

APPENDIX A

Standard Operating Procedures

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Title:	FIELD ACTIVITY LOGBOOKS
Category:	DOC 2.1
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STANDARD OPERATING PROCEDURE

FIELD ACTIVITY LOGBOOKS

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1. Summary

This Standard Operating Procedure (SOP) establishes requirements for the entry of information into logbooks to ensure that E & E field activities are properly documented. The project manager (PM) and the field team leader (FTL) are responsible for ensuring that logbook entries provide sufficient information for the completion of an accurate and detailed description of field operations and meets the requirements of the contract or technical direction document (TDD).

This SOP describes logbook entry requirements for all types of projects, specifies the format that should be used, and provides examples. Some flexibility exists when implementing the SOP because different types of projects require different data collection efforts. This SOP does not address site safety logbook requirements or geotechnical logbook entries.

2. Purpose

Complete and accurate logbook entries are important for several reasons: to ensure that data collection associated with field activities is sufficient to support the successful completion of the project; to provide sufficient information so that someone not associated with the project can independently reconstruct the field activities at a later date; to maintain quality control (QC) throughout the project; to document changes to or deviations from the work plan; to fulfill administrative needs of the project; and to support potential legal proceedings associated with a specific project.

2.1 Adequate Field Information/Quality Control

QC procedures for data collection begin with the complete and systematic documentation of all persons, duties, observations, activities, and decisions that take place during field activities. It is especially important to fully document any deviations from the contract, project scope, work plans, sampling plans, site safety plans, quality assurance (QA) procedures, personnel, and responsibilities, as well as the reasons for the deviations.

Prior to entering the field, the project manager must indicate to the field team what pertinent information must be collected during field activity in order to meet the desired objectives of the data collection effort. The PM is responsible for reviewing the adequacy of the project logbooks both during and following completion of field activities, and is also responsible for meeting with the field team members to discuss any findings and to direct activities to correct any deficiencies, as appropriate. The PM also has the responsibility of ensuring that the logbooks become part of the project or TDD file.

2.2 Work Plan Changes/Deviation

The logbook is the document that describes implementation of the work plan and other appropriate contract documents and provides the basis for the project reports. It must include



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detailed descriptions of any and all deviation from the work plan and the circumstances that necessitate such changes. These changes will be reviewed for compliance with data quality objectives and include:

- Changes in procedures agreed to in the project planning stages;
- Any conditions that prevent the completion of the field effort, or that result in additional fieldwork must be noted (i.e., weather delays, government actions, physical obstructions, personnel/ equipment problems, etc.). Persons from whom permission was obtained to make such changes must be clearly documented.
- Any modifications requested by the client or client's representative that are contradictory to the contract or outside of the existing scope of work must be documented in detail because the cost of the project could be affected by such modifications.

2.3 Evidentiary Documentation

Field activity documentation can become evidence in civil and/or criminal judicial proceedings, as well as in administrative hearings. Field logbooks serve this purpose. Accordingly, such documentation is subject to judicial or administrative review. More importantly, it is subject to the review of an opposing counsel who will attempt to discredit its evidentiary value.

The National Enforcement Investigation Center (NEIC) and the United States Environmental Protection Agency (EPA) have prepared documents outlining their documentation needs for legal proceedings. These guidelines indicate the importance of accurate and clear documentation of information obtained during the inspections, investigations, and evaluations of uncontrolled hazardous waste sites. Consequently, attention to detail must be applied by E & E personnel to all field documentation efforts for all E & E projects. Project personnel must document where, when, how, and from whom any vital project information was obtained. This information is necessary to establish a proper foundation for admissible evidence.

3. Guidelines

Logbooks should contain a summary of any meeting or discussion held with a client or with any federal, state, or other regulatory agency that was on site during the field activities. The logbook should also describe any other personnel that appear on site, such as representatives of a potential responsible party (PRP).

The logbook can be used to support cost recovery activities. Data concerning site conditions must be recorded before the response activity or the passage of time eliminates or alters those conditions. Logbooks are also used to identify, locate, label, and track samples and their final disposition. In addition, data recorded in the logbook will assist in the interpretation of the analytical results.

Logbooks are subject to internal and external audits. Therefore, the recorded information should be consistent with and capable of substantiating other site documentation such as time cards, expense reports, chain-of-custody forms, shipping papers, and invoices from suppliers and



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subcontractors, etc. Logbooks also act as an important means of reconstructing events should other field documents such as data collection forms become lost or destroyed. Therefore, all mission-essential information should be duplicated in the logbook.

3.1 General Instructions

The following general guidelines must be used for all logbooks:

- At a minimum, one separate field activity logbook must be maintained for each project or TDD.
- All logbooks must be bound and contain consecutively numbered pages.
- No pages may be removed for any reason, even if they are partially mutilated or illegible.
- All field activities must be recorded in the site logbook (e.g., meetings, sampling, surveys, etc.).
- All information must be **printed legibly** in the logbook using waterproof ink, preferably black. If weather conditions do not permit this (i.e., if it is too cold or too wet to write with ink), another medium, such as pencil, may be used. The reason that waterproof ink was not used should be specifically noted in the logbook.
- The language used in the logbook should be objective, factual, and free of personal feelings or terminology that might prove inappropriate.
- Entries should be made in chronological order. Contemporaneous entries are always preferred because recollections fade or change over time. Observations that cannot be recorded during field activities should be recorded as soon after as possible. If logbook entries are not made during field activities, the time of the activity/ observation and the time that it is recorded should be noted.
- The first entry for each day will be made on a new, previously blank page.
- Each page should be dated and each entry should include the time that the activity occurred based on the 24-hour clock (e.g., 0900 for 9 a.m., 2100 for 9 p.m.).
- At the completion of the field activity, the logbook must be returned to the permanent project or TDD file.



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3.2 Format

The information presented below is not meant to be all-inclusive. Each project manager is responsible for determining the specific information requirements associated with a field activity logbook. If someone other than the Project Manager is keeping the logbook, the Project Manager is responsible to convey to that individual, prior to the start of fieldwork, specific instructions on what type of information is required to be entered into the logbook. Information requirements will vary according to the nature and scope of the project. (Refer to Appendix A for an example of a completed logbook.)

Title Page

The logbook title page should contain the following items:

- Site name,
- Location,
- TDD No. or Job No.,
- PAN (an EPA site/task identification number), if applicable,
- SSID No. (Site ID number-assigned under CERCLA), if applicable,
- Start/Finish date, and
- Book ___ of ___.

First Page

The following items should appear on the first page of the logbook prior to daily field activity entries:

- TDD No. or Job No.,
- Date,
- Summary of proposed work (Reference work plan and contract documents, as appropriate),
- Weather conditions,
- Team members and duties, and
- Time work began and time of arrival (24-hour clock).



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Successive Pages

In addition to specific activity entries and observations, the following items should appear on every logbook page:

- Date,
- TDD or Job No., and
- Signature (bottom of each page). If more than one person makes entries into the logbook, each person should sign next to his or her entry.

Last Page

In addition to specific activity entries and observations and the items that should appear on each successive page, the last page of the logbook should contain a brief paragraph that summarizes the work that was completed in the field. This summary can become especially important later on if more or less work was accomplished during the duration of the field activity.

3.3 Corrections

If corrections are necessary, they must be made by drawing a single line through the original entry in such a manner that it can still be read. *Do not erase or render an incorrect notation illegible.* The corrected entry should be written beside the incorrect entry, and the correction must be initialed and dated. Most corrected errors will require a footnote explaining the correction.

4. Documentation

Although the requirements and content of the field logbook will vary according to the site and the tasks to be performed, the following information should be included in every logbook:

4.1 Prior to Fieldwork

Summary of Proposed Work

The first paragraph of **each** daily entry should summarize the work to be performed on that day. For example:

“Collect soil and groundwater samples from previously installed wells and ship samples to Analytical Services Center (ASC). Discuss removal with site owner.”

The first paragraph becomes especially important later when discussing work plan deviations or explaining why more or less work was accomplished for that day.



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Personnel

Each person to be involved in activities for the day, his/her respective role (sampler, health and safety, etc.), and the agency he/she represents should be noted in the logbook.

On-Site Weather Conditions

Weather conditions may have an impact on the work to be performed or the amount of time required to perform the proposed work; therefore, all weather on-site weather conditions should be noted, including temperatures, wind speed and direction, precipitation, etc., and updated as necessary. Similarly, any events that are impacted by weather conditions should be noted in the logbook.

Site Safety Meeting

Although minutes should be recorded for all site safety meetings under separate cover, the logbook should briefly summarize the site safety meeting and any specific site conditions and resultant site safety concerns.

4.2 Site Sketch

A site sketch should be prepared on the first day of field activities to indicate prominent site and environmental features. The sketch should be made either to scale or by noting the approximate distances between site feature. Area-specific sketches should be prepared as work is undertaken in such areas, and updated sketches should be drawn as work progresses.

Site Features

Examples of features to be noted on the site sketch include the following:

- Structures such as buildings or building debris;
- Drainage ditches or pathways, swales, and intermittent streams (include direction of overland runoff flow and direction of stream flow);
- Access roads, site boundaries, and utility locations;
- Decontamination and staging areas;
- Adjacent property data: the type of property that borders the site, information pertaining to ownership, and available addressees; and
- North arrow.



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Changes in Site Conditions

Any deviation from previous site sketches or drawings presented in the work plan, and any changes that have occurred since the last site visit must be noted. Differences to be noted include the following:

- Demolished buildings;
- Changes to access routes;
- Damage to wells or equipment, or changes to the amount of such equipment believed to be on site,
- Changes resulting from vandalism;
- Destruction of reference points;
- Changes resulting from environmental events or natural disasters; and
- Locations of excavations, waste piles, investigation-derived waste (IDW), drum staging areas, etc.

In short, *any* site condition that varies from the conditions described in the work plan should be noted.

4.3 Monitoring Equipment and Activities

Any monitoring equipment used during field activities should be documented in the log-book. Information to be noted includes:

- The type of equipment with model and serial numbers. (HNu, OVA, etc.);
- The frequency at which monitoring is performed;
- Calibration results and the frequency at which the equipment is calibrated or tested;
- Background readings;
- Any elevated or unusual readings; and
- Any equipment malfunctions.

It is particularly important to note elevated or unusual equipment readings because they could have an impact on personal protection levels or the activities to be performed on site. If a



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change in the proposed work or protection levels occurs, it should be clearly noted in the logbook.

4.4 Sample Collection Activities

Because it represents the first step in an accurate chain-of-custody procedure, field sampling documentation must be complete. The following items should be documented in the logbook:

Sample Collection Procedures

The following items pertaining to sample collection procedures should be included in the logbook:

- Any pre-sampling activities (i.e., well purging and the number of volumes purged before sample collection);
- Results of the pre-sampling activities (i.e., pH/conductivity/ temperature readings for well water, results of hazard categorization testing, etc.);
- Any environmental conditions that make sample collection difficult or impossible (i.e., dry or flooded drainage paths, inclement weather conditions, etc.); and
- Any deviation from the work plan (i.e., additional samples and the reason for their collection, alternate sample locations, etc.).

Sample Information

The following information regarding sample data should be recorded in the logbook:

- Sample number and station location including relationship to permanent reference point(s);
- Name(s) of sampler(s);
- Sample description and any field screening results;
- Sample matrix and number of aliquots if a composite sample;
- Preservatives used, recipient laboratory, and requested analyses;
- QA/QC samples; and
- Shipping paper (airbill) numbers, chain-of-custody form numbers, and jar lot numbers.



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Investigation-Derived Waste/Sample Shipment

Details pertaining to sampling equipment, decontamination, and IDW should be clearly delineated in the work plan. However, the following information should be included in the log-book:

- The type of IDW generated and the number of containers generated (each drum should be numbered and its contents noted);
- All information relevant to the characterization of the IDW;
- Any directions received from the client/workplan/contract relative to the management of the IDW;
- The disposition of IDW (left on site or removed from site);
- The number of sample containers shipped to the ASC or laboratory and the courier used (i.e., Federal Express, Airborne Express, etc.);
- Airbill or shipment tracking numbers; and
- The type of paperwork that accompanied the waste/sample shipment (e.g., manifests, etc.).

4.5 Photodocumentation

Photographs should be taken during all relevant field activities to confirm the presence or absence of contaminants encountered during fieldwork. Specific items to be documented include:

- Sample locations and collection activities;
- Site areas that have been disturbed or impacted, and any evidence of such impacts (i.e., stressed vegetation, seepage, discolored water, or debris);
- Hazardous materials requiring disposal, including materials that may not appear in the work plan;
- Any evidence that attests to the presence or absence of contamination; and
- Any features that do not appear in the work plan or differ from those described in the work plan.



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Documentation of any photographs taken during the course of the project must be provided in the logbook with a detailed description of what is shown in the photograph and the reason for taking it. This documentation should include:

- Make, model, and serial numbers of the camera and lens,
- Film type and number of exposures,
- Roll and frame number of the photograph;
- Direction or view angle of the photograph, and
- Name of the photographer.

4.6 Data Collection Forms

Certain phases of fieldwork may require the use of project-specific data collection forms, such as task data sheets or hazard categorization data sheets. Due to the specific nature of these forms, the information that should be included in the logbook cannot be fully discussed in this SOP. However, the following data should be included in the logbook:

- Results of any field tests or hazard categorization tests (i.e., ignitability, corrosivity, reactivity, etc.);
- The source from which any field sample was collected and its condition (i.e., drum, tank, lagoon, etc.).
- Other conclusions as a result of the data collected on data collection forms.

In many cases, rubber stamps that contain routine data collection forms can be manufactured ahead of time. These forms can be stamped into the logbook on an as-needed basis.



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Appendix A
Sample Logbook



RT 6130

WEDNESDAY JANUARY 26, 1994

PROPOSED WORK FOR DAY: COLLECT GROUNDWATER
SAMPLES FROM WELLS AND PIEZOMETERS AT
SITE 1 AND SITE 3. SHIP SAMPLES TO THE
ASC. CONTINGENTIZE PURGE WATER. MEET
WITH FRED CANSLER AND DISCUSS REMOVAL OF
CANOPIES AT SITES 1 AND 3 AND FILLING OF
EXCAVATIONS.

WEATHER ON SITE: CLOUDY AND WARM WITH
A HIGH TEMPERATURE OF 50° F. RAIN SHOWERS
WITH WINDS FROM THE SW AT 5-15 MPH.

EYE PERSONNEL ON SITE: G. JONES, J. MAYS,
S. MC CUNE

LOG

1330 ARRIVED ON SITE. THE GROUNDWATER
SAMPLING CREW WAS PREPARING TO PURGE
THE WELLS AND PIEZOMETERS IN THE FIELD
ACROSS THE ROAD FROM SITE 1. PURGING OF
WELLS BEING COMPLETED WITH HAND BOLLERS
SINCE PUMP IS INOPERATIVE.

1340 ARRIVED AT SITE 3. MW3-1 AND MW3-3
VALVELOCK AND OPEN. SCREENED BOTH WELLS.
SB - *S. Mc Cune* 1/26/94

RT 6130

1/26/94

1330 FRED CANSLER ARRIVED ON SITE. DISCUSSED
REMOVAL OF CANOPIES AND CLOSURE OF EXCAVATIONS
AT SITES 1 AND 3. FRED CANSLER STATED THAT
HE HAS A SOURCE FOR THE ROCK AND FOR
THE TOP SOIL FOR THE EXCAVATIONS.

1405 ARRIVED AT THE SITE WHERE FRED CANSLER
PROPOSES TO REMOVE THE FILL FOR THE EXCAVATIONS.
A HILL ON THE WEST SIDE ^{OF} OF THE WOODEN
NICKLE IS IN THE PROCESS OF BEING REMOVED.
THE ROCK CONSISTS OF WEATHERED SHALE SIMILAR
TO THE ROCK REMOVED FROM THE EXCAVATIONS.
FRED CANSLER PROPOSES TO USE THE ROCK TO
FILL THE EXCAVATIONS TO WITHIN ONE FOOT
OF GRADE.

1415 ARRIVED AT THE SITE WHERE FRED CANSLER
PROPOSES TO REMOVE TOP SOIL FOR THE EXCAVATIONS.
TOP SOIL REMOVED FROM THE YELLOW FREIGHT
LOT IS IN PILES ON THE NORTH SIDE OF THE
LOT.

1430 RETURNED TO SITE 3. FRED CANSLER WILL
ARRANGE TO REMOVE THE CANOPY OVER
THE EXCAVATION AT SITE 3 ON THURSDAY
MORNING AND WILL ARRANGE TO BRING
THE ROCK IN ON THURSDAY AFTERNOON.
TWO TRUCKS WILL BE USED TO HAUL THE
FILL. THE SUPPORTS HOLDING THE CANOPY
SB - *S. Mc Cune* 1/26/94

1/26/94 RI 6130

1430 (AHD) WILL BE CUT AND THE CANOPY DEIGNED AWAY FROM THE EXCAVATION.

1445 CONTACTED JOY INMAN FROM ENVIRONICS. TANKERS WILL BE ON SITE ON THURSDAY TO PUMP OUT THE EXCAVATION AT SITES 1 AND 3 AND ON FRIDAY TO REMOVE WATER AT SITE 1. A FRAC TANK WILL BE DELIVERED TO SITE 1 ON THURSDAY.

1515 SAMPLING CREW COMPLETED PACKING SAMPLES COLLECTED AT SITE 1. ALL WELLS AND PIEZOMETERS AT SITE 1 HAVE BEEN SAMPLED

1530 SAMPLING CREW COMPLETED PACKING SAMPLES AND SECURING DRUMS OF PURGE WATER.

1535 SAMPLING CREW DEPARTED SITE TO DELIVER SAMPLES TO FEDERAL EXPRESS.

1600 CONTACTED TIM GRADY FROM E+E. DISCUSSED CONVERSATION WITH FRED CANSLER AND STATUS OF WELL/PIEZOMETER SAMPLING.

1615 SECURED FOR DAY.

WORK COMPLETED: COLLECTED GROUNDWATER SAMPLES FROM SITE 1 WELLS AND PIEZOMETERS. DISCUSSED REMOVAL OF CANOPIES AND FILLING OF EXCAVATIONS WITH FRED CANSLER. SHIPPED SAMPLES TO ASC

Scott McInnis
1/26/94
40



THURSDAY JANUARY 27, 1994 RI 6130

PROPOSED WORK FOR DAY: COMPLETE COLLECTION OF GROUNDWATER SAMPLES AT SITE 3 AND SHIP THE SAMPLES TO THE ASC. REMOVE THE CANOPIES COVERING THE EXCAVATIONS AT SITES 1 AND 3. PUMP THE WATER OUT OF THE EXCAVATIONS AT SITES 1 AND 3 AND SHIP THE WATER OFF SITE TO OSCO. BACKFILL THE EXCAVATION AT SITE 3. REMOVE THE DRUMS FROM THE ROLL OFF BOX AND TRANSFER THE DRUMS TO THE WAREHOUSE.

WEATHER ON SITE: CLOUDY AND COOL WITH A HIGH TEMPERATURE OF 45°F. WINDS VARIABLE 10-20 MPH.

E+E PERSONNEL ON SITE: G. JONES, J. MAYS, S. MCGINE

LOG

0700 SCOTT MCGINE ARRIVED AT SITE 3.

0710 ENVIRONICS PERSONNEL ARRIVED AT SITE 3.

0715 HELD SITE SAFETY MEETING, DISCUSSED PHYSICAL AND CHEMICAL HAZARDS ASSOCIATED WITH SITE AND PROPOSED WORK FOR THE DAY.

0725 E+E SAMPLING TEAM ARRIVED ON SITE

41 *Scott McInnis* 1/27/94



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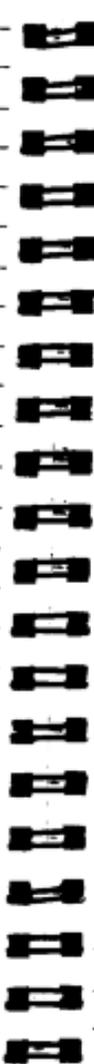
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1/27/94 RI 6130
0730 ETE SAMPLING CREW COMMENCED COLLECTING
SAMPLES AND PURGING MW'S-1 AND MW'S-2.
0800 FRED CANSLER ARRIVED ON SITE WITH
PERSONNEL TO REMOVE THE CANOPY OVER
THE EXCAVATION AT SITE 3. THE SUPPORTS
WERE CUT AND THE CANOPY WAS DROPPED
AWAY FROM THE EXCAVATION WITH TWO
TRACTORS.
0845 THE CANOPY REMOVAL AT SITE 3 COMPLETED
AND THE CREW DEPARTED FOR SITE 1.
0850 COMMENCED PUMPING WATER FROM THE
EXCAVATION INTO BRYSON TRAILER # 618CS.
0915 THE ETE SAMPLING TEAM COMPLETED COLLECTING
THE GROUNDWATER SAMPLES FROM MW'S-1,
MW'S-2, MW'S-3, AND MW'S-4. COMMENCED
PACKING SAMPLES.
0935 COMPLETED FILLING BRYSON TRAILER # 618CS
WITH 5,000 GALLONS OF WATER AND PREPARED
MANIFEST # 00941 FOR LOAD. COMMENCED
LOADING BRYSON TRAILER # 429.
1000 ETE SAMPLING TEAM DEPARTED THE SITE
TO DELIVER SAMPLES TO FEDERAL EXPRESS.
1030 ARRIVED AT SITE 1. THE CANSLER CREW
IS IN THE PROCESS OF REMOVING THE
CANOPY OVER THE EXCAVATION. CANOPY
IS NOT MOVING AS A UNIT.

42 *Swick* 1/27/94



RI 6130 1/27/94
1045 RETURNED TO SITE 3. ALL WATER IN THE
EXCAVATION HAS BEEN REMOVED EXCEPT
FOR THE ICE. BRYSON TRAILER # 429
LOADED WITH 5,200 GALLONS OF WATER. PREPARED
MANIFEST # 00942 FOR LOAD. BOTH TRAILERS
DEPARTED THE SITE.
1100 ENVIRONICS PERSONNEL OPENED THE DRUMS
OF DRILLING FLUIDS, DEVELOPMENT WATER
AND PURGE WATER AND FOUND THE DRUMS
FULL OF ICE. ENVIRONICS WILL CONTACT
GARY SHOCKLEY AND RECOMMEND THAT
THE DRUMS OR LIQUIDS BE TRANSPORTED
TO 0500 FOR TREATMENT SINCE THEY
CAN NOT BE BULKED.
1200 CANSLER CREW COMMENCED LOADING TRUCKS
WITH STONE FROM THE SITE WEST OF
THE WOODEN NICKEL.
1230 ARRIVED AT THE SITE WHERE THE STONE
WAS BEING LOADED. THE FILL MATERIAL
IS ALL UNDISTURBED WEATHERED BEDROCK.
1245 ARRIVED AT SITE 3. TWO LOADS OF
ROCK FILL HAVE BEEN DUMPED IN THE
EXCAVATION; AN ESTIMATED FOUR MORE
LOADS OF STONE WILL BE NEEDED TO
FILL THE EXCAVATION.
1300 ARRIVED AT SITE 1. BRYSON TRAILER # 617

43 *Swick* 1/27/94



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1. Introduction

This Standard Operating Procedure (SOP) outlines the procedures followed by Ecology and Environment, Inc. (E & E), for the entry of information into the geotechnical logbook, thereby ensuring that field activities are properly documented.

It is the responsibility of the site geologist to ensure that the proper information is collected in the field in order to fulfill the obligations of the contract.

2. Purpose

The purpose of this document is to establish the minimum content requirements of the geotechnical logbook entries for drilling projects. The document provides guidance to ensure that the documentation for drilling projects is correct, complete, and adequate for use in any potential legal proceeding. It is important to remember that field activity documentation can become evidence in civil and criminal law-enforcement proceedings, as well as in administrative hearings. Accordingly, such documentation is subject to judicial or administrative review; even more importantly, it is subject to the review of an opposing attorney attempting to discredit its value as evidence. Complete and accurate entries in the geotechnical logbook are important for two reasons: to maintain quality control, and to support any legal proceedings associated with the project.

3. Geotechnical Logbook Procedures

3.1 General Information

Information concerning the project can be found in the geotechnical logbook. The majority of the information should be obtained prior to arriving on site. Figure 1 is an example of a completed general information sheet.



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CLIENT: Chemical Corporation of America
JOB NUMBER: ZZ-1020

SITE NAME: ABC Landfill
DRILLER: Paul Barth E+E Drilling and Testing Company
LOCATION: CITY/TOWN: Midway
STATE: Tennessee

PROJECT MANAGER: Buff Walter
FIELD TEAM LEADERS: Marilyn Frappa 1
SITE SAFETY OFFICER(S): Greg Jones 1
TEAM MEMBERS: Paul Barth (EEDT)
Kevin Williamson (EEDT)

JOB START/FINISH DATE: 1/4/94 / 1/18/94
BOOK 1 OF 3

E&E CORPORATE: (716) 684-8060 FAX (716) 684-0844
E&E EMERGENCY RESPONSE CENTER: (716) 684-8940
E&E ANALYTIC SERVICE CENTER: (716) 631-0360 FAX (716) 631-0378
E&E EQUIPMENT SERVICE CENTER: (716) 681-9797 FAX (716) 681-4356
FEDERAL EXPRESS TOLL FREE: (800) 238-5355

PROJECT/CLIENT CONTACT(S)	AFFILIATION	PHONE
<u>Buff Walter</u>	<u>E+E</u>	<u>703/522-6065</u>

For inquires regarding the distribution, scope, and/or organization of the Geotechnical Logbook please contact:

Figure 1 General Information



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3.2 Daily Logs

3.2.1 General Guidelines

The following includes general guidelines for preparing the geotechnical logbook:

- A separate logbook must be maintained for each project.
- No pages can be removed for any reason, even if they are partially mutilated or illegible.
- All field activities (e.g., meetings, sampling, surveying) must be recorded in the geotechnical logbook.
- All information is **printed** legibly into the logbook in waterproof ink, preferably black. If weather conditions do not permit this (i.e., if it is too cold or too wet to write with ink), another medium such as a pencil may be used, but it should be specifically noted in the logbook why waterproof ink was not used.
- The language used in the geotechnical logbook should be objective, factual, and free of personal feelings or terminology that might prove inappropriate.
- Chronological entries are preferred. If entries cannot be made at the time observed, record them as soon as possible, noting both the time of the entry and the time of the observation.
- Each successive day's first entry is made on a new, blank page.
- Each page should be dated, and all entries should have a time notation based on the 24-hour clock (e.g., 0900 for 9:00 a.m., 2100 for 9:00 p.m.).
- At the completion of the drilling activity, the geotechnical logbook must be placed in the permanent project file.

