ADVANCED AMERICAN CONSTRUCTION, INC.

HEALTH AND SAFETY PROGRAM
AND
MANAGEMENT SYSTEM

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Website: www.callaac.com • CCB# 167886

Company Policy Statement

SAFETY POLICY STATEMENT

It is the policy of Advanced American Construction, Inc. to protect the safety and health of our employees. Injury and illness losses from accidents are needless, costly and preventable. Our company has established a safety and health program adapted to fundamental occupational safety and health concepts that will help us prevent injury and illness due to hazards. Employee involvement at all levels of the company is critical for us to be successful in this effort. To accomplish this task, a joint worker/management safety committee has been established. Its purpose is to bring workers and management together in a nonadversarial, cooperative effort to promote safety and health in the workplace. This safety committee will assist Advanced American Construction, Inc. in making recommendations for change.

MANAGEMENT

Management's responsibility is the prevention of injury and illness accidents, because management is held accountable for all issues under its control. Management provides direction and full support to supervision and employees regarding all safety and health procedures, job training and hazard elimination practices. Management must keep fully informed on safety and health issues throughout the company in order to constantly review the effectiveness of our safety and health program.

SUPERVISION

Supervisors are directly responsible for supervising and training their workers. This includes proper procedures, work practices and safe methods to do the job. Supervisors must enforce company rules and take immediate corrective action to eliminate hazardous conditions and practices. They will not permit safety to be sacrificed for any reason. In addition, they will be held accountable for all safety and health issues.

EMPLOYEES

Employees are responsible for working safely. Knowing how to work safely, familiarizing themselves with company policies and manuals, plus reporting unsafe conditions to supervisors or owners.

SAFETY COMMITTEE

The safety committee consists of management and employee representatives who have an interest in the general promotion of safety and health for Advanced American Construction, Inc. The committee is responsible for making recommendations for improving safety and health in the workplace. They have been charged with the responsibility to define problems and remove obstacles to accident prevention; identify hazards and recommend corrective actions; help identify employee safety training needs and establish accident investigation procedures for our company.

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EMPLOYEES

Each employee, regardless of his or her position with the company, is expected to cooperate in all aspects of the company's safety and health program. Some major points of our company safety and health program requires that:

Accidents must be reported immediately to your supervisor.

Required personal protective equipment must be worn by all employees. There are no exceptions.

Hazardous conditions or other safety and health concerns must be reported to your supervisor immediately.

Employees participate in safety committee activities and support safety committee membership.

If everyone does his or her part by doing what is necessary to ensure workplace safety and health, we all benefit.

No job is so important that we cannot take the time to do it safely.

Sincerely,

Signed_____ Date_____
Owner or CEO

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Safety Committee Functions With Objectives and Duties

FUNCTIONS

1. MANAGEMENT COMMITMENT TO WORKPLACE SAFETY/HEALTH

   Objectives and duties

   Establish procedures for review and management's response to minutes.

   Submit written recommendation for safety/health improvements/changes response.

   Evaluate employer's safety/health policies/procedures.

   Respond in writing to safety committee recommendations.

   Review corrective action taken by management.

2. COMMITTEE MEETINGS & EMPLOYEE INVOLVEMENT

   Objectives and duties

   Establish procedures for employee input, i.e., to receive suggestions, report hazards and other pertinent safety/health information.

   Include employee input on agenda for safety committee meeting.

   Hold monthly meetings (except months when quarterly inspections are done).

   Keep meeting minutes for three (3) years to be made available to OR-OSHA on inspection.

   Develop and make available a written agenda for each meeting.

Take meeting minutes and distribute to management and the safety committee members.

Include in the meeting minutes all recommendations.

3. **HAZARD ASSESSMENT & CONTROL**

Objectives and duties

Establish procedures for workplace inspections to identify safety and health hazards.

Assist employer in evaluating the accident and illness prevention program.

Appoint an inspection team of at least one (1) employee representative and one (1) employer representative.

Conduct workplace inspections at least quarterly.

Make written report of hazard location discovered during quarterly inspection.

Review corrective measures for adequacy. Make written recommendation to correct hazard; and submit to management for timely response.

4. SAFETY/HEALTH PLANNING

Objectives and duties

Establish procedures to review inspection reports and make appropriate implementation of new safety/health rules and work practices.

Develop procedures to conduct annual review of employer's accident prevention plan.

5. ACCOUNTABILITY

Objectives and duties

Evaluate employer's safety/health accountability systems.

Make recommendations to implement supervisor and employee accountability for safety and health.

6. ACCIDENT/INCIDENT INVESTIGATIONS

Objectives and duties

Establish procedures for reviewing reports generated by all safety incidents, including injury accidents, illnesses and death, so that recommendations can be made for appropriate corrective action to prevent recurrence.

7. SAFETY/HEALTH TRAINING

Objectives and duties

Discuss with all safety committee members the safety committee purpose and operation, rules 437-001-0760 through 437-001-0765 and their application and method of conducting safety committee meetings.

Have accessible all applicable OR-OSHA safety/health standards that apply to your particular industry.

Provide instruction on how to use OR-OSHA standards.

Provide training based on your type of business activity. Minimum requirements are hazard identification in the workplace and principles regarding effective accident and incident investigation.

Note: Other objectives and duties determined by the company may be listed under each function.

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Safety Committee Policy Statement

INTRODUCTION

Advanced American Construction, Inc. Service. Inc. is committed to accident prevention in order to protect the safety and health of all our employees. Injury and illness losses due to hazards are needless, costly and preventable. To prevent these losses, a joint management/worker safety committee will be established. Employee involvement in accident prevention and support of safety committee members and activities is necessary to ensure a safe and healthful workplace.

PURPOSE

The purpose of our safety committee is to bring workers and management together in a nonadversarial, cooperative effort to promote safety and health in the workplace. The safety committee will assist management and make recommendations for change.

ORGANIZATION

There shall be_____employees and_____employer representatives. Employee representatives shall be volunteers or elected by their peers. If no employees volunteer or are elected, management may appoint them. Employer representatives will be appointed. Safety committee members will serve a continuous term of at least one-year. Committee membership terms will be staggered so that at least one experienced member is always serving on the committee.

EXTENT OF AUTHORITY

It must be clearly understood that the safety committee advises management on issues that will promote safety and health in the workplace. Written recommendations are expected from the safety committee and they will be submitted to management. In turn, management will give serious consideration to the recommendations submitted and will respond in writing to the committee within a reasonable time.

FUNCTIONS

Objectives and duties
Management commitment to workplace safety/health
Committee meetings and employee involvement
Hazard assessment and control
Safety and health planning
Accountability
Accident and incident investigations
Safety and health training
Others as determined by the company

RECOMMENDATIONS

All recommendations submitted to management must be written and should:

- Be clear and concise
- Provide reasons for implementation
- Show implementation costs and recommended completion dates
- List benefits to be gained

PROCEDURES

The committee's plan of action requires procedures by which the committee may successfully fulfill its role. Procedures developed should include but not be limited to:

- Meeting date, time and location
- Election of chairperson and secretary
- Order of business
- Records

Duties of each member must include, but not be limited to:

- Reporting unsafe conditions and practices
- Attending all safety and health meetings
- Reviewing all accidents and near-misses
- Recommending ideas for improving safety and health
- Working in a safe and healthful manner
- Observing how safety and health are enforced in the workplace
- Completing assignments given to them by the chairperson
- Acting as a work area representative in matters pertaining to health and safety
- Others as determined by company safety and health needs

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SUMMARY

Only the planning and effective joint leadership of management and the safety committee can build a program that lasts. The safety committee shall be a constructive entity, providing guidance and leadership in matters pertaining to the overall health and safety of the company.

Sincerely,

Signature Chairperson	Date	Signature Owner/CEO	Date

Advanced American Construction, Inc.
Health & Safety Program

HAZARD ANALYSIS PROCESS

The Safety Management Standards (SMS) are procedural documents that represent Corporate Health and Safety Standards for office/shop and field operations. As such, depending on the activities encountered, there are a definitive number of standards that are applicable to any one location or operation.

The Hazard Analysis Process serves as a tool to assist managers in determining which SMS are applicable and must be implemented. Once this determination is made, the appropriate SMSs essentially become the framework of the Safe Work Plan for the office/shop/project.

The Office/Shop or Project Manager/Superintendent is then responsible to implement SMS which outlines requirements and also indicates how to document compliance with the stated requirements.

The following Project Hazard Analysis forms are to be used by the manager as a tool to conduct and document that the Hazard Analysis process.

For projects, the Project Hazard Analysis form must be completed and the SMSs compiled into the Safe Work Plan for the project prior to the initiation of project activities. The project manager must require that training and medical surveillance requirements are met for all personnel and that all required safety equipment and controls are in place. Field personnel are to be briefed as to the requirements of the Safe Work Plan prior to their involvement. The required documentation will be filed in the Project Health and Safety Files.

Office/Shop Managers are referred to the Facilities Hazard Analysis form. By completing this form, Office/Shop Managers will be directed to the SMSs that are

applicable for the activities at their Location. The Manager will require that the requirements of each SMS will be followed and documented in the Safety Files

Advanced American Construction, Inc.
Health & Safety Program

PROJECT HAZARD ANALYSIS FORM

Completed by:_____ Date: _____

Project Name:_____ Project Number: _____

		See SMS #
Determine the applicability of these SMSs to your project		
Emergency Action Plan		14
Housekeeping		26
Sanitation		38
Regulatory Inspections		34
WILL FIELD ACTIVITIES INVOLVE ANY OF THE FOLLOWING?	**YES**	**See SMS#**
Industrial site access of any kind?		1
Use of **Aerial lifts**?		3
Material handling that poses risk of **back injury**?		4
Diving Operations?		8
Confined space entries?		9
Manbasket (Crane Suspended Personnel Platforms) for working at heights?		10, 11, 16
Cranes or hoists?		11,36,43
Electrical equipment? -**Generators**? -**Live electrical circuits**?		13
Excavations or exposure to excavation hazards?		15
Working at heights of greater than 6 feet without protective measures such as guard rails?		16
Flammable or combustible materials used or stored which could constitute a fire hazard?		17,18

Use of **forklifts or jacklifts**?		19

WILL PROJECT ACTIVITIES INVOLVE ANY OF THE FOLLOWING?	Yes	See SMS
Hand tool use: -portable -gas powered -electric -powder actuated		22
Heavy equipment in use at this project site?		24
Hot Work (welding, cutting, grinding)		25
Lead exposures (lead paint removal, lead in dust, etc)?		27
Lockout/tagout to control exposure to hazardous energy?		28
Noise exposures?		30
Personal protective equipment?		31
Portable ladder use?		32
Respiratory protection use - required and/or voluntary?		35
Scaffolding?		39
Use of **Subcontractors?**		42
Traffic control due to work in streets and/or roadways?		45
Utility Clearances - overhead or underground?		43
Water, work over or around?		44
Work with **chemicals or hazardous materials?**		5,7,17, 21,27,46

ADVANCED AMERICAN CONSTRUCTION INC. MANAGEMENT STANDARD

SAFETY DISCIPLINARY POLICY

Advanced American Construction, Inc. wants its employees to work in a positive, productive atmosphere. However, employees who violate safety rules must be disciplined in order to protect their own safety and the safety of their co-workers. Depending on the severity and frequency of a safety violation, an employee may be:

- immediately discharge
- suspended; or
- given a written warning.

