1 part of benzene vapor per million parts of air (1 ppm) for an 8-hour workday and the maximum short-term exposure limit (STEL) is 5 ppm for any 15-minute period.

2. Dermal: Eye contact shall be prevented and skin contact with liquid benzene shall be limited.

C. Appearance and odor: Benzene is a clear, colorless liquid with a pleasant, sweet odor. The odor of benzene does not provide adequate warning of its hazard.

II. Health Hazard Data

A. Ways in which benzene affects your health. Benzene can affect your health if you inhale it, or if it comes in contact with your skin or eyes. Benzene is also harmful if you happen to swallow it.

B. Effects of overexposure. 1. Short-term (acute) overexposure: If you are overexposed to high concentrations of benzene, well above the levels where its odor is first recognizable, you may feel breathless, irritable, euphoric, or giddy; you may experience irritation in eyes, nose, and respiratory tract. You may develop a headache, feel dizzy, nauseated, or intoxicated. Severe exposures may lead to convulsions and loss of consciousness.

2. Long-term (chronic) exposure. Repeated or prolonged exposure to benzene, even at relatively low concentrations, may result in various blood disorders, ranging from anemia to leukemia, an irreversible, fatal disease. Many blood disorders associated with benzene exposure may occur without symptoms.

III. Protective Clothing and Equipment

A. Respirators. Respirators are required for those operations in which engineering controls or work practice controls are not feasible to reduce exposure to the permissible level. However, where employers can document that benzene is present in the workplace less than 30 days a year, respirators may be used in lieu of engineering controls. If respirators are worn, they must have joint Mine Safety and Health Administration and the National Institute for Occupational Safety and Health (NIOSH) seal of approval, and cartridge or canisters must be replaced before the end of their service life, or the end of the shift, whichever occurs first. If you experience difficulty

breathing while wearing a respirator, you may request a positive pressure respirator from your employer. You must be thoroughly trained to use the assigned respirator, and the training will be provided by your employer.

B. Protective Clothing. You must wear appropriate protective clothing (such as boots, gloves, sleeves, aprons, etc.) over any parts of your body that could be exposed to liquid benzene.

C. Eye and Face Protection. You must wear splash-proof safety goggles if it is possible that benzene may get into your eyes. In addition, you must wear a face shield if your face could be splashed with benzene liquid.

IV. Emergency and First Aid Procedures

A. Eye and face exposure. If benzene is splashed in your eyes, wash it out immediately with large amounts of water. If irritation persists or vision appears to be affected see a doctor as soon as possible.

B. Skin exposure. If benzene is spilled on your clothing or skin, remove the contaminated clothing and wash the exposed skin with large amounts of water and soap immediately. Wash contaminated clothing before you wear it again.

C. Breathing. If you or any other person breathes in large amounts of benzene, get the exposed person to fresh air at once. Apply artificial respiration if breathing has stopped. Call for medical assistance or a doctor as soon as possible. Never enter any vessel or confined space where the benzene concentration might be high without proper safety equipment and at least one other person present who will stay outside. A life line should be used.

D. Swallowing. If benzene has been swallowed and the patient is conscious, do not induce vomiting. Call for medical assistance or a doctor immediately.

V. Medical Requirements

If you are exposed to benzene at a concentration at or above 0.5 ppm as an 8-hour time-weighted average, or have been exposed at or above 10 ppm in the past while employed by your current employer, your employer is required to provide a medical examination and history and laboratory tests within 60 days of the effective date of this standard and annually thereafter. These tests shall be provided without cost to you. In addition, if you are accidentally exposed to benzene (either by ingestion, inhalation, or skin/eye contact) under emergency conditions known or suspected to constitute toxic exposure to benzene, your employer is required to make special laboratory tests available to you.

VI. Observation of Monitoring

Your employer is required to perform measurements that are representative of your exposure to benzene and you or your designated representative are entitled to observe the monitoring procedure. You are entitled to observe the steps taken in the measurement procedure, and to

record the results obtained. When the monitoring procedure is taking place in an area where respirators or personal protective clothing and equipment are required to be worn, you or your representative must also be provided with, and must wear the protective clothing and equipment.

VII. Access to Records

You or your representative are entitled to see the records of measurements of your exposure to benzene upon written request to your employer. Your medical examination records can be furnished to yourself, your physician or designated representative upon request by you to your employer.

VIII. Precautions for Safe Use, Handling and Storage

Benzene liquid is highly flammable. It should be stored in tightly closed containers in a cool, well ventilated area. Benzene vapor may form explosive mixtures in air. All sources of ignition must be controlled. Use non-sparking tools when opening or closing benzene containers. Fire extinguishers, where provided, must be readily available. Know where they are located and how to operate them. Smoking is prohibited in areas where benzene is used or stored. Ask your supervisor where benzene is used in your area and for additional plant safety rules.

29 CFR 1910.1028, Appendix B
Substance Technical Guidelines for Benzene
(Verified against Standard January 2008)

I. Physical and Chemical Data

A. Substance identification.

1. Synonyms: Benzol, benzole, coal naphtha, cyclohexatriene, phene, phenyl hydride, pyrobenzol. (Benzin, petroleum benzin and Benzine do not contain benzene).

2. Formula: C(6)H(6) (CAS Registry Number: 71-43-2)

B. Physical data.

1. Boiling Point (760 mm Hg); 80.1 deg. C (176 deg. F)

2. Specific Gravity (water = 1): 0.879

3. Vapor Density (air = 1): 2.7

4. Melting Point: 5.5 deg. C (42 deg. F)

5. Vapor Pressure at 20 deg. C (68 deg. F): 75 mm Hg

6. Solubility in Water: .06%

7. Evaporation Rate (ether = 1): 2.8

8. Appearance and Odor: Clear, colorless liquid with a distinctive sweet odor.

II. Fire, Explosion, and Reactivity Hazard Data

A. Fire.

1. Flash Point (closed cup): - 11 deg. C (12 deg. F)

2. Autoignition Temperature: 580 deg. C (1076 deg. F)

3. Flammable limits in Air. % by Volume: Lower: 1.3%, Upper: 7.5%

4. Extinguishing Media: Carbon dioxide, dry chemical, or foam.

5. Special Fire-Fighting procedures: Do not use solid stream of water, since stream will scatter and spread fire. Fine water spray can be used to keep fire-exposed containers cool.

6. Unusual fire and explosion hazards: Benzene is a flammable liquid. Its vapors can form explosive mixtures. All ignition sources must be controlled when benzene is used, handled, or stored. Where liquid or vapor may be released, such areas shall be considered as hazardous locations. Benzene vapors are heavier than air; thus the vapors may travel along the ground and be ignited by open flames or sparks at locations remote from the site at which benzene is handled.

7. Benzene is classified as a 1 B flammable liquid for the purpose of conforming to the requirements of 29 CFR 1910.106. A concentration exceeding 3,250 ppm is considered a potential fire explosion hazard. Locations where benzene may be present in quantities sufficient to produce explosive or ignitable mixtures are considered Class I Group D for the purposes of conforming to the requirements of 29 CFR 1910.309.

B. Reactivity.

1. Conditions contributing to instability: Heat.

2. Incompatibility: Heat and oxidizing materials.

3. Hazardous decomposition products: Toxic gases and vapors (such as carbon monoxide).

III. Spill and Leak Procedures

A. Steps to be taken if the material is released or spilled. As much benzene as possible should be absorbed with suitable materials, such as dry sand or earth. That remaining must be flushed with large amounts of water. Do not flush benzene into a confined space, such as a sewer, because of explosion danger. Remove all ignition sources. Ventilate enclosed places.

B. Waste disposal method. Disposal methods must conform to other jurisdictional regulations. If allowed, benzene may be disposed of: (a) By absorbing it in dry sand or earth and disposing in a sanitary landfill; (b) if small quantities, by removing it to a safe location from buildings or other combustible sources, pouring it in dry sand or earth and cautiously igniting it; and (c) if large quantities, by atomizing it in a suitable combustion chamber.

IV. Miscellaneous Precautions

A. High exposure to benzene can occur when transferring the liquid from one container to another. Such operations should be well ventilated and good work practices must be established to avoid spills.

B. Use non-sparking tools to open benzene containers which are effectively grounded and bonded prior to opening and pouring.

C. Employers must advise employees of all plant areas and operations where exposure to benzene could occur. Common operations in which high exposures to benzene may be encountered are: the primary production and utilization of benzene, and transfer of benzene.

FLD 57 – MOTOR VEHICLE SAFETY

RELATED OP AND FLD

OP 11-01-017 – Motor Vehicle Safety
FLD 11 – Rough Terrain

This FLD applies to vehicles other than passenger vehicles that are operated when performing WESTON activities/operations. WESTON personnel safe driving requirements must be included in site-specific health and safety plans and accident prevention plans.

SAFE VEHICLE OPERATION

The vehicle operator is responsible for the vehicle, and for ensuring that the vehicle is in good working condition before use. WESTON employees must not operate a vehicle with any mechanical defect which endangers the safety of the driver, passengers, or the public. Before use, the vehicle operator must ensure that the vehicle is safe to operate and free from apparent damage that could result in failure while in use. The vehicle operator documents the inspection of the Equipment/Trucking Inspection Checklist available on the Weston EHS Portal.

Vehicle operators are responsible for observing the procedure established in OP 11-01-017 *Motor Vehicle Safety* and the following requirements:

- comply with all state and local traffic laws
- drive defensively
- comply with client requirements regarding motor vehicle operation
- use seat belts at all times when the vehicle is in motion
- ensure that all passengers are using seat belts at all times when the vehicle is in motion
- use caution when driving through congested areas, or near where personnel and equipment are working
- use a spotter for backing vehicles, if possible.

Vehicle operators must observe the following prohibited actions:

- DO NOT operate a motor vehicle under the influence of alcohol or drugs.
- DO NOT leave keys in an unattended vehicle.
- DO NOT leave the driver's seat of a vehicle while the motor is running.
- DO NOT operate a motor vehicle when abnormally tired.
- DO NOT drive beyond any barricades or into any area posted with designations, such as "NO TRESPASSING," "RESTRICTED AREA," or "DO NOT ENTER."
- DO NOT allow riders on the outside of a vehicle while it is in motion.

SAFETY DURING TRAVEL

- Know the traveling height (overhead clearance), width, length, and weight of the vehicle and know highway and bridge load, width and overhead limits, making sure these limits are not exceeded with an adequate margin.
- Never move a vehicle unless the vehicle brakes are in sound working order.
- Allow for any overhang when cornering or approaching other vehicles or structures.
- Be aware that the canopies of service stations and motels may be too low for a high-profile vehicle.
- Watch for low hanging electrical lines, particularly at the entrances to work sites, restaurants, motels, or other commercial sites.
- Remove all ignition keys when a drill rig is left unattended.
- For off-road travel, refer to FLD 11.

LOADING AND UNLOADING

The following guidelines should be followed, as applicable, when loading and unloading vehicles.

Tractors and/or trailers must be chocked during loading and unloading. Deck plates and positive anchor systems must be used for delivery to elevated platforms at trailer floor level if unloaded by fork lifts. Trailers detached from tractors must have additional support if fork lifts will enter or if instability of load presents a hazard of front wheels collapsing.