3.2.2 Format

The information listed below is not meant to be all-inclusive. Each project manager is responsible for determining the information requirements for each geotechnical logbook; such information requirements will vary depending on the nature and scope of the project.

First Page: On the first page of every daily entry, the date and project number should be entered on the top line. The proposed work for the day, weather on site, and personnel



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on site follow below the date. Log entries include the time that personnel arrive on site, the time personnel depart the site, the time that site safety meetings are held (with signatures of the personnel attending the briefing), the levels of personal protection used by the team, specific activities undertaken (e.g., drilling operations, air monitoring, sample collection), and equipment calibration data. At the bottom of the page, the signature of the person keeping the log and the date should be entered.

Successive Pages: The date and project number should appear at the top of each successive page, and the person keeping the log should sign and date the page.

Last Page: On the last page of the daily log, the work completed that day and future plans and recommendations should be entered.

Samples: Each sample must be properly accounted for in the geotechnical logbook. Information entered in the log should include the location where the sample was collected; the time that the sample was collected; the type of sample (e.g., subsurface composite soil sample or groundwater sample); on-site measurement data (e.g., pH, temperature, conductivity); a preliminary description of the sample; preservatives used (if any); air monitoring instrument readings; and the Federal Express (or other carrier's) air bill number.

3.2.3 Photographs

If photographs are taken of soil samples, drill cuttings, or core samples, the following information should be entered in the geotechnical logbook:

- Time, location, direction, and weather conditions.
- Complete description or identification of the subject in the photograph and reason for taking the picture.
- Sequential number of photograph and film number.
- Camera type and serial number (e.g., Olympus 35-mm #1164916), and lens size and serial number (if appropriate).
- Name of photographer.

Upon return to the office, the above information will be used to prepare photograph logs.

3.2.4 Signature

Each page of the geotechnical logbook must be initialed by the person recording the information. When two individuals make entries on the same page, they must initial their own en-



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tries. The individual making the last entry on the page must sign and date the bottom of the page.

3.2.5 Corrections

If corrections are necessary, they may be made by drawing a single line through the entry and writing the corrected entry next to it. The correction must be initialed and dated. Do not render the incorrect notation illegible; make the correction in such a manner that the original entry can still be read.

3.3 Drilling Information

Information concerning the installation of the borehole is entered in the drilling log. The geotechnical logbook is divided in such a manner that the information for four boreholes can be entered in one logbook. In addition to information about the location, start and finish dates, drill rig, and driller, a sketch indicating the location where the borehole or well was installed should be drawn.

Sample information should also be included in this section. The number of blows it took to drive the split-barrel sampler 2 feet below the bottom of the hollow-stem augers in 6-inch intervals should be recorded. The amount of soil recovered in the split-barrel sampler, organic vapor readings noted in the sample, and soil components must also be recorded in this section. An example of a completed drilling log can be found in Figure 2.

3.4 Lithologic Description

A description of the materials used in the construction of the monitoring well and the type of well (e.g., screened or open-hole well) must also be recorded. Figure 3 is an example of a completed well installation diagram. In addition to the well installation diagram, a narrative description of the lithology of the soil and bedrock encountered is also recorded in this section.

3.5 Well Development Record

The proper development of monitoring wells will prevent the buildup of fines on the screened interval and will provide groundwater samples that are representative of the groundwater conditions. To determine the volume of water to be removed from the well, the inside diameter of the monitoring well or diameter of the borehole is determined and the appropriate line is found on the table in Figure 4.



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DRILLING LOG FOR MW1-1

Project Name ABC Landfill RI
 Site Location Midway, TN

Date	Time	Level (Feet)
1/6/94	1640	16.25
1/8/94	0920	13.75
1/14/94	0830	13.86
1/14/94	1020	14.26

Date Started/Finished 1/6/94 - 1/6/94
 Drilling Company E&E Drilling + Testing
 Driller's Name Paul Barth
 Geologist's Name Marilyn Frappa
 Geologist's Signature Marilyn Frappa
 Rig Type (s) RIEDRICH DSO
 Drilling Method (s) 4.25" HSA
 Bit Size (s) _____ Auger Size (s) 8" O.D.
 Auger/Split Spoon Refusal 24 ft
 Total Depth of Borehole is 24 ft
 Total Depth of Corehole is N/A

Well Location Sketch

Depth (Feet)	Sample Number	Blows on Sampler	Soil Components CL SL S GR	Rock Profile Recovery	(PPM) Head Space	Run Number	Core Recovery	RQD	Fracture Sketch	OVA (ppm)	Comments
0'-5' Asphalt		10 9									
1	1	16 19	SL/S	16"	0 PPM	1	N/A		NONE	0 PPM	
3		7 8									
4	2	10 9	SL/S	6"	0 PPM	2	N/A		NONE	0 PPM	
5		6 8									
6	3	5 9	SL/S	10"	0 PPM	3	N/A		NONE	0 PPM	
7		4 11									
8	4	23 10	SL/S	6"	0 PPM	4	N/A		NONE	0 PPM	
9		7 8									
10	5	10 9	SL/S	4"	0 PPM	5	N/A		NONE	0 PPM	
11		6 9									
12	6	26 32	S/GR	5"	28 PPM	6	N/A		NONE	1 PPM	
13		12 24									
14	7	34 48	S/GR	6"	0 PPM	7	N/A		NONE	0 PPM	

Figure 2 Drilling Information



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Stick-up <u>2</u> ft	SCREENED WELL Lock Number <u>IG 031</u>	OPEN-HOLE WELL	Stick-up _____ ft
Inner Casing Material <u>PVC</u>			Inner Casing Material _____
Inner Casing Inside Diameter <u>2</u> Inches			Inner Casing Inside Diameter _____ Inches
Top of Grout <u>0</u> ft	Quantity of Material Used: Bentonite _____ Pellets <u>2 Buckets</u> Cement <u>4 Bags</u> Cement/Bentonite _____ Grout _____ Top of Sand Pack <u>12'</u> Screen Slot Size <u>0.010</u> Screen Type <u>Continuous</u> <input checked="" type="checkbox"/> PVC <u>2"</u> <input type="checkbox"/> Stainless Steel _____		Top of Grout _____ ft
Borehole <u>8</u> Inches Diameter _____ ft			Bottom of Outer Casing _____ ft
Top of Seal at <u>10</u> ft			Borehole Diameter _____ ft
Bottom of Seal at <u>12</u> ft			Bedrock _____ ft
Top of Screen at <u>14</u> ft			Bottom of Rock Socket/ Grout/Casing _____ ft
Pack Type/Size: <input checked="" type="checkbox"/> Sand <u>20N</u> <input type="checkbox"/> Gravel _____ <input type="checkbox"/> Natural _____			Corehole Diameter _____
Bottom of Screen at <u>24</u> ft	Bottom of Hole at <u>24</u> ft		Bottom of Corehole _____ ft
	Bottom of Sandpack at <u>24'</u>		

NOTE: See page 109 and 110 for well construction diagrams

Depth-ft.	NARRATIVE LITHOLOGIC DESCRIPTION	Moisture Content		
		Dry	Moist	Wet
1	8" Asphalt then Fill - Black + Dry (cuttings)	●	○	○
2	↓	●	○	○
3	Fill Materials, Mainly Black Clinters, Some white Ash Last 3"	●	○	○
4	↓	●	○	○
5	Brown Sandy-Silt Matrix about 50% Small Large Gravel, Subangular	●	●	○
6	↓	●	●	○
7	Some as above	○	●	○
8	↓	○	●	○
9	Some as about	○	●	○
10	↓	○	●	○
11	Same as about with large gravel ~2", Hoist, 1PPM	○	●	○
12	↓	○	●	○
13	3" Rock + Ground Rock, Grey Sands wet	○	○	●
14	↓	○	○	●

Figure 3 Well Construction/Lithologic Description



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WELL DEVELOPMENT RECORD

SITE ABC Landfill DATE 1/14/94
 LOCATION Midway, TN WELL NO. MW1-1

MEASUREMENT OF WATER LEVEL AND WELL VOLUME

- Prior to sampling, the static water level and total depth of the well will be measured with a calibrated weighted line. Care will be taken to decontaminate equipment between each use to avoid cross contamination of wells.
- The number of linear feet of static water (difference between static water level and total depth of well) will be calculated.
- The static volume will be calculated using the formula:

$$V = Tr^2 (0.163)$$

Where:
 V = Static volume of well in gallons;
 T = Depth of water in the well, measured in feet;
 r = Inside radius of well casing in inches;
 and 0.163 = A constant conversion factor which compensates for π^2 factor for the conversion of the casing radius from inches to feet, the conversion of cubic feet to gallons, and (pi).
 1 well volume (v) = _____ gallons.

Diameter of Casing or Hole (in)	Gallons per Foot of Depth	Cubic Feet per Foot of Depth	Liter per Meter of Depth	Cubic Meters per Meter of Depth
1	0.041	0.0055	0.509	0.509 x10 ³
1 1/2	0.092	0.0123	1.142	1.142 x10 ³
2	0.153	0.0218	2.024	2.024 x10 ³
2 1/2	0.255	0.0341	3.167	3.167 x10 ³
3	0.357	0.0491	4.558	4.558 x10 ³
3 1/2	0.500	0.0668	6.209	6.209 x10 ³
4	0.653	0.0873	8.110	8.110 x10 ³
4 1/2	0.826	0.1104	10.260	10.260 x10 ³
5	1.020	0.1364	12.670	12.670 x10 ³
5 1/2	1.234	0.1650	15.330	15.330 x10 ³
6	1.459	0.1963	18.240	18.240 x10 ³
7	2.000	0.2673	24.840	24.840 x10 ³
8	2.611	0.3491	32.430	32.430 x10 ³
9	3.305	0.4418	41.040	41.040 x10 ³
10	4.030	0.5454	50.670	50.670 x10 ³
11	4.937	0.6600	61.310	61.310 x10 ³
12	5.875	0.7854	72.960	72.960 x10 ³
14	8.030	1.0690	99.350	99.350 x10 ³
16	10.440	1.3960	129.650	129.650 x10 ³
18	13.220	1.7670	164.180	164.180 x10 ³
20	16.320	2.1820	202.690	202.690 x10 ³
22	19.750	2.6400	245.280	245.280 x10 ³
24	23.500	3.1420	291.850	291.850 x10 ³
26	27.530	3.6870	342.520	342.520 x10 ³
28	32.000	4.2760	397.410	397.410 x10 ³
30	36.720	4.9090	456.020	456.020 x10 ³
32	41.790	5.5850	518.870	518.870 x10 ³
34	47.190	6.3050	585.680	585.680 x10 ³
36	52.890	7.0690	656.720	656.720 x10 ³

1 Gallon = 3.785 liters
 1 Meter = 3.281 feet
 1 Gallon water weighs 8.33 lbs. = 3.785 kilograms
 1 Liter water weighs 1 kilogram = 2.205 pounds
 1 Gallon per foot of depth = 12.419 liters per foot of depth
 1 Gallon per meter of depth = 12.419 x 10³ cubic meters per meter of depth

INITIAL DEVELOPMENT WATER
 WATER LEVEL (TOIC) 13.86'
 WELL DEPTH (TD) 24
 COLOR Brown Silty
 ODOR Musty
 CLARITY Opaque

FINAL DEVELOPMENT WATER
 WATER LEVEL (TOIC) 14.26'
 WELL DEPTH (TD) 24'
 COLOR Clear
 ODOR None
 CLARITY Clear

DESCRIPTION OF DEVELOPMENT TECHNIQUE Stainless Steel Hand Pump
measured volume removed with bucket.

Figure 4 Well Development Record



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3.6 Well Development—Parameter Measures

Physical measurements are made on samples of the groundwater during well development. At routine intervals, a sample of the development water is tested for temperature, conductivity, corrosivity (pH), and turbidity. The results of each test are recorded as shown in Figure 5. When two consecutive tests have the same readings, development of the well is considered complete.

3.7 Investigation-Derived Waste Inventory

In most instances, the drill cuttings, drilling fluids, development and purge water, and personal protective equipment must be containerized and handled as a hazardous waste as described by the Resource Conservation and Recovery Act (RCRA) until analytical results are available to reclassify the wastes. All hazardous wastes must be properly marked and labeled and must be disposed of in a specific period of time. The contents of each container, the source of the waste, the date that the waste was generated, the approximate volume of waste in the container, and the location where the container is being stored must be noted in the geotechnical logbook. Figure 6 is an example of a completed investigation-derived waste inventory sheet.

4. Trip Report

The geologist or team leader is responsible for filing a trip report upon returning to the office. The trip report must include information regarding the persons making the trip; the date of the trip; location of the trip; and, most importantly, the purpose of the trip. The trip report provides the means to convey information gathered and observed to the project manager. Trip reports should be written and submitted within two working days of return from a trip. Figure 7 shows the format for a trip report.

5. References

United States Environmental Protection Agency, 1986, RCRA Groundwater Monitoring Technical Enforcement Guidance Document, OSWER Directive 9950-1, September 1986.

_____, 1986, Region IV Engineering Support Branch, Standard Operating Procedures and Quality Assurance Manual, April 1986.



Title:	SAMPLE PACKAGING
Category:	ENV 3.16
Revised:	May 2001

STANDARD OPERATING PROCEDURE

SAMPLE PACKAGING

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TITLE: SAMPLE PACKAGING

CATEGORY: ENV 3.16

REVISED: May 2001

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TITLE: SAMPLE PACKAGING

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1. Introduction

Liquid and solid environmental samples are routinely collected by E & E during field surveys, site investigations, and other site visits for laboratory analysis. Unless the samples have anesthetic, noxious, or other properties that could inhibit the ability of a flight crew member to perform his or her duty or are known to meet the established U.S. Department of Transportation criteria for hazardous material (i.e., explosive, corrosive, flammable, poisonous), they are not regulated as hazardous materials.

This Standard Operating Procedure (SOP) describes the packaging procedures to be used by E & E's staff to ensure the safe arrival of the samples at the laboratory for analyses. These procedures have been developed to reduce the risk of damage to the samples (i.e., breakage of the sample containers), promote the maintenance of sample temperature within the cooler, and prevent spillage of the sampled material should a container be broken.

In the event the sample material meets the established criteria of a DOT hazardous material, the reader is referred to E & E's Hazardous Materials/Dangerous Goods Shipping Guidance Manual (see H&S 5.5).

2. Scope

This SOP describes procedures for the packaging of environmental samples in:

- Coolers;
- Steel, aluminum and plastic drums; and
- 4GV fiberboard boxes.

The Hazardous Materials/Dangerous Goods Shipping Guidance Manual will complete the information needed for shipping samples by providing guidance on:

- Hazard determination for samples which meet the USDOT definition of a hazardous material;
- Shipping profiles for "standard" shipments;
- Shipping procedures for "non-standard" shipments;
- Marking of packages containing hazardous materials;
- Labeling of packages containing hazardous materials; and
- Preparation of shipping papers for hazardous materials shipment.



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3. Sample Packaging Procedures

3.1 General

It is E & E's intent to package samples so securely that there is no chance of leakage during shipment. This is to prevent the loss of samples and the expenditure of funds for emergency responses to spills and the efforts necessary to re-obtain the sample.

Over the years, E & E has developed several "standard" package configurations for the shipping of environmental samples. These standard package configurations are described below.

Liquid samples are particularly vulnerable. Because transporters (carriers) do not know the difference between a package leaking distilled water and a package leaking a hazardous chemical, they will react to a spill in an emergency fashion, potentially causing enormous expense to E & E for the cleanup of the sample material. Therefore, liquids are to be packed in multiple layers of plastic bags and absorbent/cushioning material to preclude any possibility of leaks from a package. This section defines the standard packaging configurations for environmental samples.

3.2 Liquid Environmental Sample Packaging Procedures

Liquid environmental samples should be collected and preserved as outlined in the Standard Operating Procedures (SOP) for Surface Water Sampling (ENV 3.12), and Groundwater Well Sampling (ENV 3.7). ***Preserved water samples are not considered to meet the HM/DG definitions of Class 8 (Corrosive) and are therefore considered to be nonhazardous samples.*** Liquid environmental samples may be shipped using an 80-quart cooler or an outer package consisting of either a steel or aluminum drum. Because the steel and aluminum drums provide little insulating capability, they should not be used for samples that require icing.

Packaging Liquid Environmental Samples Using the 80-Quart Cooler

- Label and seal all water sample bottles according to appropriate sampling SOPs;
- Secure the bottle caps using fiberglass tape; and
- Place each amber, poly, and volatile organic analysis (VOA) bottle in a sealable plastic bag. Mark the temperature blank VOA bag for identification.

If a foam block insert is used:

- Line the cooler with two plastic bags;
- Place a foam insert (with holes cut to receive the sample bottles) inside the plastic bag;
- Place the bottles in the holes in the foam block;



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- Fill void spaces with bagged ice to the top of the cooler;
- Fold over the plastic bags lining the cooler and secure shut with tape;
- Place Chain-of-Custody (C-O-C) form in a sealable bag and tape it to the inside of the cooler lid; and
- Secure the cooler with strapping tape and custody seal. Cover the custody seals with clear tape.

If vermiculite is used:

- Place 1 inch of inert absorbent material (vermiculite) in the bottom of the cooler;
- Line the cooler with two plastic bags;
- Place each sample bottle inside the inner bag;
- Fill the void spaces around the bottles with vermiculite to about half the height of the large bottles;
- Fill the remainder of the void spaces with bagged ice to within 4 inches of the top of the cooler, making sure the VOAs are in direct contact with a bag of ice;
- Fold over the plastic bags lining the cooler and secure shut with tape;
- Fill the remaining space in the cooler with vermiculite to the top of the cooler;
- Place C-O-C form in a sealable bag and tape it to the inside of the cooler lid; and
- Secure the cooler with strapping tape and custody seal. Cover the custody seals with clear tape.

Alternate Packaging Using 1A2/1B2 Drum

- Place 3 inches of inert absorbent material (vermiculite) in the bottom of the drum;
- Line the drum with two plastic bags;
- Place each sample bottle inside the inner bag;
- Fill the void spaces around the bottles with vermiculite to the height of the larger bottles;



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- Fold over the plastic bags lining the drum and secure shut with tape;
- Fill the remaining space in the drum with vermiculite to the top of the drum;
- Place C-O-C form in a sealable bag and tape it to the inside of the drum lid; and
- Secure the drum with closing ring and apply custody seals. Cover the custody seals with clear tape.

3.3 Soil/Sediment Environmental Sample Packaging Procedures

Soil/sediment environmental samples should be collected as outlined in the SOP for Soil Sampling (ENV 3.13), and SOP for Sediment Sampling (ENV 3.8). Soil/sediment environmental samples may be shipped using an 80-quart cooler, a 4GV fiberboard combination package, or an outer package consisting of either a steel or aluminum drum. Because the steel and aluminum drums provide little insulating capability, they should not be used for samples that require icing.

Packaging Soil/Sediment Environmental Samples

- Label and seal each sample container according to SOPs;
- Secure the bottle caps using fiberglass tape;
- Place each sample bottle inside a sealable plastic bag and place it in its original shipping box or in individual fiberboard boxes. Mark the temperature blank bag for identification; and
- Secure the original shipping box with strapping tape, place shipping box in a plastic bag, and secure the plastic bag with tape.

If an 80-quart cooler is used:

- Place bubble pack or similar material on the bottom and sides of an 80-quart cooler;
- Place the bagged shipping boxes in the cooler with a layer of bubble pack between each box;
- Fill the void spaces with “blue ice” or ice in baggies to the top of the cooler;
- Place C-O-C form in a sealable baggie and tape it to the inside of the cooler lid; and
- Secure the cooler with strapping tape and custody seal. Cover the seals with clear tape.



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If a 1A2/1B2 drum is used:

- Place 3 inches of inert absorbent material (vermiculite) in the bottom of the drum;
- Line the drum with two plastic garbage bags;
- Place the boxes inside the inner bag;
- Fill the space around the samples with vermiculite;
- Fold over the plastic bags lining the drum and secure shut with tape;
- Fill the remaining space around the bags with vermiculite to the top of the drum;
- Place C-O-C form in a sealable bag and tape it to the inside of the drum lid; and
- Secure the drum with the closing ring and apply custody seals. Cover the custody seals with clear tape.

Note: If a small number of samples are being shipped, it may be more practical to package them using the vermiculite or foam block configurations used for shipping liquid samples.

4. Shipping Procedures

Environmental samples are to be shipped as nonhazardous cargo. Unless the samples have anesthetic, noxious, or other properties that could inhibit the ability of a flight crew member to perform his or her duty or are known to meet the established U.S. Department of Transportation criteria for a hazardous material (i.e., explosive, corrosive, flammable, poisonous), they are not regulated as hazardous materials. When preparing the containers (i.e., cooler, drum, or box) for shipment, E & E staff must remove all labels from the outside container. Labels indicating that the contents may be hazardous are misleading and are not appropriate. Markings indicating ownership of the container, destination, and chain of custody labels are acceptable and can be attached as required.

When completing the paperwork for shipment, the standard nonhazardous forms must be used. Do not use the hazardous materials/dangerous goods airbills, either in total or in part; these forms are coded and their use will invite unnecessary questions. This will only serve to confuse Airborne or Federal Express' terminal personnel and will cause much frustration and the delay of sample shipment.

Environmental sample packages can be shipped overnight by both Airborne and Federal Express. When choosing between the two, cost should be considered. It is normally much cheaper to ship Airborne. For work conducted and paid for by E & E, it is E & E's policy that you must first attempt to ship by Airborne before considering Federal Express. In addition, Airborne tends to have remote locations open later in the evenings than Federal Express, which may



TITLE:	SAMPLE PACKAGING		
CATEGORY:	ENV 3.16	REVISED:	May 2001

be helpful when trying to complete a full day's sampling effort and still make the flights on time. Although both companies offer pickup of samples at the site, it is advisable to call ahead and ensure that this service is offered beforehand. In almost all cases, both companies will deliver to the laboratory of your choice on Saturdays. When planning for sampling activities, check with the companies in advance to verify pick-up and delivery schedules.

APPENDIX B

Field Forms

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APPENDIX C

Health and Safety Plan

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HEALTH AND SAFETY PLAN

Oakland Bay Sediment Characterization Shelton, Washington

Prepared for

Washington State Department of Ecology

September 19, 2008

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Attachment 4	Waterborne Vessel Safety Plan

Acronyms

ACGIH	American Conference of Governmental Industrial Hygienists
BTEX	benzene, toluene, ethylbenzene, and xylene
CFR	Code of Federal Regulations
CPR	cardiopulmonary resuscitation
Ecology	Washington Department of Ecology
E&E	Ecology and Environment
ERP	Emergency Response Plan
ESCBA	escape self-contained breathing apparatus
FID	flame ionization detector
HASP	health and safety plan
HAZWOPER	Hazardous Waste Operations/Emergency Response
IDLH	immediately dangerous to life and health
LEL	lower explosive limit
LFC	lowest feasible concentration
mg/m ³	milligrams per cubic meter
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
MSDS	Material Safety Data Sheet
MTCA	Model Toxics Control Act
NIOSH	National Institute of Occupational Safety and Health
OSHA	Occupational Safety and Health Administration
OVA	organic vapor analyzer
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
PCP	pentachlorophenol
PEL	permissible exposure limit
PID	photoionization detector
PPE	personal protective equipment
PPL	personal protection level (A, B, C, D)
ppm	parts per million
REL	recommended exposure limit
RSS	Research Support Services
SCBA	self-contained breathing apparatus
SHSO	site health and safety officer
STEL	short-term exposure limit
SVOC	semivolatile organic compound
TLV	threshold limit value
TWA	time weighted average
VOC	volatile organic compound
U.S. EPA	United States Environmental Protection Agency
WAC	Washington Administrative Code
WISHA	Washington Industrial Safety and Health Act
WWTP	wastewater treatment plant

1.0 General Site Requirements and Background Information

1.1 Health and Safety Plan Organization and Responsibilities

1.1.1 Key Personnel

Herrera Principal-in-Charge:	Rob Zisette
Corp. Health & Safety Officer:	Peter Jowise
Herrera Project Manager:	Peter Jowise
Herrera Site Health and Safety Officer:	Bruce Carpenter
Herrera Field Personnel:	Brady Hanson Bruce Carpenter Gina Catarra George Iftner
Subcontractor Field Supervisor (RSS):	Eric Parker
Prime Consultant Project Manager (E&E):	Andy Hafferty
Client Project Manager (Ecology):	Cynthia Erickson

1.1.1.1 Principal in Charge

The Principal in Charge provides a point of contact if the Project Manager cannot be accessed during emergency situations.

1.1.1.2 Project Manager

The Project Manager provides technical support to the Site Health and Safety Officer for health and safety decision-making. Prior to beginning onsite work, the Project Manager will ensure that employee training and medical clearance are current and up-to-date.

1.1.1.3 Site Health and Safety Officer

The Site Health and Safety Officer (SHSO) shall be responsible for coordinating emergency response measures during this project. All workers shall report to the Site Health and Safety Officer in the event of an emergency. Within 24 hours of the end of fieldwork, the SHSO will submit the completed HASP to the Corporate Health and Safety Officer.

The SHSO will oversee the overall Plan. He has the authority to stop work or prohibit any personnel from working on the site at any time for not complying with any aspect of the Plan.

1.1.1.4 Subcontractor Field Supervisor

The Subcontractor Field Supervisor is responsible for implementing the Plan for his own employees.

1.1 All Onsite Personnel

Each person on the site has responsibility for their own health and safety, as well as assisting others in carrying out the Plan. Any person observed to be in violation of the Plan should be assisted in complying with the Plan, or reported to the SHSO or the Subcontractor Field Supervisor.

Any site personnel may shut down field activities if there is a real or perceived immediate danger to life or health.