The following disciplinary guidelines classify violations according to their seriousness (Groups A, B, and C), and certain penalties are suggested for each group. Unsafe conduct by an employee may violate several provisions of the different groups. This list is intended to suggest examples of inappropriate behavior. It is not a comprehensive list of all safety violations for which an employee may be disciplined or discharged. Project Mgr, Owners and/or project Superintendent will exercise this policy requirement at their discretion.

The following disciplinary policies do not in any way bind the Company to follow a particular course of conduct. The Company in its sole discretion may change these policies at any time. In addition, nothing in the policies changes the at-will nature of employment with the Company. An employee may still be terminated with or without cause, with or without notice, at the option of either the Company or the employee, except as otherwise provided by law.

Group A

1. Deliberate violation of any security or safety rules.

2. Being intoxicated or under the influence of any controlled substances while at work.

3. Deliberate or reckless misconduct that endangers the life or safety of others.

4. Possession of alcohol or illegal drugs on Company premises.

5. Deliberate destruction of or damage to Company property.

6. Deliberate falsification of any documents related to safety matters.

7. Fighting or deliberately harmful contact with co-workers.

Group B

1. Negligence that damages Company property.
2. Negligence that endangers the safety of others.
3. Unintentional safety violations that endanger the safety or health of others.
4. Failure to report conditions that one believes to be unsafe.
5. Smoking or eating in unauthorized areas.
6. Speeding or unsafe operation of a forklift or any other Company vehicle.
7. Driving a forklift or any other machinery without required approval.
8. Failure to properly record safety information for which one is responsible.
9. Improper refusal to obey a supervisor's safety instructions.
10. Any belligerent or antagonistic conduct toward co-workers, supervisors, or customers.

Group C

1. Violation of personal protective equipment (PPE) policy that does not result in injury to oneself or others
2. Poor grooming or a lack of cleanliness.
3. Poor housekeeping.
4. Failure to participate in group safety meetings.
5. Failure to properly and immediately report any accident or injury.
6. Failure to properly or immediately report any accident involving Company equipment.
7. Failure to perform inspections of tools or machinery.
8. Failure to report machine or tool deficiencies.
9. Failure to learn Company safety rules and regulations.

DISCIPLINARY PENALTIES

The following list provides a general guide for disciplinary actions for the above violations.

	1st Offense	2nd Offense	3rd Offense
Group A	Immediate discharge		
Group B	Warning or suspension	Discharge	
Group C	Warning	Warning or suspension	Discharge

WRITTEN WARNINGS

Written warnings may help employees know where they stand and improve their performance. The Company attempts to issue written warnings that include the reasons for the supervisor's dissatisfaction. Warnings usually include a statement of the actions you need to take or results that need to be achieved to avoid further problems. **However, the written warnings do not legally obligate or bind the employer or alter the at-will nature of the employee's employment with the Company. An employee who has received a warning may still be terminated with or without cause, and with or without notice, at any time.**

Any employee who receives a written warning must immediately acknowledge receipt by signing the warning. An employee who disagrees with the written warning may discuss his or her reasons for doing so with the supervisor. It is generally best to inform the supervisor of any error at the time the warning is issued. In fact, there is a place on the form for the employee to do so. Any employee who believes that a supervisor has not responded fairly to the employee's comments may contact

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Identify suitable position, e.g., Human Resources Director, Company President, etc.

DISCIPLINARY NOTICE TO EMPLOYEE

Advanced American Construction, Inc.

_____
Date

_____
Employee name

☐ First Notice ☐ Second Notice

_____
Days suspended (if applicable)

_____
Department

We believe that an employee wants to know if he or she is violating Company policy or failing to follow Company rules. This disciplinary notice is to provide you notice of a violation of Company policy. **However, the Company is not obligated to provide any warnings or to retain an employee once a warning has been given. All employees are employed at will. "At-will" employment means that an employee can be terminated with or without cause, with or without notice, at any time, at the option of either the Company or the employee.**

Your conduct is not in keeping with Company practices, standards, and policies for the
following reasons: *(Indicate specific standards and policies with which the employee has failed to comply.)*

_____

_____

_____

Suggestions for improvement:

_____

_____

_____

_____

Employee comments: (Note: An employee should state his or her disagreements with the warning in writing.)

_____

_____

_____

_____

Copy received by:

_____ _____
Employee signature Supervisor's signature

_____
Date

Copy to employee file ☐

CERTIFICATION OF EMPLOYEE

I have received a copy of Advanced American Construction, Inc.'s General Health and Safety Plan that outlines Company policies and employee responsibilities concerning safety, including disciplinary policies for violation of safety rules and regulations. I will familiarize myself with the General Health and Safety Plan and will comply with all of its provisions. I understand and agree that the Company has the right to change, amend, modify, or withdraw any provision of the General Health and Safety Plan without notifying me before the effective date of any amendment, modification, or withdrawal.

I understand that the General Health and Safety Plan is not a contract of employment and the Company has the right to follow or deviate from the policies in the General Health and Safety Plan in the Company's sole and exclusive discretion. I also understand that the General Health and Safety Plan does not change the nature of my "at-will" employment with the Company. "At-will" employment means that I can be terminated with or without cause, with or without notice, at any time, at the option of either me or the Company.

By my signature below, I agree to the terms of this Certification and also agree to follow the policies and procedures contained in the General Health and Safety Plan.

_____ _____
Employee signature Date

_____ _____
Manager/Owner Date

ADVANCED AMERICAN CONSTRUCTION, INC.
SAFETY MANAGEMENT STANDARD

ACCESSING INDUSTRIAL SITES

1.0 Applicability

This procedure applies to all projects where Advanced American Construction, Inc. personnel access industrial sites.

2.0 Purpose and Scope

The purpose of this procedure is to require that personnel determine the appropriate personal protective equipment, and receive hazard, safety and emergency information when accessing industrial sites.

3.0 Implementation

Field Activities - Implementation of this procedure is the responsibility of the Project Manager/Superintendent.

4.0 Requirements

A. Prior to accessing the site contact the facility to determine:

1. PPE requirements for personnel.

2. The procedure for safely accessing the site.

3. The need for training and/or orientation upon arrival including MSDS.

4. Any other safety procedures specifically required at the site that would require advance planning or coordination.

5. Security requirements.

B. Upon accessing the site:

1. Report to the designated entry location.

2. Attend required safety orientation/briefings.

3. Prepare to comply with site rules.

4. Inquire as to the following issues if not addressed:

   a) Facility emergency procedures including alarms and evacuation procedures.
   b) How to activate emergency procedures if necessary.
   c) Information regarding potential chemical exposures:

      (1) MSDS access.
      (2) Where these potential exposures exist.
      (3) Controls in place to prevent exposures.
      (4) How to identify when exposures may occur.

   d) Safety hazards which may not be inherently obvious and site rules or procedures regarding those hazards.
   e) Traffic issues within the facility including:

      (1) Lift truck and material handling vehicles.
      (2) Establishment of Right of Way.
      (3) Vehicle access to site.
      (4) Special pedestrian rules.

   f) Major program coordination issues, such as:

      (1) Confined Space Entry Procedures.
      (2) Lockout/Tagout and Control of Hazardous Energy Procedures.
      (3) Utility clearances.

C. Document Site Issues on Attachment 1.

D. Enter the site prepared to comply with Advanced American Construction, Inc. and site procedures. In the event that there is a discrepancy, coordinate with site representative and prepare to use the most protective procedure.

E. Wherever significant safety issues remain that cannot be resolved locally, contact the Advanced American Construction, Inc. Safety Manager for support in resolving such issues.

5.0 Documentation Summary

Field Operations

File Attachment 1 "Accessing Industrial Sites" in the Project Health and Safety File.

6.0 Resources

A. U.S. OSHA Standard - Emergency Action Plans - 29 CFR 1910.38
(http://www.oshaslc.gov/OshStd_data/1910_0038.html)
B. U.S. OSHA Fact Sheet - Responding to Workplace Emergencies
(http://www.osha-slc.gov/OshDoc/Fact_data/FSNO92-19.html)

Advanced American Construction, Inc. Health & Safety Program
Accessing Industrial Sites

Health and Safety Assessment

Industrial Site: _____

Date: _____

Project Manager: _____

	Yes	No	N/A
PRE JOB SURVEY			
Are there PPE requirements for site access?			
If yes, describe the requirements.			
What are the procedures for safely accessing the site?			
Is there a requirement for orientation or a safety briefing upon arrival?			
Are there any other safety procedures specific to this site that require advance planning?			
If yes, describe the requirements.			
UPON ACCESSING THE SITE			
Have facility emergency procedures been discussed? -alarms -evacuation routes -procedures to activate emergency system			

	Yes	No	N/A
Has the worker Right to Know program for the site been addressed (Hazcom/WHMIS)? -site chemical hazards shared with AAD staff? -information provided to owner regarding chemicals brought to site by AAD? -are all parties aware of how to detect exposures to chemicals? -Have Control Measures regarding potential chemical exposures been discussed between parties?			
Are there any safety hazards on the site which are not inherently obvious?			
If yes, describe hazards and site protective measures.			
Are there any special traffic rules for the site? -Lift truck or material handling vehicles onsite? -Right of way issues?			
If yes, describe.			
Are there any special rules for contractor vehicles on site? - Are there any special pedestrian rules?			
If yes, describe.			
Are there any major program coordination issues at this site? -Confined Space Entry -Lockout/Tagout -Process safety line brake issues			

	Yes	No	N/A
If yes, describe.			
Have all of the above related issues been shared with all project related personnel and subcontractors?			
If no, why not?			

Project Manager_____ Date_____

Project Superintendent_____ Date_____

ADVANCED AMERICAN CONSTRUCTION, INC. SAFETY MANAGEMENT STANDARD

ACCIDENT INVESTIGATION PROGRAM / INJURY AND ILLNESS PREVENTION (IIP) PROGRAM

1.0 Applicability

This procedure applies to Advanced American Construction, Inc. operations.