When loading or unloading a vehicle (such as a drill rig) or other “large” equipment on a trailer or a truck:

- Use ramps of adequate design that are solid and substantial enough to bear the weight of the vehicle or equipment with carrier - including tooling.
- Load and unload on level ground.
- Use the assistance of someone on the ground as a guide.
- Check the brakes on the vehicle or carrier before approaching loading ramps.
- Distribute the weight of the vehicle or carrier, and tools on the trailer so that the center of weight is approximately on the centerline of the trailer and so that some of the trailer load is transferred to the hitch of the pulling vehicle. Refer to the trailer manufacturer's weight distribution recommendations.

Secure the vehicle/equipment and tools to the hauling vehicle with ties, chains, and/or load binders of adequate capacity.

INSPECTION AND PRECAUTIONS

Tires

Vehicle tires must be checked daily for safety and during extended travel for loss of air, and maintained and/or repaired in a safe manner. If tires are deflated to reduce ground pressure for movement on soft ground, the tires must be reinflated to normal pressures before movement on firm or hilly ground or on streets, roads, and highways. Under-inflated tires are not as stable on firm ground as properly inflated

tires. Air pressures should be maintained for travel on streets, roads, and highways according to the manufacturer's recommendations. During tire checks, inspect for:

- Missing or loose wheel lugs.
- Objects wedged between duals or embedded in the tire casing.
- Damage to or poorly fitting rims or rim flanges.
- Abnormal or uneven wear and cuts, breaks, or tears in the casing.

The repair of truck and off-highway tires should only be made with required special tools and following the recommendations of a tire manufacturer's repair manual.

Batteries

Batteries contain strong acid. Use extreme caution when inspecting or charging batteries.

- Service batteries in a ventilated area while wearing safety glasses.
- When charging a battery with a battery charger, turn off the power source to the battery before either connecting or disconnecting charger loads to the battery posts. Cell caps should be loosened prior to charging to permit the escape of gas.
- Spilled battery acid can burn your skin and damage your eyes. Immediately flush spilled battery acid off of your skin with lots of water. Should battery acid get into someone's eyes, flush immediately with large amounts of water and see a medical physician at once.
- To avoid battery explosions, keep the cells filled with electrolyte, use a flashlight (not an open flame) to check electrolyte levels, and avoid creating sparks around the battery by shorting across a battery terminal. Keep lighted smoking materials and flames away from batteries.
- When a battery is removed from a vehicle or service unit, disconnect the battery ground clamp first.
- Secure batteries when transporting to prevent tip over.
- When installing a battery, connect the battery ground clamp last.

Fuel

Special precautions must be taken for handling fuel and refueling vehicles. Vehicles should not be fueled 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 fueling.
- Only use the type and quality of fuel recommended by the engine manufacturer.
- Refuel in a well-ventilated area.
- Do not fill fuel tanks while the engine is running. Turn off all electrical switches.
- Do not spill fuel on hot surfaces. Clean any spillage before starting an engine.
- Wipe up spilled fuel with cotton rags or cloths - do not use wool or metallic cloth.
- Keep open lights, lighted smoking materials, and flames or sparking equipment well away from the fueling area.
- Turn off heaters in carrier cabs when refueling the carrier.

- Do not fill portable fuel containers completely full to allow expansion of the fuel during temperature changes.
- Keep the fuel nozzle in contact with the tank being filled to prevent static sparks from igniting the fuel.
- Do not transport portable fuel containers in the vehicle or carrier cab with personnel.
- Keep fuel containers and hoses in contact with a metal surface during travel to prevent the buildup of static charge.

FLD 59 DECONTAMINATION

REFERENCES

Occupational Safety and Health Guidance Manual for Hazardous Wastes Site Activities - (Occupational Safety and Health Administration [OSHA], National Institute for Occupational Safety and Health [NIOSH], the U.S. Coast Guard, and the U.S. Environmental Protection Agency [EPA])

Site specific decontamination procedures for personnel and equipment are specified in each site-specific health and safety plan (SSHSP). Decontamination procedures are communicated to site workers during site safety and health orientation.

Standard operating procedures have been developed to minimize employee contact with hazardous substances or with equipment that has contacted hazardous substances. The standard procedures are based on the publication, *Occupational Safety and Health Guidance Manual for Hazardous Wastes Site Activities* (Guidance Manual). These procedures include but are not limited to:

- Adhere to the site control plan.
- Limit access to authorized and trained personnel.
- In unknown situations expose only those who need to be exposed for the duration they need to be exposed. In other words plan to use the minimum number of persons to accomplish the work in as little time as possible.
- Work in pairs. Use the buddy system to ensure proper personal protective equipment (PPE) donning, check on PPE integrity during entry, and assist with decontamination following entry.
- Use double layers to protect most likely points of contact (hands and feet). Then limit contact with potential contamination to the double protected areas (soles of feet and hands).
- Where possible, do not step in obvious contamination. Avoid puddles, discoloration or obvious chemical residue.
- Do not touch containers under pressure or leaking containers. Open containers under pressure remotely. Use remote sampling and handling opening techniques (e.g., drum grapplers, pneumatic impact wrenches).
- Seal sensitive handheld equipment, instruments, etc. in bags which can be easily removed while allowing the equipment to function.
- Wear disposable outer garments and use disposable equipment where appropriate.
- Cover equipment and tools with a strippable coating which can be removed during decontamination.
- Encase or cover the source of contaminants, e.g., with plastic sheeting or over-packs.
- Set mobile equipment with long reach attachments in clean areas and limit contact with contaminants to as little of the machine surface as possible.

PERSONNEL AND EQUIPMENT DECONTAMINATION

Only personnel who have completed the requisite training and medical exams/tests may enter the exclusion zone (EZ). Personnel decontamination facilities will be established on-site to ensure that personnel maintain a high degree of personal hygiene and minimize the possibility of exposure to chemical hazards. Personnel hygiene facilities will meet the requirements of 29 CFR 1910.120.

A personnel decontamination line will be established in the contamination reduction zone (CRZ) to facilitate decontamination and protective clothing removal. Storage and disposal containers will be used for the disposal of outerwear. If there is a rip or tear in the employee's chemical protective clothing, that individual will replace the torn garment in the decontamination area and don new protective clothing. If respiratory equipment becomes defective or damaged, the wearer will leave the EZ immediately and repair or replace the defective part or mask.

As personnel move through the decontamination line, PPE will be removed in the order of highest to lowest potential contamination. This outside-in removal minimizes contamination of inner clothing or body. All personnel exiting the EZ will pass through the decontamination line. Respirators will be inspected daily, washed, and scrubbed in a detergent/water solution. Clean respirators will be left to dry in an uncontaminated protected atmosphere.

All PPE and PPE clothing for decontamination line attendants will be removed on the decontamination line. An emergency eyewash will be located in the CRZ adjacent to the decontamination line.

Personnel are required to wash hands, face, and other exposed skin areas prior to leaving the CRZ for breaks or lunch. Towels and soap will be provided for personnel.

The use of tobacco products and eating or drinking will be prohibited except in a designated break area within the support zone (SZ).

Routine Equipment Decontamination

Unless otherwise stipulated in the SSHSP, any equipment or vehicle taken into the EZ must be assumed to be potentially contaminated and will be routinely inspected and decontaminated in the CRZ prior to leaving the site. It will be the responsibility of the Field Safety Officer (FSO) or designee to properly inspect and approve, for general cleanliness, all tools or hand operated equipment, and the frame and tires of all vehicles or heavy equipment leaving the CRZ. In order for vehicles and heavy equipment to pass inspection, they must be free of loose dirt or stabilized material on tailgates, axles, wheels, etc. Approval will be based on visual inspection of all exposed surfaces.

If necessary, WESTON will use an equipment decontamination pad located in the CRZ. This pad will be used to remove soil from all equipment leaving the work area. Decontamination procedures will consist of high-pressure water or steam cleaning of equipment to remove mud and/or dirt.

All equipment requiring maintenance or repair will be staged in the CRZ prior to servicing. Equipment wash water residue will be collected and disposed as either solid or hazardous waste based upon site conditions. Only clean water is to be used for decontamination of personnel, equipment, and vehicles.

Personnel assigned to vehicle decontamination will wear protective equipment, clothing, and respiratory protection consistent with the established health and safety program as defined in the SSHSP. Seats and floors in equipment and vehicles to be used in the EZ will be covered to the extent possible with disposable polyethylene (as necessary).

PPE and Decontamination Procedures

As necessary, the Field Supervisor/Site Manager or FSO will designate personnel to assist the work party in the donning and doffing of PPE as they proceed in and out of the CRZ. Decontamination is accomplished to ensure the materials that personnel and equipment may have contacted in the EZ are removed in the CRZ before passing into the SZ.

Personnel decontamination

The following procedures are based on the Guidance Manual as standard guidance. The decontamination section of SSHSPs will be based on risk assessments and available information. Personnel decontamination plans may be more or less stringent based on contaminants of concern and potential for contamination.

Modified Level D

- Any site equipment will be deposited in a segregated area prior to entering the CRZ.
- At the perimeter of the EZ, rain gear or splash protection (if worn) will be damp wiped or wet sprayed to remove any adhered particulates or corrosive liquids.
- Over-boots or over-the-sock boots will be scrubbed with a detergent/water solution. The boots will be removed and placed on a rack to dry.
- Hard hats will be removed and properly stored. Hard hats will be scrubbed with detergent if grossly contaminated.
- Outer gloves will be cleaned and removed, and, depending on condition, will be discarded (if damaged or uncleanable).
- Splash gear will be removed, cleaned, and hung to dry (if worn).
- Tyvek or Saranex suits will be discarded.
- Latex inner gloves will be discarded.
- Personnel will wash their hands, arms, neck, and face.

Level C/Level B

- Deposit any site-used equipment in a segregated area prior to entering the CRZ.
- At the perimeter of the EZ, rain gear or splash protection (if worn) will be damp wiped or wet sprayed to remove any adhered particulates or corrosive liquids.
- Outer-boot covers or over-the-sock boots will be scrubbed with a detergent/water solution. The boots will be removed and placed on a rack to dry.
- Hard hats will be removed and properly stored. Hard hats will be scrubbed with detergent and rinsed if grossly contaminated.
- Outer gloves will be cleaned and removed, and, depending on condition, will be discarded (if damaged or uncleanable).
- Splash gear will be removed, cleaned, and hung to dry (if worn).
- Tyvek or Saranex suits will be discarded.
- Respirators will be removed and prepared for reuse or decontamination.
- Latex inner gloves will be discarded.
- Personnel will wash their hands, arms, neck, and face.

Emergency Decontamination

In the event that a site worker in the EZ is injured or appears to exhibit signs of chemical exposure, emergency decontamination will be performed. Supplies for the emergency decontamination will be placed in the CRZ prior to site activities and shall include:

- Eyewash/shower if required
- First aid/Bloodborne pathogen (BBP) kit
- Plastic sheeting or disposable rescue blanket

These materials will be required in addition to the general decontamination equipment required for standard decontamination activities.

All employees leaving a contaminated area will be appropriately decontaminated and all contaminated clothing and equipment leaving a contaminated area will be appropriately disposed of or decontaminated.

Decontamination procedures will be monitored by the FSO to determine their effectiveness. When such procedures are found to be ineffective, appropriate steps shall be taken to correct any deficiencies.

Decontamination shall be performed in geographical areas that will minimize the exposure of uncontaminated employees or equipment to contaminated employees or equipment.

