



OCEAN
OBSERVATORIES
INITIATIVE

OOI 2.0 EH&S Plan

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Prime Awardee Organization (Prime):
Woods Hole Oceanographic Institution
266 Woods Hole Road, Woods Hole, MA 02543

In cooperation with the Subawardee Organizations (Subawardees):
Oregon State University
Rutgers University
University of Washington

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CONTENTS

Document control record	2
1.0 Purpose, Objective and Scope	4
2.0 Roles and Responsibilities	4
3.1 Comprehensive EHS Program	4
3.2 Hazard Analysis and Controls	5
3.3 EHS Training	6
3.4 Inspections and Corrective Actions	6
3.5 Emergency Planning	6
3.6 Stop Work Authority	7
3.7 Navigational Safety	7
4.0 Applicable Documents	9
5.0 Appendices	9

1.1 0 PURPOSE, OBJECTIVE AND SCOPE

The purpose of this environmental, health, and safety (EHS) plan is to establish the expectations and requirements for implementation of an effective EHS program that covers all work associated with the Ocean Observatories Initiative (OOI).

The elimination of accident-related illness, injury, property loss, and environmental damage is a cooperative effort and integral to our overall mission. We believe that accidents are preventable and look to all OOI Program organizations to do their part in helping to meet our goal of zero workplace injuries and zero vehicle accidents.

This EHSP (also referred to as Plan) applies to the OOI Prime and Subawardees and to all aspects of the OOI Project, including development, testing, fabrication, deployment, maintenance, recovery, and disposal/recycling of systems, subsystems, and equipment.

- Prime: Woods Hole Oceanographic Institution
- Subawardees:
 - University of Washington
 - Oregon State University
 - Rutgers University

2.0 ROLES AND RESPONSIBILITIES

2.1 Prime

- The Prime is responsible for implementing and maintaining this Plan. The Prime will implement this EHS Plan using it's EHS management systems.

2.2 2 Subawardees

- The Subawardees are responsible for implementing this Plan using their respective EHS management systems.
- The Subawardees likely will require Subawardees to flow down to subtier organizations similar obligations.

3.0 COMPREHENSIVE EHS PROGRAM

The Prime and Subawardees are required to have comprehensive, effective, and documented EHS programs that address all applicable federal, state, and local EHS requirements and that are adequate to address the hazards associated with their respective scope of work involving the OOI Program. Refer to Section 4.0 for applicable

documents. Additionally, the Prime and Subawardee EHS programs shall include the following program elements:

- Hazard analysis and controls
- EHS Training
- Inspections and corrective actions
- Emergency response planning
- Accident/incident investigations
- Stop work authority

Appendices A – C (Section 5.0) provide examples of a hazard report form, accident/incident investigation form, and an inspection checklist for chartering non-UNOLS vessels. The Prime and Subawardees should use these forms or equivalent forms during implementation of these functions.

The Prime and Subawardee EHS Representatives are responsible for developing, assisting with implementation, and maintaining the EHS program, including the above program elements. The Prime and Subawardee EHS Representatives shall be qualified and competent by education, experience, and training to serve in these roles and to develop, implement, and maintain the comprehensive EHS program described herein.

3.1 Hazard Analysis and Controls

Before proper controls can be selected a comprehensive hazard analysis of the proposed work activity must be conducted. The general guidelines for this hazard analysis process are as follows:

- 3.1.1** It is generally most cost-efficient to conduct the hazard analysis process during the design phase or operational planning phase.
- 3.1.2** The hazard analysis process must be tailored to the work activity, process, item, or system design in question and, depending on the complexity of the system, may require a multidisciplinary approach that involves science, engineering, and EHS disciplines.
- 3.1.3** The hazard analysis process should include the entire life cycle of the system, subsystem, or equipment in question.
- 3.1.4** There are numerous hazard analysis methods that may be used, from simple/preliminary to more complex. The hazard analysis method should be appropriate for the system design. Some examples of these methods include: Energy Trace and Barrier Analysis, Failure Mode and Effect Analysis, Fault Hazard Analysis, Fault Tree Analysis, Hazard and Operability Study, Preliminary Hazard Analysis, and What-If Analysis.
- 3.1.5** Based on this analysis, hazard controls and mitigation methods are developed and implemented.

3.1.6 Hazard controls and mitigation strategies may include, but are not limited to, elimination, substitution, engineering controls, safe operating procedures, warning labels, and personal protective equipment.

3.2 EHS Training

All OOI project personnel are required to be adequately trained on relevant and applicable EHS topics, including:

3.2.1 Hazard identification and selection of controls

3.2.2 Relevant and applicable EHS requirements

3.2.3 Accident and incident reporting

3.2.4 Emergency planning

3.2.5 Stop work authority

3.2.6 Navigational safety

3.3 Inspections and Corrective Actions

Periodic EHS inspections of OOI Program work areas and activities must be conducted and documented by the OOI organization that is performing or supervising the work in question. EHS issues and noncompliance items must be identified, documented and corrected in a timely manner. Imminent danger conditions must be immediately corrected or the activity/process in question must be immediately stopped.