2.0 Purpose and Scope

The purpose of this procedure is to identify root causes of accidents, near misses, and incidents to prevent any recurrence throughout our various operations.

3.0 Implementation

Office Locations - Implementation of this procedure is the responsibility of the Office Manager.

Shop Locations- Implementation of this procedure is the responsibility of the Shop Manager Foreman.

Field Activities - Implementation of this procedure is the responsibility of the Project Manager.

4.0 Requirements

A. Policy Statement

Thousands of accidents occur throughout the United States every day. The failure of people, equipment, supplies, or surroundings to behave or react as expected causes most of the accidents. Accident investigations determine how and why these failures occur. By using the information gained through an investigation, a similar or perhaps more disastrous accident may be prevented. Conduct accident investigations with accident prevention in mind. Investigations are NOT to place blame.

An accident is any unplanned event that results in personal injury or in property damage. Investigate all accidents regardless of the extent of injury or damage, AND near misses. All of these incidents provide critical information for the improvement of our safety efforts.

Accidents are usually complex. An accident may have 10 or more events that an be causes. At the lowest level, an accident results only when a person or object receives an amount of energy or hazardous material that cannot be

absorbed safely. This energy or hazardous material is the DIRECT CAUSE of the accident. The direct cause is usually the result of one or more unsafe acts or unsafe conditions, or both. Unsafe acts and conditions are the INDIRECT CAUSES or symptoms. In turn, indirect causes are usually traceable to poor management policies and decisions, or to personal or environmental factors. These are the BASIC CAUSES.

In spite of their complexity, most accidents are preventable by eliminating one or more causes. Accident investigations determine not only what happened, but also how and why. The information gained from these investigations can prevent recurrence of similar or perhaps more disastrous accidents.

B. Investigative Procedures

The actual procedures used in a particular investigation depend on the nature and results of the accident. The Managers will be in charge of the investigation, and will investigate all near misses, incidents (minor injuries, and accidents). The investigator will:

1. Visit the incident/accident site to get information as quickly as possible but within 1 hour. Secure the area. Do not disturb the scene unless a hazard exists.
2. Define the scope of the investigation and location of the accident site.
3. Provide a description of the accident
4. Prepare the necessary sketches and photographs. Label each carefully and keep accurate records. Develop drawings as appropriate
5. Interview each victim and witness. Also interview those who were present before the accident and those who arrived at the site shortly after the accident. Keep accurate records of each interview. Use a tape recorder if desired and if approved
6. Document the events that preceded the accident
7. Determine whether normal or non-typical operating procedures were used
8. Determine:
    a) What was not normal before the accident.
    b) Where the abnormality occurred.
    c) When it was first noted.
    d) How it occurred.
9. Determine and summarize:
    a) The most likely sequence of events and the most probable causes (direct, indirect, basic) of why the incident occurred.

b) Alternative sequences.

10. Conduct a post-investigation briefing.

11. Complete the attached ***Advanced American Construction, Inc. Incident Investigation Form***, including the recommended actions to prevent a recurrence. Distribute the report according to applicable instructions.

    An investigation is not complete until all data are analyzed and a final report is completed. In practice, the investigative work, data analysis, and report preparation proceed simultaneously over much of the time spent on the investigation.

C. Fact-Finding

Gather evidence from many sources during an investigation. Get information from witnesses and reports as well as by observation. Interview witnesses as soon as possible after an accident. Inspect the accident site before any changes occur. Take photographs and make sketches of the accident scene. Get copies of all reports and documents containing normal operating procedures, flow diagrams, maintenance charts, or reports of difficulties or abnormalities are particularly useful. Keep complete and accurate notes in a bound notebook. Record pre-accident conditions, the accident sequence, and post-accident conditions. In addition, document the location of victims, witnesses, machinery, energy sources, and hazardous materials.

In some investigations, a particular physical or chemical law, principle, or property may explain a sequence of events. Include laws in the notes taken during the investigation or in the later analysis of data. In addition, gather data during the investigation that may lend itself to analysis by these laws, principles, or properties. An appendix in the final report can include an extended discussion.

D. Interviews

In general, experienced personnel should conduct interviews. The Managers will be in charge of conducting these. In conducting interviews:

1. Get preliminary statements as soon as possible from all witnesses.
2. Locate the position of each witness on a master chart (including the direction of view).
3. Arrange for a convenient time and place to talk to each witness.
4. Explain the purpose of the investigation (accident prevention) and put each witness at ease.

Listen, let each witness speak freely, and be courteous and considerate

1. Take notes without distracting the witness. Use a tape recorder only with consent of the witness.
2. Use sketches and diagrams to help the witness.
3. Emphasize areas of direct observation. Label hearsay accordingly.
4. Be sincere and do not argue with the witness. Record the exact words used by the witness to describe each observation. Do not "put words into a witness' mouth."
5. Word each question carefully and be sure the witness understands.
6. Identify the qualifications of each witness (name, address, occupation, years of experience, etc.).
7. Supply each witness with a copy of his or her statements. Signed statements are desirable.

   After interviewing all witnesses, the Managers should analyze each witness' statement. They may wish to re-interview one or more witnesses to confirm or clarify key points. While there may be inconsistencies in witnesses' statements, investigators should assemble the available testimony into a logical order. Analyze this information along with data from the accident site.

   Not all people react in the same manner to a particular stimulus. For example, a witness within close proximity to the accident may have an entirely different story from one who saw it at a distance. Some witnesses may also change their stories after they have discussed it with others. The reason for the change may be additional clues.

   A witness who has had a traumatic experience may not be able to recall the details of the accident. A witness who has a vested interest in the results of the investigation may offer biased testimony. Finally, eyesight, hearing, reaction time, and the general condition of each witness may affect his or her powers of observation. A witness may omit entire sequences because of a failure to observe them or because their importance was not realized.

E. Problem Solving Techniques

Accidents represent problems that must be solved through investigations. Several formal procedures solve problems of any degree of complexity. This section discusses two of the most common procedures: Change Analysis and Job Safety Analysis.

1. Change Analysis

As its name implies, this technique emphasizes change. To solve a problem, an investigator must look for deviations from the norm. Consider all problems to result from some unanticipated change. Make an analysis

1. Take notes without distracting the witness. Use a tape recorder only with consent of the witness.
2. Use sketches and diagrams to help the witness.
3. Emphasize areas of direct observation. Label hearsay accordingly.
4. Be sincere and do not argue with the witness. Record the exact words used by the witness to describe each observation. Do not "put words into a witness' mouth."
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1. Discussion Analysis of the Accident – REMEMBER TO ASK……..

   (5 "W"s—What, When, Where, Why, Who) ?

   a) Direct causes (energy sources; hazardous materials)

   b) Indirect causes (unsafe acts and conditions)

   c) Basic causes (management policies; personal or environmental factors)

4. Recommendations (to prevent a recurrence) for immediate and long-range action to remedy:

   a) Root causes

   b) Indirect causes or symptoms

   c) Direct causes (such as reduced quantities or protective equipment or structures)

   Oregon OSHA must be notified @ 800.922.2689 or 503.378.3272 for any work related fatalities, catastrophes, or overnight hospitalizations (for medical treatment). Fatalities and catastrophes are to be reported as quickly as possible but no longer than 8 hours after occurrence. Overnight hospitalizations are to be reported within 24 hours. The accidents must also be logged on the OSHA 300 form as per the instructions for work related illnesses or injuries, other than first aid treatment incidents. All records will be available to the Oregon Occupational Safety and Health Division for examination and copying.

5. The Safety Committee must also receive a copy for review and discussion at the subsequent safety committee meeting.

G. Documentation Summary

Provide the following documentation to the Safety Director for inclusion to the Office/Shop/Project Health and Safety File

A. Training Records

1. Training records will include the date of training session, summary of the contents of the training session and the names and qualifications of the persons presenting the training.

2. All attendees to training will sign a log with name and job title.
3. Training records will be maintained for three years from the date on which the training occurred.

B. Availability

1. All records will be available to the Oregon Occupational Safety and Health Division for examination and copying.
2. Training records and Incident Reports will be available upon request for examination and copying to employees, their representatives, the Oregon Occupational Safety and Health Division.

C. Incident Investigation Forms, and support information.

5.0 Resources

- Occupational Injury and Illness Recording and Reporting Requirements-
  http://www.osha-slc.gov/FedReg_osha_data/FED20010119.html
- Accident and Incident Investigation Procedures-
  http://www.osha-slc.gov/sltc/safetyhealth ecat/mod4 factsheets accinvest.htm.

INJURY AND ILLNESS PREVENTION (IIP) PROGRAM

1.0 Responsibility

The AACI Injury and Illness Prevention (IIP) Safety Director has the authority, the responsibility and overall accountability for implementing and maintaining this IIP Program for Advanced American Construction, Inc. Managers and supervisors are responsible for implementing and maintaining the IIP Program in their work areas and for answering worker questions about the IIP Program. A copy of this IIP Program is available from each manager and supervisor.

2.0 Compliance

All workers, including managers and supervisors, are responsible for complying with safe and healthy work practices by incentives, training, retraining programs and disciplinary programs. Our system of ensuring that all workers comply with these practices include the following:

a) Informing workers of the provisions of our IIP Program.

b) Evaluating the safety performance of all workers.

c) Recognizing employees who perform safe and healthful work practices.

d) Providing training to workers whose safety performance is deficient.

e) Disciplining workers for failure to comply with safe and healthful work Practices.

3.0 Communication

All managers and supervisors are responsible for communicating with all workers about occupational safety and health in a form readily understandable by all workers. Our communication system encourages all workers to inform their managers and supervisors about workplace without fear of reprisal.

Our communication system includes the following items:

a) New worker orientation including a discussion of written safety and health policies and procedures.

b) Review of our IIP Program.

c) Training programs.

d) Regularly scheduled safety meetings.

e) Posted or distributed safety information.

f) A system for workers to anonymously inform management about workplace hazards.

g) Our establishment has less than ten employees and communicates with and instructs employees orally about general safe work practices and hazards unique to each employee's job assignment.

4.0 Hazardous Assessment

Periodic inspections to identify and evaluate workplace hazards shall be performed and recorded by a competent observer in the following areas of our workplace:

Periodic inspections are performed according to the following schedule:

1. When we initially established our IIP Program.
2. When new substances, processes, procedures or equipment which present
   potential new hazards are introduced into our workplace;
3. When new, previously unidentified hazards are recognized;
4. When occupational injuries and illnesses occur; and
5. Whenever workplace conditions warrant an inspection.