1.2 Minimum Training, Respirator Fit-Testing, and Medical Surveillance Requirements for Site Personnel

1.2.1 Training

All field workers have received health and safety training required by OSHA (29 CFR 1910.120) and WISHA (WAC 296-843-200), including some or all of the following:

- 40/80 hrs. Hazardous Waste Operations/Emergency Response training (HAZWOPER)
- 8 hrs. Annual HAZWOP Refresher training
- 8 hrs. Supervisor HAZWOP training for Site Health and Safety Officer
- First Aid and CPR training
- Annual Respirator Fit Testing
- Annual Medical Clearance.

Copies of personnel training certifications are presented in Attachment 3 of this HASP.

1.2.2 Medical Surveillance

The Herrera medical surveillance program is described in the corporate health and safety plan. In summary, all Herrera employees potentially exposed to hazardous substances or health hazards for 30 days or more a year will participate in the program. The medical surveillance program includes a determination of fitness for each individual to work in hazardous environments, including use of various levels of personal protective equipment. Medical examinations are conducted on a regular basis (usually annually) and each person's condition reviewed at that time. The Corporate Health and Safety Officer maintains medical records in a designated file and are available for review by each affected employee.

2.0 Post

Local Emergency and Project Telephone Numbers

2.1 Site Address and Phone Number

Site Address: NA (for hospital route map use Shelton Marina - 661 E. Pine St.)

Site Phone Number: NA

2.2 Local Emergency Phone Numbers

	Name	Telephone No.*
Hospital	Mason General Hospital	360-426-1611
Ambulance	Mason County Medic One	360-426-3403
Police/Sheriff	Shelton City Police Department	360-426-4441
Fire	Shelton Fire Department	360-426-3348
Utilities	UULS (Washington)	(800) 424-5555
Other:	Emergency pager/cell phone	

* Include phone numbers other than "911".

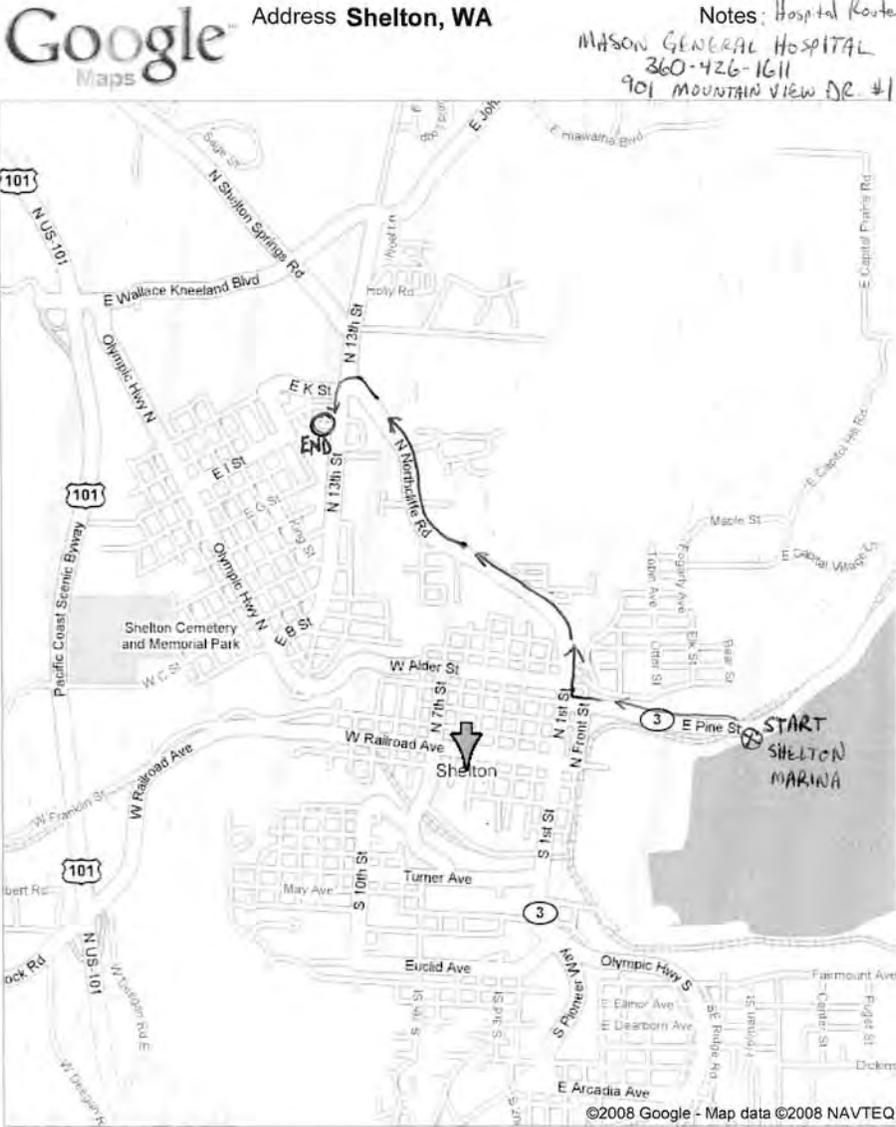
2.3 Project Personnel Phone Numbers

	Name	Telephone No.
Site Health and Safety Officer	Bruce Carpenter	(206) 441-9080 wk
Project Manager	Peter Jowise	(206) 441-9080 wk; (206) 780-5712 hm
Principal-in-Charge	Rob Zisette	(206) 441-9080 wk; (206) 930 6585 cell
Client Contact	Cynthia Erickson	(360) 407-6361
Corporate Health & Safety Officer	Peter Jowise	(206) 441-9080 wk; (206) 780-5712 hm
Subcontractor Field Supervisor	Eric Parker	(206) 550-5202 cell

3.0 Post Hospital Location Map

loc: Shelton, WA - Google Maps

Page 1 of 1



<http://maps.google.com/maps?hl=en&ic=UTF8&near=Shelton,+WA&fb=1&ll=47.218694,-123.10...> 4/4/2008

4.0 Emergency Response Plan

4.1 Injury or Exposure

If an injury or exposure occurs, take the following actions:

- Get First Aid for the person immediately.
- Notify the Site Health and Safety Officer (SHSO). The SHSO is responsible for immediately notifying the Project Manager, and preparing and submitting an Injury/Exposure Report (Attachment 1) to the Corporate Health and Safety Officer within 24 hours, as well as notifying the employee's supervisor and Principal-in-Charge. If a subcontractor employee is injured, the Subcontractor Field Supervisor will also complete their own injury/exposure investigation and submit a copy of their report to the Corporate Health and Safety Officer as well.
- The SHSO will assume charge during a medical emergency.

4.2 Site Incident

If an incident occurs, take the following action:

- Notify the SHSO immediately. The SHSO is responsible for immediately notifying the Project Manager, and preparing and submitting a Site Incident Report (Attachment 1) to the Corporate Health and Safety Officer within 24 hours.

Local Emergency and Project Telephone Numbers See page 5.

4.3 Emergency Routes

Also see Hospital Location Map—page 6.

Hospital Name:	<u>Mason General Hospital</u>
Hospital Address:	<u>901 Mountain View Drive #1</u>
Hospital Phone Number:	<u>360-426-1611</u>

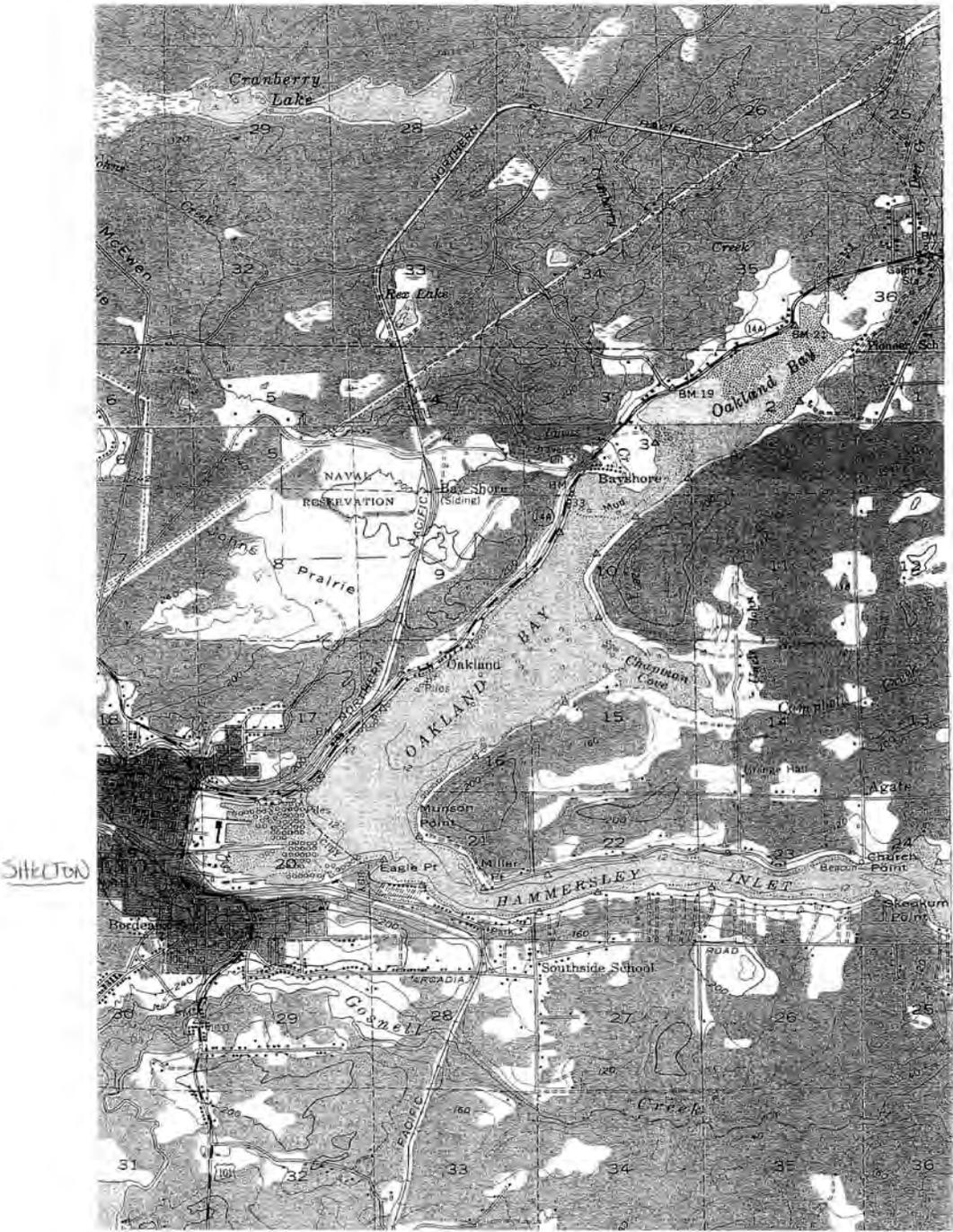
Route from onsite work area to hospital:

- Take E. Pine St. (Hwy 3) West towards Shelton (0.5 mile)
- Turn RIGHT (north) on N. 1st St. (0.1 mile)
- N. 1st St. becomes N. Northcliffe Rd. (1.1 miles)
- Turn LEFT (south) on N. 13th Street (69 feet)
- Turn RIGHT (west) on Mountainview Drive Rd. (Hospital is straight ahead.)

5.0 Post

Site Map

(Include work/exclusion zones)



6.0 Scope of Work

The purpose of this work assignment is to perform a characterization of marine sediment throughout Oakland Bay, including northeast Oakland Bay, Shelton Harbor, and the west end of Hammersley Inlet (i.e., to Miller Point) to support the prioritization of cleanup and restoration actions under the Puget Sound Initiative.

Field crews will be collecting surface and subsurface sediment samples to be processed and sent to the laboratory for chemical analysis.

6.1 Detailed Description of Specific Tasks Planned

Number each separate task in order of progression:

	Task Description
Task 1.	Collection of sediment samples for chemical analysis.
Task 2.	
Task 3.	
Task 4.	
Task 5.	

6.2 Initial Site Entry

Has this been performed by Herrera? (Yes/No): No

If yes, describe:

6.3 Interior Work and Confined Spaces

Will any work be done inside an enclosure, building, or confined space? (Yes/No): No

If yes, describe:

6.4 Excavation and Trenching

Excavation and/or trenching will be done on this site? (Yes/No): No

6.5 Landfills and Other Areas Potentially Containing Explosive Gas or Vapor

Site is in an area containing a current/former landfill, or the geology contains known/suspected pockets of explosive gas/vapor? (Yes or No): No

If yes, describe:

6.6 Time of OnSite Work

Work will be done during daylight hours? (Yes/No): Yes

If no, describe:

6.7 Hazardous Materials

Will any hazardous materials (chemicals) be used on-site? (If so, include MSDSs under Attachment 5.) (Yes/No): No

If yes, describe:

7.0 Site Characteristics

7.1 Facility/Site Description

Identify structures, buildings, pits, impoundments, and work area, as well as water supply and mains, telephone, radio, power lines, traffic patterns, gas lines, terrain, vacant lots, debris, other physical hazards, etc.:

Work will be conducted in boats and on foot along the shoreline throughout Oakland Bay.

7.2 Site Status

Site Status: Occupied? (Yes or No): Yes

If yes, describe current activities and relationship to field work: Boat traffic and log rafting operations are expected to be encountered, primarily in Shelton Harbor. Shellfish beds also will be crossed, primarily in north Oakland Bay.

7.3 Site History and Background Information

Oakland Bay is a shallow estuary located in South Puget Sound, with the City of Shelton and its industrial waterfront and harbor located at the southwest corner of the bay. Water depth of the bay ranges between 10 and 35 feet, with shallow and broad intertidal zones exposed during low tides at the north end of the bay and in Shelton Harbor. Due to the restrictive nature of Hammersley Inlet, a long narrow waterway linking the bay to the Puget Sound Basin, the water in Oakland Bay has high refluxing, low flushing, and high retention rates. Eight major freshwater creeks discharge into the bay. The waters of Shelton Harbor and the northern portions of Oakland Bay are currently listed as impaired by the State of Washington because of fecal coliform bacteria levels. Fecal coliform contamination from excessive infiltration and inflow to Shelton's aging sewer and stormwater collection systems, residential septic systems, and surface water runoff from small farms, may have contributed to recent closures of shellfish harvesting in portions of the bay.

The Shelton waterfront and harbor have been historically and are currently used by a number of timber and wood product manufacturing industries, including saw mills and plywood manufacturing, pulp and paper production, and insulation board and fiber board manufacturing. Over the years, process chemicals and wastewater from wood-product manufacturing processes have either been discharged through onsite industrial stormwater systems or were released due to accidental spills and leaks to the harbor, to Shelton and Goldsborough Creeks, or across upland portions of the waterfront.

Barges loaded with wood chips used by the pulp mill for processing into pulp, have historically moored in the harbor adjacent to the pulp mill. Logs used in lumber, plywood, and fiber board manufacturing were rafted and stored in the water prior to processing at sawmills and plywood plants from the late 1800s through the late 1960s. Log rafts continue to be stored throughout Shelton Harbor and Oakland Bay.

Bulk fuel storage marine terminals have operated either at the north end of Shelton Harbor or about a half mile northeast of Shelton along the west shore of Oakland Bay. Petroleum-related contaminants have been identified in sediments collected within the intertidal zone adjacent to the former Evergreen Fuel marine terminal at the north end of the harbor.

The scope of this study is limited geographically to the intertidal and aquatic areas of Oakland Bay, including northeast Oakland Bay, Shelton Harbor, and the west end of Hammersley Inlet (i.e., to Miller Point).

8.0 Personal Protective Equipment Requirements

The Site Health and Safety Officer is responsible for establishing and coordinating procedures for evacuation of all onsite personnel, including non Herrera personnel, prior to commencement of work. This plan will be reviewed at the site safety meeting conducted at the beginning of the first day of work (and at subsequent site safety meetings as warranted by changing conditions and addition of new site workers). A Daily Tailgate Health and Safety Meeting Form (Attachment 2) is to be completed and signed by all personnel who attended the site safety meetings.

In the event of a potential emergency, as determined by any onsite worker, the Site Health and Safety Officer will be notified and all site personnel assembled at an area designated during the site safety meeting. The Project Manager, with the aid of the Site Health and Safety Officer and other site workers, will decide the appropriate response depending onsite conditions.

The following equipment shall be maintained onsite at all times:

- First-aid kit
- Emergency eye wash
- Fire extinguisher (A, B, C).

All personnel who perform work on-site will be minimally required to meet the protective clothing and safety equipment requirements listed here for Level D. Level D status will apply to fieldwork on the site unless the trigger mechanism(s) to Level C are activated.

Personal Protection - Level D

(‘X’ if applicable)

	Protective Clothing		Safety Equipment
X	Cotton coveralls/long-sleeved shirt and pants		Photoionization detector
X	Rubber boots		Flame ionization detector
X	Hard hat (required when davit in use)	X	Personal floatation devices (PFD)
X	Safety glasses/goggles	X	Visual distress signal (VDS), (flashlight or orange flag)
X	Work gloves	X	U.S. Coast Guard-certified fire extinguisher
X	Solvex gloves (for sample handling)		
	Disposable boot covers		
	Ear plugs		
	Reflective vests		
	Insulated coveralls		

Personal Protection – Level C

Level ‘C’ personal protection includes level ‘D’ plus:

General Protective Clothing	Specific Model or Type
Air-purifying respirator	
Cartridges	
Inner gloves	
Outer gloves	
Chemical resistant boots or boot covers	
Chemical resistant suit	

The Site Health and Safety Officer must notify the Health & Safety Manager at the end of work that day if Level ‘C’ was used.

Personal Protection – Level B

Level ‘B’ personal protection includes level ‘D’ plus:

General Protective Clothing	Specific Model or Type
Self-contained breathing apparatus or supplied air respirator	
Inner gloves	
Outer gloves	
Chemical resistant boots or boot covers	
Chemical resistant suit	

The Site Health and Safety Officer must notify the Health & Safety Manager at the end of work that day if Level ‘B’ was used.

9.0 Hazard Identification

Hazards may exist in a number of forms on the site and shall be classified among three general categories: chemical, physical, and biological. The following list is meant to convey the general hazard classes that may be encountered on the site.

(Shade all hazard classes that will or may exist on the site.)

Chemical Hazards	Physical Hazards	Biological Hazards
Asbestos	Animal/Human Contact	Coliform Bacteria
Flammable Liquids/Gases	Climatic Hazards	CSO Effluent
Metals	Confined Space Entry	Hospital Waste
PCBs	Drilling Rigs	Human Blood
Pesticides/Herbicides	Earth Moving Equipment	Landfill Waste
Petroleum Hydrocarbons	Electrical Hazards	Pathogens
Volatiles	Explosives	Untreated Sewage
Semivolatiles	Falling Hazards	WWTP Sludges
Toxic Liquids/Gases	Heavy Lifting	Poisonous Insects/Snakes
Dioxins	Radioactive Isotopes	Viruses
	Transportation Hazards	
	Water Hazards	

9.1 Potential Chemical Hazards

Chemical hazards will be evaluated both by visual examination of site conditions, as well as by use of monitoring equipment. Visual indications of potential chemical hazards include evidence of dead or dying vegetation, dead animals, discolored vegetation or soil, sheens on water, non aqueous liquids, etc. Monitoring equipment to be used at this site is discussed in under General Site Procedures.

(List the specific compounds and matrices that have been or may be encountered on the site. If none or unknown, list as "none" or "unknown". Do not leave a list blank. If the concentration is known include either or both the average and maximum values.)

Petroleum Products			Volatiles		
Chemical	Matrix	Regulatory Action Level	Chemical	Matrix	Regulatory Action Level
Diesel	Sed	2,000 mg/kg			
Lube oil	Sed	2,000 mg/kg			

Semivolatiles			Metals		
Chemical	Matrix	Regulatory Action Level	Chemical	Matrix	Regulatory Action Level
Benzo(a)pyrene	Sed	0.1 mg/kg	Arsenic	Sed	20 mg/kg
			Cadmium	Sed	2 mg/kg
			Chromium	Sed	2,000 mg/kg
			Lead	Sed	250 mg/kg
			Mercury	Sed	2 mg/kg

Pesticides/PCBs			Other		
Chemical	Matrix	Regulatory Action Level	Chemical	Matrix	Regulatory Action Level
PCB Mixtures	Sed	1 mg/kg	Dioxins/Furans (tcdd;2,3,7,8-)	Sed	6.67E-06
DDT	Sed	3 mg/kg			

References: MTCA method A and method B (2007).

9.2 Potential Physical Hazards

"X" if applicable	Hazards	Hazard Control Measures
	Overhead utilities (describe):	Identify/locate and mark existing utilities prior to work. Ensure that overhead utility lines are at least 15 feet away from project activities. Contact utility companies to confirm locations, as necessary. Complete Utility Clearance Log (Attachment 2)
	Underground utilities (describe):	Identify/locate and mark existing utilities prior to work. Contact utility companies to confirm locations, as necessary. Complete Utility Clearance Log (Attachment 2)
	Geoprobe drilling	Wear hard hat, steel-toe boots, and noise protection. Maintain line of sight between drillers and field personnel.
	Drilling	Identify/locate underground utilities prior to drilling activities. Hand auger first 5 feet to ensure clearance of underground utilities. Wear hard hat, steel-toe boots, and noise protection. Maintain line of sight between drillers and field personnel.
	Excavation/Trenching	Ensure that any required sloping or shoring systems are approved as per 29 CFR 1926 Subpart P. Identify special PPE and monitoring needs if personnel are required to enter approved excavated areas or trenches. Maintain line of sight between equipment operators and personnel in excavations/trenches. Suspend or shut down operations at signs of cave in, excessive water, defective shoring, changing weather, or unacceptable monitoring results.
X	Heavy Equipment Operation (Vibracore)	Define equipment routes, traffic patterns, and site-specific safety measures. Maintain line of sight between equipment operators and ground personnel and that both are informed of proper hand signals and communication protocols. Ensure that lifting capacities, load limits, etc., are not exceeded. Identify special PPE and monitoring needs. Ensure that field personnel do not work in close proximity to operating equipment.
	Heat Exposure	Provide cool break area and adequate breaks. Provide cool non-caffeinated beverages. Promote heat stress awareness. Use active cooling devices (e.g., cooling vests) where specified.
	Cold Exposure	Provide warm break area and adequate breaks. Provide warm non-caffeinated beverages. Promote cold stress awareness.
X	Weather Extremes	Establish site-specific contingencies for severe weather situations. Provide for frequent weather broadcasts. Weatherize safety gear, as necessary. Identify special PPE needs. Discontinue work during severe weather.

Health and Safety Plan

“X” if applicable	Hazards	Hazard Control Measures
	Oxygen deficiency	Monitor for oxygen level. Do not enter area if less than 19.5% oxygen. Use SCBA if area has less than 19.5% oxygen.
	Confined space	Complete the confined space entry form. Attach permit for confined space entry.
	Noise	Establish noise level standards for onsite equipment and operations. Inform personnel of hearing protection requirements. Define site-specific requirements for noise monitoring.
	Ionizing radiation	Identify special PPE and monitoring needs prior to entering area suspected of ionizing radiation.
	Fire/Explosion	Inform personnel of the location(s) of potential fire/explosion hazards. Establish site-specific procedures for working and handling around flammables. Ensure that appropriate fire suppression equipment and systems are available and in good working order. Define requirements for intrinsically safe equipment. Identify special monitoring needs. Remove ignition sources from flammable atmospheres. Establish contingency plans and review daily with team members.
	Electrical	Locate and mark energized lines. De-energize lines as necessary. Ground all electrical circuits. Guard or isolate temporary wiring to prevent accidental contact. Evaluate potential areas of high moisture or standing water and define special electrical needs.
	Work Surfaces	
	Holes/ditches	Identify special safety control needs -
	Steep grades	Identify special safety control needs -
X	Slippery surfaces	Identify special safety control needs - Take extra care entering and exiting boats.
X	Uneven terrain	Identify special safety control needs - Take extra care entering and exiting boats.
X	Unstable surfaces	Identify special safety control needs – Be alert when working in close quarters on boats during sample collection/retrieval. Develop a system so all field personnel understand their role.
	Elevated work surfaces	Identify special safety control needs (e.g., lanyards, safety nets, etc.) -
X	Traffic hazards	Be aware of other vessel traffic during sample collection, as well as boat positioning.
	Other:	

9.3 Potential Biological Hazards

(List all potential biological hazards including specific pathogens, bacteria, or diseases likely to be encountered onsite.)

Biological Hazard	Matrix
Untreated sewage/coliform bacteria	water

9.4 Exposure Pathways and Permissible Exposure Limits (PELs)

The following is a list of potential exposure pathways, and the PELs and TWAs for chemical and biological hazards that may be encountered on the site. The potential exposure pathways are not limited to those listed. Acute systems of exposure along with odor thresholds and descriptions are given when that information is known. Odor thresholds are not exact and vary with susceptibility or sensitivity involved.