3.4 Emergency Planning

Emergency response and management programs and procedures must be developed, implemented, and tested. These programs and procedures must be designed to effectively respond to, manage, and recover from emergency scenarios that could have significant impacts to OOI personnel, property, operations and actions.

3.5 Accident/Incident Investigations & Reporting

Accident/incident reports must be completed and submitted for all injuries, accidents with the potential for injury, property or product damage, and near misses where there was potential for significant injury or property loss and that are associated with OOI. Significant injury to personnel or significant damage to equipment shall be deemed to have occurred if such mishap results in death to any person, injury to any person requiring professional medical treatment beyond first aid, or damage to any property in excess of \$25,000. To facilitate timely reporting and investigation, the accident/incident reporting process should be online.

All accident/incident reports must be investigated to verify the facts, determine the root cause and contributing factors, identify corrective actions that will prevent reoccurrence, and to determine reporting requirements. As appropriate, lessons learned from accidents/incidents should be shared to help prevent reoccurrence.

The Prime and Subawardee Program Managers shall report all injuries, accidents with the potential for injury, property or product damage, and near misses where there was potential for significant injury or property loss to the Prime's Program Management Office and Director of Environmental Health & Safety with 72 hours of receiving the final incident report. Significant injury to personnel or significant damage to equipment shall be deemed to have occurred if such mishap results in death to any person, injury to any person requiring professional medical treatment beyond first aid, or damage to any property in excess of \$25,000.

3.6 Stop Work Authority

All OOI Program personnel are empowered to stop any work activity that is not safe and to report unsafe conditions to management. Management is responsible for the timely review of all safety concerns and for correcting any unsafe conditions. For situations that require expediency, the Prime and Subawardee EHS Representatives, working in conjunction with their Principal Investigators, Program Managers and institutional EHS procedures, have the authority to act as appropriate to prevent or mitigate EHS issues that could result in property loss, a potential fatality, or injury.

3.7 Navigational Safety

As detailed in the Site-specific Environmental Assessment for the NSF-Funded Ocean Observatories Initiative (SSEA; NSF, 2011), Finding of No Significant Impact/Decision Document (FONSI; NSF, 2011), and Supplemental Environmental Report (SER; NSF, 2013) (available for review at <http://www.nsf.gov/geo/oce/envcomp/index.jsp>), the OOI Program will continue to conduct discussions with the U.S. Coast Guard (USCG) and fishing communities to recommend voluntary, non-regulatory "areas to be avoided" around the Regional Cabled Array (RCA) infrastructures and Coastal Array sites. OOI will not propose recommended areas to avoid around Global Array Sites. The diameters of these proposed avoidance areas or zones relate to water depths (larger zones in deeper water). A 0.2- nautical mile (nm) radius avoidance area applies to the EA inshore sites and 0.5-nm radius for the shelf and offshore EA sites. An avoidance area of 0.5- nm radius exists for all Pioneer Array mooring sites while the array is operated at its initial location on the mid-Atlantic shelf. Because the Pioneer Array is relocatable, the size and locations of the Pioneer Array areas to avoid are subject to change, depending upon its location (and depth) in subsequent years. The RCA cabled sites are clearly

marked on charts distributed by the OFCC and distributed to members, and locations of the Endurance and Pioneer Coastal Array sites will be communicated to the USCG to facilitate appearance on National Oceanic and Atmospheric Administration (NOAA) electronic navigation charts (see Table 2-13 of the SSEA and Table 10 of the SER). Both Coastal Array sites will also be published in Notice to Mariners (NM) and Local Notice to Mariners (LNM), and communicated to marine user communities. There will be active radar transponders on some surface buoys as well as required U.S. Coast Guard markings.

In accordance with Oregon State law, Ocean Leadership and the OFCC previously entered into a formal agreement that would address concerns of the fishing industry regarding installation and operation of the RCA cable and potential impacts on fishing revenues from potential loss of gear associated with the installation and operation of the proposed RCA infrastructure off the coast of Oregon. All Pioneer Array moorings, Endurance Array Washington Line moorings, Endurance Oregon surface moorings, and Endurance Oregon inshore moorings would be either permitted as Private Aids to Navigation (PATONs) through the USCG or in cases of moorings without permanent surface expressions, positions of the moorings would be communicated to the USCG. Surface buoys would be marked per USCG requirements, with all required lights and markings, with locations appearing in the NM and LNM. Surface buoys would be marked with contact information, which will be included in the NM and LNM with suggested voluntary areas to avoid around moorings (see Table 2-13 of the SSEA and Tables 4 and 7 of the SER).