All equipment and solvents used for decontamination will be decontaminated or disposed of properly.

Personal protective clothing and equipment will be decontaminated or handled as follows:

- Protective clothing and equipment will be decontaminated, cleaned, laundered, maintained or replaced as needed to maintain their effectiveness.
- Employees whose non-impermeable clothing becomes wetted with hazardous substances will immediately remove that clothing and proceed to shower. The clothing will be disposed of or decontaminated before it is removed from the work zone.

Unauthorized employees will not remove protective clothing or equipment from change rooms.

Commercial laundries or cleaning establishments that decontaminate protective clothing or equipment will be informed of the potentially harmful effects of exposures to hazardous substances.

Where the decontamination procedure indicates a need for regular showers and change rooms outside of a contaminated area, they will be provided and meet the requirements of 29 CFR 1910.141. If temperature conditions prevent the effective use of water, then other effective means for cleansing will be provided and used.

Equipment Decontamination

Any equipment, vehicles, or tools that have entered an EZ will be cleaned with water. Some equipment decontamination may require pressurized water or steam cleaning. Equipment removed from the EZ will be decontaminated in the CRZ. All water and material will be collected and placed in the designated waste disposal area.

Following this cleaning, all items will be inspected and approved by the Field Supervisor prior to removal from the site. The following subsections outline procedures to be used for specific site equipment.

Vehicles and Heavy Equipment

- Don appropriate PPE.
- Scrape or brush off gross residues.
- Pressure wash outside of equipment, paying particular attention to tires and tracks.
- Sweep and wipe down interior.
- Dispose of residues and rinse surfaces until visibly clean.

Disposal of Decontamination Wastes

All liquids and other decontamination waste will be collected and treated as contaminated waste and disposed of properly in accordance with the applicable regulations. The Level of Protection for personnel handling and decontaminating contaminated equipment will be established in the SSHSP. Equipment must be cleaned prior to demobilization. Wash waters and residues must be collected for treatment and/or proper disposal.

FLD 60 EMPLOYEE DUTY SCHEDULE/BASIC FATIGUE MANAGEMENT PLAN

For project assignments lasting longer than two weeks, WESTON employees should not work in excess of 84 hours per week (12 hours/day – 7 days/week) unless approved by the Project Manager. The Division and Corporate EHS communities, as well as the local Operations/Resource Manager are available to support the Project Manager's decision process. Certain Federal Contracts, Regulatory Agencies, and Country-specific (non-CONUS) regulations may require more stringent limitations on work hours which are addressed in Weston's Staffing and Work Plans.

Project Health and Safety Plans (HASPs) address specific employee requirements as they relate to working long hours. On project assignments requiring extended periods of working long hours, Site Supervisors and/or Field Safety Officers (FSOs) will monitor employees for outward signs of fatigue (see Appendix B for signs and symptoms). Employee rotations may need to be adjusted to allow for individual differences in how fatigue-related stress is handled and for their specific role on the Project.

While working extended hours, employee travel time to and from work will be minimized to allow for sufficient rest and should be taken into account in determining hours per day and per week limits. Group transportation to and from the work location and lodging may be used to address this situation. The Project HASP will address project- related commuting and employee fatigue. Consideration should be given to "awake" time and not just the hours logged on a time sheet. For example, if an employee is awake at 6:00 AM, works a 10 hour shift on-site (7:00 AM until 6:00 PM with an hour for lunch), returns to the hotel for clean-up and dinner and begins a 5 hour commute home at 8:00 PM – this employee will be awake for 18 hours when he/she is one hour from home in the middle of the night. Studies demonstrate that being awake and driving at the 18 hour mark is equivalent of driving under the influence (DUI) and exposes the employee and others to a higher probability of an accident caused by falling asleep at the wheel or fatigue-induced errors in judgment.

There may be extreme circumstances that require employees to work longer rotations based on given Project circumstances. If a Project requires a WESTON employee to work greater than 84 hours per week for more than two weeks, this should be addressed in the HASP and approved by the Project Manager. If the Project circumstances are projected to run long than a month, then the work/rest cycle will be addressed in a HASP amendment prior to end of that month time frame for the Project. The HASP will address recognition of fatigue, actions to take when fatigue is noted and appropriate and relevant elements of a Fatigue Management Plan to ensure risk mitigation. Anyone having concerns about safety issues relating to long hours should discuss these with the Project Manager, FSO, Office Safety Manager, or Division EHS Manager.

Appendix A is a Risk of Injury Table that presents data from studies where risk of injury was quantified and/or modeled. Appendix B is a reprint of an article that describes symptoms of fatigue. Additional information on fatigue, fatigue factors, and mitigation will also be posted on the Corporate EHS Portal Site.

APPENDIX A RISK OF INJURY TABLE

Association Between Working Extended Work Shifts/Work Weeks and Workplace Injury: Summary of Reviewed Literature

This table highlights studies that evaluated the association between hours worked and occupational injury. It presents data from several recent studies where the risk of injury has been quantified and/or modeled. None of the studies highlighted here evaluate how the implementation of a well-designed and well-managed fatigue management program would impact the risk of injury. However, it is clear from the studies that when aspects of such a program (e.g., including breaks throughout a work shift) are implemented, fatigue is reduced and performance is enhanced; the risk of injury may be similarly reduced. These data should be used collectively when designing a work schedule for an incident-specific fatigue management plan. It is "necessary to consider the various features of the schedule in combination with one another, rather than in isolation from one another" (Johnson & Lipscomb, 2006).

Reference	Risk of Injury (as compared with working 8-hr work day, working during the day shift, and working a 40 hr work week)					
	10-hr work shift	**12-hour work shift**	**afternoon work shift**	**night work shift**	**successive shifts**	**> 40-hr work week**
S. Vegso, et al, 2007						↑ by 88% for those who worked more than 64 hr during the previous week
Folkhard & Lombardi, 2006 (model using results from numerous studies)	↑ by 13%	↑ by 27.5%	↑ by 15.2%	↑ by 27.9%	Night Shifts: ↑ by 6% for 2nd night worked ↑ by 17% for 3rd night worked ↑ by 36% for 4th night worked Day Shifts: ↑ by 2% for 2nd day worked ↑ by 7% for 3rd day worked ↑ by 17% for 4th day worked	Varies based on of length of shift and time of day. For any given work week duration, a long span of short shifts is likely to be safer than a short span of long shifts. 60 hour week – as 6 10-hr days: ↑ by 16% (day) ↑ by 54% (night) as 5 12-hr days: ↑ by 28% (day) ↑ by 62% (night)
Dembe, et al, 2005		↑ by 37%				↑ by 23% (60 hrs/week)

Reference	Risk of Injury (as compared with working 8-hr work day, working during the day shift, and working a 40 hr work week)					
	10-hr work shift	**12-hour work shift**	**afternoon work shift**	**night work shift**	**successive shifts**	**> 40-hr work week**
Dong, 2005	↑ by 57% (> 8 hrs; construction workers)					↑ by 98% (> 50 hrs; all occupations)
Folkhard & Lombard, 2004	↑ by 13%	↑ by 27.5%	↑ by 18.3%	↑ by 30.4%	Night Shifts: ↑ by 6% for 2nd night worked ↑ by 17% for 3rd night worked ↑ by 36% for 4th night worked Day Shifts: ↑ by 2% for 2nd day worked ↑ by 7% for 3rd day worked ↑ by 17% for 4th day worked	
Folkhard & Tucker 2003,			↑ by 18.3%	↑ by 30.4%	Night Shifts: ↑ by 6% for 2nd night worked ↑ by 17% for 3rd night worked ↑ by 36% for 4th night worked Day Shifts: ↑ by 2% for 2nd day worked ↑ by 7% for 3rd day worked ↑ by 17% for 4th day worked	
Baker, 2003*	no significant ↑; accidents peaked – 10th hour (day shift) and 12th hour (night shift)					

Reference	Risk of Injury (as compared with working 8-hr work day, working during the day shift, and working a 40 hr work week)					
	10-hr work shift	**12-hour work shift**	**afternoon work shift**	**night work shift**	**successive shifts**	**> 40-hr work week**
Johnson & Sharit, 2001*		no significant ↑ (switched from 8- to 12-hr work shift)				

* "Research comparing 8- and 12-hour shift schedules has not consistently reported increases in health and safety risks with longer shift durations. Some of the 12-hr shift schedules offset longer shifts with fewer consecutive work days (a "compressed" work week) and more rest days so that total hours approximate a 40-hr week. Fewer commutes may be another offsetting advantage. Thus, future research needs to consider potential interactions of shift length with length of work week, opportunity for rest, and commuting requirements." (Caruso et al., 2006)

Considerations for evaluating data included in this table:

- This table highlights studies that evaluate the relationship between hours worked and risk of injury. It presents data from several recent studies where this relationship has been quantified or modeled. There are numerous studies that evaluate the relationship between hours worked and other health effects, which are of equal importance in understanding the full range of effects that workers may experience when working extended work shifts, work weeks, and work rotations. Many of these studies are highlighted in the literature review presented in this Appendix.
- None of the studies evaluated recovery workers during disaster operation.
- Most of the studies included individuals working in a broad range of occupations, or focused on a single manufacturing or market sector. The study lead by Dong focused on constructions workers, an occupation that is frequently involved in recovery operation, but did not focus on construction operations during disaster recovery.
- All of the studies have design and data limitations – it is important to understand these when evaluating the data presented in the study and in this table.
- The type and severity of injury is not well defined in the studies reviewed. Folkard and Lombardi (2006) note that "in the vast majority of cases the incidents on which these trends are based were not severe, but it is likely that they represent a relatively direct measure of the occurrence of mistakes and omissions." Injury severity likely varies among the individuals within each study and between the studies evaluated.

YOU MIGHT BE FATIGUED IF....

by Frederick V. Malmstrom, Ph.D., CPE from ***Flying Safety***, February 1997, pg 14-15 (Reprinted by permission.)

The National Transportation Safety Board (NTSB) doesn't consider fatigue a "cause" of aviation mishaps. Rather, as a "contributing factor." Personally, I think this kind of reasoning is more an exercise in semantics than reality. But, whatever the causes, the results of fatigue can be deadly.

So, what on earth is fatigue? It is, as psychologists are fond of saying, a theoretical construct. Nobody can measure it, weight it, time it, smell it, or place any physical units on it—yet everyone agrees it exists. It's been said that for every two Frenchmen who meet in a coffee house, a new political party is formed. It's also said that for every psychologist who writes an article on fatigue, a new definition of fatigue is created.

Fatigue is typified by symptoms of inattention, degraded judgment, poor motor skills, exhaustion, confusion, and a whole long list of other effects. (See table 1.)

I have experienced the near-fatal side effects of fatigue. This was an instance when we'd been up flying combat all night and coasted in sleepily for a dawn landing. The brakes somehow had collected water and froze. During the half-second of fatigue-induced inattention after touchdown, our EB-66C's brakes locked up, and we spun into the infield grass. Happily, all six of us walked (well, ran) away from that one.

THE FOUR CAUSES OF FATIGUE

AS RESEARCHERS RICHARD ADAMS OF

Advanced Aviation Concepts and Dr. Alan Stokes of the Florida Institute of Technology (1995) warn, fatigue is much more than just sleep deprivation. There are at least four known causes:

1. Inadequate rest.

2. Desynchronized physiological circadian rhythms.

3. Weariness following physical activity.

4. Impaired judgment following prolonged mental activity.

And any or all of the above-mentioned causes are enough to induce fatigue.