9.5 Predominant Potential Site Chemical Hazards

Chemical (or Class)	Exposure Limits (TWA)			Other Pertinent Limits	Warning Properties	Routes of Exposure Or Irritation	Acute Health Effects	Chronic Health Effects/Target Organs
	OSHA PEL	NIOSH REL	STEL					
Gasoline		LFC Carcinogenic		Carcinogenic	Fuel petroleum/ aromatic odor	Inhalation, absorption, ingestion, skin and/or eye contact	Irritated eyes, skin, mucous membranes; headache, weakness, exhaustion, blurred vision, dizziness, slurred speech, confusion, convulsion, chemical pneumonia	Carcinogen A1 – Eyes, skin, respiratory system, central nervous system, muscular neurological systems, liver and kidney cancer (benzene maximum of 3%)
Diesel	500 ppm			ACGIH TLV = 100 ppm	Fuel petroleum odor	Inhalation, ingestion, skin	Irritated eyes and respiratory system, headaches, dizziness, drowsiness, pulmonary function changes	Carcinogen A4 – Eyes, respiratory system, muscular neurological systems, cancer
Coal tar pitch volatiles (creosote and coal tar); PAHs Acenaphthene Dibenzofuran Fluorene Phenanthrene Anthracene Pyrene Benzo(a)anthracene Chrysene Benzo(b)fluoranthene Benzo(k)fluoranthene Benzo(a)pyrene Indeno(1,2,3-cd)pyrene Dibenz(a,h)anthracene Benzo(g,h,i)perylene	0.2 mg/m ³	0.1 mg/m ³ Carcinogenic		IDLH = 80 mg/m ³ Carcinogenic	Black or dark brown oil/tar, mothball-like odor	Inhalation, absorption, skin and/or eye contact	Irritated eyes, skin, and respiratory system; dermatitis, bronchitis	Carcinogen A1 – Respiratory system, skin, bladder, kidneys (lung, kidney, and skin cancer) (potential occupational carcinogen)
Bis(2-Chloro- ethyl)ether (Dichloroethyl ether)	15 ppm (90 mg/m ³) [skin]	Carcinogenic 5 ppm (30 mg/m ³)	NIOSH = 10 ppm (60 mg/m ³) [skin]	IDLH = 100 ppm Carcinogenic	Colorless liquid with a chlorinated solvent-like odor	Inhalation, absorption, ingestion, skin and/or eye contact	Irritated nose, throat, respiratory system; discharge of tears, cough, nausea, vomiting	Eyes, respiratory system, liver (liver tumors) (potential occupational carcinogen)

Chemical (or Class)	Exposure Limits (TWA)			Other Pertinent Limits	Warning Properties	Routes of Exposure Or Irritation	Acute Health Effects	Chronic Health Effects/Target Organs
	OSHA PEL	NIOSH REL	STEL					
2,4,5-/2,4,6- Trichlorophenol					Colorless needles, gray flakes, or off-white lumpy solid with phenolic-like odor	Inhalation, skin and/or eye contact	Irritated eyes, nose, respiratory system, redness, edema, chemical burns on skin, nose and pharynx systemic effects	Carcinogen A2 –
Naphthalene	10 ppm (50 mg/m ³)	10 ppm (50 mg/m ³)	15 ppm (75 mg/m ³)	IDLH = 250 ppm	Colorless to brown solid with mothball-like odor	Inhalation, absorption, ingestion, skin and/or eye contact	Irritated eyes; headache, confusion, excitement, malaise, nausea, vomiting, abdominal pain, irritated bladder, profuse sweat, jaundice, blood in urine, hemoglobinuria, renal shutdown, dermatitis, optical neuritis, corneal damage	Carcinogen A4 – Eyes, skin, blood, liver, kidneys, central nervous system
Dimethylphthalate	5 mg/m ³	5 mg/m ³		IDLH = 2,000 mg/m ³	Colorless, oily liquid with a slight aromatic odor	Inhalation, ingestion, skin and/or eye contact	Irritated eyes, upper respiratory system; stomach pain	Eyes, respiratory system, gastrointestinal tract
Diethylphthalate		5 mg/m ³			Colorless to water-white, oily liquid with a very slight aromatic odor	Inhalation, ingestion, skin and/or eye contact	Irritated eyes, skin, nose, throat; headache, dizziness, nausea, discharge of tears; pain, numbness, weakness, exhaustion, spasms in arms & legs,	Eyes, skin, respiratory system, central nervous system, peripheral nervous system, reproductive system, possible polyneuropathy, vestibular dysfunction
Di-n-octylphthalate Di(2-ethylhexyl) phthalate; DEHP; bis-(2-ethylhexyl) phthalate	5 mg/m ³	5 mg/m ³ LFC Carcinogenic	NIOSH = 10 mg/m ³	IDLH = 5,000 mg/m ³ Carcinogenic	Colorless, oily liquid with a slight odor	Inhalation, ingestion, skin and/or eye contact	Irritated eyes, mucous membranes	Carcinogen A2 – Eyes, respiratory system, central nervous system, reproductive system, liver, gastrointestinal tract (liver tumors), (potential occupational carcinogen)
Pentachloro- phenol (PCP)	0.5 mg/m ³ [skin]	0.5 mg/m ³ [skin]		IDLH = 2.5 mg/m ³	Colorless to white, crystalline solid with benzene-like odor (fungicide)	Inhalation, absorption, ingestion, skin and/or eye contact	Irritated eyes, nose, throat; sneezing, coughing, weakness, exhaustion, sweating, anorexia, low weight, headaches, dizziness, nausea, vomiting, breathing difficulty, chest pain, high fever, dermatitis	Eyes, skin, respiratory system, cardiovascular system, liver, kidneys, central nervous system

Health and Safety Plan

Chemical (or Class)	Exposure Limits (TWA)			Other Pertinent Limits	Warning Properties	Routes of Exposure Or Irritation	Acute Health Effects	Chronic Health Effects/Target Organs
	OSHA PEL	NIOSH REL	STEL					
Heptachlor Heptachlor epoxide	0.5 mg/m ³ [skin]	0.5 mg/m ³ [skin] LFC Carcinogenic ACGIH TLV = 0.05 mg/m ³ [skin]		IDLH = 35 mg/m ³ Carcinogenic	White to light tan crystals with a camphor-like odor	Inhalation, absorption, ingestion, skin and/or eye contact	Tremors, convulsions, incoordination	Carcinogen A2 – Central nervous system, liver (potential occupational carcinogen)
Dieldrin	0.25 mg/m ³ [skin]	0.25 mg/m ³ [skin] LFC Carcinogenic		IDLH = 50 mg/m ³ Carcinogenic	Colorless to light tan crystals with a mild chemical odor (insecticide)	Inhalation, absorption, ingestion, skin and/or eye contact	Headache, dizziness, nausea, vomiting, malaise, sweating, myoclonic limb jerks, convulsions, coma	Carcinogen A4 – Central nervous system, liver, kidneys, skin (potential occupational carcinogen)
4,4'-DDT 4,4'-DDE 4,4'-DDD	1 mg/m ³ [skin]	0.5 mg/m ³ LFC Carcinogenic		IDLH = 500 mg/m ³ Carcinogenic	Colorless crystals or white powder with a slight aromatic odor	Inhalation, absorption, ingestion, skin and/or eye contact	Irritated eyes, skin; paresthesia tongue, lips, face; tremors, anxiety, dizziness, confusion, convulsions, malaise, headache, weakness, exhaustion, vomiting	Carcinogen A2 – Eyes, skin, central nervous system, kidneys, liver, peripheral nervous system (potential occupational carcinogen) (liver, lungs, and lymphatic tumors)
Toxaphene (Chlorinated camphene)	0.5 mg/m ³ [skin]	LFC Carcinogenic [skin]		IDLH = 200 mg/m ³ Carcinogenic	Amber, waxy solid with a mild, piney, chlorine- and camphor-like odor	Inhalation, absorption, ingestion, skin and/or eye contact	Nausea, confusion, agitation, tremors, convulsions, unconsciousness; dry red skin	Carcinogen A4 – central nervous system, skin (liver cancer) (potential occupational carcinogen)
PCB [Chlorodiphenyl 42% chlorine (Aroclor 1242)]	1 mg/m ³ [skin]	0.001 mg/m ³ LFC Carcinogenic		IDLH = 5 mg/m ³ Carcinogenic	Colorless to light-colored, viscous liquid with a mild hydrocarbon odor	Inhalation, absorption, ingestion, skin and/or eye contact	Irritated eyes, chloracne	Carcinogen A1 – Skin, eyes, liver, reproductive system (pituitary gland and liver tumors, leukemia)

Chemical (or Class)	Exposure Limits (TWA)			Other Pertinent Limits	Warning Properties	Routes of Exposure Or Irritation	Acute Health Effects	Chronic Health Effects/Target Organs
	OSHA PEL	NIOSH REL	STEL					
PCB [Chlorodiphenyl 54% chlorine (Aroclor 1254)]	0.5 mg/m ³ [skin]	0.001 mg/m ³ LFC Carcinogenic		IDLH = 5 mg/m ³ Carcinogenic	Colorless to pale-yellow, viscous liquid with a mild hydrocarbon odor	Inhalation, absorption, ingestion, skin and/or eye contact	Irritated eyes, chloracne	Carcinogen A1 – Skin, eyes, liver, reproductive system (pituitary gland and liver tumors, leukemia)
Arsenic	0.010 mg/m ³	LFC Carcinogenic		IDLH = 5 mg/m ³ Carcinogenic CEILING (NIOSH) = 0.002 mg/m ³ (15 min.)	Silver-gray or tin-white, brittle, odorless solid as pure substance; in tailings not distinguishable	Inhalation, absorption, ingestion, skin and/or eye contact	Ulceration of nasal septum, dermatitis, gastrointestinal disturbances, peripheral neuropathy, respiratory irritation, hyperpigmentation of skin	[Potential occupational carcinogen] - Liver, kidneys, skin, lungs, lymphatic system (lung and lymphatic cancer)
Cadmium	0.005 mg/m ³	LFC Carcinogenic		IDLH = 9 mg/m ³ Carcinogenic	Silver-white, blue-tinged lustrous, odorless solid as pure substance; in tailings not distinguishable	Inhalation, ingestion	Pulmonary edema, breathing difficulty, cough, chest tightness; headache, chills, muscle aches; nauseous, vomiting, diarrhea; anosmia, emphysema, proteinuria, mild anemia	Carcinogen – Respiratory system, kidneys, prostate, blood (prostatic and lung cancer)
Chromium	1 mg/m ³	0.5 mg/m ³		IDLH = 250 mg/m ³	Blue-white to steel-gray, lustrous, brittle, hard, odorless solid as pure substance; in tailings not distinguishable	Inhalation, ingestion, skin and/or eye contact	Irritated eyes and skin, lung fibrosis (histologic)	Eyes, skin, respiratory system
Lead	0.050 mg/ m ³	0.050 mg/m ³		IDLH = 100 mg/m ³	Heavy, ductile, soft, gray solid as pure substance; in tailings not distinguishable	Inhalation, ingestion, skin and/or eye contact	Irritated eyes, weakness, exhaustion, insomnia, facial pallor, anorexia, weight loss, constipation, abdominal pain, colic, tremors, paralysis wrists and ankles, hypotension	Carcinogen – Eyes, gastrointestinal tract, central nervous system, blood, kidneys, gingival tissue

Health and Safety Plan

Chemical (or Class)	Exposure Limits (TWA)			Other Pertinent Limits	Warning Properties	Routes of Exposure Or Irritation	Acute Health Effects	Chronic Health Effects/Target Organs
	OSHA PEL	NIOSH REL	STEL					
Mercury		Vapor = 0.05 mg/m ³ [skin]		IDLH = 10 mg/m ³ CEILING (OSHA & NIOSH) = 0.1 mg/m ³ [skin]	Silver, white heavy odorless liquid as pure substance; in tailings not distinguishable	Inhalation, absorption ingestion, skin and/or eye contact	Irritated eyes, skin; cough , chest pain, breathing difficulty, bronchitis pneumonitis, tremors, insomnia, headache, irritability, indecision, weakness, exhaustion, salivation, gastrointestinal disturbances, anorexia, weight loss	Eyes, skin, respiratory system, central nervous system, kidneys
Nickel	1 mg/m ³	0.015 mg/m ³ LFC Carcinogenic		IDLH = 10 mg/m ³ Carcinogenic	Lustrous, silvery odorless solid as pure substance; in tailings not distinguishable	Inhalation, ingestion, skin and/or eye contact	Sensitization dermatitis, allergic asthma, pneumonitis	[Potential occupational carcinogen] – Nasal cavities, lungs, skin (lung and nasal cancer)
Silver	0.01 mg/m ³	0.01 mg/m ³		IDLH = 10 mg/m ³	White, lustrous solid as pure substance; in tailings not distinguishable	Inhalation, ingestion, skin and/or eye contact	Blue-gray eyes, nasal septum, throat, skin; irritation, ulceration of skin, gastrointestinal disturbance	Nasal septum, skin, eyes
Zinc (zinc oxide)	5 mg/m ³ (respirable dust and fume) 15 mg/m ³ (total dust)	5 mg/m ³ (dust and fume)	10 mg/m ³	IDLH = 500 mg/m ³ CEILING (dust; NIOSH) = 15 mg/m ³	Odorless, white to brown metallic solid as pure substance; in tailings not distinguishable	Inhalation	Metal fume fever (chills, muscle ache, nausea, fever, dry throat, cough), weakness, exhaustion, metallic taste, headache, blurred vision, vomiting, malaise, tight chest, breathing difficulty, decreased pulmonary function	Respiratory system

PEL-TWA = Permissible Exposure Limit-Time Weighted Average (8 hours).

REL-TWA = Recommended exposure limit – time weighted average.

TLV-TWA = Threshold Limit Value-Time Weighted Average (8 hours).

STEL = Short Term Exposure Limit (15 minutes).

IDLH = Immediately Dangerous to Life or Health.

LFC = Lowest feasible concentration (no-effect exposure)

CEILING = Ceiling Limit (not to be exceeded, even instantaneously).

References: ACGIH Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices. 93-94.

NIOSH Pocket Guide to Chemical Hazards, U.S. Dept. of Health and Human Services, 10/2003.

Carcinogenicity Status (ACGIH)

A1 - Confirmed human carcinogen

A2 - Suspected human carcinogen

A3 - Animal carcinogen

A4 - Not classified as a human carcinogen

9.6 Action Level Table for Chemical Monitoring

No air monitoring will be conducted during field activities at this site because contaminants of concern are not volatile. Odor and visual screening of sediment will be used to determine if contaminated sediment is encountered during sample collection.

10.0 General Site Health and Safety Procedures

10.1 Site Security

Site Health and Safety Officer is responsible for monitoring entry onto active areas of the site and for knowing who is on-site at all times.

- Work site area perimeter identification method (describe equipment and procedures to be used): Sediment sampling equipment and one to three boats will be used for sample collection. Field activity will be performed in an isolated area open to the public. The boat tenders and other field personnel will be aware of visitors and keep the general public away from the sampling area.
- Work area security (on- and off-hours) used: Herrera site health and safety manager will monitor site access within the sediment processing work zone. Boat captains will monitor areas surrounding the vessels during sediment collection.
- Work will be done around heavy equipment (e.g. drill rig, backhoe, etc.): (Yes/No): Yes
Both the vibracore equipment used to collect cores and surface sediment samplers will involve use of davits/yardarms on boats that swing across the deck. Crew members must be aware of swinging equipment during use.
- Work will be done in or adjacent to a road, street or highway: (Yes/No): No
If yes, describe:
- Reflective vests will be worn around heavy equipment or when working in or around traffic.
- Prior to working on-site, a general inspection of hazards will be made by the Site Health and Safety Officer.
- If an onsite command post is necessary, ensure that it is located upwind from source areas, given prevailing winds, and locate/identify on Site Map (p.7).
- Onsite personnel must be able to call offsite via a telephone within 150 feet of work.
- Designate at least one vehicle for emergency use.

10.2 Work Limitations and Restrictions

- Be aware of unstable conditions associated with rocking boats.
- No eating or drinking is allowed in the area of work.
- No smoking or lighting of matches or lighters is allowed in the area of work.
- No rings, watches, bracelets, necklaces, or other jewelry that could trap chemical contamination or get caught in moving equipment.
- Buddy system at all times when working around heavy equipment.

10.3 Perimeter Identification and Personal Protection Equipment

To protect workers from potential contaminants in sample media, protective clothing will be worn during sampling activities. Protective clothing will be discarded or decontaminated between uses.

10.3.1 Level of Protection

- **Level D** - No respiratory protection. Safety glasses, hard hat, steel-toe boots, long-sleeved shirt and pants. Hearing protection, gloves, and other PPE as required.

10.3.2 Work Zone Boundaries

This job will require one or all of the following “zones” or “boundaries” to be established during work.

- **a. Exclusion Zone** - Required when workers within that zone must wear PPE (usually Level B or C)
- **b. Contamination Reduction Zone** - Required when decontamination of people and equipment leaving the Exclusion Zone is required (usually Level B or C)
- **c. Support Zone** - The location where administrative and other support activities are conducted (usually Level B or C)
- **d. Work Area Boundary** - Excludes non-workers from entering a potentially hazardous environment (usually Level B, C, or D).

10.4 Heat and Cold Stress

The Site Health and Safety Officer will monitor weather broadcasts before the start of outdoor work each day, and more frequently as necessary. No work will be done outdoors during hazardous weather conditions (e.g. lightning storms).

For Heat Stress:

- For temperatures above 75°F, each person will take their pulse at rest. At breaks, the pulse should be less than 110 beats per minute after one minute. Before returning to work, the pulse should be no more than 10 beats greater than the resting pulse.
- If the air temperature is greater than 95°F, work should be done for 30 minutes with a rest break of 10 minutes for Level 'D'. At least 8 ounces (1 cup) of cool water, Gatorade-type drink, or dilute fruit juice should be consumed at each rest break or at least one cup every 20 minutes.
- Work should stop if any of the following symptoms occur: muscle spasm and/or pain in the limbs or abdomen (heat cramps); weak pulse, heavy sweating, dizziness, and/or fatigue (heat exhaustion); or rapid pulse, no sweating, nausea, dizziness, and/or confusion (heat stroke). Provide First Aid immediately.
- Use sunscreen on unprotected skin to protect against ultraviolet exposure as necessary.

For Cold Stress:

- For temperatures below 40°F, adequate insulating clothing must be worn. If the temperature is below 20°F, workers will be allowed to enter a heated shelter at regular intervals. Warm sweet drinks should be available. Coffee intake should be limited.
- No one should begin work or return to work from a heated shelter with wet clothes. Workers should be aware of signs of cold stress such as heavy shivering, pain in the fingers or toes, drowsiness, or irritability. Onsets of any of these signs are indications for immediate return to a heated shelter.

10.5 Noise

A noise hazard exists when working in the immediate vicinity of heavy machinery operations. In addition to the potential for hearing damage, noise may interfere with critical communication and recognition of other potential hazards at the work site, such as moving vehicles. To minimize potential injuries, field employees will utilize hearing protection devices, (ear plugs, headphones), as necessary, and maintain a high level of alertness at all times.

11.0 Decontamination

Following are the decontamination procedures that will be employed to prevent contamination of personnel and to prevent cross contamination of sampling equipment during the collection of samples.

11.1 Personnel Decontamination

Decon Solutions:	Soap and tap water
Decon Method:	Remove and dispose of Tyvek, rain suits, or coveralls; clean boots (if muddy) with water from the bay and tap water; remove and dispose gloves; wash and rinse hands and face with soap and water.
Exposure Monitoring:	None
Level of Protection:	D
Location:	Support zone (work zone c)

11.2 Sampling Equipment Decontamination

Decon Solutions:	Liquinox detergent and distilled water
Decon Method:	<u>Bowls and spoons</u> - Scrub with Liquinox/water solution, rinse with site water, rinse with distilled water.
Exposure Monitoring:	None
Level of Protection:	D
Location:	Support zone (work zone c) Bowls and spoons – at the site.

12.0 Waste Characteristics

12.1 Waste Generation

Waste Anticipated (Yes/No): No

Waste Type	Description	Quantity
Solid	Excess core sediment stored in drums.	< 5 drums
Liquid	Decon water disposed in bay.	
Sludge	None.	
Incidental	Disposable gloves and paper towels will be placed in a trash bag and disposed with general refuse.	10 bags
Other		

12.2 Expected Health Characteristics

Corrosive _____ Flammable/Ignitable _____ Radioactive _____
 Toxic _____ Reactive _____ Unknown _____
 Explosive _____ Medical/Pathogenic _____ Carcinogenic _____
 Other (specify) _____

12.3 Packaging Requirements for Waste Material

Open head 55-gallon drum: Excess sediment.

Plastic trash bag: Incidental refuse.

Other:

12.4 Disposal and/or Treatment Methods Proposed

Waste	Disposal and/or Treatment
Plastic trash bags of incidental refuse.	Municipal waste dumpster.
Sediment	Permitted waste facility.

13.0 Employee Training and Medical Clearance

The following is a summary of training information for personnel who will perform work on the site. Copies of personnel training certificates are presented in Attachment 3.

1. Name Brady Hanson Title Geologist Approved PPL _____

Field Responsibilities: Site Health and Safety Officer

Training	Dates (Month/Year)
Current 8-Hour Refresher	9/08
40-Hour Hazardous Waste	8/00
Supervisor	
First Aid; CPR	10/07 (both)
Medical Clearance	
Other	

2. Name Gina Catarra Title Chemist Approved PPL _____

Field Responsibilities: Sample collection / processing

Training	Dates (Month/Year)
Current 8-Hour Refresher	1/08
40-Hour Hazardous Waste	12/02
Supervisor	
First Aid; CPR	8/07; 8/07
Medical Clearance	
Other	

3. Name Bruce Carpenter Title Sr. Hydrogeologist Approved PPL _____

Field Responsibilities: Sample collection / processing

Training	Dates (Month/Year)
Current 8-Hour Refresher	9/08
40-Hour Hazardous Waste	12/87
Supervisor	2/90
First Aid; CPR	8/07; 8/07
Medical Clearance	
Other	

4. Name George Iftner Title Geologist Approved PPL _____

Field Responsibilities: Sample collection

Training	Dates (Month/Year)
Current 8-Hour Refresher	9/08
40-Hour Hazardous Waste	4/98
Supervisor	
First Aid; CPR	2/06; 2/06
Medical Clearance	
Other	

14.0 Health and Safety Plan — Acknowledgement and Agreement Form

The following field personnel have read this health and safety plan and understand the potential and actual hazards present on the site and shall abide by its strictures.

Name	Signature	Company	Date
Name	Signature	Company	Date
Name	Signature	Company	Date
Name	Signature	Company	Date
Name	Signature	Company	Date
Name	Signature	Company	Date
Name	Signature	Company	Date
Name	Signature	Company	Date
Name	Signature	Company	Date
Name	Signature	Company	Date

ATTACHMENT 1

Injury/Exposure Report and Site Incident Report

Injury/Exposure Report

(Attach additional documentation as necessary)

DATE OF INCIDENT: _____ CASE NO. _____ TIME OF DAY _____
EMPLOYEE NAME _____ DATE OF BIRTH _____
HOME ADDRESS _____ PHONE NO. _____
SEX MALE ___ FEMALE ___ AGE ___ JOB TITLE _____ SOCIAL SECURITY NO. _____
OFFICE LOCATION _____ DATE OF HIRE _____

WHERE DID INCIDENT OCCUR? (INCLUDE ADDRESS) _____

ON EMPLOYER'S PREMISES? YES ___ NO ___ PROJECT NAME/NO. _____

WHAT WAS EMPLOYEE DOING WHEN INCIDENT OCCURRED? (BE SPECIFIC) _____

HOW DID THE INCIDENT OCCUR? (DESCRIBE FULLY)

WHAT STEPS COULD BE TAKEN TO PREVENT SUCH AN INCIDENT?

OBJECT OR SUBSTANCE THAT DIRECTLY CAUSED INCIDENT? _____

DESCRIBE THE INJURY OR EXPOSURE _____ PART OF BODY AFFECTED _____

NAME AND ADDRESS OF PHYSICIAN _____

IF HOSPITALIZED, NAME AND ADDRESS OF HOSPITAL _____

LOSS OF ONE OR MORE DAYS OF WORK? YES ___ NO ___ IF YES, DATE LAST WORKED _____

HAS EMPLOYEE RETURNED TO WORK? YES ___ NO ___ IF YES, DATE RETURNED _____

DID EMPLOYEE DIE? YES ___ NO ___ IF YES, DATE _____

COMPLETED BY (PRINT) _____ EMPLOYEE SIGNATURE _____
(Supervisor or Site Health & Safety Officer)

DATE _____

SIGNATURE _____ PIC SIGNATURE _____

DATE _____ DATE _____

This report must be completed by the employee's supervisor or Site Health and Safety Officer immediately upon learning of the incident. The completed report must be reviewed and signed by the Principal-in-Charge and transmitted to Corporate Health and Safety Officer within 24 hours of the incident, even if employee is not available to review and sign. Employee or employee's doctor must submit a copy of the doctor's report to Corporate Health and Safety Officer within 24 hours of the initial exam and any subsequent exams. For field injuries, submit a copy of the Health and Safety Plan.

ATTACHMENT 2

Daily Tailgate Health and Safety Meeting Form

Daily Tailgate Safety Meeting Form

FIRST DATE OF ACTIVITY: _____ TIME: _____ SITE LOCATIONS: _____

1. Discussed activities planned for the day
2. Individual activities are clear to each crew member
3. Chemical hazards discussed
 - a. Action levels are known and understood
 - b. Frequency and procedures for air monitoring are known and understood
4. Physical hazards discussed

a. <input type="checkbox"/> Heat stress	e. <input type="checkbox"/> Overhead utilities
b. <input type="checkbox"/> Cold stress	f. <input type="checkbox"/> Underground utilities
c. <input type="checkbox"/> Slip, trip, and fall hazards	g. <input type="checkbox"/> Moving and emptying drums
d. <input type="checkbox"/> Drilling operations	
5. Personal protective equipment (PPE) discussed
 - a. Head protection (hard hat)
 - b. Eye protection (safety glasses must have side shields)
 - c. Hearing protection (at all times drill rig is in operation and when in close proximity to flight line)
 - d. Foot protection (steel toes and shanks for work boots)
 - e. Splash (solvent rinse)
 - f. Gloves
 - i. Chemical hazard (diluting standards for GC)
 - ii. Environmental conditions (cold)
 - iii. Protection against cross-contamination (disposal after each use)
 - iv. Physical hazard (cut, puncture, and abrasion)
6. Decon procedures discussed

a. <input type="checkbox"/> Drilling equipment	b. <input type="checkbox"/> Sampling equipment
--	--
7. Emergency procedures discussed
 - a. Route to hospital from site locations(s) above
 - b. Evacuation procedures
 - c. Cellular phone, map to hospital, first aid kit, and eyewash with onsite geologist
8. Special conditions/procedures

a. <input type="checkbox"/> Escort required	b. <input type="checkbox"/> Locked gates, permits, passes, etc.
---	---
9. Questions/concerns addressed
10. Other

Meeting attended by (sign and date for each day of work on site; **USE BACK IF ADDITIONAL SPACE IS REQUIRED**):

(Print Name)	(Signature)	(Date)
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Meeting conducted by: _____ (Title) _____

ATTACHMENT 3

Personnel Training Certificates

Certificate of Completion

This is to certify that

Brady A. Hanson

has satisfactorily completed
8 hours of refresher training in

**Hazardous Waste Operations
And Emergency Response**

to comply with the training requirements of
OSHA 29 CFR 1910.120

Certificate Number 10267992


Instructor



Sep 20, 2007
Date(s) of Training

Annual Refresher Required by: Sep 19, 2008



Certificate of Training

This is to certify that

Brady Hanson

has successfully completed a course of instruction in
HAZWOPER 40 Hour Training (HS 102)
meeting the requirements of OSHA's Hazardous Waste Operations and
Emergency Response Standard (HAZWOPER),
29 CFR 1910.120 (p) and related topics.