A summary of the USCG permit requirements and actions to be taken to reduce negative interactions between fisheries and proposed OOI moorings are as follows:

- 3.7.1** The Prime will submit USCG Private Aids to Navigation (PATON) applications for the Endurance Washington Line, Endurance Oregon Line In-shore moorings, and Pioneer moorings in advance of deployment. Existing PATONs will be updated as operational mooring turns are completed.
- 3.7.2** The Prime will work with the USCG to develop guidance (to appear in NM, LNM, or NOAA chart annotations) regarding the suggested voluntary “areas to avoid” for Pioneer Array moorings to reduce any potential risk of gear entanglement.

The NM and LNM details will be provided to NOAA so that the Pioneer and Endurance array mooring locations can be updated on the NOAA electronic charts.

- 3.7.3** The Prime will give advance notice to the USCG of glider/AUV deployments, operating area, instructions if found, and a point of contact.
- 3.7.4** The Prime is proposing a 0.5-nm voluntary area to avoid around all Pioneer Array mooring sites and the offshore and shelf mooring sites of the Endurance Array, and a 0.2-nm avoidance area around the inshore mooring sites of the Endurance

Array. These avoidance areas would reduce the risk of gear entanglement and damage to OOI moorings and sensors.

Beginning in 2017, Navy Commander of the Submarine Forces (COMSUBLANT) has asked WHOI to coordinate Pioneer Array activities through Fleet Area Control and Surveillance Facility, Virginia Capes (FACSFAC VACAPES). This coordination consists of WHOI providing FACSFAC VACAPES with lat/lon coordinates of an operational box and start and end dates at least 48 hours prior to each major Pioneer turn cruise.

4.0 APPLICABLE DOCUMENTS

It is the responsibility of the Prime and Subawardees to determine and comply with the applicable documents (regulations, standards, codes, etc.) that apply to their respective scope of work. Federal regulations, consensus standards, and codes that may apply to the OOI Program (but are not limited to) the following:

Federal and State Regulations

- 29 CFR Occupational Safety and Health Administration (OSHA) General Industry Standards
- 40 CFR U.S. Environmental Protection Agency (EPA) Protection of the Environment
- 49 CFR Department of Transportation (DOT)
- National Science Foundation requirements
- State regulatory requirements

Standards, Requirements and Codes

- American National Standards Institute (ANSI)
- American Society of Mechanical Engineers (ASME)
- American Society of Testing and Materials (ASTM)
- International Air Transport Association (IATA) Dangerous Goods Regulation
- International Maritime Dangerous Goods (IMDG) Code
- National Fire Protection Association (NFPA)
- UNOLS Research Vessel Safety Standards (RVSS)

5.0 APPENDICES

Appendices A - C provide examples of a hazard report form, accident/incident investigation form, and an inspection checklist for chartering non-UNOLS vessels. The Prime and Subawardees should use these forms or equivalent forms during implementation of these functions.

Appendix A: OOI Hazard Report Form

This form (or an equivalent form) is to be completed and retained by the Prime or Subawardee Program Managers or their desingees.

OOI System Hazard Report	No.	OOI-XXX
System or Location		Phase
Subsystem	Hazard Group	Date
Hazard Title		
Applicable Safety Requirements	Hazard Category: Catastrophic Critical	
Description of Hazard:		
Hazard Causes:		
Hazard Controls:		
Safety Verification Methods:		
Status of Verification:		

OOI Hazard Report Form (continued)

System Hazard Report Continuation Sheet	No.
System	Phase
<p>Hazard Title:</p> <p>Hazard Causes:</p> <p>Hazard Controls:</p> <p>Safety Verification Methods:</p> <p>Status of Verification:</p> 	

Approval by Design Organization/Program Mgr.	Design Org.	Program Mgr.
Review I		
Review II		
Review III		

Appendix B: Example Accident/Incident Investigation Form

To be completely filled out by the supervisor and employee who were involved, and signed by both. An initial accident/incident or near-miss report must be routed to the Program Manager within 24 hours of occurrence for processing. A final report is due within 7 days of the event. Separate paper may be used for continuation of any field and is encouraged. The Prime and Subawardee Program Managers shall report all injuries, accidents with the potential for injury, property or product damage, and near misses where there was potential for significant injury or property loss to the Prime's Program Management Office and Director of Environmental Health & Safety with 72 hours of receiving the final incident report.