FATIGUE-INDUCED ERRORS

Even though the NTSB says fatigue doesn't "cause" mishaps, research shows it sure causes errors. As students of the theory of signal detection know, there are only two categories of flying errors: (1) *errors of commission*, and (2) *errors of omission*.

Unfortunately, fatigue causes both categories of error, although the error of *omission* is by far the most common.

Adams and Stokes cited a classic 1948 U.K. study in which fatigued subjects flying a simulator made numerous errors of omission followed by several "catch-up" errors of commission. Talk about making a bad situation badder!

What are the most common fatigue-induced flight errors? Well, for instance, in 1995, Dr. J. C. Wilson of Leicester University and Capt A. Elsey and Mr. P. Hunton of British Airline Pilots' Association (BAPA) surveyed over 1,000 U.K. commercial pilots and flight engineers. Although no single type of fatigue-related error is overwhelming the "miscommunication"* error seems to come up more frequently. Their study found a shotgun spread of fatigue-related errors—probably because fatigue is a *global* thing. When you fly long hours, you fatigue your entire person—not just your eyes, not just your mind, and not even just your backside. The nasty thing about fatigue is that it seems to lower your all-around ability to *integrate* the parts of the puzzle.

Fatigued individuals have limited attention—they see the trees but not the forest. For instance, older (like me) people are especially vulnerable to fatigue. That's probably in no small part due to our reduced brain, skeletal, and muscle mass. There is simply physically less of us to cope with the global problems of the world.

HOW DO YOU RECOGNIZE FATIGUE?

Unfortunately, fatigue, like hypoxia, tends to sneak up on the victim gradually and isn't always easy to recognize. Having worked with mental patients for years, I've noted that the truly psychotic persons are themselves the last to know that they're crazy. Hence, they must rely on outside observers to point this out to them, and even then, these disturbed persons often won't accept the fact. Likewise, fatigued persons tend to be in denial and wouldn't always recognize fatigue if it bit them.

Dr. Richard F. Haines and C. Flatau, in their book *Night Flying* (1992), have taken the time to table some observable effects of fatigue. I've condensed some of their findings into Table 1. Note that some of the effects can be seen only by you (intrinsic symptoms). Extrinsic symptoms are easily seen only by others. Please take the time to note the extrinsic symptoms. They're the kind of behaviors which the individual typically ignores but the outsider should be able to spot rather easily.

If you aren't able to recognize your own fatigue symptoms, the least you can do is recognize these fatigue symptoms in others. And, if you do, you can say, "You might be fatigued if...you have these symptoms." I'd have been grateful if someone had brought that to my attention on that morning 30 years ago while I was landing in the EB-66C.

*Miscommunication is a hot topic in aviation research. CRM-crew resource management (aka cockpit resource management)—analyzes things like crew workload, social interactions, and (mis)communications. For further reading, see Maj. Eric Offil's article, "Cockpit Resource Management," in the September 1996 *Flying Safety*.

Table 1. You might be fatigued if...you have these observable effects of fatigue (from Haines & Flatau, 1992)

What you see:

INTRINSIC SYMPTOMS

A. PHYSICAL

1. Frequent, unexplainable headaches

2. Muscular aches and pains

3. Breathing difficulties

4. Blurred/double vision

5. Burning urination

B. MENTAL

1. Attentional focusing

2. Easily distracted

3. Reduced flying standards

4. Feeling of depression

5. Impaired judgment

6. Poor visual perception

What others see:

EXTRINSIC SYMPTOMS

A. PHYSICAL

1. Degraded motor skills

2. Tenseness and tremors

3. Intolerant/irritable

4. Increased reaction time

5. Social withdrawal

B. MENTAL

1. Absentmindedness

2. Poor short-term memory

3. Lack of interest and drive

4. Confused and fearful

5. Slow startle response

6. Worried and anxious

FLD 61 GASOLINE CONTAMINANT EXPOSURE

RELATED FLDs

FLD54 – Benzene Exposure Control Plan

Note: This FLD replaces the Benzene Guideline from the 2003 Safety Officer Manual. Use of the previous Benzene Guideline is no longer valid or authorized.

If gasoline contamination is a concern, there may be the potential for benzene to be present in the breathing zone at concentrations reaching or exceeding the OSHA Permissible Exposure Level (PEL) or American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Value (TLV). A determination of the magnitude of worker exposure must be made to allow use of this guideline and of the applicability of the gasoline TLV/Time Weighted Average (TWA) or establish the need to follow the OSHA Benzene exposure requirements (29 CFR 1910.1028 and FLD 54).

Actions for this guide are based upon the ACGIH TLV/TWA for Gasoline of 300 ppm.

Assume worst case as 5% benzene by volume in gasoline, therefore "units" as measured by a photoionization detector (PID) or flame ionization detector (FID) can be paired with Levels of Protection (LOP) as follows:

0-10 units	=	Level D (at 10 units see below)
10-150 units (benzene less than 0.5 ppm)	=	Level D
150-250 units (benzene less than 0.5 ppm)	=	Level C
250 units or greater (benzene less than 0.5 ppm)	=	Level B

Monitoring Requirements

A properly calibrated PID or FID must be used to monitor exposure. At 10 units site personnel must evaluate the potential for benzene-specific exposure. The RAE Systems UltraRAE with the RAE-SEP benzene tubes (see RAE Systems Guide TN-127) is the PID of choice as cross-sensitivities are eliminated or greatly minimized. The LOP identified above may be used provided benzene exposures remain below 0.5 ppm.

An alternative, but less accurate procedure using colorimetric chemical detector tubes (Draeger benzene 0.5/c or equivalent tube) may be used to quantify benzene concentration. If less than 0.5 ppm, continue with LOP as above.

RAE-SEP tube or colorimetric tube readings must be made and documented at 60 minute (maximum) intervals during exposure situations when the PID/FID readings are 10 units or greater.

If benzene exposures are equal to, or greater than 0.5 ppm, compliance with FLD 54 and OSHA's Benzene standard (29 CFR 1910.1028) is required.

For Level C operations, a full-face air-purifying respirator must be used. Cartridges must be changed at end or service life or at no greater than 4-hour periods.

All air monitoring needs to be conducted within the employee's breathing zone.

Attachment H
Hurricane Evacuation Plan

REGION 6 START
HURRICANE READINESS AND RESPONSE PLAN

GOAL:

To provide an organized, safe, and timely evacuation of all Superfund Technical Assistance and Recovery Team (START) personnel in the event of a hurricane predicted to make landfall at or near coastal Louisiana (LA)

OBJECTIVES:

- Maintain a constant flow of information to all START personnel so everyone is fully aware of the weather situation and the evacuation plan stages
- Provide transportation to mobilize all START personnel and equipment to a safe location in a safe manner
- Provide appropriate accommodations to all START personnel who are considered "standby/ready"
- Stabilize all personnel and equipment within a 6-hour radius from New Orleans
- Insure adequate emergency food and water are available en route to the designated safe location, or in temporary "shelter in place" options until the emergency passes

- **WEATHER SITUATION:**

  `Insert NOAA weather advisory`

CONSIDERATIONS:

- Command Staff: Approximately 3 START personnel (as of 05-28-10) are being housed at:
  - TownPlace Suites
  - 5424 Citrus Boulevard, Haranhan, LA, 70123
  - (504) 818-2400
- Chalmette Branch: Approximately 15 START personnel (as of 05-28-10) are being housed at:
  - Residence Inn
  - 3 Galleria Blvd, Metairie, LA
  - (504) 832-0888

- Venice Branch: Approximately 15 START personnel (as of 05-28-10) are being housed at:
  - The Lighthouse Lodge
  - 42256 Highway 23, Venice, LA, 70091
  - (504) 534-2522

- Cocodrie Branch: Approximately 3 START personnel (as of 5-28-10) are being housed at:
    - CoCo Marina
    - 106 Pier 56, Chauvin, LA
    - (985) 594-6626

- Grand Isle Branch –
    - Grand Isle Fire Station
    - Highway 1 & Chighizola Ln, Grand Isle, LA 70358.
    - No phone in the ICP

- START Safety Points of Contact (POCs)
    - Brian Mason – (512) 466-2163
    - Sam Cheek – (972) 977-1579
    - Jim Davis – (334) 319-0380

Phase 4: Readiness

NOAA is currently tracking a tropical storm that has the potential to reach the Gulf of Mexico.

- Command Staff will watch the progress of the storm and review the Hurricane Readiness and Response Plan.
- The NOAA advisory will be posted daily for all START personnel.

Phase 3: Readiness

A Tropical Storm has entered the Gulf of Mexico and has been predicted to make landfall on or near coastal LA. It appears to be at least 120 hrs (5 days) out from landfall.

Action items:

- The START Health and Safety Officer will track the movement of any storm entering the Gulf and will be in contact with EPA counterparts at the Incident Command Post (ICP)/LDEQ Office.
- All START personnel working ***must*** confirm their work location(s) with the START Branch Directors before they leave for their assignment.
- Branch directors will inform the Operations Section Chief and/or Incident Commander (IC) of the locations of their crews through the daily roster. Changes will be forwarded to the Operations Section Chief and/or (IC) as soon as possible.
- START personnel from adjacent states and whose homes and families may be affected by a potential hurricane must keep in contact with their respective START Branch Director should the need for a sudden demobilization become necessary.

- All START personnel are to ensure that their cell phones are charged and that their numbers have been added to the master list. Copies of the phone list will be made available to all site workers.
- Several evacuation sites will be located and arrangements made to shelter there, depending upon the severity of the storm and the time and method of transporting personnel there. (Connie Daley or Logistics)

- All START personnel will be kept informed of storm advisory information, as well as storm mobilization arrangements.
    1. All START personnel will maintain an up to date road map of the current locality and the surrounding areas.
    2. Instructions on the location of the evacuation site, personnel POCs and other pertinent information will be given to all evacuees.
    3. All START personnel will check and pack a minimum of the following items when evacuating.
        - Ensure all vehicles are full of fuel (minimum fuel fill in the vehicle at all times will be ¾ of a tank) and ready to travel
        - Prescription or over the counter (OTC) medications and medical supplies gathered.
        - 4 days of clothing.
        - Bottled water, first aid kit, flashlight (and chem-lites), MRE's or equivalent, sanitizer, toilet paper, and PPE
        - Car keys and maps/directions to evacuation point
        - Documents, including driver's license, EPA/START ID, and company ID badges will be identified and clearly marked.
        - Cell phone list

    4. Any START personnel traveling to site will be requested to change their plans and not travel to the site until the storm passes.

Logistics

- All equipment and supplies will be accounted for.
- All Enterprise vehicles not in use or not needed will be relocated to the Enterprise Harahan location.

Phase 2: Ready to Respond/Evacuate

A hurricane is in route from the gulf with a 50% chance of landfall at or near coastal LA. Land fall is predicted to be 96 hrs (4 days) away. The IC has decided to begin evacuation of START personnel.

ACTION ITEMS FOR EACH GROUP:

Command Staff

- Confirm accountability for all employees including phone numbers and estimated times of arrival from sites and remote assignment locations.
- START personnel who are within 4 days of their demobilization date will be sent home, if transportation is available.
- Pull all field personnel from coastal zone operations.
- Determine non-essential personnel that can be sent home or on to an evacuation shelter (determined to be out of impact of the storm).