Class Completion: August 19, 2000

Instructor

August 19, 2000

Date



Together, we can save a life

This recognizes that
BRADY HANSON
has completed the requirements for
CPR - ADULT
conducted by
RED CROSS OF KING-KITSAP
Date completed **10/19/2007**
The American Red Cross recognizes this certificate
as valid for **1** year(s) from completion date.



Together, we can save a life

This recognizes that
BRADY HANSON
has completed the requirements for
STANDARD FIRST AID
conducted by
RED CROSS OF KING-KITSAP
Date completed **10/19/2007**
The American Red Cross recognizes this certificate
as valid for **3** year(s) from completion date.

Certificate of Completion

This is to certify that

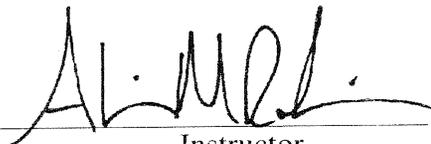
Gina S. Catarra

has satisfactorily completed
8 hours of refresher training in

**Hazardous Waste Operations
And Emergency Response**

to comply with the training requirements of
OSHA 29 CFR 1910.120

Certificate Number 10270198



Instructor



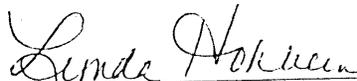
Jan 17, 2008
Date(s) of Training

Annual Refresher Required by: Jan 16, 2009

Certificate of Completion

This is to certify that
Gina Catarra
has satisfactorily completed
40 hours of training in
Hazardous Waste Operations
in compliance with 29 CFR 1910.120 and WAC 296-62, Part P

December 13, 2002


Training Coordinator



Prezant

Prezant Associates, Inc. • 330 Sixth Avenue North, Suite 200 • Seattle, Washington 98109 • (206) 281-8858



Certificate # 02-4316

Conducted at:
Prezant Associates Seattle, WA



CPR Training Center, Inc. (888) 881-4277

**BUSINESS FIRST AID,
UNTIL HELP ARRIVES**

Gina Catarra

HAS COMPLETED AN 8-HOUR FIRST AID CLASS INCLUDING ADULT 1 PERSON CPR

[Signature]

INSTRUCTOR L&M 916A11913

8-1-09

EXPIRATION DATE



This is to certify that

Bruce A. Carpenter

has completed the

8-Hour Hazardous Waste Operations and Emergency Response

Project Manager Health and Safety Training

as required by OSHA 1910.120 (e) (4)

Belleveue, WA
Location

2/13-14/90
Date

Mary G. Zell
Mary G. Zell
Regional Safety Manager

Environmental and Occupational Health Associates

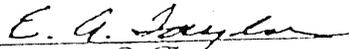
This certifies that

Bruce A. Carpenter

has completed the course

Personal Protection on Hazardous Waste Sites

for 40 hours of classroom instruction.


Elizabeth A. Taylor CIH
President

December 12, 1987

Date

Certificate of Completion

This is to certify that

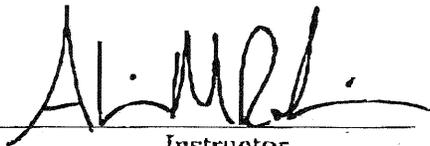
Bruce Carpenter

has satisfactorily completed
8 hours of refresher training in

**Hazardous Waste Operations
And Emergency Response**

to comply with the training requirements of
OSHA 29 CFR 1910.120

Certificate Number 10268393



Instructor



Oct 4, 2007
Date(s) of Training

Annual Refresher Required by: Oct 3, 2008

Argus Pacific, Inc. • 1900 W. Nickerson • Suite 315 • Seattle, Washington • 98119 • (206) 285.3373 • fax (206) 285.3927



CPR Training Center, Inc. (888) 881-4277

**BUSINESS FIRST AID,
UNTIL HELP ARRIVES**

Bruce Carpenter

HAS COMPLETED AN 8 HOUR FIRST AID CLASS INCLUDING ADULT 1 PERSON CPR

Karen J. [Signature]

8/23/09

INSTRUCTION # J2942K11973

EXPIRATION DATE

Certificate of Completion

This is to certify that

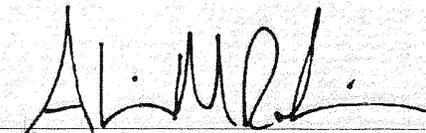
George C. Iftner

has satisfactorily completed
8 hours of refresher training in

**Hazardous Waste Operations
And Emergency Response**

to comply with the training requirements of
OSHA 29 CFR 1910.120

Certificate Number 10267873



Instructor

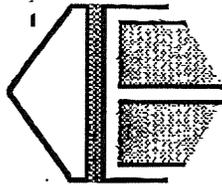


Sep 13, 2007

Date(s) of Training

Annual Refresher Required by: Sep 12, 2008

Argus Pacific, Inc. • 1900 W. Nickerson • Suite 315 • Seattle, Washington • 98119 • (206) 285.3373 • fax (206) 285.3927



IESMC, Inc.

**Industrial/Environmental
Safety Management Consulting, Inc.**

P.O. Box 331, Crystal Lake, IL 60039-0331

815-455-1762 Fax: 815-455-1780

Certifies that

George Iftner

*has been awarded this certificate for successfully completing
40 Hour Hazardous Incident Response Operations EPA (165.5) Training
in accordance with 29 CFR 1910.120 and in Cooperation with the U.S. EPA
OFFICE OF EMERGENCY AND REMEDIAL RESPONSE*

Conducted on April 19, 1998

Certification #: 0498HW100142

April 19, 1998

Date

2.1 CEU


James C. Meldrum, Founder, CBI

**American
Red Cross**



Together, we can save a life

This recognizes that
GEORGE IFTNER
has completed the requirements for
STANDARD FIRST AID

conducted by

RED CROSS OF KING-KITSAP
Date completed

02/16/2006

The American Red Cross recognizes this certificate
as valid for **3** year(s) from completion date.

**American
Red Cross**



Together, we can save a life

This recognizes that
GEORGE IFTNER
has completed the requirements for
ADULT CPR

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RED CROSS OF KING-KITSAP
Date completed

02/16/2006

The American Red Cross recognizes this certificate
as valid for **1** year(s) from completion date.

ATTACHMENT 4

Waterborne Vessel Safety Plan

WATERBORNE VESSEL SAFETY PLAN

Prepared for

Washington State Department of Ecology

April 2008

WATERBORNE VESSEL SAFETY PLAN

Prepared for

Washington State Department of Ecology
300 Desmond Drive SE
Lacey, Washington 98503

Prepared by

Herrera Environmental Consultants, Inc.
2200 Sixth Avenue, Suite 1100
Seattle, Washington 98121
Telephone: 206/441-9080

April 10, 2008

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E. Performance Impairing Substances	3
Appendix A	Templates for Float Plan, Pre-Departure, and Standard Checklists
Appendix B	U.S. Coast Guard Equipment Requirements, Navigation Rules, and Safety/Survival Tips
Appendix C	Washington Administrative Code (WAC) Boating Statutes

A. Introduction

This plan applies to, but is not limited to, field work requiring use of waterborne watercraft, including rafts, canoes, skiffs, or commercial vessels either owned by or subcontracted by Herrera Environmental Consultants Inc. (Herrera). Herrera expects that all employees, for company-approved fieldwork or personal use, will follow safety procedures and regulations set forth in this safety plan.

B. Safety Policy

Herrera's Safety Policy is that health and safety of the staff is of paramount importance. Activities performed under potentially hazardous conditions shall be acknowledged and planned to mitigate personal injury. Herrera's Safety Policy shall apply during approved fieldwork, as well as during pre-approved periods of personal activities when using Herrera-owned watercraft.

C. Person-In-Charge

Fieldwork will be organized and supervised by a Project Manager (PM) or designate. It is the responsibility of the person-in-charge to take all reasonable steps to ensure that:

- a. Each participant be informed of the known risks and physical requirements
- b. Each participant be shown where the personal floatation devices (PFDs) are stowed
- c. Each participant has read this Plan
- d. The academic portion of the work is conducted safely
- e. It has been determined what safety equipment and clothing is appropriate
- f. All company and personal equipment taken into the field is thoroughly checked for safety by a qualified person before it is used
- g. Each field trip participant is instructed in safety, the wearing of safety clothing, (e.g., hard hats, safety boots, goggles, etc.), and the safe use of equipment.

D. Checklist

In a generic document such as this, it is impractical to anticipate all situations. The following lists some major items; other items will be dictated by the knowledge or experience of the person-in-charge. Refer to Appendix A for checklist templates.

i. Equipment

All equipment taken for fieldwork must be checked by a qualified person before removal from the office, to ensure that it is in good condition, complete, and safe.

One PFD of proper size that is United States Coast Guard (U.S.C.G.) approved must be kept in an accessible location on board for each person that is present. If the vessel is longer than 16 feet, one additional throwable PFD must be immediately available for use. In a small boat such as a raft, canoe, or kayak, PFDs must be worn at all times.

An electric visual distress signal (VDS), such as a flashlight, must be present if the vessel is 16 feet or longer. A daytime VDS, such as an orange flag 3' by 3' with a black square above a black dot, must be present if the vessel is 16 feet or longer.

A U.S. Coast Guard-certified fire extinguisher must be present if there is a fire hazard due to the motor or fuel system of the vessel. It must be portable and have a specific marine-type mounting bracket. Look for "Marine Type USCG" on the label.

If equipment fails during fieldwork, its use must be discontinued and the failure reported to the person-in-charge immediately. This equipment must not be used until satisfactory repairs have been completed.

The responsibility for ensuring equipment is safe is vested in the person-in-charge.

The Boater's Pre-Departure Checklist (Appendix A) must be completed prior to vessel departure (copy to be incorporated into project file). Additional equipment requirements are provided in Appendix B.

ii. Remote or Hazardous Areas

In the case of fieldwork to be performed in remote or hazardous areas, the person-in-charge should consider:

- a. Having at least one participant trained in first aid

- b. Having at least one participant trained in CPR
- c. Providing a communication link to a central station (at a minimum, whistles provided for each participant)
- d. Providing large scale maps of the area providing routes of egress
- e. Conducting area-familiarization trips before work has started
- f. Having a procedure for contacting local police who will organize a search for missing people
- g. Leaving a float plan at the base camp, plus an overall plan with the departmental office lead at Herrera
- h. For underwater research, evidence that diver(s) hold current and valid license (refer to Herrera's Manual for Safe Diving)
- i. For those who must be equipped with firearms, ensure that they are trained and hold a proficiency certificate
- j. Safety and survival tips are provided in Appendix B.

iii. Float Plan

Before leaving for work in the field, a member of the field crew must fill out a Float Plan (Appendix A) describing when and where the event will take place, what vessels will be taken, and who will be present on the field event. A Float Plan should be filled out for work performed on company-owned and rented boats, as well as when services are subcontracted. The Float Plan should be left with their respective department lead in case of an emergency.

E. Performance Impairing Substances

The use of substances that can impair performance or judgment and the consumption of alcohol during the working periods of field trips is not approved by the company, under any circumstances.

APPENDIX A

Templates for Float Plan, Pre-Departure, and Standard Checklists

Oakland Bay Sediment Characterization

06-03386-007

Float Plan

*Do not file this plan with the Coast Guard.
Contact the Herrera office in case of
delayed return.*

1. Person In Charge

Name _____ Phone _____

2. Description of Boat

Name _____

Registration/ Documentation No. _____ Length _____

Make _____ Type _____

Hull Color _____ Trim Color _____

Fuel Capacity _____ Engine Type _____ No. of Engines _____

Distinguishing Features _____

3. Operator of Boat

Name _____ Phone _____

4. Survival Equipment (check as appropriate)

- # _____ PFDs Flares Mirror
- Smoke Signals Flashlight Food
- Paddles Water Anchor
- Raft or Dinghy EPIRB
- Others

5. Marine Radio:

Yes No

Type _____ Freqs. _____

Digital Selective Calling (DSC) Yes No

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:

9. Additional Information

General Vessel Safety Checklist

Each Trip:

- Make sure all exhaust clamps are in place and secure.
- Look for exhaust leaking from the exhaust system components evidenced by rust and/or black streaking, water leaks, or corroded or cracked fittings.
- Inspect rubber exhaust hoses for burned or cracked sections. All rubber hoses should be pliable and free of kinks.
- Confirm that cooling water flows from the exhaust outlet when the engines and generator are started.
- Test the operation of each carbon monoxide detector by pressing the test button.

Do not operate the vessel if any of these problems exist!

At Least Annually:

- Replace exhaust hoses if any evidence of cracking, charring, or deterioration is found.
- Inspect each water pump impeller and inspect the condition of the water pump housing. Replace if worn or cracked (refer to the engine and generator manuals for further information).
- Inspect each of the metallic exhaust components for cracking, rusting, leaking, or looseness. Pay particular attention to the cylinder head, exhaust manifold, and water injection elbow.
- Clean, inspect, and confirm the proper operation of the generator cooling water anti-siphon valve (if equipped).

Regular maintenance and proper operation of the boat are the best defenses against injury from carbon monoxide. To find out more information about how you can prevent carbon monoxide poisoning on recreational boats, contact:

U.S. Coast Guard Infoline
1-800-368-5647
<www.uscgboating.org>

National Marine Manufacturer's Association
312-946-6200
<www.nmma-medialink.com>

Boater's Pre-Departure Checklist

Know your vessel. Before departure, always be sure your vessel is in good working condition and properly equipped for emergencies. Avoid inconvenience and potential danger by taking a few minutes to check the following:

Minimum Federal Required Equipment	Yes	No
State Registration Documentation		
State Numbering Displayed		
Certificate of Documentation		
Lifejackets (PFDs) – one for each person		
Throwable PFD		
Visual Distress Signals		
Fire Extinguishers (fully charged)		
Proper Ventilation		
Backfire Flame Arrestor		
Sound Producing Device(s)		
Navigation Lights		
Oil Pollution Placard		
Garbage Placard		
Marine Sanitation Device		
Navigation Rules		
Any Additional State Requirements		

Besides meeting the federal requirements, prudent boaters carry additional safety equipment. The following additional items are suggested depending on the size, location, and use of your boat:

Recommended Equipment	Yes	No	N/A
VHF Marine Radio			
Anchor and Tackle			
Chart(s) of Area and Navigation Tools			
Magnetic Compass			
Fenders and Boat Hook			
Mooring Lines and Heaving Line			
Manual Bilge Pump or Bailing Device			
Tool Kit			
Spare Parts (fuses, spark plugs, belts, etc.)			
Spare Battery (fully charged)			

Recommended Equipment (continued)	Yes	No	N/A
Spare Propeller			
Extra Fuel and Oil			
Alternate Propulsion (paddles/oar)			
Flashlight and Batteries			
Search Light			
First Aid Kit			
Sunscreen (SPF 30+)			
Mirror			
Food and Water			
Extra Clothing			
AM/FM Radio			
Cellular Phone			
Binoculars			

Safety Checks and Tests	Yes	No	N/A
Test Marine Radio (voice call)			
Test Navigation and Anchor Lights			
Test Steering (free movement)			
Test Tilt/Trim			
Test Bilge Pump			
Check for Any Excessive Water in Bilges			
Check Fuel System for Any Leaks			
Check Engine Fluids			
Ensure Boat Plug is Properly Installed			
Check Electrical System			
Check Galley/Heating Systems			
Check Gauges (i.e., batteries)			
Check Fuel Amount			
Ensure Anchor is Ready for Use			
Check Load of Vessel and Secure Gear from Shifting			
Ensure Passengers Know Emergency Procedures and Equipment Location			
Everyone Put on a Lifejacket to Check for Proper Fitting			
Check the Weather Forecast			
File a Float Plan at Herrera Office			

APPENDIX B

U.S. Coast Guard Equipment Requirements, Navigation Rules, and Safety/Survival Tips

U.S. Coast Guard
Equipment Requirements:
April 19, 2004



- Search:

- Safety

- ✓ Federal Requirements
- ✓ MetLife Safety Tips
- ✓ Consumer Advisories
- ✓ Boating Safety Courses
- ✓ U.S. Aids to Navigation
- ✓ Boating Under the Influence
- ✓ GMDSS Communications

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Federal Requirements and Safety Tips for Recreational Boats

Personal Flotation Devices (PFD)

All recreational boats must carry one wearable PFD (Type I, II, III or Type V PFD) for each person aboard. A Type V PFD provides performance of either a Type I, II, or III PFD (as marked on its label) and must be used according to the label requirements. Any boat 16ft and longer (except canoes and kayaks) must also carry one throwable PFD (Type IV PFD).

PFDs must be

- Coast Guard approved,
- in good and serviceable condition, and
- the appropriate size for the intended user.

Accessibility

- Wearable PFDs must be readily accessible.
- You must be able to put them on in a reasonable amount of time in an emergency (vessel sinking, on fire, etc.).
- They should not be stowed in plastic bags, in locked or closed compartments or have other gear stowed on top of them.
- The best PFD is the one you will wear.
- Though not required, a PFD should be worn at all times when the vessel is underway. A wearable PFD can save your life, but only if you wear it.
- Throwable devices must be immediately available for use.

Inflatable PFDs

- Inflatable PFDs may be more comfortable to wear.
- The best PFD is the one you will wear.
- Inflatable PFDs require the user to pay careful attention to the condition of the device.
- Inflatable PFDs must have a full cylinder and all status indicators on the inflator must be green, or the device is NOT serviceable, and does NOT satisfy the requirement to carry PFDs.
- Coast Guard Approved Inflatable PFD's are authorized for use on recreational boats by person at least 16 years of

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 - Pollution Regulations
 - Marine Sanitation Devices
 - Vessel Safety Check (VSC) Program
 - Quick Reference Chart
- Vessels Operating Offshore
- Operating Procedures
- **Safety and Survival Tips**

age.

Child PFD Requirements

Some states require that children wear PFDs

- applies to children of specific ages
- applies to certain sizes of boats
- applies to specific boating operations

Check with your state boating safety officials.

Child PFD approvals are based on the child's weight. Check the "User Weight" on the label, or the approval statement that will read something like "Approved for use on recreational boats and uninspected commercial vessels not carrying passengers for hire, by persons weighing ___ lbs". They can be marked "less than 30", "30 to 50", "less than 50", or "50 to 90".

PFD requirements for certain boating activities under state laws

The Coast Guard recommends and many states require wearing PFDs:

- For water skiing and other towed activities (use a PFD marked for water skiing).
- While operating personal watercraft (PWC) (use a PFD marked for water skiing or PWC use).
- During white water boating activities.
- While sailboarding (under Federal law, sailboards are not "boats").

Check with your state boating safety officials.

Federal law does not require PFDs on racing shells, rowing sculls, racing canoes, and racing kayaks; state laws vary. Check with your state boating safety officials.

If you are boating in an area under the jurisdiction of the Army Corps of Engineers, or a federal, state, or local park authority, other rules may apply.

PFD Flotation

There are three basic kinds of PFD flotation in the five types of PFDs with the following characteristics:

Inherently Buoyant (primarily Foam)

- The most reliable
- Adult, Youth, Child, and Infant sizes
- For swimmers & non-swimmers
- Wearable & throwable styles

- Some designed for water sports

Minimum Buoyancy		
Wearable Size	Type	Inherent Buoyancy (Foam)
Adult	I	22 lb.
	II & III	15.5 lb.
	V	15.5 to 22 lb.
Youth	II & III	11 lb.
	V	11 to 15.5 lb.
Child and Infant	II	7 lb.
Throwable: Cushion Ring Buoy	IV	20 lb.
		16.5 & 32 lb.

Inflatable

- The most compact
- Sizes only for adults
- Only recommended for swimmers
- Wearable styles only
- Some with the best in-water performance

Minimum Buoyancy		
Wearable Size	Type	Inherent Buoyancy
Adult	I & II	34 lb.
	III	22.5 lb.
	V	22.5 to 34 lb.

Hybrid (Foam & Inflation)

- Reliable
- Adult, Youth, and Child sizes
- For swimmers & non-swimmers
- Wearable styles only
- Some designed for water sports

Minimum Buoyancy			
Wearable Size	Type	Inherent Buoyancy	Inflated Total Buoyancy
Adult	II & III	10 lb	22 lb.
	V	7.5 lb.	22 lb.
Youth	II & III	9 lb	15 lb.
	V	7.5 lb.	15 lb.
Child	II	7 lb.	12 lb.

[Types of PFD's >](#)

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- Search:

- Safety

- ✓ Federal Requirements
- ✓ MetLife Safety Tips
- ✓ Consumer Advisories
- ✓ Boating Safety Courses
- ✓ U.S. Aids to Navigation
- ✓ Boating Under the Influence
- ✓ GMDSS Communications

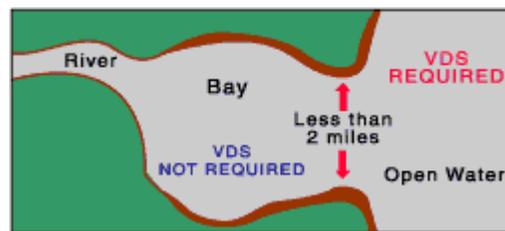
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Federal Requirements and Safety Tips for Recreational Boats

Visual Distress Signals

All vessels used on coastal waters, the Great Lakes, territorial seas, and those waters connected directly to them, up to a point where a body of water is less than two miles wide, must be equipped with U.S.C.G. Approved visual distress signals. Vessels owned in the United States operating on the high seas must be equipped with U.S.C.G. Approved visual distress signals.



These vessels are not required to carry day signals but must carry night signals when operating from sunset to sunrise:

- Recreational boats less than 16 feet in length
- Boats participating in organized events such as races, regattas, or marine parades.
- Open sailboats less than 26 feet in length not equipped with propulsion machinery.
- Manually propelled boats.

Pyrotechnic Devices

Pyrotechnic Visual Distress Signals must be Coast Guard Approved, in serviceable condition, and readily accessible.

- They are marked with an expiration date. Expired signals may be carried as extra equipment, but can not be counted toward meeting the visual distress signal requirement, since they may be unreliable.
- Launchers manufactured before January 1, 1981, intended for use with approved signals, are not required to be Coast Guard Approved.
- If pyrotechnic devices are selected a minimum of three are required. That is, three signals for day use and three signals for night. Some pyrotechnic signals meet both day and night use requirements.

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 - Vessel Safety Check (VSC) Program
 - Quick Reference Chart
- Vessels Operating Offshore
- Operating Procedures
- **Safety and Survival Tips**

- Pyrotechnic devices should be stored in a cool, dry location, if possible.
- A watertight container painted red or orange and prominently marked "DISTRESS SIGNALS" or "FLARES" is recommended.

U.S.C.G. Approved Pyrotechnic Visual Distress Signals and associated devices include:

- Pyrotechnic red flares, hand-held or aerial.
- Pyrotechnic orange smoke, hand-held or floating.
- Launchers for aerial red meteors or parachute flares.

[EACH OF THESE DEVICES HAS A DIFFERENT OPERATING (BURNING) TIME. CHECK THE LABEL TO SEE HOW LONG EACH PYROTECHNIC DEVICE WILL ACTUALLY BE ILLUMINATED. THIS WILL ALLOW YOU TO SELECT A WARNING DEVICE BETTER SUITED TO THE CONDITIONS WHERE YOUR BOAT WILL OPERATE?]



Non-Pyrotechnic Devices

Non-Pyrotechnic Visual Distress Signals must be in serviceable condition, readily accessible, and certified by the manufacturer as complying with U.S.C.G. requirements. They include:

Orange distress flag

- Day signal only.
- Must be at least 3 x 3 feet with a black square and ball on an orange background.
- Must be marked with an indication that it meets Coast Guard requirements in 46 CFR 160.072.
- Most distinctive when attached and waved on a paddle, boathook, or flown from a mast.
- May also be incorporated as part of devices designed to attract attention in an emergency, such as balloons, kites, or floating streamers.

Electric distress light

- Accepted for night use only
- Automatically flashes the international SOS distress signal:
(... — — — ...)
- Must be marked with an indication that it meets Coast Guard requirements in 46 CFR 161.013.

Under Inland Navigation Rules, a high intensity white light flashing at regular intervals from 50-70 times per minute is considered a distress signal. Such devices do NOT count

toward meeting the visual distress signal requirement, however.

Regulations prohibit display of visual distress signals on the water under any circumstances except when assistance is required to prevent immediate or potential danger to persons on board a vessel.

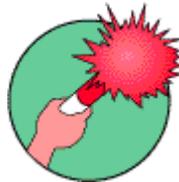
All distress signals have distinct advantages and disadvantages. No single device is ideal under all conditions or suitable for all purposes. Pyrotechnics are universally recognized as excellent distress signals. However, there is potential for injury and property damage if not properly handled. These devices produce a very hot flame and the residue can cause burns and ignite flammable materials.

Pistol launched and hand-held parachute flares and meteors have many characteristics of a firearm and must be handled with caution. In some states they are considered a firearm and prohibited from use.

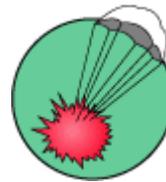
The following are just a few of the variety and combination of devices which can be carried in order to meet the requirements:

- Three hand-held red flares (day and night).
- One hand-held red flare and two parachute flares (day and night).
- One hand-held orange smoke signal, two floating orange smoke signals (day) and one electric distress light (night only).

Pyrotechnic Device Examples



Red Flare
(hand held/day and night)



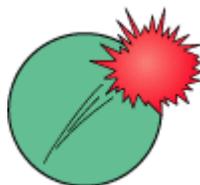
Parachute Flare
(day and night)



Orange Smoke Signal
(hand held/day only)



Floating Orange Smoke Signal
(day only)

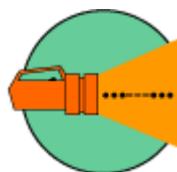


Red Meteor
(day and night)

Non-Pyrotechnic Device Examples



Orange Flag
(day only)



Electric Distress Signals
(night only)

All boaters should be able to signal for help. Boaters must have current dated U.S.C.G. Approved day and night signals for all boats operating on coastal and open bodies of water.