5.0 Accident/Exposure Investigations

Procedures for investigating workplace accidents and hazardous substance exposures include:

1. Interviewing injured workers and witnesses;
2. Examining the workplace for factors associated with the accident/exposure;
3. Determining the cause of the accident/exposure;
4. Taking corrective action to prevent the accident/exposure from reoccurring; and
5. Recording the findings and actions taken.

6.0 Hazard Correction

Unsafe or unhealthy work conditions, practices or procedures identified from the inspections, accident investigations and system hazard identifications and in order of priority shall be corrected in a timely manner based on the severity of the hazards. Hazards shall be corrected according to the following procedures:

1. When observed or discovered; and
2. When an imminent hazard exists which cannot be immediately abated without endangering employee(s) and/or property, we will remove all exposed workers from the area except those necessary to correct the existing condition. Workers who are required to

correct the hazardous condition shall be provided with the necessary protection.

7.0 Training and Instruction

All workers, including managers and supervisors, shall have training and instruction on general and job-specific safety and health practices. Training and instruction is provided:

1. When the IIP Program is first established
2. To all new workers, except for construction workers who are provided training through a construction industry occupational safety and health training program approved by Cal/OSHA;
3. To all workers given new job assignments for which training has not been previously provided;
4. Whenever new substances, processes, procedures or equipment are introduced to the workplace and represent a new hazard;
5. Whenever the employer is made aware of a new or previously unrecognized hazard;
6. To supervisors to familiarize them with the safety and health hazards to which workers under their immediate direction and control may be exposed; and
7. To all workers with respect to hazards specific to each employee's job assignment.
8. Prior to or at the time of initial job assignment.

General workplace safety and health practices include, but are not limited to, the following:

1. Implementation and maintenance of the IIP Program.
2. Emergency action and fire prevention plan.
3. Provisions for medical services and first aid including emergency procedures.
4. Prevention of musculoskeletal disorders, including proper lifting techniques.
5. Proper housekeeping, such as keeping stairways and aisles clear, work areas neat and orderly, and promptly cleaning up spills.
6. Prohibiting horseplay, scuffling, or other acts that tend to adversely influence safety.
7. Proper storage to prevent stacking goods in an unstable manner and storing goods against doors, exits, fire extinguishing equipment and electrical panels.
8. Proper reporting of hazards and accidents to supervisors.

9. Hazard communication, including worker awareness of potential chemical hazards, and proper labeling of containers.
10. Proper storage and handling of toxic and hazardous substances including prohibiting eating or storing food and beverages in areas where they can become contaminated.

8.0 Recordkeeping

Our establishment has twenty or more workers or has a workers' compensation experience modification rate of greater than 1.1 and is not on a designated low hazard industry list. We have taken the following steps to implement and maintain our IIP Program.

1. Records of hazard assessment inspections, including the person(s) conducting the inspection, the unsafe conditions and work practices that have been identified and the action taken to correct the identified unsafe conditions and work practices, are recorded on a hazard assessment and correction form; and
2. Documentation of safety and health training for each worker, including the worker's name or other identifier, training dates, type(s) of training, and training providers, are recorded on a worker training and instruction form.

   Inspection records and training documentation will be maintained according to the following checked schedule:

   For one year, except for training records of employees who have worked for less than one year which are provided to the employee upon termination of employment.

9.0 Resources

Cal/OSHA T8 CCR 3203

HAZARDOUS ASSESSMENT & CORRECTION RECORD

Date of Inspection: **Person Conducting Inspection:**

Unsafe Condition or Work Practice:

Corrective Action Taken:

Date of Inspection: **Person Conducting Inspection:**

Unsafe Condition or Work Practice:

Corrective Action Taken:

Incident Investigation Form or "Good Catch"

Instructions:

1. **The jobsite Foreman, Engineer or Superintendent is to complete this form immediately for any occasion involving a significant incident i.e. fire or Recordable/Lost Time injury or a "Good Catch".**
2. **Send or hand deliver completed form to the Safety Director andyw@aac.com ASAP.**
3. **The senior person on-site assures that corrective actions are completed as indicated.**

Is this a report of a "Good Catch"? **Yes** _____ **No** _____

Is this a report of injury? **Yes** _____ **No** _____

Is this a report of Property Damage? **Yes** _____ **No** _____

If Injury:

Name Of Injured: _____ **Date:** _____

Age: _____

Department: _____

Shift: _____ **(Time) On The Job:** _____

Craft/ Department: _____/ _____

Description Of Incident or "Good Catch"

(Describe The Situation -- Use Back Of Page For More Space)

Contributing Symptoms (Circle *All* Appropriate Responses):

Slip/Trip	**Fall**	**-Overexposure**
Flying Object	**Contact Hot Item**	**-Weight**
Stepped On	**Contact Electricity**	**-Pushing/Pulling**
Fall At Same Level	**Hit /Struck By/Against**	**-Reaching**
Chemical Contact	**Caught By/Between Machinery/Tool Repetition/Twisting**	**-**

List Contributing Conditions/Behaviors; Review Whether Training Is Adequate, And Has Accountability Been In Place?

Unsafe Act	Unsafe Condition
_____	_____
_____	_____
_____	_____
_____	_____

Contributing Causes

	Yes	No
-Was Training Adequate To Address Hazards And Proper Controls?	___	___
-Were Supervisors, Leads, And Managers Observing Work Habits To Assure That Training Was Being Followed, And Holding People Accountable?	___	___
-If Applicable, Was Personal Protective Equipment Adequate?	___	___
-Was Equipment Failure Or Condition An Issue?	___	___

-Other:

_____
_____

Nature Of Incident (Circle All Appropriate Responses):

Strain	**Sprain**	**Cut/Puncture/ Laceration**
Foreign Body	**Cumulative Trauma**	**Burn**
Contusion	**Crushing**	**Electric Shock**
Fracture	**Hernia**	**Infection**
Inflammation	**Loss Of Hearing**	**Respiratory Irritation**
Stress	**Rupture**	**Occupational Disease**

Corrective Actions And Who Will Respond?

Corrective Actions **Responsible Person**

_____

_____/_____

_____/_____

_____/_____

_____/_____

_____/_____

Does anything need to be added to the JSA or JSA Evaluation? If so, what?

_____

_____

_____
_____

Acknowledgment Of Corrective Action Completion (Initial)

Manager: _____ **Date:** _____

WORKER TRAINING AND INSTRUCTION RECORD

Worker's Name Trainers	Training Dates	Type of Training

ADVANCED AMERICAN CONSTRUCTION, INC. SAFETY MANAGEMENT STANDARD

AERIAL LIFTS

1.0 Applicability

This procedure applies to Advanced American Construction, Inc. shop locations or projects involving the use of scissors lifts, extensible boom platforms, aerial ladders, articulating boom platforms, vertical towers, or any combination thereof.

2.0 Purpose and Scope

The purpose of this procedure is to require the safe use and proper operation of aerial lifts and scissors.

3.0 Implementation

Shop Locations- Implementation of this procedure is the responsibility of the Shop Manager/Foreman.

Field Activities – Implementation of this procedure is the responsibility of the Project Manager/Superintendent.

4.0 Requirements

A. Unless otherwise provided in this section, aerial lifts acquired for use on or after January 22, 1973 shall be designed and constructed in conformance with the applicable requirements of the American National Standards for “Vehicle Mounted Elevating and Rotating Work Platforms, “ANSI A92.2-1969, including appendix. Aerial lifts acquired before January 22, 1973 which do not meet the requirements of ANSI A92.2-1969, may not be used after January 1, 1976, unless they shall have been modified so as to conform with the applicable design and construction requirements of ANSI A92.2-1969. Aerial lifts include the following types of vehicle-mounted aerial devices used to elevate personnel to job-sites above ground:

B. Require that the manufacturer's operating instruction manual be available onsite.

C. Allow only trained, authorized personnel to operate aerial lifts.

D. Inspect the unit for unsafe conditions each day prior to use. Units that have been damaged or weakened from any cause must be taken out of service until repairs are completed.

E. Test the lift controls each day prior to use to determine that such controls are in safe working condition. Tests shall be made at the beginning of each shift during which the equipment is to be used to determine that the brakes and operating systems are in proper working condition.

F. Require that both lower and platform controls are plainly marked as to their function.

G. Survey the route to be traveled immediately prior to the work trip to check for overhead obstructions, holes in pavement, slopes, ditches, or other potential hazards.

H. Wear fall protection in the form of a full body harness and lanyard attached to the manufacturer's prescribed anchorage point. Fall protection is not required for scissors lifts utilizing standard guardrails unless specifically required by the manufacturer.

I. Stand firmly on the floor of the basket when working from an aerial lift. Sitting or climbing on the edge of the basket and/or use of planks, ladders, or other devices for work position are prohibited.

J. Never exceed the boom and basket load limits set by the manufacturer.

K. Set the braking system before elevating the basket.

L. Install wheel chocks before using an aerial lift on an incline, provided they can be safely installed.

M. Electrically ground or barricade aerial lifts when working near energized lines or equipment and consider the lift to be energized equipment.

N. Do not pass equipment between a pole or structure and an aerial lift while an employee working from the basket is within reaching distance of energized conductors or equipment that are not covered with insulating protective equipment.

O. Do not operate lower controls unless permission has been obtained from the employee in the basket, except in case of emergency.

P. Alteration of the insulated portion of an aerial lift that may reduce the insulating value is not permitted.

Q. Never field modify an aerial lift for uses other than those intended by the manufacturer.

R. Aerial lifts may be “field modified” for uses other than those intended by the manufacturer provided the modification has been certified in writing by the manufacturer or by any equivalent entity.

S. The equipment will have a reverse signal alarm audible above the surrounding noise level or the vehicle is backed up only when an observer signals that it is safe to do so.

T. Allow minimum clearance between electrical lines and any part of the equipment. For lines rated 50 kV. Or below, minimum clearance between the lines and any part of the crane or load shall be 10 feet.