Injured Employee's Name: _____ Department: _____ Shift: _____
 Job Title: _____
 Supervisor: _____
 Date of Injury: _____ Time of Injury: _____
 Location where accident/incident occurred: _____
 Did employee stop working? Yes/No _____
 Did employee return to work? Yes/No _____ If Yes; Date: _____

Specific activities employee was engaged in:

Equipment, Chemical, Materials, Machinery, Tools employee was using:

List all steps leading up to the accident/incident occurrence:

Part of the body affected:

Type (category) of Injury (sprain/strain; laceration; contusion; concussion; elec. shock; eye injury etc.):

Name(s) of Witnesses:

Supervisor Check One Only	
<input type="checkbox"/>	No Medical Treatment
<input type="checkbox"/>	Treated within (EMT; First Aid)
<input type="checkbox"/>	Treated by Clinic; Hospital; Physician
Advise the employee to update HR & Safety if future treatment is sought.	
Date of Treatment:	
Name and Location of Doctor and/or Hospital:	

Was this accident/incident caused by an unsafe practice? Yes/No
 If yes, describe the unsafe practice:

Did an unsafe condition or tool cause this accident/incident? Yes/No
 If yes, describe the unsafe condition:

Supervisor has visited the scene of event: (Initial)

What procedure was directing this activity?

Describe & identify the document by referencing its identification number:

Does the procedure or document need to be changed? Yes/No
 If Yes, describe recommended change:

Were all safety guards in place? Yes/No

Was the employee made aware of the safety hazards of the job? Yes/No

Was prior training for this task adequate? Yes/No

If no, explain why:

If Personal Protective Equipment is required or recommended, was it worn? Yes/No

If no, explain why:

List other possible causal factors that contributed to this accident/incident (temperature; weather; lighting; body mechanics; fatigue, etc.):

What recommendation(s) does the injured person have for how this injury/illness could have been avoided?

CORRECTIVE ACTIONS		
State Immediate Actions to Eliminate Hazards		Completion Date
Identify Long Term Corrective Actions/System Improvements	Estimated Completion Date	Actual Completion Date

Employee Signature:

Date:

Supervisor Signature:

Date:

State how all corrective actions will be tracked to completion:

Manager Signature:

Date:

Verification of Corrective Action Closer (Employee Manager)

Status Report - Follow-Up comments from Employee Manager [Include picture if able] {Lessons Learned? Injury-History?}	Date of Follow-Up	Employee Mgr. initials

Signature below verifies that the accident/incident investigation is closed.

Manager:

Date of Closure:

Appendix C: Inspection Check List for Chartering Non-UNOLS Vessels

To be completed and retained by the Prime or Subawardee Program Manager or their designee that are chartering non-UNOLS vessels.

Vessel Name:	
Owner:	
Address and Contact Information:	
Operator:	
Address and Contact Information:	
Licenses held:	
Vessel Type and General Description:	
Length Overall:	
Displacement:	
Tonnage [GT/GRT/NT] :	
Draft:	
Radio Call Sign	
Number of Passengers/Scientists that can be carried:	
Charterer – PI and Institution	
Dates of planned charter:	
Area of operations:	
Type of operations or activities planned:	
Number in planned science party:	

Life Saving Equipment:

_____PFDs

_____Immersion Suits

_____ Inflatable Life Rafts

_____ Life Ring Buoys

_____ Rescue Boats

_____ Water Lights/Strobes

Exterior Decks and Equipment:

_____ Anchors and Associated Equipment

_____ Watertight Doors and Hatch Comings

_____ Freeing Ports

_____ Deck Vents

_____ Cargo and Weight Handling Equipment (Safe Work Load posted & tested, 46CFR189.35 requirements, Appendix A requirements if appropriate).

_____ Deck Surfaces Non-Skid

_____ Life Lines and Safety Chains

Fire Fighting Equipment:

_____ Fixed and Portable Fire Extinguishers Inspection Dates Current? _____

_____ Smoke and Fire Detectors

_____ Fire Stations and Hoses

_____ Self Contained Breathing Apparatus

_____ Fire and Damage Control Locker

_____ Emergency Stations Bill

Engineering:

_____ Gas Engines. Check flame arrestor, vents, gas hoses, no sparking devices in bilges.

_____ Diesel Engines. Check oil and exhaust leaks, starting system, maintenance, hours since last overhaul.

_____ Inspect overall cleanliness and condition of power sources.

_____ Check emergency lights.

_____ Check bilge and ballast systems and pumps.

_____ Check fueling system and pumps.

_____ Check refrigeration systems.

_____ Check fire pump.

_____ Check engine room fire suppression capability.

_____ Check all manifolds for saltwater, fuel, etc.

_____ Check condition of switchboards, wiring and auxiliary generators.

Structural:

____ Tank Inspections/Record of Inspections

Miscellaneous:

____ First Aid Kits and Medical Supplies

____ Damage Control Equipment

____ Emergency Steering

____ General Appearance and Cleanliness

____ Oil Pollution Placard and other required notices are posted.

____ Sanitary System Operations

____ Assess vessel's overall stability

____ Assess vessel's overall ability to perform charter mission. Include laboratory and deck space, berthing and feeding capability, scientific equipment and winches, etc.