[Fire Extinguishers >](#)

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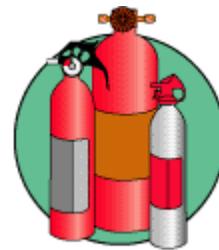
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Federal Requirements and Safety Tips for Recreational Boats

Fire Extinguishers

Coast Guard Approved fire extinguishers are required on boats where a fire hazard could be expected from the motors or the fuel system. Extinguishers are classified by a letter and number symbol. The letter indicates the type fire the unit is designed to extinguish (Type B for example are designed to extinguish flammable liquids such as gasoline, oil and grease fires). The number indicates the relative size of the extinguisher. The higher the number, the larger the extinguisher.

Coast Guard approved extinguishers required for boats are hand portable, either B-I or B-II classification and have a specific marine type mounting bracket. It is recommended the extinguishers be mounted in a readily accessible position, away from the areas where a fire could likely start such as the galley or the engine compartment.



Extinguisher markings can be confusing because extinguishers can be approved for several different types of hazards. For instance, an extinguisher marked "Type A, Size II, Type B:C, Size I" is a B-I extinguisher.

Look for the part of the label that says "**Marine Type USCG**"

- Make sure Type B is indicated
- Portable extinguishers will be either size I or II. Size III and larger are too big for use on most recreational boats.

Classes	Foam (Gals)	C02 (lbs)	Dry Chemical (lbs)	Halon (lbs)
B-I(TypeB, SizeI)	1.25	4	2	2.5
B-I(TypeB, Size II)	2.5	15	10	10

Fire Extinguishers are required on boats when any of the following conditions exist:

- Inboard engines are installed.
- There are closed compartments and compartments under

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- Safety and Survival Tips

- seats where portable fuel tanks may be stored.
- There are double bottoms not sealed to the hull or which are not completely filled with flotation materials.
- There are closed living spaces.
- There are closed stowage compartments in which combustible or flammable materials are stored.
- There are permanently installed fuel tanks. (Fuel tanks secured so they cannot be moved in case of fire or other emergency are considered permanently installed. There are no gallon capacity limits to determine if a fuel tank is portable. If the weight of a fuel tank is such that persons on board cannot move it, the Coast Guard considers it permanently installed.)

Fire Extinguisher Maintenance

Inspect extinguishers monthly to make sure that:

- Seals and tamper indicators are not broken or missing.
- Pressure gauges or indicators read in the operable range. (Note: CO2 extinguishers do not have gauges.)
- There is no obvious physical damage, rust, corrosion, leakage or clogged nozzles.
- Weigh extinguishers annually to assure that the minimum weight is as stated on the extinguisher label.

Fire extinguishers that do not satisfy the above requirements or that have been partially emptied must be replaced or taken to a qualified fire extinguisher servicing company for recharge.

Required Number of Fire Extinguishers

The number of fire extinguishers required on a recreational boat are based on the overall length of the boat. The following chart lists the number of extinguishers that are required. In the case where a Coast Guard approved fire extinguishing system is installed for the protection of the engine compartment, the required number of units may be reduced in accordance with the chart.

Minimum number of hand portable fire extinguishers required		
Vessel Length	No Fixed System	With approved Fixed Systems
Less than 26'	1 B-1	0
26' to less than 40'	2 B-1 or 1 B-II	1 B-I
40' to 65'	3 B-I or 1 B-II and 1 B-1	2 B-1 or 1 B-II

The pressure gauge alone is not an accurate indicator that Halon extinguishers are full. The weight of the units should be checked regularly. It is recommended that portable extinguishers be mounted in a readily accessible position.

[Ventilation >](#)

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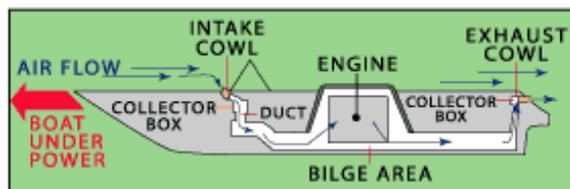
Ventilation

All boats which use gasoline for electrical generation, mechanical power or propulsion are required to be equipped with a ventilation system. A natural ventilation system is required for each compartment in a boat that:

1. contains a permanently installed gasoline engine;
2. has openings between it and a compartment that requires ventilation;
3. contains a permanently installed fuel tank and an electrical component that is not ignition-protected;
4. contains a fuel tank that vents into that compartment (including a portable tank); and
5. contains a non-metallic fuel tank.

A natural ventilation system consists of:

- A supply opening (duct/cowl) from the atmosphere (located on the exterior surface of the boat) or from a ventilated compartment or from a compartment that is open to the atmosphere;
- and an exhaust opening into another ventilated compartment or an exhaust duct to the atmosphere.



All blower motors installed in exhaust ducts must be in working condition of date of manufacture.

Each exhaust opening or exhaust duct must originate in the lower one-third of the compartment. Each supply opening or supply duct and each exhaust opening or duct in a compartment must be above the normal accumulation of bilge water.

A powered ventilation system is required for each compartment in a boat that has a permanently installed gasoline engine with a cranking motor for remote starting.

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A powered ventilation system consists of one or more exhaust blowers. Each intake duct for an exhaust blower must be in the lower one-third of the compartment and above the normal accumulation of bilge water.

For boats built prior to 1980, there was no requirement for a powered ventilation system; however, some boats were equipped with a blower.

The Coast Guard Ventilation Standard, a manufacturer requirement, applies to all boats built on or after August 1, 1980. Some builders began manufacturing boats in compliance with the Ventilation Standard as early as August 1978. If your boat was built on or after August 1, 1978 it might have been equipped with either (1) a natural ventilation system, or (2) both a natural ventilation system and a powered ventilation system. If your boat bears a label containing the words "This boat complies with U.S. Coast Guard safety standards," etc., you can assume that the design of your boat's ventilation system meets applicable regulations.

Manufacturers of boats built after 1980 with remote starters are required to display a label which contains the following information:

Warning:

Gasoline vapors can explode. Before starting engine, operate blower at least 4 minutes and check engine compartment bilge for gasoline vapors.

All owners are responsible for keeping their boat's ventilation systems in operating condition. This means making sure openings are free of obstructions, ducts are not blocked or torn, blowers operate properly, and worn components are replaced with equivalent marine type equipment.

[Backfire Flame Arrestor \(BFA\) >](#)

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Backfire Flame Arrestor (BFA)

Gasoline engines installed in a vessel after April 25, 1940, except outboard motors, must be equipped with an acceptable means of backfire flame control. The device must be suitably attached to the air intake with a flame tight connection and is required to be Coast Guard approved or comply with SAE J-1928 or UL 1111 standards and marked accordingly.

[Sound Producing Devices >](#)

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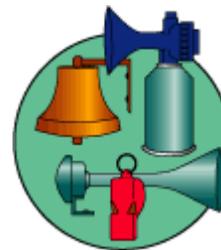
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Sound Producing Devices

The navigation rules require sound signals to be made under certain circumstances. Meeting, crossing and overtaking situations described in the Navigation Rules section are examples of when sound signals are required. Recreational vessels are also required to sound signals during periods of reduced visibility.

When operating on Inland Waters of the United States, vessels 39.4 feet/12 meters or more in length are required to carry on board a whistle or horn, and a bell.

Note: The requirement to carry a bell on board no longer applies to vessels operating on International Waters.



Signalling Devices

Any vessel less than 39.4 feet/12 meters in length may carry a whistle or horn, or some other means to make an efficient sound signal to signal your intentions and to signal your position in periods of reduced visibility.

Therefore, any vessel less than 39.4 feet/12 meters in length is required to make an efficient sound signal to signal your intentions and to signal your position in periods of reduced visibility.

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Navigation Rules

Require vessels to display lights and shapes under certain conditions.

Navigation Lights

Recreational vessels are required to display navigation lights between sunset and sunrise and other periods of reduced visibility (fog, rain, haze, etc.). The U.S. Coast Guard Navigation Rules, International-Inland, specifies lighting requirements for every description of water craft. The information provided is for power-driven and sailing vessels less than 65.5 feet/20 meters in length.

Power-driven Vessels

(Sail Vessel under machinery power is considered a power-driven vessel).

If your power-driven vessel is less than 65.5 feet/20 meters in length, then it must display navigation lights per Figure 1.

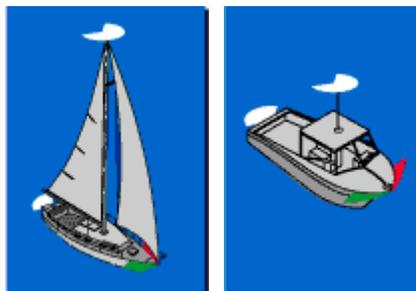


Figure 1

If your power-driven vessel is less than 39.4 feet/12 meters in length, then it may display navigation lights per Figure 2.

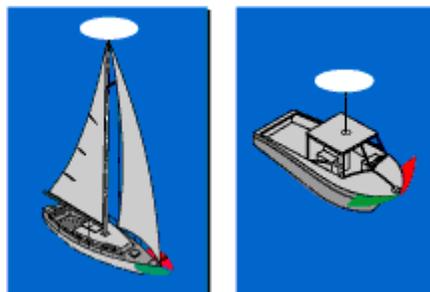


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Figure 2

If your power-driven vessel is less than 23 feet/7 meters in length and its maximum speed cannot exceed 7 knots, then it may display an all-round white light, and if practicable, sidelights instead of the lights prescribed previously. (For International Rules only)

For power-driven vessels less than 39.4 feet/12 meters in length, the masthead or all-round white light must be at least 1 meter above the sidelights.

Sidelights may be a combination light, instead of two separate lights as shown in figures 2 and 5.

Sailing Vessels

If your sailing vessel is less than 65.6 feet/20 meters in length, then it must display navigation lights as shown in Figures 3, 4, or 5.

**Figure 3****Figure 4****Figure 5**

If your vessel is less than 23 feet/7 meters in length, then it should display lights for a sailboat (Figures 3,4,or 5, if practicle). As an option, your vessel may carry an electric torch (flashlight) or lightened lantern that can show a white light in sufficient time to prevent collision. (see Figure 6)

**Figure 6****Vessel Under Oars**

If your vessel is under oars, then it should display lights for a sailboat (Figures 3 or 4), if



Figure 7

practicle. As an option, your vessel your vessel may carry a flashlight or lighted lantern that can show a white light in sufficient time to prevent collision. (see Figure 7)

Lights and Shapes

To alert other vessels of conditions, which may be hazardous, there are requirements to display lights at night and shapes during the day.

Anchored Vessels

AT NIGHT: All vessels at anchor must display anchor lights. If your vessel is less than 164 feet/50 meters in length, then its anchor light is an all-round white light visible where it can best be seen from all directions. (Figure 8)

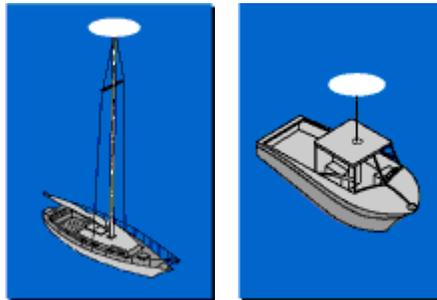


Figure 8

DURING THE DAY: All vessels at anchor must display, forward where it can be best seen, a black ball shape. (See Figure 9)

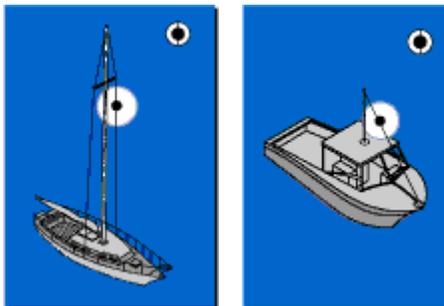


Figure 9

EXCEPTIONS: If your vessel is less than 23 feet/7 meters in length, then it is not required to display an anchor light or shape unless it is anchored in or near a narrow channel, fairway or anchorage, or where other vessels normally navigate.

If your vessel is less than 65.6 feet/20 meters in length, then it is not required to display an anchor light if it is anchored in Inland Waters in a special anchorage designated by the Secretary of

Transportation.

Sailing Vessels Under Power (Machinery)

During the day, vessels under sail also being propelled by machinery, must exhibit forward, where best seen, a black conical shape with the apex pointing down. (Figure 10)



Figure 10

EXCEPTION: If your vessel is less than 39.4 feet/12 meters in length, then it is not required to display the shape in Inland Waters.

REMINDER: If you are operating your sail vessel at night using machinery or sail and machinery, then your vessel must display lights required for a power-driven vessel. (See figures 1 or 2)

Restricted Maneuverability

The Navigation Rules require vessels restricted in their ability to maneuver to display appropriate day shapes or lights. To meet this requirement, if your vessel is engaged in diving activities during the day, then it must exhibit a rigid replica of the international code flag "Alpha" not less than 3.3 feet/ 1 meter in height. If the diving activities are at night, then your vessel must display the navigation lights shown in Figure 11. This requirement does not affect the use of a red and white divers flag, which may be required by State or local law to mark a diver's location. The "A" flag is a navigation signal indicating your vessel's restricted maneuverability and does not pertain to the diver.

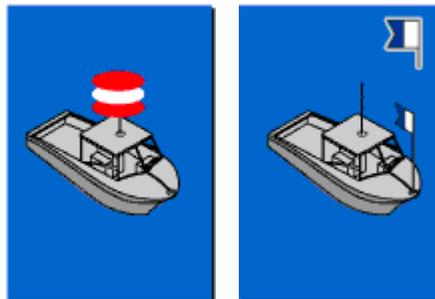


Figure 11

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Radio Regulations

Carrying a Radio

Most recreational vessels under 65.6ft/20m in length do not have to carry a marine radio. Any vessel that carries a marine radio must follow the rules of the Federal Communications Commission (FCC).

Radio Licenses

The FCC does not require operators of recreational vessels to carry a radio or to have an individual license to operate VHF marine radios (with or without digital selective calling capability), EPIRBs, or any type of radar. Operators must however follow the procedures and courtesies that are required of licensed operators specified in FCC Rules. You may use the name or registration number of your vessel to identify your ship station.

Users of VHF marine radio equipped with digital selective calling will need to obtain a maritime mobile service identity (MMSI) number from the FCC. It is unlawful to use digital selective calling without obtaining this identity.

Vessels required to be licensed:

1. Vessels that use MF/HF single side-band radio, satellite communications, or telegraphy,
2. Power Driven vessels over 65.6 feet/20 meters in length.
3. Vessels used for commercial purposes including:
 - Vessels documented for commercial use, including commercial fishing vessels.
 - CG inspected vessels carrying more than 6 passengers.
 - Towboats more than 25.7 feet/7.8 meters in length.
 - Vessels of more than 100 tons certified to carry at least 1 passenger.
 - Cargo ships over 300 tons.
4. Any vessel, including a recreational vessel, on an international voyage.

Radio Listening Watch

Vessels not required to carry a radio (e.g. recreational vessels less than 65.6 feet/20 meters in length), but which voluntarily

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carry a radio, must maintain a watch on channel 16 (156.800 MHz) whenever the radio is operating and not being used to communicate. Such vessels may alternatively maintain a watch on VHF channel 9 (156.450 MHz), the boater calling channel.

Distress Call Procedures

1. Make sure radio is on
2. Select Channel 16
3. Press/Hold the transmit button
4. Clearly say: MAYDAY MAYDAY MAYDAY
5. Also give:
 - Vessel Name and/or Description
 - Position and/or Location
 - Nature of Emergency
 - Number of People on Board
6. Release transmit button
7. Wait for 10 seconds – If no response Repeat "MAYDAY" Call.

False Distress Alerts

It is unlawful to intentionally transmit a false distress alert, or to unintentionally transmit a false distress alert without taking steps to cancel that alert.

For further information:

FCC — Toll free telephone: 1-888 CALL FCC
World Wide Web: <http://www.fcc.gov/wtb/>

USCG — World Wide Web:
<http://www.navcen.uscg.gov/marcomms/>

For a complete listing of VHF Channels and Frequencies visit the USCG Navigation Center web site: www.navcen.uscg.gov

VHF Marine Radio Channels

The chart below contains a partial listing of channels recreational boaters should be familiar with:

Channel	Type of Message and Use
06	Intership Safety: Used for ship-to-ship safety messages and search messages and ships and aircraft of the Coast Guard.
09	Boater Calling: FCC has established this channel as a supplementary calling channel for recreational boaters in order to relieve congestion on VHF Channel 16.
13, 67	Navigation Safety (Also known as the Bridge-to-Bridge channel): Ships greater than 20 meters in length maintain a listening watch on this channel in US waters. This

- channel is available to all ships. Messages must be about ship navigation (i.e. passing or meeting other ships). You must keep your messages short. Your power output must not be more than one watt. This is also the main working channel at most locks and drawbridges. Channel 67 is for lower Mississippi River only.
- 16** **International Distress, Safety and Calling:** Use this channel to get the attention of another station (calling) or in emergencies. Ships required to carry a radio maintain a listening watch on this channel. USCG and most coast stations also maintain a listening watch on this channel.
- 21A, 23A, 83A** **U.S. Coast Guard only**
- 22A** **Coast Guard Liaison and Maritime Safety Information Broadcasts:** Announcements of urgent marine information broadcasts and storm warnings on Channel 16.
- 24, 25, 26, 27, 28, 84, 85, 85, 87** **Public Correspondence (Marine Operator):** Use these channels to call the marine operator at a public station. By contacting a public coast station, you can make and receive calls from telephones on shore. Except for dis-tress calls, public stations usually charge for this service.
- 70** **Digital Selective Calling:** Use this channel for distress and safety calling and for general purpose calling using only digital selective calling (DSC) techniques.
- Note: The U.S. Coast Guard will not be equipped to respond to DSC distress calls on Channel 70 until 2006—use Channel 16.**

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Pollution Regulations

The Refuse Act of 1899 prohibits throwing, discharging or depositing any refuse matter of any kind (including trash, garbage, oil, and other liquid pollutants into the waters of the United States.

The Federal Water Pollution Control Act prohibits the discharge of oil or hazardous substances which may be harmful into U.S. navigable waters. Vessels 26 feet in length and over must display a placard at least 5 by 8 inches, made of durable material, fixed in a conspicuous place in the machinery spaces, or at the bilge pump control station, stating the following:

Discharge of Oil Prohibited

The Federal Water Pollution Control Act prohibits the discharge of oil or oily waste upon or into any navigable waters of the U.S. The prohibition includes any discharge which causes a film or discoloration of the surface of the water or causes a sludge or emulsion beneath the surface of the water. Violators are subject to substantial civil and/or criminal sanctions including fines and imprisonment.

Regulations issued under the Federal Water Pollution Control Act require all vessels with propulsion machinery to have a capacity to retain oily mixtures on board and be equipped with a fixed or portable means to discharge these oily mixtures to a reception facility. On recreational vessels, a bucket, oil absorbent pads and heavy duty plastic bag, bailer or portable pump are some suitable means that meet the requirement for retention on board until transferring the oily mixture to a reception facility. No person may intentionally drain oil or oily waste from any source into the bilge of any vessel. You must immediately notify the U.S. Coast Guard if your vessel discharges oil or hazardous substances in the water. Call toll-free 800-424-8802 (In Washington, D.C. (202) 267-3675).

Report the following information:

- location
- size
- source
- color
- time observed
- substances

Discharge of Garbage Prohibited

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The Act to Prevent Pollution from Ships (MARPOL ANNEX V) places limitations on the discharge of garbage from vessels. It is illegal to dump plastic trash anywhere in the ocean or navigable waters of the United States. It is also illegal to discharge garbage in the navigable waters of the United States, including inland waters as well as anywhere in the Great Lakes. The discharge of other types of garbage is permitted outside of specific distances offshore as determined by the nature of that garbage.

Garbage Type	Discharge
Plastics – includes synthetic ropes, fishing nets, and plastic bags	Prohibited in all areas
Floating dunnage, lining and packing materials	Prohibited less than 25 miles from nearest land
Food waste, paper, rags, glass, metal, bottles, crockery and similar refuse	Prohibited less than 12 miles from nearest land
Comminuted or ground food waste, paper, rags, glass, etc.	Prohibited less than 3 miles from nearest land

United States vessels of 26 feet or longer must display in a prominent location, a durable placard at least 4 by 9 inches notifying the crew and passengers of the discharge restrictions.

United States oceangoing vessels of 40 feet or longer, which are engaged in commerce or are equipped with a galley and berthing must have a written Waste Management Plan describing the procedures for collecting, processing, storing and discharging garbage, and designate the person who is in charge of carrying out the plan.

[Marine Sanitation Devices >](#)

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Marine Sanitation Devices

All recreational boats with installed toilet facilities must have an operable marine sanitation device (MSD) on board. Vessels 65 feet and under may use a Type I, II or III MSD. Vessels over 65 feet must install a Type II or III MSD. *All installed MSDs must be Coast Guard certified.* Coast Guard certified devices are so labeled except for some holding tanks, which are certified by definition under the regulations.

When operating a vessel on a body of water where the discharge of treated or untreated sewage is prohibited the operator must secure the device in a manner which prevents any discharge. Some acceptable methods are: padlocking overboard discharge valves in the closed position, using non releasable wire tie to hold overboard discharge valves in the closed position, closing overboard discharge valves and removing the handle, locking the door, with padlock or keylock, to the space enclosing the toilets (for Type I and Type II only).

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Vessel Safety Check (VSC) Program

Introduction

The mission of the Coast Guard Recreational Boating Safety program is to minimize the loss of life, personal injury, property damage and environment impact associated with the use of recreational vessels through preventive means. The VSC program supports one of the program's key goals: to improve the demonstrated knowledge, skills, abilities and behaviors of boaters.

The VSC is not a boarding or law enforcement issue. No citations will be given as a result of this encounter. The boater will be given a copy of the completed evaluations so that the boater may follow some of the suggestions given. Vessels that pass will be able to display the distinctive VSC decal. This does not exempt the boater from law enforcement boarding, but the boater can be prepared to make this a positive encounter.

What is a Vessel Safety Check?

A Vessel Safety Check (VSC) is a FREE check to boaters who wish to be sure that their vessel meets all federal and state equipment requirements. Vessel Examiners performing this service have been trained to look for some of the more common problems, which might occur on vessels or their associated safety equipment. The items checked are:

- Proper Display of Numbers
- Registration/Documentation
- Personal Flotation Devices (PFDs)
- Visual Distress Signals (VDS)
- Fire Extinguishers
- Ventilation
- Backfire Flame Arrestor
- Sound Producing Devices/Bell
- Navigation Lights
- Pollution Placard
- MARPOL Trash Placards
- Marine Sanitation Device
- Navigation Rules
- State and/or Local Requirements
- Overall Vessel Condition

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If the vessel has all the required items (listed above) on board and are in good working order, the vessel examiner will award a VSC decal to affix to the vessel.



Additional Safety Equipment

- Marine Radio
- Dewatering Device & Backup
- Mounted Fire Extinguishers
- Anchor and Line for Area
- First Aid and Person-In-Water Kit (PIW)
Note: PIW consists of one extra wearable PFD and a throwable type IV PFD with line
- Inland Visual Distress Signals
- Capacity/Certification of Compliance

Note: The above items not required for the award of the Vessel Safety Check decal.

Boating Safety Education

During the Vessel Safety Check, the vessel examiner will discuss with the recreational boater the purpose of specific marine safety equipment, will clarify various federal and state regulations, will discuss certain safety procedures practices, and will answer any boating related questions. Some of the topics discussed are:

- Accident Reporting/Owner Responsibility
- Charts and Aids to Navigation
- Offshore Operations
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- Boating Checklist
- Availability of Boating Safety Classes

For Further Information

To get your vessel "Safety Checked" or for more information on the Vessel Safety Check program, contact your local U.S. Coast Guard Auxiliary or U.S. Power Squadron member or visit the

Vessel Safety Check web site at www.safetyseal.net.

Remember!

This is a FREE public service provided in the interest of Boating Safety...

[Quick Reference Chart >](#)

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Federal Requirements and Safety Tips for Recreational Boats

Quick Reference Chart

Vessel Length (in feet)	Equipment				Requirement
	<16	16<26	26<40	40<65	
X	X	X	X	Certificate of Number (State Registration)	All undocumented vessels equipped with propulsion machinery must be State registered. Certificate of Number must be on board when vessel is in use. Note: some States require all vessels to be registered.
X	X	X	X	State Numbering	(a) Plain Block letters/numbers not less than 3 inches in height must be affixed on each side of the forward half of the vessel (Contrasting color to boat exterior). (b) State validation sticker must be affixed within six inches of the registration number
	X	X	X	Certificate of Documentation	Applies only to "Documented" vessels: (a) Original and current certificate must be on board (b) Vessel name/hailing port marked on exterior part of hull -- letters not less than 4 inches in height. (c) Official Number permanently affixed on interior structure -- numbers not less than 3 inches in height.