5.0 Documentation Summary

A. File the following documents in the Shop/Project Health and Safety File

1. Copy of the cover page of the Manufacturer's Operation Manual.

2. Training documentation.

3. List of authorized employees.

4. Daily inspections

6.0 Resources

A. U.S. OSHA Standard - Aerial Lifts - 29 CFR 1926.556
(http://www.osha-slc.gov/OshStd_data/1926_0556.html)
B. U.S. OSHA Standard - Mechanical Equipment - 29 CFR 1926.952
(http://www.osha-slc.gov/OshStd_data/1926_0952.html)
C. U.S. OSHA Standard - Overhead Lines - 29 CFR 1926.955
(http://www.osha-slc.gov/OshStd_data/1926_0955.html)
D. U.S. OSHA Standard – Cranes and derricks -1926-550
E. U.S. OSHA Standard – Aerial Lifts – 1926.453

ADVANCED AMERICAN CONSTRUCTION, INC. SAFETY MANAGEMENT STANDARD

MANUAL LIFTING/ BACK INJURY PREVENTION

1.0 Applicability

This procedure applies to Advanced American Construction, Inc. operations where personnel perform manual lifting.

2.0 Purpose and Scope

The purpose of this procedure is to prevent back injuries to Advanced American Construction, Inc. personnel.

3.0 Implementation

Office Locations - Implementation of this procedure is the responsibility of the Office Manager.

Shop Locations- Implementation of this procedure is the responsibility of the Shop Manager Foreman.

Field Activities - Implementation of this procedure is the responsibility of the Project Manager.

4.0 Requirements

A. Safe Lifting.

1. Recognize that many assignments tend to be lifting-intensive, and that Advanced American Construction, Inc. has a duty to provide the means by which personnel can perform lifting duties without risk of injury.

2. Require that personnel receive the training described in (B) below.

3. Evaluate tasks that involve lifting during the hazard assessment and creation of the job hazard analysis to ensure that the tasks can be completed without risk of back injury to assigned personnel before manual lifting is accomplished. Do this for all phases of the work in advance. As conditions change or when new employees are assigned re-evaluate conditions and employees' work techniques and make necessary adjustments.

4. Provide and train employees in the use of material handling devices, such as carts, dollies, trucks with lift gates, to assist in the safe moving of materials. If required, assign additional personnel to the task.

5. When lifting tasks are ongoing rotate employees to reduce individual exposures.

6. Organize the site to minimize manual lifting and maximize the use of forklifts, cranes or other mechanical methods.

7. Direct field personnel not to assist in lifting tasks that are normally undertaken by subcontractor personnel.

8. Contact the Advanced American Construction, Inc. Safety Manager when assistance is necessary to evaluate a lifting task that may pose a back injury risk to assigned personnel.

B. Training

1. Require that personnel who may have lifting as part of their duties receive training that includes the following topics:

   a) Showing personnel how to avoid unnecessary physical stress and strain.
   b) Teaching personnel to become aware of what they can comfortably handle without undue strain.
   c) Instructing personnel on the proper use of equipment to assist them such as hand trucks, dollies or other specialized manual lifting equipment.
   d) Teaching personnel to recognize potential hazards and how to prevent or correct them.
   e) Discuss examples of situations where the use of mechanical lifting devices is impractical and two-person lifts are performed. Include the need for both employees to discuss the lift in advance so that they work together in a cooperative and coordinated way.

2. This training must be completed prior to an employee being assigned to a task that involves lifting.

3. Investigate all manual lifting injuries to gather information on the cause of injury. Use this information to re-evaluate the tasks and make changes in work procedures to prevent future injuries.

C. Office Moves and Relocations

1. Utilize professional movers (who are appropriately insured) to move office furniture such as desks, file cabinets, and bookcases, even if such a move is only between offices or cubicles at a particular location (on-site move).

2. Utilize professional movers for intensive moving of file boxes and other heavy materials.

5.0 Documentation Summary

File the following documents in the Office Shop/Project Health and Safety File

Training rosters.

6.0 Resources

A. Work Practices Guide for Manual Lifting, NIOSH

ADVANCED AMERICAN CONSTRUCTION, INC. SAFETY MANAGEMENT STANDARD

BENZENE AWARENESS

1.0 Applicability

This procedure applies to Advanced American Construction, Inc. shop and field operations where Benzene awareness is required.

2.0 Purpose and Scope

The purpose of this procedure is to provide information regarding the proper storage, handling and work practices associated with benzene.

3.0 Implementation

Shop Locations - Implementation of this program is the responsibility of the Shop Manager.

Field Activities - Implementation of this program is the responsibility of the Project Manager/Superintendent.

4.0 Requirements

A. Substance Identification

1. Substance: Benzene

a. Permissible Exposure: Except as to the use of gasoline, motor fuels and other fuels subsequent to discharge from bulk terminals and other exemptions specified in section 5218(a)(2):

b. Airborne: The maximum time-weighted average exposure limit is 1 part of benzene vapor per million parts of air (1 ppm) for an 8-hour workday and the maximum short-term exposure limit (STEL) is 5 ppm as averaged over a 15-minute sampling period.

b. Dermal: Eye contact must be prevented and skin contact with liquid benzene must be limited.

2. Characteristics

a. Benzene is a toxic, clear, colorless liquid with an aromatic odor and is not soluble in water and is flammable.

b. Benzene liquid is highly flammable. It should be stored in tightly closed containers in a cool, well ventilated area. Benzene vapor may form explosive mixtures in air. All sources of ignition must be controlled. Use non-sparking tools when opening or closing benzene containers. Fire extinguishers, where provided, must be readily available. Know where they are located and how to operate them. Smoking is prohibited in areas where benzene is used or stored. Ask your supervisor where benzene is used in your area and for additional plant safety rules.

3. Physical and Chemical Data

a. Synonyms: Benzol, benzole, coal naphtha, cyclohexatriene, phene, phenyl hydride, pyrobenzol. (Benzin, petroleum benzin and Benzine do not contain benzene).

b. Formula: C(6)H(6) (CAS Registry Number: 71-43-2)

c. Boiling Point (760 mm Hg); 80.1 deg. C (176 deg. F)

d. Specific Gravity (water=1): 0.879

e. Vapor Density (air=1): 2.7

f. Melting Point: 5.5 deg. C (42 deg. F)

g. Vapor Pressure at 20 deg. C (68 deg. F): 75mm Hg

h. Solubility in Water: .06%

i. Evaporation Rate (ether=1): 2.8

j. Appearance and Odor: Clear, colorless liquid with a distinctive sweet odor.

4. Fire, Explosion, and Reactivity Hazard Data

a. Fire.

b. Flash Point (closed cup):-11 deg. C (12 deg. F)

c. Autoignition Temperature: 580 deg. C (1076 deg. F)

d. Flammable limits in Air. % by Volume: Lower: 1.3%, Upper: 7.5%

e. Extinguishing Media: Carbon dioxide, dry chemical, or foam.

g. Special Fire-Fighting procedures: Do not use solid stream of water, since stream will scatter and spread fire. Fine water spray can be used to keep fire-exposed containers cool.

h. Unusual fire and explosion hazards: Benzene is a flammable liquid. Its vapors can form explosive mixtures. All ignition sources must be controlled when benzene is used, handled, or stored. Where liquid or vapor may be released, such areas shall be considered as hazardous locations. Benzene vapors are heavier than air; thus the vapors may travel along the ground and be ignited by open flames or sparks at locations remote from the site at which benzene is handled.

i. Benzene is classified as a 1 B flammable liquid for the purpose of conforming to the requirements of 29 CFR 1910.106 A concentration exceeding 3,250 ppm is considered a potential fire explosion hazard. Locations where benzene may be present in quantities sufficient to produce explosive or ignitable mixtures are considered Class I Group D for the purposes of conforming to the requirements of 29 CFR 1910.309.

5. Reactivity.

a. Conditions contributing to instability: Heat.

b. Incompatibility: Heat and oxidizing materials.

c. Hazardous decomposition products: Toxic gases and vapors (such as carbon monoxide).

6. Spill and Leak Procedures

a. Steps to be taken if the material is released or spilled. As much benzene as possible should be absorbed with suitable materials, such as dry sand or earth. That remaining must be flushed with large amounts of water. Do not flush benzene into a confined space, such as a sewer, because of explosion danger. Remove all ignition sources. Ventilate enclosed places.

b. Waste disposal method. Disposal methods must conform to other jurisdictional regulations. If allowed, benzene may be disposed of: (a) by absorbing it in dry sand or earth and disposing in a sanitary landfill; (b) if small quantities, by removing it to a safe location from buildings or other combustible sources, pouring it in dry sand or earth and cautiously igniting it; and (c) if large quantities, by atomizing it in a suitable combustion chamber.

7. Miscellaneous Precautions

    a. High exposure to benzene can occur when transferring the liquid from one container to another. Such operations should be well ventilated and good work practices must be established to avoid spills.

    b. Use non-sparking tools to open benzene containers which are effectively grounded and bonded prior to opening and pouring.

    c. Advanced American Construction, Inc. must advise employees of all plant areas and operations where exposure to benzene could occur. Common operations in which high exposures to benzene may be encountered are: the primary production and utilization of benzene, and transfer of benzene.

        1. Advanced American Construction, Inc. fueling stations on our own work barges
        2. Assisting plumbing subcontractors on piping and plumbing operations.
        3. Mechanical repair processes at petroleum refining sites.
        4. Mechanical repairs on customer docks.
        5. At our facilities around paint locker and aerosol dispensers.
        6. During our fueling & servicing of equipment.
        7. Customer fuel storage or piping areas.
        8. While rigging or moving small portable storage tanks.
        9. During davit testing around fueling areas.
        10. During repairs or testing hoisting jibs.

B. Health Hazard Data

1. Ways in which benzene affects your health. Benzene can affect your heath if you inhale it, or if it comes in contact with your skin or eyes. Benzene is also harmful if you happen to swallow it.

2. Effects of Overexposure.

    a. Short-term (acute) Overexposure: If you are overexposed to high concentrations of benzene, well above the levels where its odor is first recognizable, you may feel breathless, irritable, euphoric, or giddy; you may experience irritation in your eyes, nose, and respiratory tract. You may develop a headache, feel dizzy, nauseated, or intoxicated. Severe exposures may lead to convulsions and loss of consciousness.

    b. Long-term (chronic) Exposure. Repeated or prolonged exposure to benzene, even at relatively low concentrations, may result in various blood disorders, ranging from anemia to leukemia, an irreversible, fatal disease.

Many blood disorders associated with benzene exposure may occur without symptoms.

C. Protective Clothing and Equipment.

1. Respirators. Respirators are required for those operations in which engineering controls or work practice controls are not feasible to reduce exposure to the permissible level. However, where employers can document that benzene is present in the workplace less than 30 days a year, respirators may be used in lieu of engineering controls. If respirators are worn, they must have joint Mine Safety and Health Administration and the National Institute for Occupational Safety and Health (NIOSH) seal of approval, and cartridges or canisters must be replaced before the end of their service life, or the end of the shift, whichever occurs first. If you experience difficulty breathing while wearing a respirator, you may request a positive pressure respirator from your employer. You must be thoroughly trained to use the assigned respirator, and the training will be provided by Advanced American Construction, Inc.