All Personnel

- Bring personal gear to the operations warehouse for loading, marked clearly with name and address.
- Due to the possibility of damage to communications evacuees should carry extra cash.

Resources Unit

- Compile list of non-essential personnel to be dispatched to evacuation site at the 120 hour point.
- Compile and validate personnel rosters for all personnel.
- Establish check-in / accountability procedures for arrival of incoming evacuees.
- Ensure all paperwork is secure and data is backed up.

Logistics

- Confirm evacuation site and finalize negotiated shelter and temporary arrangements (see Connie Daly)
- Confirm transportation needs and sources: Personnel will use Enterprise rental vehicles already in use as fleet vehicles.
- Identify and confirm drivers for all vehicles. Each vehicle will carry a minimum of two START personnel.
- Develop lists of personnel assigned to specific evacuation vehicles
- Send advance team (one each from Logistics, Finance, Planning and technical support for communications and connectivity) to the evacuation site.
- Food and water will be staged at the ICP/LDEQ Office.
- Confirm with evacuation shelter and provide estimated time for arrival and in-transit communications
- The route to the evacuation shelter and any alternates will be made available.

Finance

- Coordinate with Logistics to ensure evacuation site contracts are finalized
- Ensure all paperwork is secure and data is backed up

Operations

- Any remaining field operations in the various Parishes will demobilize, with all personnel and report to the operations warehouse for evacuation mobilization.

- Personnel in remote response sites in the outlying Parishes will demobilize or standby as determined by the IC.
- Confirm/validate equipment list and personnel counts at staging areas.

IT/Data Management

- Coordinate with Logistics to package equipment and prep IT for exit.
- Ensure all data is backed up.

PHASE 1: Response/Evacuation

A hurricane is in the Gulf and there is a 50% or better chance of it making landfall at or near coastal LA. Landfall prediction is 72 hours (3 days) away. START will commence personnel and equipment evacuations.

Action Items:

All remaining personnel depart en route to the evacuation shelter. This tail element, consisting of at least one representative from Safety, Logistics and Planning will depart ensuring that:

- Remaining personnel, equipment, and vehicles have been evacuated
- All equipment and vehicles left behind as secured.
- Main power is shut down where applicable
- Upon departure, immediately notify Command of the final implementation of the evacuation plan.

NOTE:

At the daily briefings, information will be updated as to when and if any of these actions will take place. The evacuation order will be given by the START IC.

Relocate all START equipment

Relocate equipment located outside of buildings (2 logistics personnel will need approximately 2 hours to complete this assignment).

Radio Frequency Systems: Louisiana Emergency Alert System

Baton Rouge
AM 1150 (WJBO)
FM 102.9 (KAJN)

Lake Charles
AM 1470 (KLCL)
FM 101.9 (WLMG)

New Orleans
AM 870 (WWL)
FM 101.9 (WLMG)

HURRICANE EVACUATION PLAN

START INCIDENT MANAGEMENT TEAM

LDEQ Office: 201 Evans Road, Building 4, Suite 420, New Orleans, LA, 70123

_____

START INCIDENT COMMANDER

_____

START OPERATIONS CHIEF

_____

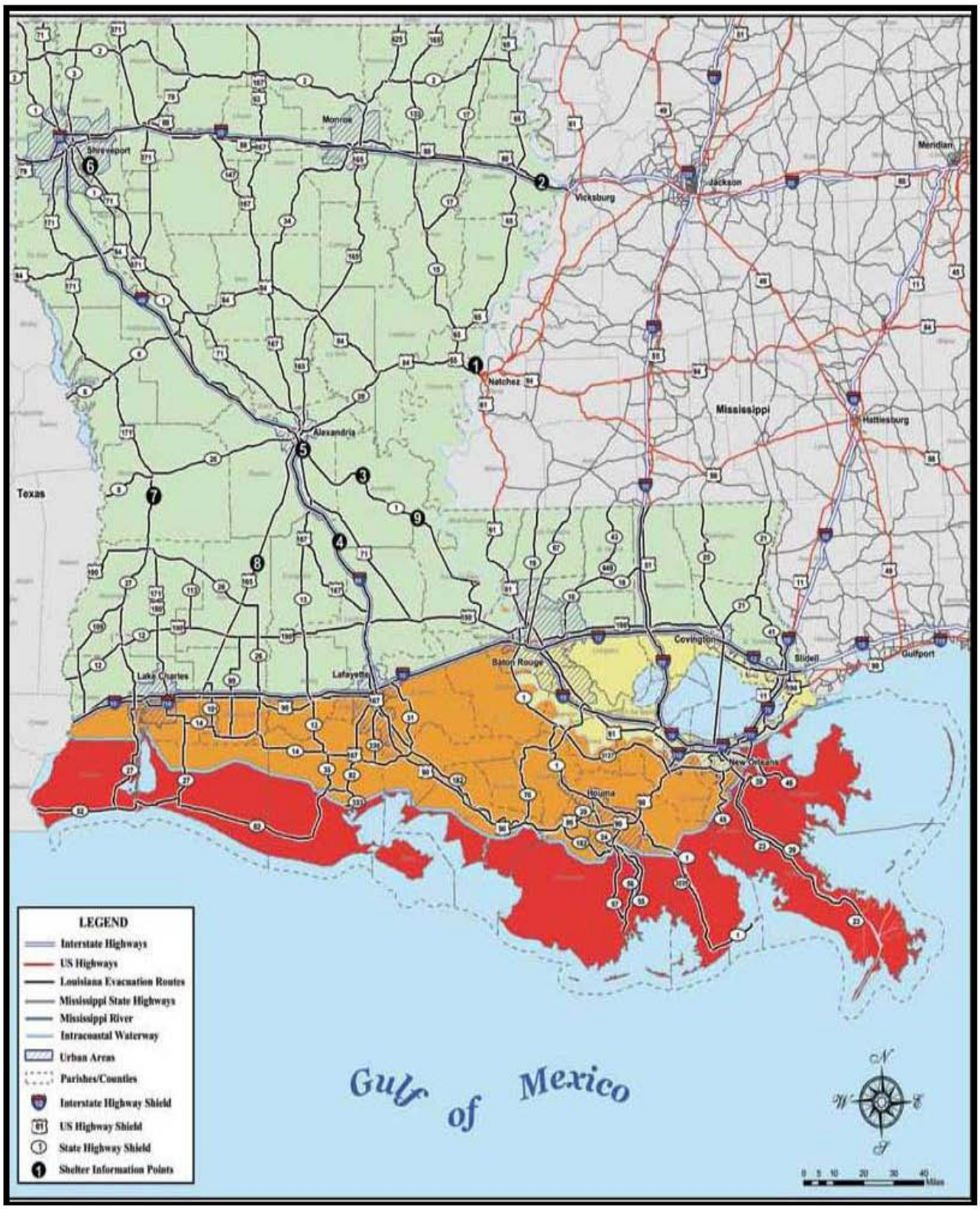
START SAFETY OFFICER

_____

LOGISTICS OFFICER

Rev.01

ATTACHMENT A
LOUISIANA STATE
EVACUATION MAPS
AND
CONTRAFLOW INSTRUCTIONS



Contraflow Instructions

I-10 West Contra flow Lanes:

- The eastbound and westbound lanes of I-10 from Clearview Parkway in Metairie to I-55 North in LaPlace will be used as westbound lanes. On the Contra flow Plan, the normal westbound lanes are shown with BROWN arrows and the Contraflow (eastbound) lanes are shown with BLUE arrows.
- All I-10 West entrances through New Orleans, Metairie and Kenner will be used in their normal manner to gain access to I-10 West.

I-55 North Contra flow Lanes:

- The northbound and southbound lanes of I-55 from I-12 in Hammond to the Mississippi state line will be used as northbound lanes. On the Contraflow Plan, the normal northbound lanes are shown with RED arrows and the Contraflow (southbound) lanes are shown with BROWN arrows.
- Traffic traveling I-55 North (BROWN) will be diverted onto I-55 North Contra flow and will only be allowed to exit at two locations: Exit 47 (LA-16) in Amite and Exit 61 (LA-38) in Kentwood.

I-59 North Contra flow Lanes:

- The northbound and southbound lanes of I-59, north of the I-10/I-12/I-59 interchange, will be used as northbound lanes. On the Contraflow Plan, the normal northbound lanes are shown with PURPLE arrows and the Contraflow (southbound) lanes are shown with GREEN arrows.

BROWN Arrows (I-10/I-55 North to Hammond and Mississippi):

- In LaPlace, the I-10 West (BROWN) lanes will be diverted to I-55 North toward Hammond and Mississippi. Traffic will not be allowed to continue on I-10 West at this interchange.
- All traffic traveling on I-55 North will travel in the existing northbound lanes.
- When traffic traveling on I-55 North reaches the I-55/I-12 interchange in Hammond, I-55 will begin to Contraflow (both the north and south lanes will travel north into Mississippi).

BLUE Arrows (I-10 West to Baton Rouge):

- Traffic destined for Baton Rouge may enter the Contrflow (eastbound) lanes from Clearview Parkway, Veterans Boulevard or Williams Boulevard in New Orleans (see diagrams).
- Traffic destined for Baton Rouge may enter the Contraflow (eastbound) lanes from I-10 West via a cross- over at the Clearview Parkway overpass. This is the only opportunity to enter the Contraflow (eastbound) lanes from I-10 West without exiting and re-entering the interstate.
- In LaPlace, I-10 Contraflow traffic (BLUE) will be diverted onto the westbound lanes of I-10 and will continue west on I-10 toward Baton Rouge.

RED Arrows (Lake Pontchartrain Causeway to Covington, I-12, Hammond, Mississippi):

- Northbound traffic on the Lake Pontchartrain Causeway (RED) will be diverted onto I-12 West (RED) at the US-190/I-12 interchange and will continue on I-12 West to Hammond.
- I-12 West (RED) will be diverted onto I-55 North (RED) at the I-12/I-55 interchange in Hammond.
- I-55 North (RED) will continue north into Mississippi.

GREEN Arrows (I-10 East to I-59, North to Slidell, Mississippi):

- I-10 East traffic (GREEN) from New Orleans will cross the I-10 Twin Spans using the three eastbound lanes.
- Contraflow of I-59 will begin at the I-10/I-12/I-59 interchange.
- At the I-10/I-12/I-59 interchange, the left and center lanes of eastbound I-10 will be diverted onto southbound I-59 (GREEN). Only the right lane will continue onto I-59 North (PURPLE).
- The I-10 East (GREEN) traffic will not be allowed to continue on I-10 East or enter I-12 West.

PURPLE Arrows (I-59 North to Mississippi from I-10 West):

- I-10 East traffic (GREEN) from New Orleans will cross the I-10 East Twin Spans using the three eastbound lanes.
- Only the right lane (GREEN) will continue onto I-59 North (PURPLE).
- All traffic on I-10 West (PURPLE) from Mississippi will be diverted on I-59 North (PURPLE) at the I-10/I-12/I-59 interchange.
- I-10 West traffic will not be allowed to continue westbound on I-10 or I-12.