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X	X	X	X	Life Jackets (PFDs)	<p>(a) One Type I, II, III, or V wearable PFD for each person on board. (must be USCG approved)</p> <p>(b) In addition to paragraph (a), must carry One Type IV (throwable) PFD.</p>
	X	X	X		
X				Visual Distress Signal (VDS)	<p>(a) One electric distress light or Three combination (day/night) red flares. Note: only required to be carried on board when operating between sunset and sunrise.</p> <p>(b) One orange distress flag and One electric distress light - or -Three hand-held or floating orange smoke signals and One electric distress light - or - Three combination (day/night) red flares: hand-held, meteor or parachute type.</p>
	X	X	X		

Vessel Length (in feet)				Equipment	Requirement
<16	16<26	26<40	40<65		
X	X			Fire Extinguishers	<p>(a) One B-I (when enclosed compartment)</p> <p>(b) One B-II or Two B-I. Note: fixed system equals One B-I</p> <p>(c) One B-II and One B-I or Three B-I. Note: fixed system equals One B-I or Two B-II</p>
		X			
			X		
X	X	X	X	Ventilation	<p>(a) All vessels built after 25 April 1940 that use gasoline as their fuel with enclosed engine and /or fuel tank compartments must have natural ventilation (at least two ducts fitted with cowls).</p> <p>(b) In addition to paragraph (a), a vessel built after 31 July 1980 must have rated power exhaust blower.</p>

X	X	X		Sound Producing Devices	<p>(a) A vessel 39.4 ft must, at a minimum, have some means of making an "efficient" sound signal - (i.e. handheld air horn, athletic whistle - Human voice/ sound not acceptable).</p> <p>(b) A vessel 39.4 ft (12 meters) or greater, must have a sound signaling appliance capable of producing an efficient sound signal, audible for 1/2 mile with a 4 to 6 seconds duration. In addition, must carry on board a bell with a clapper (bell size not less than 7.9 inches - based on the diameter of the mouth)</p>
		X	X		
X	X	X	X	Backfire Flame Arrestor	Required on gasoline engines installed after 25 April 1940, except outboard motors
X	X	X	X	Navigational Lights	Required to be displayed from sunset to sunrise and in or near areas of reduced visibility.
				Oil Pollution Placard	<p>(a) Placard must be at least 5 by 8 inches, made of durable material.</p> <p>(b) Placard must be posted in the machinery space or at the bilge station.</p>
		X	X	Garbage Placard	<p>(a) Placard must be at least 4 by 9 inches, made of durable material.</p> <p>(b) Displayed in a conspicuous place notifying all on board the discharge restrictions.</p>
X	X	X	X	Marine Sanitation Device	If installed toilet: Vessel must have an operable MSD Type I, II, or III.
		X	X	Navigation Rules	The operator of a vessel 39.4 ft (12 meters) or

(Inland Only) greater must have on board a copy of these rules.

[Vessels Operating Offshore >](#)

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Vessels Operating Offshore

If you operate offshore, you should seriously consider carrying additional equipment beyond the minimum federal requirements. This equipment should include appropriate communications gear, an Emergency Position Indicating Radio Beacon (EPIRB), a means of accurately determining your location, and an inflatable life raft. In cold waters, an immersion suit should be carried for everyone on board.

[Communications >](#)

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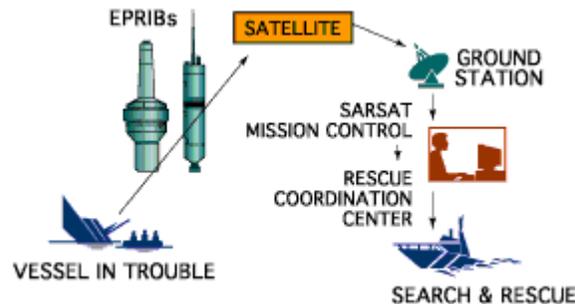
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Communications

Carry communications gear, marine VHF-FM and/or HF transceiver(s), appropriate to your operating area. Cellular phone coverage is available in many coastal areas. HOWEVER, cellular phones should NOT BE considered a substitute for VHF-FM marine band radios for emergency purposes.

Satellite EPIRBs

Satellite EPIRBs (406 MHz) are designed to quickly and reliably alert rescue forces, indicate an accurate distress position, and guide rescue units to the distress scene, even when all other communications fail.



When activated, the satellite EPIRB transmits a distress signal with a beacon-unique identifying code. The system detects the signal, calculates an accurate distress position, checks the unique identifying code against the EPIRB registration database (vessel and point of contact information supplied by the owner) and routes the distress alert with registration information to the responsible U.S. Coast Guard (or international) Rescue Coordination Center (RCC). 406 MHz EPIRBs with GPS (internal or attached) also provide an immediate GPS position in the information passed to the RCC.

Geostationary satellites make detection almost immediate. If the EPIRB does not have the ability to provide a GPS position, the process to determine a position takes about an hour on average and almost always less than two hours. Satellite EPIRBs also include a homing beacon and strobe to

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help rescue forces quickly locate the distress scene.

Satellite beacons have significant coverage, alerting timeliness, position accuracy, and signaling advantages over other types of EPIRBs (121.5 MHz). Before purchasing or using an other-than-406MHz EPIRB, be sure you understand its capabilities and limitations.

Mount the EPIRB to float free according to the manufacturer's instructions, if possible. Otherwise, make sure it is readily accessible. Register the EPIRB with NOAA, according to the instructions provided with the beacon. Registration is mandatory, improves response and reduces false alarms.

[Inflatable Life Rafts >](#)

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Immersion Suits

Immersion suits will delay the effects of [hypothermia](#) in cold water. They should be stored and maintained according to the manufacture's instructions.

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U.S. Coast Guard
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Operating Procedures

Navigation Rules

The Navigation Rules establish actions to be taken by vessels to avoid collision. The Rules are divided into two parts, INLAND and INTERNATIONAL. Inland Rules apply to vessels operating inside the line of demarcation while International apply outside. Demarcation lines are printed on most navigational charts and are published in the Navigation Rules.

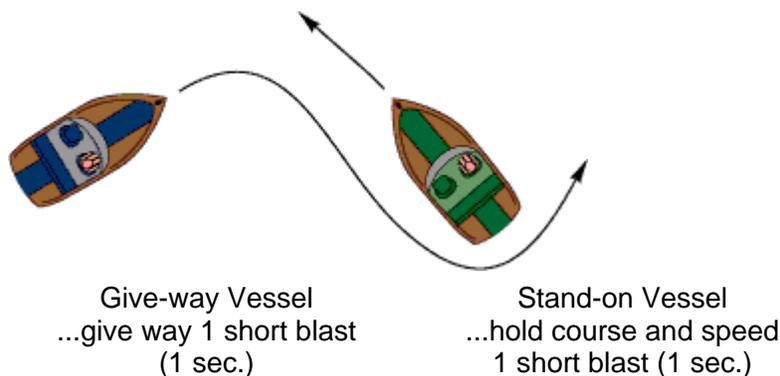
The operator of a vessel 39.4 feet/12 meters or greater is responsible for having on board and maintaining a copy of the Inland navigation rules. The following diagrams describe the whistle signals and action to be taken by vessels in a crossing, meeting or overtaking situation while operating in inland waters. These are basic examples, for further information consult the "NAVIGATION RULES" International Inland (Commandant Instruction M16672.2 Series)

Copies of the rules may be obtained from the Superintendent of Documents, U.S. Government Printing Office, P.O. Box 371954, Pittsburgh, PA 15250-7954 tel. (202) 512-1800

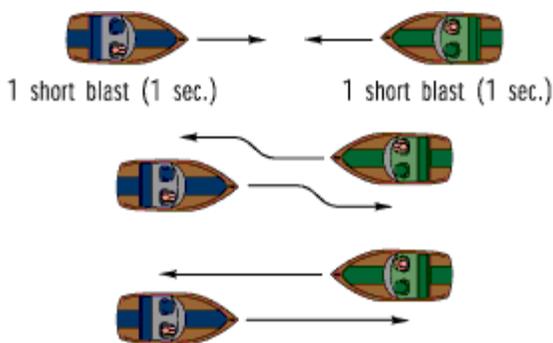
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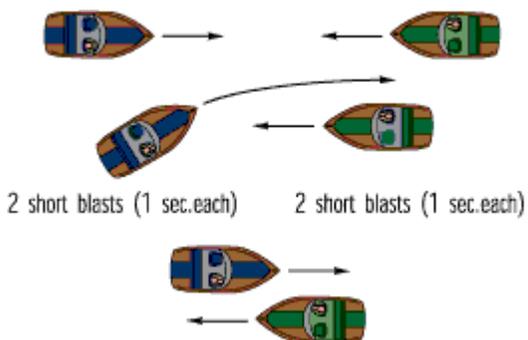
Crossing Situations



Meeting Head-On or Nearly So Situations



Vessels generally pass portside to portside. However, vessels may pass starboard to starboard if proper signals are given.



Overtaking Situations



[Aids to Navigation >](#)



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Aids to Navigation

Aids to Navigation are placed along coasts and navigable waters as guides to mark safe water and to assist mariners in determining their position in relation to land and hidden dangers. Each aid to navigation is used to provide specific information.

Several aids to navigation are usually used together to form a local aid to navigation system that helps the mariner follow natural and improved channels. Such aids to navigation also provide a continuous system of charted marks for coastal piloting. Individual aids to navigation are used to mark landfall from seaward, and to mark isolated dangers.

Lateral markers are buoys or beacons that indicate the port and starboard sides of a route to be followed. Virtually all U.S. lateral marks follow the traditional 3R rule of "red, right, returning". This means, when returning from sea, keep red marks on the right-hand (starboard) side of the vessel.

Mariners must NOT rely on buoys alone for determining their position. Storms and wave action can cause buoys to move.

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Lateral Aids

Lateral aids marking the sides of channels as seen when entering from seaward.

Port Side (Odd Numbers) Standard Side (Even Numbers)

 Lighted Buoy (Green Light Only)	Chart Symbol G "9" Fl G 4 sec	 Lighted Buoy (Red Light Only)	Chart Symbol R "8" Fl R 4 sec
 Can Light (Unlighted)	Chart Symbol C "7"	 Nun Buoy (Unlighted)	Chart Symbol N "6"
 Daybreak	Chart Symbol G "1"	 Daybreak	Chart Symbol R "2"

Do not tie up to Aids to Navigation, it is dangerous and illegal.

Safe Water Markers

 Chart Symbol RW "E" Mo (A)	 Chart Symbol RW C "E"
--	-------------------------------------

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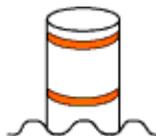


Chart Symbol



RW
"A"

Information and Regulatory Markers



Diamond Shape
warns of danger



Diamond Shape with cross
means boats keep out



Circle marks area controlled
"as indicated"



For displaying informaion such as
directions, distances, locations,
ect.

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Nautical Charts

One of the most important tools used by boaters for planning trips and safely navigating waterways are Nautical Charts. Nautical Charts show the nature and shape of the coast, depths of water, general configuration and character of the bottom, prominent landmarks, port facilities, aids to navigation, marine hazards, and other pertinent information. Changes brought about by people and nature require that nautical charts be constantly maintained and updated to aid safe navigation. To meet the needs of the boating public, the National Ocean Service (NOS) produces a variety of nautical charts and chart products. The date of a nautical chart is critical to the boater. Only up-to-date charts should be used for navigation. Nautical charts vary in scale and format. For coastal navigation, for instance, boaters should use the largest chart scale available. Chart updating information can be obtained from "Local Notice to Mariners" published by the U.S. Coast Guard.

NOS nautical charts may be purchased either directly by mail from the NOS Distribution Branch or through an authorized agent. There are more than 1,700 nautical chart agents that sell NOS charts. To obtain a list of the agents near you, request a free catalog.

FAA/National Aeronautical Charting Office
 Distribution Division, AVN-530
 6303 Ivy Lane, Suite 400
 Greenbelt, MD 20770
 Telephone: (301) 436-8301 or 1-800-638-8972 U.S. Only
 FAX: (301) 436-6829
 Email: 9-AMC-chartsales@faa.gov
 Website: <http://naco.faa.gov/>

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Safety and Survival Tips

Operator's Responsibilities

Your water fun depends on you, your equipment and other people who, like yourself, enjoy spending leisure time on, in or near the water. Let's take a look at your responsibilities:

- Make sure the boat is in top operating condition and that there are no tripping hazards. The boat should be free of fire hazards and have clean bilges
- Safety equipment, required by law, is on board, maintained in good condition, and you know how to properly use these devices.
- File a float plan with a relative or friend.
- Have a complete knowledge of the operation and handling characteristics of your boat.
- Know your position and know where you are going.
- Maintain a safe speed at all times to avoid collision.
- Keep an eye out for changing weather conditions, and act accordingly.
- Know and practice the Rules of the Road (Navigation Rules).
- Know and obey Federal and state regulations and waterway markers.
- Maintain a clear, unobstructed view forward at all times. "Scan" the water back and forth; avoid "tunnel" vision. Most boating collisions are caused by inattention.

You are the key to water safety!

[Overloading >](#)

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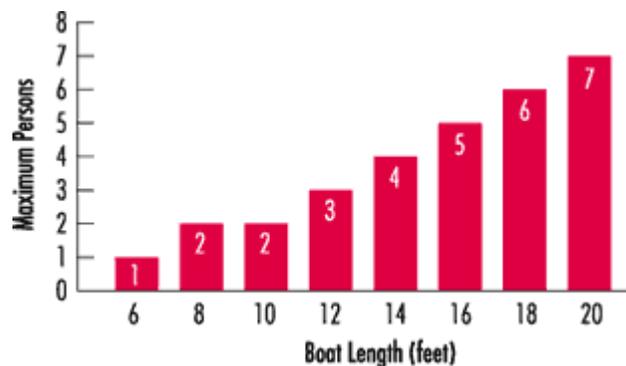
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Overloading

Never overload your boat with passengers and cargo beyond its safe carrying capacity. Too many people and/or gear will cause the boat to become unstable. Always balance the load so that the boat maintains proper trim. Here are some things to remember when loading your boat:

- Distribute the load evenly fore and aft and from side to side.
- Keep the load low.
- Keep passengers seated (Do not stand up in a small boat!).
- Fasten gear to prevent shifting.
- Do not exceed the "U.S. Coast Guard Maximum Capacities" information label (commonly called the Capacity Plate).
- If there is no capacity plate, use the following chart as a guide to determine the maximum number of persons you can safely carry in calm weather. (The chart is applicable only to mono-hull boats less than 20ft in length.) A mono-hull is a boat, which makes a single "footprint" in the water when loaded to its rated capacity. For example, a catamaran, trimaran, or a pontoon boat is not a mono-hull boat.



Number of People = $(\text{Length of Boat} \times \text{Boat Width})$

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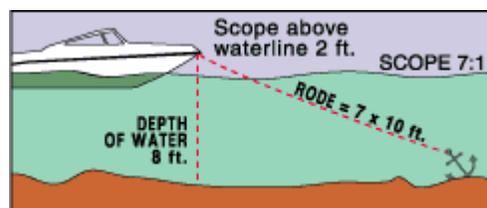
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Anchoring

Anchoring is done for two principal reasons: first, to stop for fishing, swimming, lunch, or an overnight stay and secondly, to keep you from running aground in bad weather or as a result of engine failure. Anchoring can be a simple task if you follow these guidelines:

- Make sure you have the proper type of anchor (danforth/plow/mushroom).
- A three to six foot length of galvanized chain should be attached to the anchor. The chain will stand up to the abrasion of sand, rock or mud on the bottom much better than a fiber line.
- A suitable length of nylon anchor line should be attached to the end of the chain (this combination is called the "Rode"). The nylon will stretch under heavy strain cushioning the impact of the waves or wind on the boat and the anchor.
- Select an area that offers maximum shelter from wind, current and boat traffic.
- Determine depth of water and type of bottom (preferably sand or mud).
- Calculate amount of anchor line you will need. General rule: 5 to 7 times as much anchor line as the depth of water plus the distance from the water to where the anchor will attach to the bow. For example, if the water depth is 8 feet and it is 2 feet from the top of the water to your bow cleat, you would multiply 10 feet by 5 to 7 to get the amount of anchor line to put out (See diagram below)



- Secure the anchor line to the bow cleat at the point you want it to stop.
- Bring the bow of the vessel into the wind or current.
- When you get to the spot you want to anchor, place the

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engine in neutral.

- When the boat comes to a stop, slowly lower the anchor. Do not throw the anchor over, as it will tend to foul the anchor.
- When all anchor line has been let out, back down on the anchor with engine in idle reverse to help set the anchor.
- When anchor is firmly set, use reference points (landmarks) in relation to the boat to make sure you are not drifting. Check these points frequently.

Do not anchor by the Stern!!

Anchoring a small boat by the stern has caused many to capsize and sink. The transom is usually squared off and has less freeboard than the bow. In a current, the force of the water can pull the stern under. The boat is also vulnerable to swamping by wave action. The weight of a motor, fuel tank, or other gear in the stern increases the risk.

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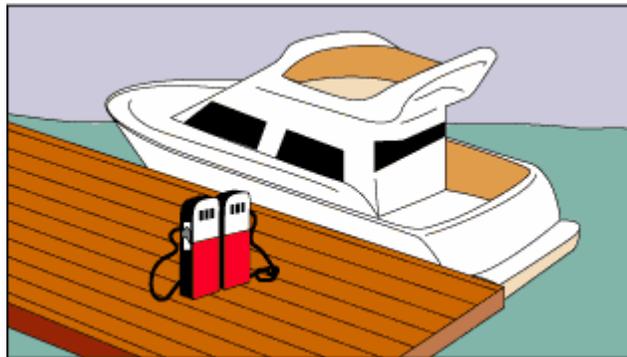
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Fueling Precautions

Most fires and explosions happen during or after fueling. To prevent an accident follow these rules:

- Portable tanks should be refueled ashore.
- Close all hatches and other openings before fueling.
- Extinguish all smoking materials.
- Turn off engines, all electrical equipment, radios, stoves and other appliances.
- Remove all passengers.
- Keep the fill nozzle in contact with the tank and wipe up any spilled fuel.
- Open all ports, hatches and doors to ventilate.
- Run the blower for at least four minutes.
- Check the bilges for fuel vapors before starting the engine.
- Do the "sniff test". Sniff around to make sure there is no odor of gasoline anywhere in the boat.



Do not start the engine until all traces of fuel vapors are eliminated!!

Fuel Management

Practice the "One-Third Rule" by using:

- One-third of the fuel going out
- One-third to get back
- One-third in reserve

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[Float Plan >](#)

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Float Plan

Play it safe, keep a stack of float plan forms on hand. Leave a copy with a friend, relative or local marina before heading out on the water. In case of an emergency, pertinent information will be right at their fingertips to enable them to contact the local marine police or Coast Guard with necessary details. A word of caution—in case you're delayed, and it's not an emergency, inform those with your float plan, and be sure to notify them when you return so the float plan can be "closed out" and an unnecessary and costly search avoided. An example of a float plan is provided [here as a PDF](#).

[Propeller Blades Warning >](#)

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Propeller Blades Warning

Never forget the danger to persons in the water that boat propellers can inflict. Statistics indicate that most propeller injuries and fatalities involve open motorboats 16 to less than 26 feet in length and are due to operator inattention, inexperience, and carelessness. Remember to shut off your engines when approaching swimmers. When engines are running, alert swimmers to stay clear of the stern. Propeller guards are not suitable for all types of boats. Therefore, the best and safest course of action to take when people are in the water near your boat—Shut off your engines!



People in the water can be severely injured or killed!

[Weather >](#)

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Weather

You should never leave the dock without first checking the local weather forecast. You can get the weather information from the TV, radio, local newspaper, on-line, or from one of the weather channels on your VHF radio.

At certain times of the year weather can change rapidly and you should continually keep a "weather eye" out. While you are out in a boat here are a few signs you can look for that indicate an approaching weather change:

- Weather changes generally come for the west. Scan the sky with your weather eye, especially to the west.
- Watch for cloud build up, especially rapid vertically rising clouds.
- Sudden drop in temperature.
- Sudden change in wind direction and/or speed.
- If you have a barometer on your boat, check it every 2 to 3 hours. A rising barometer indicates fair weather and a rise in wind velocity; a falling barometer indicates stormy or rainy weather.

What To Do in Severe Weather

- Reduce speed, but keep just enough power to maintain headway.
- Put on your PFDs.
- Turn on running lights.
- Head for nearest shore that is safe to approach, if possible.
- Head bow of boat into the waves at about a 45-degree angle.
- Keep bilges free of water.
- Seat passengers on bottom of boat near centerline.
- If your engine fails, trail a sea anchor on a line from the bow to keep the boat headed into the waves. A bucket will work as a sea anchor in an emergency.
- Anchor the boat if necessary

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Small Boats and Water Activities

Many hunters and anglers do not think of themselves as boaters, but use small semi v-hull vessels, flat bottom jon-boats or canoes to pursue their sports. These boats tend to be unstable and easily capsize. Capsizings, sinkings, and falls overboard from small boats account for 70% of boating fatalities and these facts mean you must have a greater awareness of the boat's limitations and the skill and knowledge to overcome them.

Standing in a small boat raises the center of gravity, often to the point of capsizing. Standing for any reason or even changing position in a small boat can be dangerous, as is sitting on the gunwales or seat backs or on a pedestal seat while underway. A wave or sudden turn may cause a fall overboard or capsizing because of the raised center of gravity.

[Staying Afloat >](#)

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Staying Afloat

It is common belief that someone dressed in heavy clothing or waders will sink immediately if they fall overboard. This is not true. Air trapped in clothing provides considerable flotation, and bending the knees will trap air in waders, providing additional flotation. To stay afloat follow these rules:

- Remain calm, do not thrash about or try to remove clothing or footwear. This leads to exhaustion and increases the loss of air that keeps you afloat.
- Keep your PFD on.
- Keep your knees bent.
- Float on your back and paddle slowly to safety.

[Cold Water Survival >](#)

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Cold Water Survival

Sudden immersion in cold water can induce rapid, uncontrolled breathing, cardiac arrest, and other physical body conditions, which can result in drowning. Always wearing a PFD will help you survive in rapid immersion situations. In other situations where you must enter the water, here are a few things to follow:

- Wear a PFD.
- Button up your clothing.
- Cover your head if possible and enter the water slowly.
- Keep your head out of the water if at all possible.
- Assume the Heat Escape Lessening Posture (H.E.L.P.) position.



[Hypothermia >](#)

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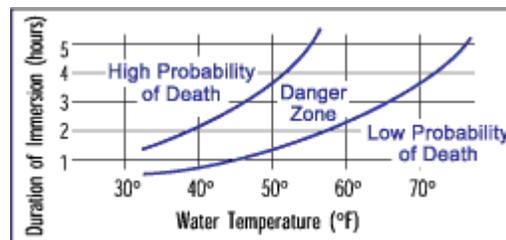
Federal Requirements and Safety Tips for Recreational Boats



Hypothermia

Immersion in water speeds the loss of body heat and can lead to hypothermia. Hypothermia is the abnormal lowering of internal body temperature. If your boat capsizes it will likely float on or just below the surface. Outboard powered vessels built after 1978 are designed to support you even if full of water or capsized. To reduce the effects of hypothermia get in or on the boat. Try to get as much of your body out of the water as possible. If you can't get in the boat a PFD will enable you to keep your head out of the water. This is very important because about 50% of body heat loss is from the head.

It may be possible to revive a drowning victim who has been under water for considerable time and shows no signs of life. Numerous documented cases exist where victims have been resuscitated with no apparent harmful effects after long immersions. Start CPR immediately and get the victim to a hospital as quickly as possible.



The Danger Zone indicates where safety precautions and appropriate behavior (adopting H.E.L.P.) can increase your chances of survival when immersed in cold water.

[Carbon Monoxide >](#)

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Carbon Monoxide Hazards on Recreational Boats

The Facts

Carbon Monoxide can be a "silent killer" on houseboats and other recreational vessels. Each year, boaters are injured or killed by carbon monoxide. Virtually all of the poisonings are preventable.

Carbon monoxide is a by-product of combustion of carbon based material such as gasoline, propane, charcoal or wood. Common sources aboard boats include main and auxiliary engines, generators, cooking ranges, space heaters, and water heaters. (Note: Cold and poorly tuned engines produce more carbon monoxide than warm properly tuned engines).

Carbon monoxide can collect within a boat in a variety of ways. Exhaust leaks (the leading cause of death by carbon monoxide) can allow carbon monoxide to migrate throughout the boat and into enclosed areas. Even properly vented exhaust can re-enter a boat if it's moored too close to a dock or another boat, or if the exhaust is pushed back by prevailing winds. Exhaust can re-enter boats when cruising under certain conditions – the station wagon effect – especially with canvas in place. Exhaust can also collect in enclosed spaces near the stern swim platform.

What To Do?

- Schedule regular engine and exhaust system maintenance inspections by experienced and trained mechanics.
- Be aware that dangerous concentrations of carbon monoxide can accumulate when a boat, generator or other fueled device is operated while the boat is at a pier, seawall or alongside another boat. Do not run engines or equipment for extended periods of time under these conditions or without continuous monitoring.
- Keep forward facing hatches open to allow fresh air circulation in accommodation spaces, even in inclement weather.
- Keep people clear of the rear deck area and swim platform of the boat while either the generator or engines

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- are running. Always monitor the swimming area.
- Do not confuse carbon monoxide poisoning with seasickness or intoxication. If someone on board complains of irritated eyes, headaches, nausea, weakness or dizziness, immediately move the person to fresh air, investigate the cause and take corrective action. Seek medical attention, if necessary.
 - Install a carbon monoxide detector in each accommodation space on your boat. Check the detectors periodically to be sure they are functioning properly.

[Checklist >](#)

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Checklist

Each Trip:

- Make sure all exhaust clamps are in place and secure.
- Look for exhaust leaking from the exhaust system components evidenced by rust and /or black streaking, water leaks, or corroded or cracked fittings.
- Inspect rubber exhaust hoses for burned or cracked sections. All rubber hoses should be pliable and free of kinks.
- Confirm that cooling water flows from the exhaust outlet when the engines and generator are started.
- Listen for any change in exhaust sound that could indicate a failure of an exhaust component.
- Test the operation of each carbon monoxide detector by pressing the test button.

Do not operate the vessel if any of these problems exist!

At Least Annually:

(Performed by a qualified marine technician)

- Replace exhaust hoses if any evidence of cracking, charring or deterioration is found.
- Inspect each water pump impeller and inspect the condition of the water pump housing. Replace if worn or cracked (refer to the engine and generator manuals for further information).
- Inspect each of the metallic exhaust components for cracking, rusting, leaking or looseness. Pay particular attention to the cylinder head, exhaust manifold, and water injection elbow.
- Clean, inspect and confirm the proper operation of the generator cooling water anti-siphon valve (if equipped).

Regular maintenance and proper operation of the boat are the best defenses against injury from carbon

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monoxide...

To find out more information about how you can prevent carbon monoxide poisoning on recreational boats, contact:

U.S. Coast Guard Infoline
1-800-368-5647
www.uscgboating.org

National Marine Manufacturers Association
312-946-6200
www.nmma-medialink.com

[Download](#) a printable pdf of the checklist.