2. Protective Clothing. You must wear appropriate protective clothing (such as boots, gloves, sleeves, aprons, etc.) over any parts of your body that could be exposed to liquid benzene.

3. Eye and Face Protection. You must wear splash-proof safety goggles if it is possible that benzene may get into your eyes. In addition, you must wear a face shield if your face could be splashed with benzene liquid.

D. Emergency and First-Aid Procedures.

1. Eye and Face Exposure. If benzene is splashed in your eyes, wash it out immediately with large amounts of water. If irritation persists or vision appears to be affected see doctor as soon as possible.

2. Skin Exposure. If benzene is spilled on your clothing or skin, remove the contaminated clothing and wash the exposed skin with large amounts of water and soap immediately. Wash contaminated clothing before you wear it again.

3. Breathing. If you or any other person breathes in large amounts of benzene, get the exposed person to fresh air at once. Apply artificial respiration if breathing has stopped. Call for medical assistance or a doctor as soon as possible. Never enter any vessel or confined space where the benzene concentration might be high without proper safety equipment and at least one other person present who will stay outside. A life line should be used.

4. Swallowing. If benzene has been swallowed and the patient is conscious, do not induce vomiting. Call for medical assistance or a doctor immediately.

E. Medical Requirements

1. If you are exposed to benzene at a concentration at or above 0.5 ppm as an 8-hour time weighted average, or have been exposed above 10 ppm in the past while employed by your current employer, your employer is required to provide an initial medical examination and history and laboratory tests and annually thereafter. These tests shall be provided without cost to the employee. In addition, if you are accidentally exposed to benzene (either by ingestion, inhalation, or skin/eye contact) under emergency conditions known or suspected to constitute toxic exposure to benzene, your employer is required to make special laboratory tests available to you.

F. Observation of Monitoring

1. Advanced American Construction, Inc. will perform measurements that are representative of your exposure to benzene and you or your designated representative are entitled to observe the monitoring procedure. You are entitled to observe the steps taken in the measurement procedure and to record the results obtained. When the monitoring procedure is taking place in an area where respirators or personal protective clothing and equipment are required to be worn, you or your representative must also be provided with, and must wear the protective clothing and equipment.

G. Access to Records

1. You or your representative are entitled to see the records of measurements of your exposure to benzene upon written request to Advanced American Construction, Inc. Your medical examination records can be furnished to yourself, your physician or designated representative upon request by you to Advanced American Construction, Inc.

H. Precautions for Safe Use, Handling and Storage

1. Benzene liquid is highly flammable. It should be stored in tightly closed containers in a cool, well ventilated area. Benzene vapor may form explosive mixtures in air. All sources of ignition must be controlled. Use nonsparking tools when opening or closing benzene containers. Fire extinguishers, where provided, must be readily available. Know where they are located and how to operate them. Smoking is prohibited in areas where benzene is used or stored. Ask you supervisor where benzene is used in your area and for additional plant safety rules.

2. Advanced American Construction, Inc. will develop site specific contingency/emergency plans through our JSA software program. Our employees will be aware of provisions of site specific contingency/emergency

plans as well as the plan being displayed in our job site office trailer, and readily available and accessible to all.

3. In addition to item 2 above, Advanced American Construction, Inc. will make ourselves aware of the owners contingency plan provisions. Advanced American Construction, Inc. will inform our employees to where benzene is used in the host facility and make aware of additional plant safety rules.

5.0 Documentation Summary

A. File these records in the Safety Filing System:

1. Location of the MSDS inventory.

2. Completed Flammable and Combustibles Inspection Checklist.

6.0 Resources

A. U.S OSHA Standard – Substance safety data sheet, Benzene – 1910.1028 App A
B. U.S. OSHA Standard – Substance technical guidelines, Benzene – 1910.1028 App B
C. California Code of Regulation, Title 8, Section 5218. Benzene, Appendix A

ADVANCED AMERICAN CONSTRUCTION, INC. SAFETY MANAGEMENT STANDARD

BLOODBORNE PATHOGENS CONTROL PROGRAM

1.0 Applicability

This procedure applies to Advanced American Construction, Inc. operations where personnel perform tasks where exposure to bloodborne pathogens may exist.

2.0 Purpose and Scope

Control exposures to bloodborne pathogens through proper work practices, employee training and engineering controls.

3.0 Implementation

Office Locations - Implementation of this procedure is the responsibility of the Office Manager.

Shop Locations- Implementation of this procedure is the responsibility of the Shop Manager Foreman.

Field Activities - Implementation of this procedure is the responsibility of the Project Manager.

4.0 Requirements

A. Policy Statement

Bloodborne diseases can be transferred from source to source. The risk of transmittal can be reduced by following the guidelines provided in the Bloodborne Pathogens Control Program. It is crucial to control exposures to bloodborne pathogens through proper work practices, employee training and engineering controls.

It is the policy of our organization that you can work with minimal risk of contracting any bloodborne diseases by following the correct work practices.

It is the purpose of this Bloodborne Pathogens Exposure Control Program to minimize exposure to bloodborne diseases from body fluids encountered during the workday.

B. Definitions

1. Blood - means human blood, human blood components and products made from human blood.

2. Bloodborne Pathogens - mean pathogenic microorganism that are present in human blood and that can cause disease in humans. These pathogens include, but are not limited to, Hepatitis B Virus (HBV) and the human immunodeficiency virus (HIV).

3. Contaminated -- means the presence or reasonably anticipated presence of blood or other potentially infectious materials on an item or surface.

4. Contaminated Laundry -- means laundry that has been soiled with blood or other potentially infectious materials or may contain sharps.

5. Contaminated Sharps -- means any contaminated object that can penetrate the skin including, but not limited to needles, scalpels, broken glass, broken capillary tubes, and exposed ends of dental wires.

6. Decontaminated -- means the use of physical or chemical means to remove, inactivate, or destroy the bloodborne pathogens on the surface or item to the point where they are no longer capable of transmitting infectious particles and the surface or item is rendered safe for handling, use or disposal.

7. Engineering Controls -- mean controls that isolate or remove the bloodborne pathogen hazards from the workplace.

8. Disposable -- means any item indicated as single use only.

9. Exposure -- Any non Exposure Incident contact with blood or potentially infectious materials. Direct skin contact with intact skin.

10. Exposure Incident -- means a specific mouth, eye, other mucous membrane, non intact or parenteral contact with blood or other potentially infectious materials that result from the performance of an employees duties.

11. Handwashing Facilities -- means a facility providing an adequate supply of running potable water, soap and single use towels or air drying machine.

12. Hazard -- means an actual or potential exposure to risk.

13. HBV -- means Hepatitis B Virus

14. HIV -- means Human Immunodeficiency Virus

15. Occupational Exposure -- means reasonably anticipated skin, eye, mucous membrane or other parenteral contact with blood or other potentially infectious materials that may result from the performance or an employees duties.

16. Other Potentially Infectious Materials -- mean semen vaginal fluids, cerebrospinal fluid, synovial fluid, pleural fluid, pericardial fluid, peritoneal fluid, amniotic fluid, saliva in dental procedures, and any fluid contaminated with blood, and all body fluids when it is difficult to distinguish.

17. Parenteral -- means piercing mucous membranes or the skin barrier through such events as needle sticks, human bites, cuts and abrasions.

18. Personal Protective Equipment -- is specialized clothing or equipment worn by an employee for protection against a hazard. General work clothes not intended to function as protection against a hazard are not considered PPE.

19. Regulated Waste -- means liquid or semi liquid blood or potentially infectious materials, contaminated items, that would release blood or potentially infectious materials in a liquid or semi liquid state if compressed, items that are caked with dried blood or OPIM and are capable of releasing these materials during handling, contaminated sharps, and pathological and microbiological wastes containing blood or OPIM.

20. Sterilize -- means the use of physical and or chemical procedures to destroy all microbial life including highly resistant bacterial endospores.

21. Universal Precautions -- is an approach to infection control where all human blood and body fluids are treated as if known to be infectious for HIV, HBV and or other bloodborne pathogens.

22. Workpractice Control -- Means controls that reduce the likelihood of exposure by altering the manner in which a task is performed.

C. Methods of Compliance

The following sections are intended to give guidelines for working with exposures to potentially infectious materials.

1. Universal Precautions

   Our policy is to treat all first aid patients and body fluids equally by following the standards for Universal Precautions outlined in the Infection Control Protocols.

The term "Universal Precautions" refers to a system of infectious disease control which assumes that every direct contact with body fluids is infectious and requires every employee exposed to direct contact to bodily fluids to be protected as though such fluids were HBV or HIV infected. Therefore, universal precautions are intended to reduce risk to employees from parenteral, mucous membrane and non-intact skin exposures to bloodborne pathogens.

In addition to the body fluids falling under the Universal Precautions, all sharps, and any other items potentially contaminated will be treated using Universal Precautions. For more information refer to the Appendix A.

2. Engineering and Work Practice Controls. Engineering and work practice controls shall be used to eliminate or minimize employee exposure. Prevention of exposure to Blood Borne pathogens engineering controls include, proper storage facilities and container, syringes designed to prevent accidental needle sticks, autoclaves and disinfectant equipment, without regard of personal protective equipment.

Several engineering and workpractice controls have been implemented to help reduce exposure to potential bloodborne pathogens.

a. Workpractice Control -- Means controls that reduce the likelihood of exposure by altering the manner in which a task is performed. Some workpractice controls that are used include:

Potential Exposure	Work Practice Control
Contact with Fluids	Gloves, Glasses and CPR Masks during first aid treatment
Contact with sharps on Equpment	Sharps disposed of after incident by user.
Contact with tooling or knife blade	Knife blades will be disposed of by the user in the event of an incident. Tooling will be immediately washed with an EPA Approved disinfectant by user.
CPR and Stomach Contents	CPR Masks
Box Straps	Straps which cause hand cuts to employees and will be immediately removed from the box & disposed of by the cut employee.

Body Fluid Spills	Designated/trained employees will wear gloves and use an EPA approved disinfectant to clean the area.

Operations will be reviewed on a periodic basis to determine if additional exposures need to be addressed.

b. Engineering Controls -- mean controls that isolate or remove the bloodborne pathogen hazards from the workplace. There are several engineering controls utilized including:

Potential Exposure	Engineering Control
Contaminated Sharps	All sharps will be placed in designated and labeled sharps containers impervious to stick through from sharps.