ORANGE Arrows (I-12 Westbound - Covington/Hammond):

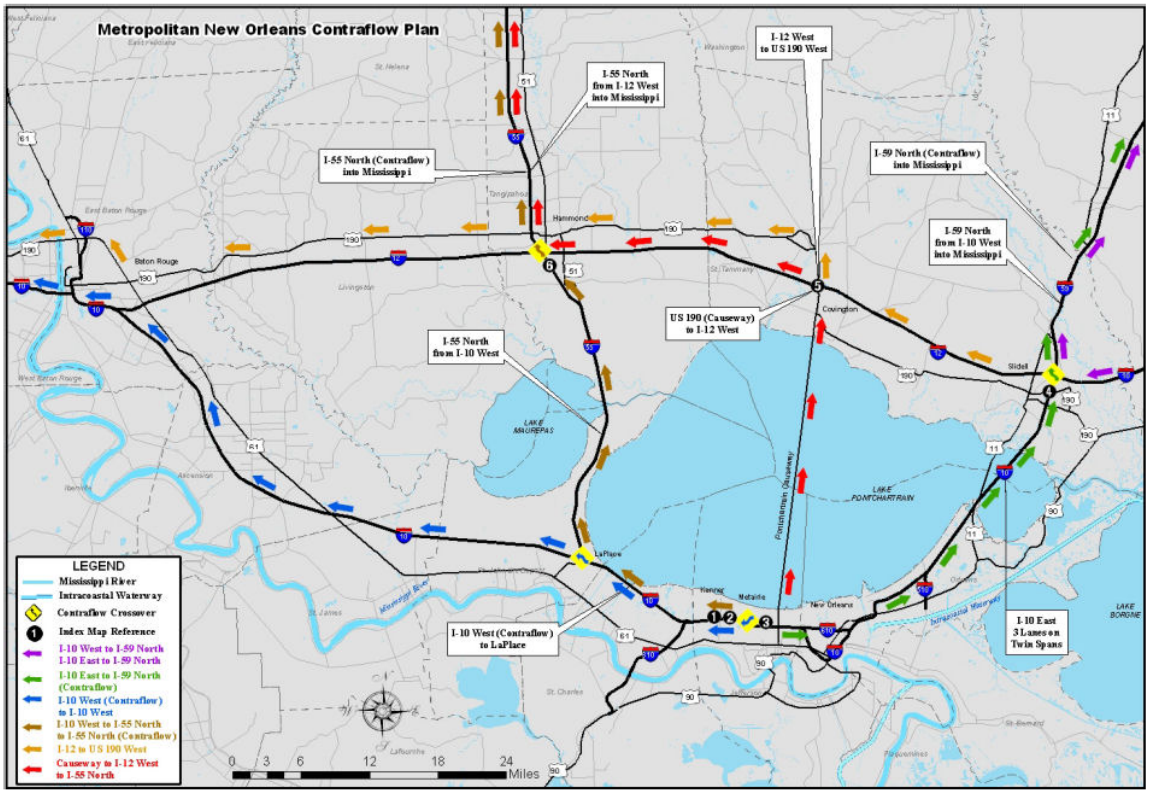
- Traffic traveling on I-12 West (RED) between Covington (US-190) and Hammond (I-55) will NOT be allowed to continue on I-12 West. This traffic must divert onto I-55 North.
- Traffic traveling on I-12 West between Slidell (I-10/I-12/I-59 interchange) and Covington (US-190) will NOT be allowed to continue I-12 West. This traffic will be diverted onto US-190 West.
- Traffic traveling on US-190 West will be allowed to continue to Baton Rouge.

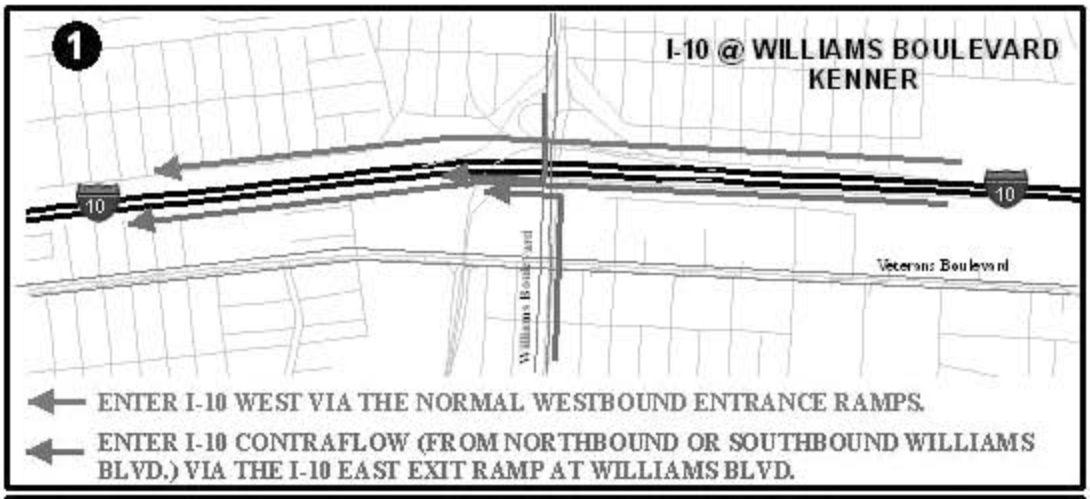
All Interstate exit ramps will be open to normal traffic flow. Interstate exit ramps in the Contraflow lanes will be limited and marked with variable message boards.

Study this map and CHOOSE YOUR ROUTE WISELY. There will be many restrictions on the Interstate system. Upon entering the contraflow area, it may not be possible to change routes. Contraflow operations will

begin when evacuations are initiated in Jefferson and Orleans parishes. If you do not wish to evacuate under the contra flow restrictions, your best strategy is to LEAVE EARLY before contra flow is activated.

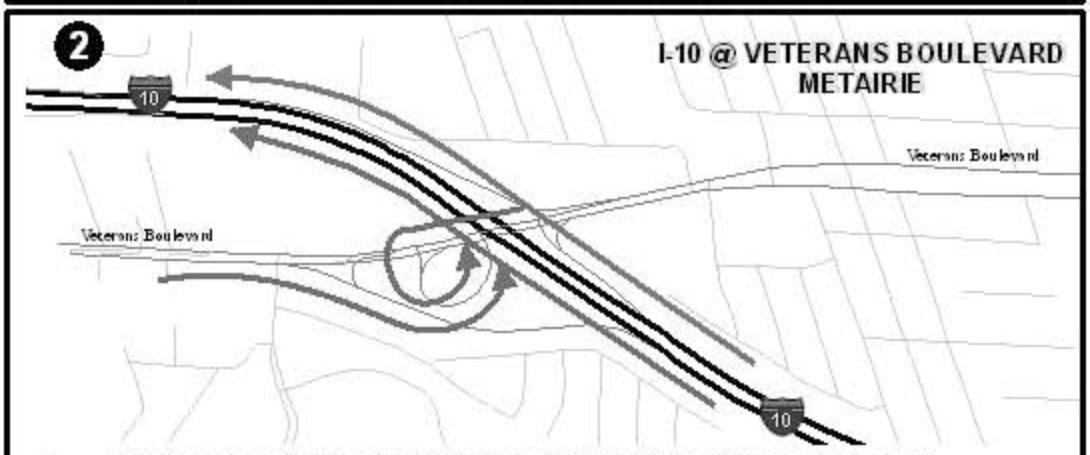
Metropolitan New Orleans Contra Flow Map





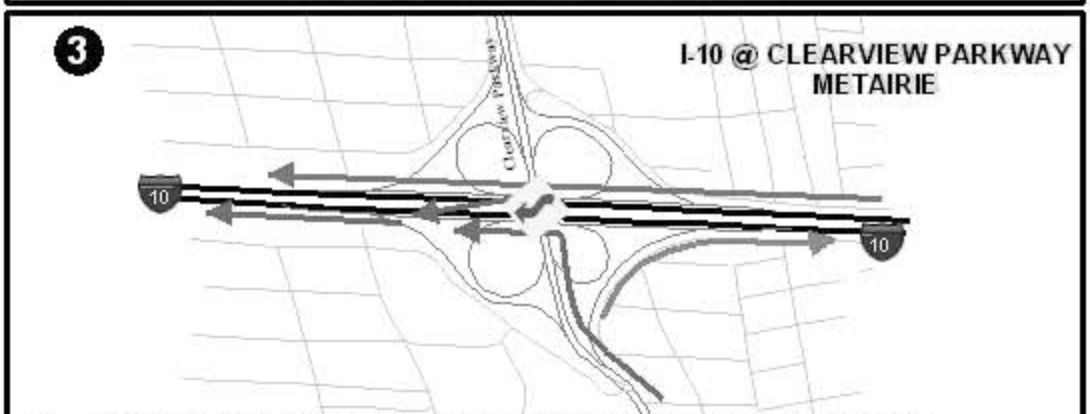
ENTER I-10 WEST VIA THE NORMAL WESTBOUND ENTRANCE RAMPS.

ENTER I-10 CONTRAFLOW (FROM NORTHBOUND OR SOUTHBOUND WILLIAMS BLVD.) VIA THE I-10 EAST EXIT RAMP AT WILLIAMS BLVD.



ENTER I-10 WEST VIA THE NORMAL WESTBOUND ENTRANCE RAMPS.

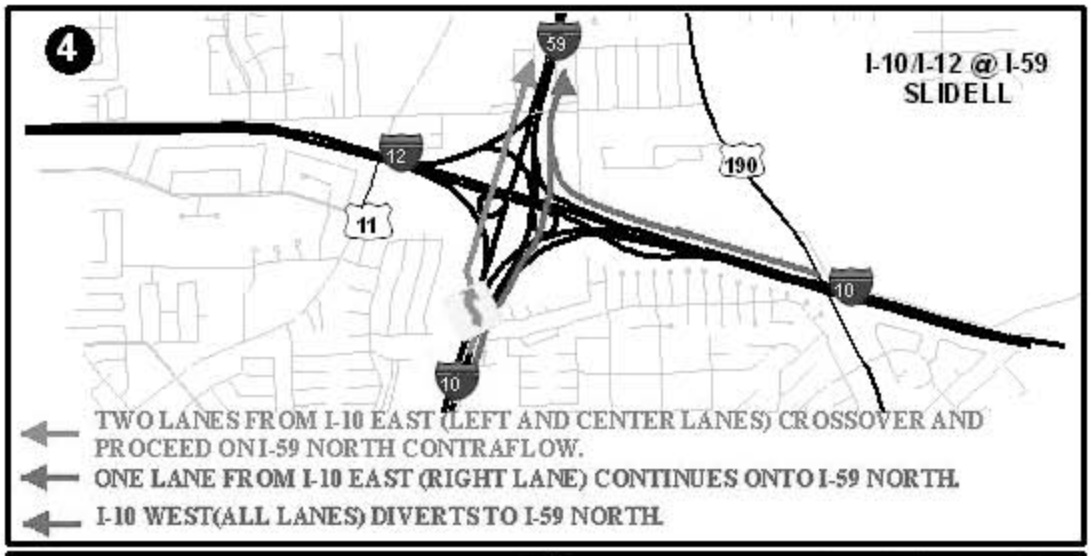
ENTER I-10 CONTRAFLOW (FROM EASTBOUND OR WESTBOUND VETERANS BLVD.) VIA THE I-10 EAST EXIT RAMP AT VETERANS BLVD.