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Boater's Pre-Departure Checklist

Know your vessel. Before departure, always be sure your vessel is in good working condition and properly equipped for emergencies. Avoid inconvenience and potential danger by taking a few minutes to check the following:

Minimum Federal Required Equipment	Yes	No
State Registration Documentation		
State Numbering Displayed		
Certificate of Documentation		
Lifejackets (PFDs) - one for each person		
Throwable PFD		
Visual Distress Signals		
Fire Extinguishers (fully charged)		
Proper Ventilation		
Backfire Flame Arrestor		
Sound Producing Device(s)		
Navigation lights		
Oil Pollution Placard		
Garbage Placard		
Marine Sanitation Device		
Navigation rules		
Any Additional State Requirements		

Besides meeting the federal requirements, prudent boaters carry additional safety equipment. The following additional items are suggested depending on the size, location and use of your boat:

Recommended Equipment	Yes	No	N/A
VHF Marine Radio			
Anchor and Tackle			
Chart(s) of Area & Navigation Tools			
Magnetic Compass			
Fenders and Boat Hook			

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Mooring Lines and Heaving line
 Manual Bilge Pump or Bailing
 Device
 Tool Kit
 Spare Parts (fuses, spark plugs,
 belts, etc)
 Spare Battery (fully charged)
 Spare Propeller
 Extra Fuel & Oil
 Alternate Propulsion (paddles/oar)
 Flashlight & Batteries
 Search Light
 First Aid Kit
 Sunscreen (SPF 30+)
 Mirror
 Food and Water
 Extra Clothing
 AM - FM Radio
 Cellular Phone
 Binoculars

Safety Checks and Tests

Yes No N/A

Test Marine Radio (voice call)
 Test Navigation and Anchor Lights
 Test Steering (free movement)
 Test Tilt / Trim
 Test Bilge Pump
 Check for any excessive water in
 bilges
 Check Fuel System for any leaks
 Check Engine Fluids
 Ensure Boat Plug is properly installed
 Check Electrical System
 Check Galley / Heating Systems
 Check Gauges (i.e. batteries)
 Check Fuel Amount
 Ensure Anchor is ready for use
 Check load of vessel and secure
 gear from shifting
 Ensure passengers know Emergency
 Procedures and Equipment Location
 Everyone put on a Lifejacket to check
 for proper fitting.
 Check the Weather Forecast
 File a Float Plan with family or friend

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Be Safe on the Water

Know the navigation rules, observe the courtesies of safe boating and

KNOW . . .

- your **B**oat
- the **E**quipment
- the **S**afety devices and wear PFDs
- about **A**lcohol and other distress stressors
- about **F**irst aid and emergency procedures
- your **E**nvironment, area and weather

. BEFORE YOU GO!

Boating Safety is no accident. To build sound knowledge, proficiency and confidence, the keys to safe boating, take a boating safety course.

For more information on boating safety and boating courses, contact your State Boating Agency, Coast Guard Auxiliary, US Power Squadron, Coast Guard District or call the Boating Safety Infoline (1-800-368-5647).

**Take Time to Reflect on Safety
Safe Boating Begins Here . . .
with You!**

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Metric Measure	Feet in Decimals	Feet and Inches
50.0 Meters (M)	164.0 ft.	164' 1/2"
20.0 M	65.6 ft.	65' 7 1/2"
12.0 M	39.4 ft.	39' 4 1/2"
10.0 M	32.8 ft.	32' 9 3/4"
8.0 M	26.3 ft.	26' 3"
7.0 M	23.0 ft.	22' 11 1/2"
6.0 M	19.7 ft.	19' 8 1/4"
5.0 M	16.4 ft.	16' 4 3/4"
4.0 M	13.1 ft.	13' 1 1/2"
2.5 M	8.2 ft.	8' 2 1/2"
1.0 M	3.3 ft.	3' 3 1/3"

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APPENDIX C

Washington Administrative Code (WAC) Boating Statutes

WAC 352-60-030 Personal flotation devices required. No person shall operate or permit the operation of a vessel on the waters of the state unless the vessel has on board United States Coast Guard approved personal flotation devices as follows:

(1) Vessels less than sixteen feet (4.9 meters) in length, and canoes and kayaks of any length, must have one Type I, II, or III PFD of the proper size for each person on board.

(2) Vessels sixteen feet (4.9 meters) or more in length, except a canoe or kayak, must have one Type I, II, or III wearable PFD of the proper size for each person on board and, in addition, one Type IV throwable PFD.

(3) Alternate PFD requirement. A United States Coast Guard approved Type V PFD may be carried in lieu of any required PFD under this section if it is approved for the activity in which the vessel is engaged in and used in compliance with requirements on the approval label.

(4) Stowage and condition. All personal flotation devices required by this section shall be readily accessible to all persons on board and be in good and serviceable condition. All devices shall be approved by the United States Coast Guard and marked in compliance with Coast Guard standards.

(5) Exemptions. Racing shells, rowing sculls and racing kayaks are exempt from the requirements of this section provided they are manually propelled, recognized by a national or international racing association and designed solely for competitive racing.

[Statutory Authority: RCW [43.51.400](#), [88.12.065](#), [88.12.125](#), [88.12.245](#) and chapter 33, CFR Part 175.15. 94-16-027, § 352-60-030, filed 7/25/94, effective 8/25/94. Statutory Authority: RCW [43.51.400](#). 84-11-057 (Order 79), § 352-60-030, filed 5/18/84.]

WAC 352-60-040 Visual distress signals. (1) Application. The requirements for this section apply to coastal waters.

(2) No person shall operate or permit the operation of a vessel unless visual distress signals are carried on board under the following conditions:

(a) For vessels sixteen feet (4.9 meters) or more in length, devices suitable for day use and devices suitable for night use, or devices suitable for both day and night use must be carried on board.

(b) For vessels less than sixteen feet (4.9 meters) in length, visual distress signals for night use must be carried on board when operating between sunset and sunrise.

(3) Visual distress signals accepted. Any of the following signals as specified in Title 46, Code of Federal Regulations, Part 160, when carried in the number required, can be used to meet the requirements of this section:

(a) An electric distress light meeting the standards of Chapter 46, Code of Federal Regulations, Part 161.013. One is required to meet the night only requirement.

(b) An orange flag meeting the standards of Chapter 46, Code of Federal Regulations, Part 160.072. One is required to meet the day only requirement.

(c) Pyrotechnics meeting the standards noted in the table below:

Distress Signal Description	USCG Approval Number	Use	Number Required
Hand-Held Red Flare Signals	160.021	Day and Night	3
Floating Orange Smoke Signals	160.022	Day Only	3
Parachute Red Flare Signals	160.024	Day and Night	3
Hand-Held Rocket Propelled Parachute Red Flare Signals	160.036	Day and Night	3
Hand-Held Orange Smoke Signals	160.037	Day Only	3
Floating Orange Smoke Signals	160.057	Day Only	3
Red Aerial Pyrotechnic Flares	160.066	Day and Night	3

(4) Marking and stowage. Visual distress signals required by this section must be legibly marked with the United States Coast Guard approval number and must be readily accessible.

(5) Condition and expiration date. Visual distress signals required by this section must be in serviceable condition, and if marked with an expiration date, shall not be expired.

(6) Launchers. Any vessel that carries a visual distress signal required by this section where a launcher is necessary to activate the signal, must also have on board a launcher approved by the United States Coast Guard.

(7) Prohibited use. No person in a vessel shall display a visual distress signal on the waters of Washington state under any circumstance except a situation where assistance is needed because of immediate or potential danger to the persons on board.

(8) Exceptions. The following vessels, when operating between sunset and sunrise, must carry visual distress signals that meet the requirements of this section and are suitable for night use:

(a) A vessel competing in any organized marine parade, regatta, race or similar authorized event;

(b) A vessel being manually propelled; or

(c) A sailing vessel of completely open construction, less than twenty-six feet (7.9 meters) in length, and not equipped with propulsion machinery.

(9) Any combination of signal devices selected from the types noted in subsection (3)(a), (b) and (c) of this section, when carried in the number required, may be used to meet both day and night requirements. Examples - the combination of two hand-held red flares (160.021), and one parachute red flare (160.024 or 160.036) meets both day and night requirements. Three hand-held orange smoke (160.037) with one electric distress light (161.013) meet both day and night requirements.

[Statutory Authority: RCW [43.51.400](#), [88.12.065](#), [88.12.125](#), [88.12.245](#) and chapter 33, CFR Part 175.15. 94-16-027, § 352-60-040, filed 7/25/94, effective 8/25/94. Statutory Authority: RCW [43.51.400](#), 84-11-057 (Order 79), § 352-60-040, filed 5/18/84.]

RCW 79A.60.130**Muffler or underwater exhaust system required -- Exemptions -- Enforcement -- Penalty.**

(1) All motor-propelled vessels shall be equipped and maintained with an effective muffler that is in good working order and in constant use. For the purpose of this section, an effective muffler or underwater exhaust system does not produce sound levels in excess of ninety decibels when subjected to a stationary sound level test that shall be prescribed by rules adopted by the commission, as of July 25, 1993, and for engines manufactured on or after January 1, 1994, a noise level of eighty-eight decibels when subjected to a stationary sound level test that shall be prescribed by rules adopted by the commission.

(2) A vessel that does not meet the requirements of subsection (1) of this section shall not be operated on the waters of this state.

(3) No person may operate a vessel on waters of the state in such a manner as to exceed a noise level of seventy-five decibels measured from any point on the shoreline of the body of water on which the vessel is being operated that shall be specified by rules adopted by the commission, as of July 25, 1993. Such measurement shall not preclude a stationary sound level test that shall be prescribed by rules adopted by the commission.

(4) This section does not apply to: (a) A vessel tuning up, testing for, or participating in official trials for speed records or a sanctioned race conducted pursuant to a permit issued by an appropriate governmental agency; or (b) a vessel being operated by a vessel or marine engine manufacturer for the purpose of testing or development. Nothing in this subsection prevents local governments from adopting ordinances to control the frequency, duration, and location of vessel testing, tune-up, and racing.

(5) Any officer authorized to enforce this section who has reason to believe that a vessel is not in compliance with the noise levels established in this section may direct the operator of the vessel to submit the vessel to an on-site test to measure noise level, with the officer on board if the officer chooses, and the operator shall comply with such request. If the vessel exceeds the decibel levels established in this section, the officer may direct the operator to take immediate and reasonable measures to correct the violation.

(6) Any officer who conducts vessel sound level tests as provided in this section shall be qualified in vessel noise testing. Qualifications shall include but may not be limited to the ability to select the appropriate measurement site and the calibration and use of noise testing equipment.

(7) A person shall not remove, alter, or otherwise modify in any way a muffler or muffler system in a manner that will prevent it from being operated in accordance with this chapter.

(8) A person shall not manufacture, sell, or offer for sale any vessel that is not equipped with a muffler or muffler system that does not comply with this chapter. This subsection shall not apply to power vessels designed, manufactured, and sold for the sole purpose of competing in racing events and for no other purpose. Any such exemption or exception shall be documented in any and every sale agreement and shall be formally acknowledged by signature on the part of both the buyer and the seller. Copies of the agreement shall be maintained by both parties. A copy shall be kept on board whenever the vessel is operated.

(9) Except as provided in RCW 79A.60.020, a violation of this section is an infraction under chapter 7.84 RCW.

(10) Vessels that are equipped with an engine modified to increase performance beyond the engine manufacturer's stock configuration shall have an exhaust system that complies with the standards in this section after January 1, 1994. Until that date, operators or owners, or both, of such vessels with engines that are out of compliance shall be issued a warning and be given educational materials about types of muffling systems available to muffle noise from such high performance engines.

(11) Nothing in this section preempts a local government from exercising any power that it possesses under the laws or Constitution of the state of Washington to adopt more stringent regulations.

[2000 c 11 § 97; 1993 c 244 § 39. Formerly RCW 88.12.085.]

NOTES:

Intent -- 1993 c 244: See note following RCW 79A.60.010.

RCW 79A.60.180**Loading or powering vessel beyond safe operating ability -- Penalties.**

(1) A person shall not load or permit to be loaded a vessel with passengers or cargo beyond its safe carrying ability or carry passengers or cargo in an unsafe manner taking into consideration weather and other existing operating conditions.

(2) A person shall not operate or permit to be operated a vessel equipped with a motor or other propulsion machinery of a power beyond the vessel's ability to operate safely, taking into consideration the vessel's type, use, and construction, the weather conditions, and other existing operating conditions.

(3) A violation of subsection (1) or (2) of this section is an infraction punishable as provided under chapter 7.84 RCW except as provided under RCW 79A.60.020 or where the overloading or overpowering is reasonably advisable to effect a rescue or for some similar emergency purpose.

(4) If it appears reasonably certain to any law enforcement officer that a person is operating a vessel clearly loaded or powered beyond its safe operating ability and in the judgment of that officer the operation creates an especially hazardous condition, the officer may direct the operator to take immediate and reasonable steps necessary for the safety of the individuals on board the vessel, including directing the operator to return to shore or a mooring and to remain there until the situation creating the hazard is corrected or ended. Failure to follow the direction of an officer under this subsection is a misdemeanor punishable as provided under RCW 9.92.030.

[2000 c 11 § 100; 1993 c 244 § 16. Formerly RCW 88.12.135.]

NOTES:

Intent -- 1993 c 244: See note following RCW 79A.60.010.

RCW 79A.60.200**Duty of operator involved in collision, accident, or other casualty -- Immunity from liability of persons rendering assistance -- Penalties.**

(1) The operator of a vessel involved in a collision, accident, or other casualty, to the extent the operator can do so without serious danger to the operator's own vessel or persons aboard, shall render all practical and necessary assistance to persons affected by the collision, accident, or casualty to save them from danger caused by the incident. Under no circumstances may the rendering of assistance or other compliance with this section be evidence of the liability of such operator for the collision, accident, or casualty. The operator shall also give all pertinent accident information, as specified by rule by the commission, to the law enforcement agency having jurisdiction: **PROVIDED**, That this requirement shall not apply to operators of vessels when they are participating in an organized competitive event authorized or otherwise permitted by the appropriate agency having jurisdiction and authority to authorize such events. These duties are in addition to any duties otherwise imposed by law. Except as provided for in RCW 79A.60.020 and subsection (3) of this section, a violation of this subsection is a civil infraction punishable under RCW 7.84.100.

(2) Any person who complies with subsection (1) of this section or who gratuitously and in good faith renders assistance at the scene of a vessel collision, accident, or other casualty, without objection of the person assisted, shall not be held liable for any civil damages as a result of the rendering of assistance or for any act or omission in providing or arranging salvage, towage, medical treatment, or other assistance, where the assisting person acts as any reasonably prudent person would have acted under the same or similar circumstances.

(3) An operator of a vessel is guilty of a class C felony and is punishable pursuant to RCW 9A.20.021 if the operator: (a) Is involved in a collision that results in injury to a person; (b) knew or reasonably should have known that a person was injured in the collision; and (c) leaves the scene of the collision without rendering all practical and necessary assistance to the injured person as required pursuant to subsection (1) of this section, under circumstances in which the operator could have rendered assistance without serious danger to the operator's own vessel or persons aboard. This subsection (3) does not apply to vessels involved in commerce, including but not limited to tugs, barges, cargo vessels, commercial passenger vessels, fishing vessels, and processing vessels.

[2000 c 11 § 102; 1996 c 36 § 1; 1993 c 244 § 18; 1984 c 183 § 1; 1983 2nd ex.s. c 3 § 48. Formerly RCW 88.12.155, 88.12.130, and 88.02.080.]

NOTES:

Intent -- 1993 c 244: See note following RCW 79A.60.010.

RCW 79A.60.210**Casualty and accident reports -- Confidentiality -- Use as evidence.**

(1) All reports made to the commission pursuant to RCW 79A.60.200 and 79A.05.310 shall be without prejudice to the person who makes the report and shall be for the confidential usage of governmental agencies, except as follows:

(a) Statistical information which shall be made public;

(b) The names and addresses of the operator and owner and the registration number or name of the vessel as documented which was involved in an accident or casualty and the names and addresses of any witnesses which, if reported, shall be disclosed upon written request to any person involved in a reportable accident, or, for a reportable casualty, to any member of a decedent's family or the personal representatives of the family.

(2) A report made to the commission pursuant to RCW 79A.60.200 and 79A.05.310 or copy thereof shall not be used in any trial, civil or criminal, arising out of an accident or casualty, except that solely to prove a compliance or failure to comply with the report requirements of RCW 79A.60.200 and 79A.05.310, a certified statement which indicates that a report has or has not been made to the commission shall be provided upon demand to any court or upon written request to any person who has or claims to have made a report.

[1999 c 249 § 1502; 1984 c 183 § 3. Formerly RCW 88.12.165, 88.12.140, and 43.51.402.]

NOTES:

Severability -- 1999 c 249: See note following RCW 79A.05.010.

RCW 79A.60.220**Boating accident reports by local government agencies -- Investigation -- Report of coroner.**

Law enforcement authorities, fire departments, or search and rescue units of any city or county government shall provide to the commission a report, prepared by the local government agency regarding any boating accident occurring within their jurisdiction resulting in a death or injury requiring hospitalization. Such report shall be provided to the commission within ten days of the occurrence of the accident. The results of any investigation of the accident conducted by the city or county governmental agency shall be included in the report provided to the commission. At the earliest opportunity, but in no case more than forty-eight hours after becoming aware of an accident, the agency shall notify the commission of the accident. The commission shall have authority to investigate any boating accident. The results of any investigation conducted by the commission shall be made available to the local government for further processing. This provision does not eliminate the requirement for a boating accident report by the operator required under RCW 79A.60.200.

The report of a county coroner, or any public official assuming the functions of a coroner, concerning the death of any person resulting from a boating accident, shall be submitted to the commission within one week of completion. Information in such report may be, together with information in other such reports, incorporated into the state boating accident report provided for in RCW 79A.05.310(4), and shall be for the confidential usage of governmental agencies as provided in RCW 79A.60.210.

[1999 c 249 § 1503; 1987 c 427 § 1. Formerly RCW 88.12.175, 88.12.150, and 43.51.403.]

NOTES:

Severability -- 1999 c 249: See note following RCW 79A.05.010.

Boating accidents and boating safety services -- Study -- Report -- 1987 c 427: "The parks and recreation commission shall conduct a study of boating accidents and boating safety services in Washington including a review of how the local option tax for funding of boating safety enforcement is used. Further the parks and recreation commission shall develop recommendations to address identified problems and report these recommendations to the legislature by January 2, 1988." [1987 c 427 § 4.]

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APPENDIX D

Sample Station Coordinate and Property Ownership Information

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Sample ID	Latitude	Longitude	Description	Location	DNR Provided Owner Information	Mason County Parcel	Mason County Parcel
						Records	Owner Name
Shelton Harbor							
SH-1	47.21335280510	-123.08389258400	sediment	Shelton Marina	Simpson Timber Co.	unknown	320208888888
SH-2	47.21357972570	-123.08752080000	sediment	Marine Railway	M. Reid et al.	unknown	320208888888
SH-3	47.21253760410	-123.09011602700	sediment	Harbor, near Shelton Creek outfall	Peninsula Rwy. Co.	unknown	320208888888
SH-4	47.21269848820	-123.09164275000	sediment	Simpson outfalls	Peninsula Rwy. Co.	unknown	320208888888
SH-5	47.21152314180	-123.09183896200	sediment	Simpson outfalls	Peninsula Rwy. Co.	unknown	320208888888
SH-6	47.21015870000	-123.09201501400	sediment	Simpson outfall, north of Goldsborough Creek	Peninsula Rwy. Co.	Peninsula Rwy. Co.	320204100800
SH-7	47.21087563100	-123.09074755900	sediment	300 ft east offshore	Peninsula Rwy. Co.	unknown	320208888888
SH-8	47.21078230520	-123.08918135700	sediment	600 ft east offshore	Peninsula Rwy. Co.	unknown	320208888888
SH-9	47.21067696370	-123.08561299000	sediment	Inner harbor	Peninsula Rwy. Co.	Peninsula Rwy. Co.	320204100800
SH-10	47.21157022410	-123.08325541700	sediment	Inner harbor	Peninsula Rwy. Co.	unknown	320208888888
SH-11	47.20798213810	-123.09421152300	sediment	North of former sawmill 4	W. Kneeland (1910)	unknown	320208888888
SH-12	47.20727984060	-123.09407152500	sediment	Offshore of former sawmill 4	W. Kneeland (1910)	unknown	320208888888
SH-13	47.20653792370	-123.09282144400	sediment	Offshore south of former sawmill 4, Rayonier lab, and Manke yard	Peninsula Rwy. Co.	unknown	320208888888
SH-14	47.20874883010	-123.08079300400	sediment	Inner harbor	Peninsula Rwy. Co.	unknown	320208888888
SH-15	47.21010206870	-123.07724672900	sediment	Oakland Bay next to Shelton Harbor	DNR	DNR	320202222222
SH-16	47.21346494700	-123.07812388200	sediment	Oakland Bay next to Shelton Harbor	DNR	DNR	320202222222
SH-17	47.21135179380	-123.08636737000	sediment core	Inner harbor	Peninsula Rwy. Co.	unknown	320208888888
SH-18	47.20869813890	-123.09411367800	wood waste	Offshore from sawmill 3	Peninsula Rwy. Co.	unknown	320208888888
SH-19	47.20791603560	-123.09244722500	wood waste	Inner harbor	Peninsula Rwy. Co.	unknown	320208888888
SH-20	47.20689092220	-123.09058218800	wood waste	Inner harbor, north of Manke sort yard	Peninsula Rwy. Co.	unknown	320208888888
SH-21	47.20875570080	-123.08971317000	wood waste	Inner harbor	Peninsula Rwy. Co.	unknown	320208888888
SH-22	47.20801499490	-123.08681786600	wood waste	Inner harbor	Peninsula Rwy. Co.	unknown	320208888888
SH-23	47.20828690170	-123.08447926700	wood waste	Inner harbor	Peninsula Rwy. Co.	unknown	320208888888
SH-24	47.20655790280	-123.08445670000	wood waste	Offshore from City of Shelton property	Peninsula Rwy. Co.	unknown	320208888888
SH-25	47.20699266070	-123.08098855600	wood waste	Offshore from City of Shelton property	Peninsula Rwy. Co.	unknown	320208888888
SH-26	47.21160568320	-123.08995585900	wood waste	Inner harbor	Peninsula Rwy. Co.	unknown	320208888888
SH-27	47.21217461540	-123.08789514200	wood waste	Inner harbor	Peninsula Rwy. Co.	unknown	320208888888
SH-28	47.21042296660	-123.08198493700	wood waste	Inner harbor	Peninsula Rwy. Co.	Peninsula Rwy. Co.	320204100800
SH-29	47.21188452180	-123.07812156100	wood waste	Oakland Bay next to Shelton Harbor	DNR	DNR	320202222222
SH-30	47.21433878030	-123.08403291100	wood waste	Shelton Marina	Port of Shelton	Port of Shelton	320205706006
Hammersley Inlet							
HI-1	47.20348900360	-123.06213733300	sediment	Offshore from Walker Park	DNR	DNR	320212222222
HI-2	47.20583578390	-123.06266993200	sediment	Offshore from Miller Point	T. Chapman et al./Foss Co.	DNR	320218888888
HI-3	47.20655209380	-123.07260575100	sediment	East of Eagle Point, north of private residences	DNR	unknown	320218888888
HI-4	47.20854138690	-123.06717714300	sediment	Hammersley Inlet	DNR	DNR	320212222222
HI-5	47.20907894270	-123.07380145300	sediment	Existing WWTP outfall	DNR	DNR	320212222222
HI-6	47.21233048460	-123.07102386900	sediment	Offshore from Munson Point	Nathan Gardner	DNR	320212222222
HI-7	47.21440288350	-123.07698850100	sediment	Oakland Bay	DNR	DNR	320202222222

Sample ID	Latitude	Longitude	Description	Location	DNR Provided Owner Information	Mason County Parcel	Mason County Parcel
						Records	Owner Name
Oakland Bay							
OB-1	47.21864411600	-123.07924708000	sediment	Offshore from bulk fuel facilities	Oakland Shellfish Co./Clam Acres/Gretchen Matzen/DNR	unknown	320178888888
OB-2	47.21927956040	-123.07394810500	sediment	Oakland Bay	DNR	DNR	320162222222
OB-3	47.21792790110	-123.07010388000	sediment	Oakland Bay	DNR	DNR	320162222222
OB-4	47.22478829900	-123.07051045900	sediment	Oakland Bay	DNR	DNR	320162222222
OB-5	47.22488318740	-123.06255986500	sediment	Oakland Bay	DNR	DNR	320162222222
OB-6	47.22245017080	-123.05407662200	sediment	Oakland Bay	DNR	DNR	320152222222
OB-7	47.22723912780	-123.04334754500	sediment	Chapman Cove	M. McDonald/J. O'Neill	Taylor United Inc.	320151080160
OB-8	47.22345089410	-123.03393635800	sediment	Chapman Cove	Rayonier Inc./A. Swanson (oys. trks)	DNR	320142222222
OB-9	47.23156670560	-123.05594129600	sediment	Oakland Bay	DNR	DNR	320092222222
OB-10	47.23761782030	-123.04958556400	sediment	Oakland Bay	DNR	DNR	320102222222
OB-11	47.24800529420	-123.03196349300	sediment	North Oakland Bay	DNR	DNR	320022222222
OB-12	47.25071093550	-123.03991970500	sediment	North of Bayshore Point	Reserve No. 2/Taylor United Inc.	WDFW	320032222222
OB-13	47.25315052750	-123.03276208400	sediment	North Oakland Bay, offshore from Moran property	Rayonier Inc./F. Stabenfeldt	Taylor United Inc.	320020081150
OB-14	47.25595172310	-123.02083075800	sediment	North Oakland Bay	Rayonier Inc./F. Stabenfeldt	Taylor United Inc.	320020081150
OB-15	47.22253605390	-123.06268961000	sediment core	Oakland Bay		WDFW	320162222222
OB-16	47.23933354220	-123.04826168500	sediment core	Water area south of Bayshore Point	Reserve "B"	DNR	320102222222
OB-17	47.21584383170	-123.08189269800	wood waste	Oakland Bay, north of Shelton Marina	Simpson Timber Co./Taylor Resources Inc./Manke Family Resources	unknown	320178888888
OB-18	47.21567167290	-123.06917348300	wood waste	Oakland Bay north of Munson Point	DNR	DNR	320162222222
OB-19	47.22642273820	-123.05275550400	wood waste	Oakland Bay near Chapman Cove	DNR	DNR	320152222222

Sample coordinates are in NAD 83.

DNR - Department of Natural Resources