3. Hand Washing Facilities

Hand washing is one of the most important procedures for preventing infection. Hands must **always** be washed after first aid treatment contacts (following removal of gloves), after touching inanimate objects likely to be contaminated by blood and any time there is a potential of contamination. The rationale for hand washing after the removal of gloves is that gloves become perforated, knowingly or unknowingly, during use and allow bacteria to enter and beneath the glove materials, multiply rapidly. For more information refer to Appendix B.

a. Advanced American Construction, Inc. will provide hand washing facilities at all work locations. When hand washing facilities are not feasible, Advanced American Construction, Inc. will provide either an appropriate antiseptic hand cleanser in conjunction with cloth/paper towels or antiseptic.

4. Handling of Contaminated Needles and Sharps

There are limited types of sharps which employees may encounter. These include, but are not limited to Tooling, Knife Blades, and other objects that may become contaminated with blood or Other Potentially Infectious Material (OPIM) and have the potential of puncturing skin.

In order to prevent accidental parenteral contact with sharps the following procedures and guidelines have been developed.

a. Disposable Sharps -- Disposable sharps such as box knife blades shall be removed from the equipment by the user after any incident. Sharps will

be placed into designated, labeled and puncture resistant Sharps containers by the original user.

Box Knife Blades that cannot be removed will be disinfected by the original user. An EPA approved disinfectant shall be used.

b. Personal Protective Equipment -- PPE will be required to be worn when working with any potentially contaminated sharps. Impervious gloves are available at the first aid stations.

Advanced American Construction, Inc. will provide at no cost to the employee appropriate PPE such as gloves, face masks, etc. PPE shall be used unless Advanced American Construction, Inc. shows that employees temporarily declined to use PPE under rare circumstances. Advanced American Construction, Inc. will ensure that appropriate PPE in the appropriate sizes is readily accessible. PPE will be cleaned, laundered & properly disposed. Advanced American Construction, Inc. will repair & replace PPE as needed to maintain its effectiveness.

c. Specimens of blood or other potentially infectious materials shall be placed in a container which prevents leakage during collection, handling, processing, storage, transport, or shipping.

d. The container for storage, transport, or shipping shall be labeled or color-coded according to paragraph (g)(1)(i) and closed prior to being stored, transported, or shipped. When a facility utilizes Universal Precautions in the handling of all specimens, the labeling/color-coding of specimens is not necessary provided containers are recognizable as containing specimens. This exemption only applies while such specimens/containers remain within the facility. Labeling or color-coding in accordance with paragraph (g)(1)(i) is required when such specimens/containers leave the facility.

5. Personal Hygiene

   NO EATING, DRINKING OR SMOKING IN ANY OF THE FIRST AID TREATMENT AREAS. In addition, never eat, drink or smoke in any area where there are contaminated items or risk of exposure to potential bloodborne pathogens.

   Always wash you hands, using the procedures identified in this program, before and after work, as well as before and after meals, even if no identifiable contact took place.

6. Personal Protective Equipment
   Personal Protective Equipment (PPE) is a crucial part of our prevention program. The following protection is required.

   a. Patient Contact (First Aid) -- Personnel must be equipped with Impervious Gloves, Glasses (equipped with non-perforated side shields if there is a risk of splashing) or goggles, and masks at a minimum. Personnel falling into this category include First Aid Providers.

7. Housekeeping

   Cleanliness is one of the most important aspects to this program and the prevention of contraction of Bloodborne Pathogens from occupational exposures. The following is a synopsis of the procedures for cleaning and housekeeping.

   a. After each First Aid case

      - Sharps shall be placed in the designated and labeled, puncture resistant container.
      - Non-sharp, disposable items shall be placed in the designated biohazard waste container. Disposable items include gauze, towels, cotton products, gloves, masks and all barriers.
      - The spray, wipe, and spray technique shall be used on all touch and splash surfaces. An EPA registered surface disinfectant shall be applied to the surfaces to be cleaned, wiped off, and then a second coat shall be applied to these same surfaces and allowed to remain in a moist state for the recommended time per manufacturer. Although the areas should remain moist, they should not be dripping wet.

8. Exposure Determination

   a. The following Advanced American Construction, Inc. employees are all at risk of exposure, (Owners, Project Managers, Supervisors,

Machinists, Mechanics, Warehouse workers, Welders, Divers, Tenders, Pile Bucks). The firm is a prime marine construction company and encounters a wide range of exposure opportunity.

b. Some employees have a potential of occupational exposure (Office Personnel).

c. The most likely tasks in which occupational exposure could occur is as follows:

1. Those employees trained in First Aid / CPR. A high percentage of our employees are certified in First Aid / CPR and are expected to provide short term emergency care until professional medical assistance is available.

d. The exposure determination is made without regard to the use of personal protective equipment.

D. Hepatitis B Virus Vaccinations

1. All employees who have had a potential exposure to bloodborne pathogens will be offered a HBV vaccine within 24 hours of notice of exposure at no cost. This will be communicated to employees during orientation. Although it is not a condition of employment, our organization strongly encourages you to protect yourself from Hepatitis B by having and keeping your immunization current if there is an exposure. A simple blood screening test is available to determine if you require the vaccine.

2. Prior to receiving the vaccine, all employees will be provided with a copy of the Bloodborne Pathogens Standard and **the** Bloodborne Pathogens Program.

3. If an employee refuses the vaccine, documentation must be completed. See below for a sample refusal form:

Advanced American Construction, Inc. has made available to me the screening and or vaccination for HBV without cost to me.

Although I realize I am working in a position with potential risk of exposure to HBV, I do not wish to have the blood screening or vaccination at this time.

_____ _____

Signature **Date**

Return to Health and Safety Coordinator

E. Communication of Hazards

1. Labels

   Universal markings (red containers) or BIOHAZARD Labels will be affixed to all containers with potentially infectious materials contained within them. Some of the containers include:

a. Sharps Container	RED CONTAINERS
b. Waste Containers Designated for Biohazard Wastes	Red Plastid Waste Bags

2. Signs

   All first aid stations will be posted indicating potential exposure areas.

3. Employee Training

   All first aid designee employees will receive initial and annual Bloodborne Pathogens training. Training will also be given in the event of change of assignment or process changes. This training will be completed annually.

   Training topics will include:

   a. Copy of standard and explanation of contents

   b. General explanation of epidemiology, symptoms and modes of transmission of bloodborne diseases.

   c. Explanation of Exposure Control Plan with copies or where to get copies

   d. PPE Information on use, storage and maintenance, disposal and decontamination.

   e. How to recognize tasks that may involve exposure

   f. HBV Vaccination information

   g. How to handle emergencies involving occupation exposure.

   h. Exposure incident management

   i. Labeling requirements

   j. QUESTIONS AND ANSWERS

F. Post Exposure Evaluation and Follow-Up

1. Exposure Incident -- means a specific mouth, eye, other mucous membrane, non intact or parenteral contact with blood or other potentially infectious materials that result from the performance of an employees duties.

   a. Medical Evaluation and Follow-Up Procedures Immediately after an exposure incident, the employee is required to report the exposure to their supervisor or Health and Safety Coordinator.

      The Health and Safety Coordinator will document the exposure using the Accident Investigation Form and the Exposure Incident Report. The Exposure Incident Report will at the minimum identify:

      - Route of Exposure
      - Circumstances of Exposure
      - Identification of Source Individual

   b. After the exposure incident has been filed, the Health and Safety Coordinator will contact the source patient to obtain consent for blood testing. The Health and Safety Coordinator will explain the purpose of the test (to protect employee) and that testing will be performed cost free. A follow up letter shall also be sent with the same information. The source patient will sign a written consent form for testing or a written denial of testing form.

   c. Exposed Worker

      If source individual consents to testing the exposed worker shall be offered information about HIV and HBV infection, methods of preventing infection and the HIV/HBV tests.

      If source individual denies testing, the employee will be notified by the Health and Safety Coordinator and advised to obtain a blood test. All costs associated with the blood tests will be at the expense of our organization. The appropriate forms will be provided to the employee regarding these tests.

      Employees will also have Evaluation of Reported Illnesses, Counseling and other medical assistance upon need or request.

   d. Health Care Provider

      - All health care professionals will be provided with a copy of this regulation and the exposure control plan. Additional information will be provided to the health care professional including:

1) Description of exposed employees duties
2) Documentation of route of exposure
3) Results of source individual testing
4) All relevant medical records.

- The health care professional will provide our organization with a copy of their written opinion which will be supplied to the employee.

5.0 Documentation Summary

File the following documents in the Office/Shop/Project Health and Safety File

A. Medical Records

1. An accurate record will be kept for each employee with occupational exposure including:

   - Name and Social Security Number
   - Copy of HBV Vaccination Status and medical records relative to the employee's ability to receive vaccination.
   - A copy of all results of examinations, medical testing and follow up procedures for any exposure incidents.
   - Employer's copy of Written Opinion
   - A copy of the information provided to health care professionals for exposure incident evaluation.

2. All employee medical records shall be kept confidential and will not be discussed, disclosed or reported without the employee's express written consent to any person.

3. All medical records will be maintained for a minimum of the duration of employment plus 30 years.

B. Training Records

1. Training records will include the date of training session, summary of the contents of the training session and the names and qualifications of the persons presenting the training.
2. All attendees to training will sign a log with name and job title.
3. Training records will be maintained for three years from the date on which the training occurred.

C. Availability

1. All records will be available to the Oregon Occupational Safety and Health Division for examination and copying.
2. Training records will be available upon request for examination and copying to employees, their representatives, the Oregon Occupational Safety and Health Division.
3. Medical records will be provided upon request to subject employees and to anyone having the written consent of the subject employee.
4. Advanced American Construction, Inc. will ensure that all records required by this section shall be made available upon request of employees, Assistant Secretary & the Director for examination & copying. Medical records must have written consent of employee before released. The employer shall comply with the requirements involving transfer of records set forth in 29 CFR 1910.1020 (h).

6.0 Resources

Bloodborne Pathogens (29 CFR 1910.1030) - IX. Summary and Explanation of the Standard- http://www.osha-slc.gov/Preamble/Blood_data/BLOOD9.html

APPENDIX A

UNIVERSAL PRECAUTIONS

Blood and other body fluids shall be considered potentially infectious materials. These precautions are intended to prevent contact exposure to bloodborne pathogens by an employee via parenteral, mucous membrane and/or non-intact skin. All people (employees, visitors, first aid patients, etc.) will be assumed to be infections.

It is the organization's policy to treat all first aid patients equally by following the standards for Universal Precautions outlined in the Infection Control Protocols.