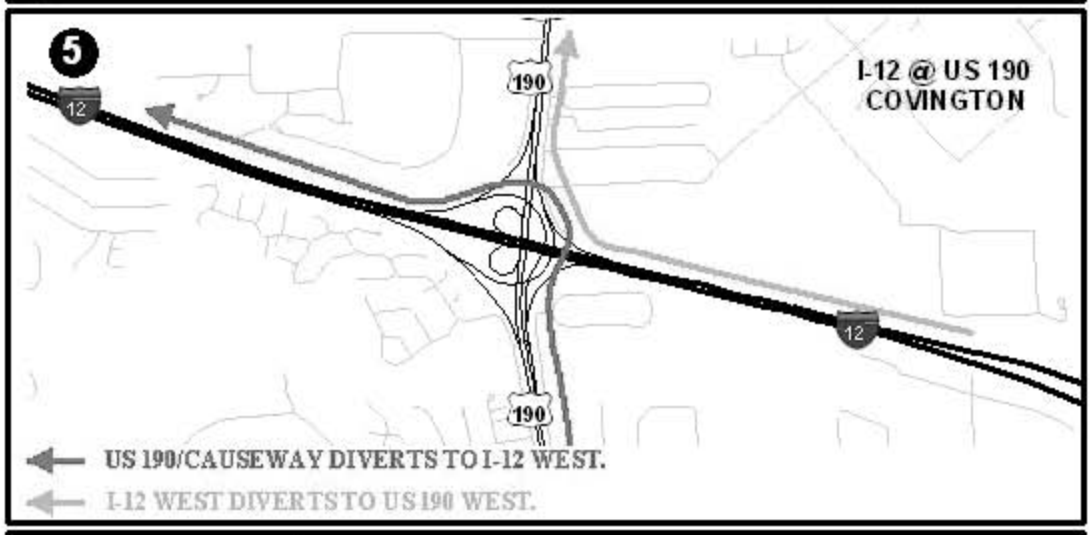


ENTER I-10 WEST VIA THE NORMAL WESTBOUND ENTRANCE RAMPS.

NORTHBOUND TRAFFIC ON CLEARVIEW PKWY. CAN ENTER I-10 CONTRAFLOW VIA THE I-10 EAST EXIT RAMP AT CLEARVIEW PKWY.

ENTER I-10 EAST VIA THE NORMAL EASTBOUND ENTRANCE RAMP FROM CLEARVIEW PKWY.


4
I-10/I-12 @ I-59
SLIDELL
59
12
190
11
10
10
TWO LANES FROM I-10 EAST (LEFT AND CENTER LANES) CROSSOVER AND PROCEED ON I-59 NORTH CONTRAFLOW.
ONE LANE FROM I-10 EAST (RIGHT LANE) CONTINUES ONTO I-59 NORTH.
I-10 WEST(ALL LANES) DIVERTS TO I-59 NORTH.


5
I-12 @ US 190
COVINGTON
12
190
12
190
US 190/CAUSEWAY DIVERTS TO I-12 WEST.
I-12 WEST DIVERTS TO US 190 WEST.

6
I-12 @ I-55
HAMMOND
55
51
51B
12
12
55
I-12 WEST (ALL LANES) DIVERTS TO I-55 NORTH.
I-55 NORTH (ALL LANES) CROSSOVER AND PROCEED ON I-55 NORTH CONTRAFLOW.

Attachment I
BBS Field Review Form

Site Name: _____ **WO #:** _____

Location: _____ **Date:** _____ **Field Activities Began:** _____

Name of Designated, Qualified Field Safety Officer On-Site: _____

DESCRIPTION OF FIELD ACTIVITIES: Check one

☐ **Drilling/Soil Sampling** ☐ **Groundwater Sampling** ☐ **Air Sampling** ☐ **IH Sampling**

☐ **Test Pits/Trenching** ☐ **UST Removal** ☐ **Remediation** ☐ **Vertical Construction**

☐ **Demolition** ☐ **Fuels** ☐ **MEC\UXO\DMM** ☐ **Recon**

☐ **Other:** _____

BEHAVIOR-BASED SAFETY (BBS) PROGRAM ELEMENTS

Item No.	Yes	No	Element	
1			All WESTON personnel on-site have received BBS orientation.	
2			Weston's "Safety Vision" has been communicated to all project team members.	
3a			Project has SMART safety goals. ☐ Field activities ☐ Vehicle safety ☐ Other	If yes, list:
3b			SMART goals are documented and communicated to field team, including contractors.	
4			The client has a BBS program to which Weston must adhere.	
5			Baseline safety data exists for the scheduled work tasks/activities.	
6			Targeted behaviors are identified for observation during the field audit.	If yes, list:
7			Health and Safety Plan (HASP) posted on-site and orientation given to each person.	
8			Initial HASP meeting held and documented before work began.	
9			Daily EHS briefings identify the day's tasks and related potential unsafe behaviors.	
10			Daily EHS briefings are interactive.	
11			Daily EHS Meetings are conducted by: ☐ SM ☐ FSO ☐ Other (Identify): _____	
12			Site personnel are provided with additional training or support to complete tasks safely.	
13			Question and answer time is available to all site personnel.	
14			A formal observation program is in place (client-specific). Observations are documented. If yes, observations are performed by: _____	
15			An informal observation program is in place. Observations are documented. If yes, observations are performed by: _____ Type: ☐ Targeted behavior checklist – corporate ☐ Site-specific ☐ Observed actively caring behaviors	
16			Feedback mechanisms are in place.	If yes, identify mechanisms:

Item No.	Yes	No	Element
17			The field team leader or designee recognizes and corrects unsafe behaviors in the field.
18			The field team leader shows commitment to the Actively Caring concept and encouragement of Actively Caring behaviors among team members.
19a			The Short Service Employee (SSE) Policy is followed for anyone with Weston for 6 months or less or in current position for 6 months or less.
19b			A mentor is assigned to the SSE.
19c			The SSE is designated through use of: _____ (e.g., specific colored hat, badge/sticker)
19d			Site team consists of minimum number of SSEs.
Comments/Additional Information – Best Practices Observed:			

CERTIFICATION OF PERSONNEL

Item No.	Yes	No	Element
1a			Site is subject to HAZWOPER Regulations
1b			If yes, all personnel on-site have current HAZWOPER training.
1c			If (1a) is yes, all personnel on-site have current HAZWOPER medical.
2			Site requires respirator use. If yes, all personnel on site are: ☐ medically qualified for respirator use ☐ trained for respirator use ☐ fit-tested for respirators to be used
3a			Site/client requires other standard specific medical certification. If yes, specify requirement(s):
3b			Site/client requires substance-specific medical. If yes, list substance(s):
3c			Site/client requires drug and alcohol testing.
3d			Physical capability medical required. If yes, indicate type: ☐ General physical capability ☐ Equipment/vehicle operation ☐ Other: _____
4			Site requires special supervisor training and/or certification. If yes, check requirement: ☐ HAZWOPER supervisor training ☐ Construction 30 hour course ☐ Construction site manager's safety course ☐ Asbestos abatement ☐ Lead Abatement ☐ Competent person. List type(s): ☐ Qualified person. List type(s):
Comments/Additional Information:			

MEDICAL AND FIRST AID

Item No.	Yes	No	Element

1			First-aid kits accessible and identified.
2			Emergency eye/safety washes available. ☐ ANSI compliance required.
3			First-aid kits and eyewash capabilities inspected weekly and documented (for site projects greater than 1 week in duration).
4			At least two first-aid/CPR-trained persons are on-site at all times when working.
Comments/Additional Information:			

EMERGENCY ACTION PLANS

Item No.	Yes	No	Element
1			Emergency Action Plan (EAP) posted on-site.
2			EAP orientation provided.
3			Emergency telephone numbers posted.
4			Emergency routes posted. ☐ Map ☐ Written Directions.
5			Emergency plan and signals reviewed with all persons.
Comments/Additional Information:			

HAZARD COMMUNICATION

Item No.	Yes	No	Element
1			A site-specific HAZCOM Plan is in effect and up to date.
2			A chemical inventory and MSDSs are available. Where?
3			Employees trained in the HAZCOM Plan and chemical hazards.
4			100% compliance with HAZCOM observed.
5			Coaching on HAZCOM observed.
Comments/Additional Information:			

PERSONAL PROTECTION

Item No.	Yes	No	Element
1			PPE Plan has been verified by a Qualified person.
2			All PPE meets applicable ANSI/OSHA/EPA criteria.
3			Hard hat, eye, hearing, foot and other PPE areas are defined and signs in place.
4			Levels of protection (LOP) are established.
5			Site control zones (Exclusion, CRZ, Support) are indicated clearly.
6			All employees know their LOP scheme.
7			OSHA respirator program in place.
8			Employees fit tested: ☐ QLFT ☐ QNFT ☐ On-site ☐ Current
9			PPE inspected and checked before use.

Item No.	Yes	No	Element
10			PPE stored properly.
11			Defective equipment tagged out.
12			Sufficient quantities of equipment available.
13			Monitoring Instruments Plan in place and communicated.
14			Instruments maintained and calibrated.
15			Maintenance & Calibration logs up to date.
16			Flotation devices worn when working on or over water.
17			PPE use 100% safe.
18			PPE coaching observed.
Comments/Additional Information:			

DECONTAMINATION

Item No.	Yes	No	Element
1			Decontamination system set up on-site.
2			Decontamination system used according to safety plan.
3			Contamination reduction corridor clearly delineated in the CRZ.
4			Appropriate waste receptacles available for all waste.
5			Receptacles properly closed at end of day.
6			All decon liquids properly contained and disposed.
7			All wastes disposed of according to approved plan.
8			All personnel received decontamination training.
9			All reusable personal protective gear deconned and disinfected at least daily.
10			Decontamination process 100% followed.
11			Decontamination coaching observed.
Comments/Additional Information:			

HIGHWAY VEHICLE DRIVING

Item No.	Yes	No	Element
1			Highway vehicle driving addressed in HASP.
2			Highway vehicle driving regularly addressed in safety meetings.
3			Fatigue Management policy discussed with all site workers.
4			Hands-free cell phone use only.
5			All cell phone/radio use limited while driving.
6			100% safe driving observed.
7			Safe driving coaching observed.
8			Journey Management Plan in place.

Item No.	Yes	No	Element
Comments/Additional Information:			

WORKING AT ELEVATION

Item No.	Yes	No	Element
1			Ladders are used 100% safely.
2			Ladders used are appropriate for work performed.
3			Portable ladders are inspected before use.
4			Portable ladders are secured from falling.
5			Fixed ladders are inspected for structural integrity.
6			Coaching on ladder use observed.
7			Scaffolds are set up and dismantled under supervision of a competent person.
8			Scaffolding is inspected daily.
9			Scaffold inspections are documented.
10			All site personnel are trained to use scaffolding safely.
11			Scaffolding is used 100% safely.
12			Coaching on safe scaffold use observed.
13			Only qualified persons operate aerial or scissor lifts.
14			Personnel working at elevation in aerial or scissor lifts are protected from falling by fall limiting or arrest systems as required by regulation or manufacturers.
15			Aerial or scissor lifts are moved while workers are elevated only if permitted by manufacturers.
16			Travel routes for aerial or scissor lifts are inspected for impediments prior to moving.
17			Aerial and scissor lifts are inspected prior to each shift.
18			Aerial and scissor lifts are used 100% safely.
19			Coaching in safe use of aerial and scissor lifts observed.
20			The hierarchy of controls (elimination, substitution, engineering, administrative) is considered prior to performing work at elevation where reliance is placed on fall limiting or fall arresting system.
21			Fall prevention plans are developed by a competent person.
22			Horizontal lifelines are installed by qualified persons.
23			Fall prevention plans include plans for rescue.
24			Fall limiting and arrest equipment is inspected prior to use.
25			Fall limiting and arrest equipment is worn properly.
26			Anchor points are designed and used properly.
27			100% safe use of fall arrest and limiting systems.
28			Coaching is observed on use of fall arrest and limiting systems.
Comments/Additional Information:			

STRUCK-BY HAZARDS

Item No.	Yes	No	Element
1			Struck-by hazards are identified and addressed in the HASP.
2			Struck-by hazards are addressed in daily safety meetings.
3			High visibility vests are worn by all personnel working in areas were moving equipment is in use and along roadways.
4			A written Traffic Control Plan is implemented.
5			Operators and pedestrians are trained to gain eye contact before crossing vehicle travel ways.
6			Vehicles with blind spots are equipped with backup or motion alarms.
7			Qualified spotters are provided for vehicle backing in congested areas.
8			Qualified flaggers are provided where vehicle traffic enters or crosses public roadways.
9			Signs meeting requirements of the MUTCD are used to alert roadway users impacted by vehicles entering, crossing or leaving public roadways.
10			Site speed limits are posted and followed.
11			Traffic routes are established and followed in congested areas.
12			100% safe operation is observed.
13			Coaching for traffic safety is observed.
14			Materials which can fall from above or be blown are secured.
15			Exclusion zones are established around operations which can expel material or objects at velocity.
16			Personnel are not permitted under loads.
17			Personnel are not permitted to cross under conveyors unless guarding is provided.
18			Taglines are used for positioning elevated loads.
19			Lifting equipment operators know not to fly loads over site personnel.
20			Exclusion zones are established around masonry walls under construction or being demolished.
21			Preformed walls or lift slab concrete is secured during placement.
22			Power tools designed to accommodate guards are equipped with functional guards.
23			When work is being performed overhead, tools not in use are secured or placed in holders.
24			The use of cranks on hand-powered winches or hoists is prohibited unless the hoists or winches are provided with positive self-locking dogs.
25			Hand wheels with exposed spokes, projecting pins, or knobs are not used.
26			Abrasive wheels are provided with safety guards.
27			Abrasive wheels for chop saws are chosen based on material to be cut.
28			Safety clips or retainers are installed and maintained on pneumatic impact tools to prevent dies and tools from being accidentally expelled from the barrel.
29			Safety lashings are provided at connections between tool and hose and at all quick makeup type connections.
30			Only qualified persons operate explosive-actuated tools.
31			Chain saws, torches or other power tools are not used to cut above shoulder height.
32			Powered nailers have a safety device on the muzzle to prevent the tool from ejecting fasteners unless the muzzle is in contact with the work surface.

Item No.	Yes	No	Element
33			Contact trip devices or triggers are not secured in an “on” position.
34			Workers using tools are positioned so work of one does not adversely affect others.
35			100% safe use of tools observed.
36			Coaching on tool use observed.
Comments/Additional Information:			

CAUGHT -IN HAZARDS

Item No.	Yes	No	Element
1			Caught-in hazards are identified and addressed in the HASP.
2			Caught-in hazards are addressed in daily safety meetings.
3			Pinch point, power drives, belts, etc. are guarded.
4			Lockout-tagout (LOTO) used when performing maintenance.
5			All site personnel trained in LOTO Program.
6			100% Safe LOTO procedures observed.
7			Coaching on LOTO observed.
8			A competent person for excavation is on-site when excavation is performed.
9			Utility check performed, reconfirmed and documented before excavation or drilling per FLD 34.
10			At least one utility competent person is on-site.
11			Competent person determines appropriate protection to prevent excavation cave in.
12			Guardrails or fences placed around excavations near walkways or roads.
13			Excavation locations lighted/or otherwise made visible at night.
14			Ladders or ramps are provided to access and exit trenches more than 4 feet deep and within 25 ft of any entrance.
15			All excavated material, personnel, and heavy equipment are at least 24-inches from the edge of all trenches.
16			100% safe utility mark, excavation, and trenching observed
17			Coaching on safe utility mark, excavation and trenching observed.
18			Confined space entry (CSE) permit procedure in place and communicated to all.
19			CSE permit procedure used: ☐ Pre-entry review ☐ Safety watch/attendant ☐ Safety watch protected same as entrants ☐ Retrieval system ☐ Appropriate rescue available ☐ Continuous monitoring for ___%O_2 ____%LEL & TOX: _, __, __, __
20			CSE employee training documented.
21			100% safe CSE observed.
22			Coaching on CSE observed.

Item No.	Yes	No	Element
Comments/Additional Information:			

ELECTRICAL

Item No.	Yes	No	Element
1			Warning signs indicate the presence and location of high voltage equipment, 250 V or greater.
2			Qualified persons only permitted to work within 10 feet of any exposed live electrical conductors.
3			Electrical equipment and wiring properly guarded.
4			Electrical lines, extension cords, and cables guarded and properly maintained.
5			Extension cords kept dry out of puddles and rain.
6			Damaged equipment tagged out.
7			GFCIs used as appropriate.
8			Extension cords are rated for hard or extra hard outdoor use.
9			Underground electrical lines located and indicated per FLD 34.
10a			Arc flash assessments are performed as required.
10b			PPE for arc flash is provided.
10c			PPE for arc flash is appropriate.
11			100% safe electrical work observed.
12			Coaching on safe electrical work observed.
Comments/Additional Information:			

WALKING AND WORKING SURFACES

Item No.	Yes	No	Element
1			Access ways, stairs, ramps, and ladders free of ice, mud, snow, or debris
2			Mobile offices/labs have fixed stairs and handrails.
3			Work areas kept free of debris and equipment.
4			*Material in storage is protected from falling or collapse by effective stacking, blocking, cribbing, etc.*
5			*Walkways and aisles are kept clear.*
6			*Materials are not stored on scaffolds or runways in excess of normal placement or in excess of safe load limits.*
7			*Work areas and means of access are maintained safe and orderly.*
8			*Tools, materials, extension cords, hoses or debris do not cause tripping or other hazards.*

Item No.	Yes	No	Element
9			*Storage and construction-sites are kept free from the accumulation of combustible materials.*
10			Waste materials and rubbish are placed in containers or, if appropriate, in piles.
11			Waste materials are disposed of in accord with applicable local, state, or federal requirements.
12			100% safe walking and working surfaces observed.
13			Coaching on safe walking and working surfaces observed.
Comments/Additional Information:			

MATERIAL HANDLING

Item No.	Yes	No	Element
1			Mechanical lifting is available and used whenever possible.
2			Employees are trained in and use safe lifting techniques.
3			Repetitive motion tasks are evaluated and addressed in the HASP.
4			Repetitive injury prevention is discussed during indoctrination.
5			Repetitive injury prevention is a regular topic at daily meetings.
6			100% material handling observed.
7			Coaching on safe material handling observed.
Comments/Additional Information:			

FIRE PREVENTION/PROTECTION

Item No.	Yes	No	Element
1a			Hot Work Checklists completed (FLD 36).
1b			If Hot Work Permit(s) required: ☐ Permit(s) up to date. ☐ Closed out permit(s) on file.
2			Smoking restricted to designated area.
3			Fire lanes established, clearly designated, and maintained.
4			Flammable/combustible liquid dispensing transfer systems grounded and bonded.
5			Proper flammable materials storage used.
6a			Fire alarm established.
6b			Workers aware of established fire alarm
7			Fire extinguisher(s) appropriately located.
8			Fire extinguisher(s) appropriate for fire hazard potential.
9			Location and use of fire extinguisher(s) known by all personnel.
10			Fire extinguisher(s) checked before each shift.
11			Fire extinguisher(s) inspected monthly.
12			Fire extinguisher(s) inspected yearly.
13			Combustible materials segregated from ignition sources.

Item No.	Yes	No	Element
14			Incompatibles segregated.
15			100% fire prevention/protection observed.
16			Coaching on fire prevention/protection observed.
Comments/Additional Information:			

MOTOR VEHICLES/HEAVY EQUIPMENT

Item No.	Yes	No	Element
1			Highway driving safety addressed in HASP.
2			Drivers assigned to vehicles based on experience and training.
3			Construction equipment inspected before each use. ☐ Inspection documents on file. ☐ Inspections documente.
4			Inspection issues identified are corrected.
5			Unsafe equipment tagged out and reported.
6			Certificates on site for operators of equipment requiring licenses or certifications.
7			All safety appliances/guards in place.
8			Equipment shut down for fueling.
9			Construction equipment has back-up alarms or spotters are used if 360° visibility restricted.
10			Loads are secure before transport.
11			Roads and structures inspected for load capacity per vehicle weights.
12			A Traffic Control Plan is in effect.
13			100% safe vehicle and equipment operation observed.
14			Coaching on safe vehicle and equipment operation observed.
Comments/Additional Information:			

HAND AND POWER TOOLS

Item No.	Yes	No	Element
1			Guards and safety devices in place and used.
2			Tools inspected before each use.
3			Tools tagged out, if defective.
4			Eye protection areas identified and protection worn.
5			Non-sparking tools available.
6			Coaching on safe tool operation observed.
Comments/Additional Information:			

WELDING AND CUTTING

Item No.	Yes	No	Element
1			Only qualified welders permitted.
2			Hot work permitting system in use.
3			Fire watch provided.
4			Equipment inspected before use.
5			Welding equipment properly grounded.
6			Appropriate PPE worn: ☐ Proper helmets and shields (including proper tint for UV protection) ☐ Leathers or other protection from sparks/slag
7			Air sampling/monitoring is performed to assess toxic fume exposure.
8			Adjacent workers protected from welding flash.
9			Oxidizers and fuel cylinders separated by 20 feet or ½ hour fire wall in storage.
10			Fuel cylinders secured in upright position.
11			Fire extinguishers present at all welding and cutting operations.
12			100%safe welding and cutting operations observed.
13			Coaching on welding and cutting observed.
Comments/Additional Information:			

ENVIRONMENTAL PROTECTION AND SUSTAINABILITY PLAN (EPSP)

Item No.	Yes	No	Element
1			Environmental Protection and Sustainability Plan posted.
2			EPSP reviewed as part of site indoctrination.
3			EPSP Checklist used to review Environmental Compliance.
4			100% environmental compliance observed.
5			Coaching on environmental compliance observed.
Comments/Additional Information:			

MISCELLANEOUS

Item No.	Yes	No	Element
1			Overhead hazards are noted, communicated to all, and labeled as needed.
2			For large construction projects, EHS Inspection (Checklist is used.
3			Copies of contracts with client and sub-contractors are on-site, WESTON's role regarding site health and safety responsibilities are clear in these, and site manager(s) understands.
4			Sub-contractors have received approved copies of their safety plan or have signified their intent to conform to Weston's safety plan.
5			Site managers understand their responsibilities for sub-contractors' conformance with all OSHA and other health and safety requirements

Item No.	Yes	No	Element
6			Site managers know what to do in the event of an OSHA/agency inspection
7			If warranted based on audit observations, a feedback session was provided to affected employees.
8			
9			
10			
Comments/Additional Information:			

COMMENTS/FEEDBACK PROVIDED:

_____

_____

_____

_____