The term "universal precautions" refers to a system of infectious disease control which assumes that every direct contact with body fluids is infectious and requires every employee exposed to direct contact with body fluids to be protected as though such body fluids were HBV or HIV infected. Therefore, universal precautions are intended to prevent health care workers from parenteral, mucous membrane and non-intact skin exposures to blood-borne pathogens.

Universal Precautions apply to:

- Human blood
- Human blood products
- Human blood components
- Human unfixed tissue and organs (living or dead) other than intact skin
- All body fluid visibly contaminated with blood
- All body fluids if differentiation is difficult/impossible
- Other body fluids including, cerebrospinal fluid (CSF), synovial fluid, pleural fluid, peritoneal fluid, pericardial fluid, and amniotic fluid

APPENDIX B

HAND WASHING

Hand washing is the single most effective barrier to microbial transfer.

Components of hand washing:

- Water
- Agent
- Friction
- Time

Hand Washing Technique:

- Begin water flow
- Remove jewelry
- Moisten hands, other skin surfaces
- Apply cleansing agent
- Apply friction (rub)
    - Finger planes
    - Web Spaces
    - Fingernails
    - Time: Dependent upon exposure
    - Rinse thoroughly under running water
    - Dry thoroughly with disposable towels
    - Utilize drying towel to turn faucet to OFF position
    - Discard drying towel in designated container

ADVANCED AMERICAN CONSTRUCTION, INC. SAFETY MANAGEMENT STANDARD

CADMIUM IN CONSTRUCTION

1.0 Applicability

This procedure applies to Advanced American Construction, Inc. projects where cadmium-containing materials are disturbed and occupational exposures may occur.

2.0 Purpose and Scope

The purpose of this program is to protect personnel from occupational exposures to cadmium.

3.0 Implementation

Field Activities - Implementation of this procedure is the responsibility of the Project Manager/Superintendent.

4.0 Requirements

A. Determine whether any surface to be disturbed or altered contains cadmium or has a surface coating that contains cadmium.

B. Establish where necessary, regulated areas and assure that access to and from those areas is limited to authorized employees.

C. Assure the adequacy of any employee exposure monitoring required equipment.

D. Assure that all employees exposed to air cadmium levels above the PEL wear appropriate personal protective equipment (PPE) and are trained in the use of appropriate methods of exposure control.

E. Assure that proper hygiene facilities are provided and that workers are trained to use those facilities.

F. Assure that the engineering controls required by 29 CFR 1926.1127 is implemented, maintained in proper operating condition, and functioning properly.

G. All employees who are or may be exposed to cadmium at or above the action level must:

1. Be in the Medical Surveillance Program for cadmium.

2. Have received training as outlined in Attachment 1.

H. Interim Protection Measures

Until the initial exposure assessment can be conducted the following protective measures must be implemented:

1. Provide respiratory protection as outlined in Attachment 2.

2. Provide coveralls or other similar full body covering.

3. Provide gloves, hats, shoes or disposable shoe coverings.

4. Provide faceshields, goggles or other appropriate protective equipment.

5. Provide change areas and handwashing facilities.

I. Initial Exposure Assessment

1. Contact the Advanced American Construction, Inc. Safety Manager to determine whether historical air monitoring data is available that accurately represents exposure conditions for the Initial Determination for the project.

2. In the absence of representative historical data conduct air monitoring to assess personnel exposure to cadmium.

J. Negative Initial Determination

1. Exposures to cadmium below an 8-hour time-weighted average of 2.5 ug/m^3 requires a written record which includes:

a) Date of determination.
b) Location within the worksite.
c) Name of each employee monitored.
d) Monitoring results.
e) Type of activity conducting during monitoring.

2. No further action regarding cadmium required.

K. Exposures to cadmium above an 8-hour time-weighted average of 2.5 ug/m^3 and below 50 ug/m^3

All employees potentially exposed to cadmium must:

1. Be in the Medical Surveillance Program for cadmium.

2. Have received training as outlined in Attachment 1.

3. Utilize appropriate PPE and personal hygiene procedures as outlined in the project-specific safety plan.

5.0 Exposures above the 8-hour time-weighted average Permissible Exposure Limit of 50 ug/m^3

1. Develop a cadmium Compliance Plan

a) The compliance plan must include the following topics:

(1) Description of work activities that expose personnel to cadmium.
(2) Equipment to be used and procedures to be followed during cadmium exposure activities.
(3) Employee job responsibility and crew size during cadmium exposure activities.
(4) Maintenance practices to be followed for servicing and cleaning equipment and disposing of waste.
(5) Specific instructions on how to set up engineering controls (ventilation; containment; etc.).
(6) Air monitoring data from initial assessment.
(7) A detailed work schedule for implementation.
(8) A description of arrangements made among contractors on multi-contractor sites with respect to informing affected employees of potential exposure to cadmium.
(9) The name of the competent person for the site.

b) Appoint a Competent Person who will be responsible for performing regular inspections of the job site, materials, and equipment during the job.

2. Order the PPE specified in the cadmium Compliance Plan.

3. Provide for the cleaning, laundering, and disposal of protective clothing and equipment.

6.0 Require that Engineering Controls are on site and installed correctly before work begins. Implement the engineering controls specified in the Cadmium Compliance Plan for the site.

7.0 Provide hygiene facilities which include:

1. A clean change room equipped with separate lockers for the storage of street clothes and work clothes.

2. A shower and handwashing facilities.

3. A lunch area free from cadmium contamination.

8.0 Establish rules that will maintain proper housekeeping in the cadmium abatement area, specifically:

1. Prohibit contaminated clothing and equipment outside of cadmium work area.

2. Require cadmium workers to shower at the end of the shift and wash up before eating and drinking outside the cadmium area.

3. Segregate dirty or contaminated equipment from clean work areas.

4. HEPA vacuum all cadmium-contaminated surfaces.

9.0 Label cadmium hazardous areas and equipment.

1. Mark cadmium hazardous areas with boundary tape and signs stating:

WARNING
CADMIUM WORK AREA
POISON
NO SMOKING OR EATING

2. Mark cadmium contaminated equipment and debris with labels warning of the cadmium hazard.

10.0 Notify contractors and subcontractors before work begins.

Require contractors to know the location of cadmium in the job site. Even if contract workers are not directly exposed they may need to still perform training required under the hazard communication standard.

11.0 Maintain requirements of the Cadmium Compliance Plan throughout the job.

Direct the appointed "competent person" to inspect the job site at least daily for those days when lead operations are performed.

5.0 Documentation Summary

File these records in the Project Safety File:

1. Physician's medical clearance for cadmium workers.
2. Proof of blood cadmium testing for personnel.
3. Pre-Job Cadmium Hazard Initial Assessment.
4. Air monitoring results.
5. Completed Cadmium Job Inspection forms.
6. Cadmium Compliance Plan for the job (as necessary).

6.0 Resources

A. U.S. OSHA Standard - Cadmium – 29 CFR 1910.1027
(http://www.u.s.osha standard – cadmium 1910.1027.com/

Advanced American Construction, Inc. Health & Safety Program
TRAINING REQUIREMENTS FOR CADMIUM WORKERS

Assure each employee is trained in the following:

a) The content of cadmium in construction standard, (29 CFR 1926.1127 (b) for U.S. operations).

b) The specific nature of the operations that could result in exposure to cadmium above the action level.

c) The purpose, proper selection, fitting, use, and limitations of respirators.

d) The purpose and description of the medical surveillance program and the medical removal protection program including information concerning the adverse health effects associated with excessive exposure to cadmium.

e) The engineering controls and work practices associated with the employee's job assignment including training of employees to follow relevant good work practices.

f) The content of any cadmium compliance plan and the location of regulated areas in effect.

g) Instructions to employees that chelating agents should not be routinely used.

h) The employee's right of access to records.

Advanced American Construction, Inc. Health & Safety Program
INTERIM RESPIRATORY PROTECTION MEASURES

During the interim work period while air monitoring is being performed and exposure levels are being determined, the following guidance must be followed regarding respiratory protection for employees:

1. Provide half face respirators with HEPA cartridges where cadmium coatings or paint is present and any of the following activities will occur:

    a) Manual demolition of structures.
    b) Manual scraping.
    c) Manual sanding.
    d) Heat gun applications.
    e) Power tool cleaning with dust collection applications.
    f) Spray painting with cadmium paint.

2. Provide Loose fitting hood or helmet powered air purifying respirator with high efficiency filters, or hood or helmet supplied air respirator operated in a continuous-flow mode when performing tasks involving:

    a) Cadmium containing mortar.
    b) Cadmium burning.
    c) Rivet busting.
    d) Power tool cleaning without dust collection systems.
    e) Cleanup activities where dry expendable abrasives are used.
    f) Abrasive blasting enclosure movement and removal.

3. Provide full facepiece supplied air respirator operated in pressure demand or other positive-pressure when performing tasks involving:

    a) Abrasive blasting.
    b) Welding.
    c) Cutting.
    d) Torch burning.

Respirator selection.

1910.1027(g)(3)

Advanced American Construction, Inc. will select , and provide to employees, the appropriate respirators specified in paragraph (d)(3)(i)(A) of 29 CFR 1910.134 and/or 1926.1127(g)(3)

1910.1027(g)(3)(i)

The employer must select the appropriate respirator from Table 2 of this section.

TABLE 2.—RESPIRATORY PROTECTION FOR CADMIUM

Airborne concentration or condition of use[a]	Required respirator type[b]
10 X or less	A half mask, air-purifying equipped with a HEPA[c] filter.[d]
25 X or less	A powered air-purifying respirator ("PAPR") with a loose-fitting hood or helmet equipped with a HEPA filter, or a supplied-air respirator with a loose-fitting hood or helmet facepiece operated in the continuous flow mode.
50 X or less	A full facepiece air-purifying respirator equipped with a HEPA filter, or a powered air-purifying respirator with a tight-fitting half mask equipped with a HEPA filter, or a supplied-air respirator with a tight-fitting half mask operated in the continuous flow mode.
250 X or less	A powered air-purifying respirator with a tight fitting full facepiece equipped with a HEPA filter, or a supplied-air respirator with a tight-fitting full facepiece operated in the continuous flow mode.
1000 X or less	A supplied air respirator with half mask or full facepiece operated in the pressure demand or other positive pressure mode.
>1000 X or unknown concentrations	A self-contained breathing apparatus with a full facepiece operated in the pressure demand or other positive pressure mode, or a supplied-air respirator with a full facepiece operated in the pressure demand or other positive pressure mode and equipped with an auxiliary escape type self-contained breathing apparatus operated in the pressure demand mode.
Fire fighting	A self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode.

[a] Concentrations expressed as multiple of the PEL.
[b] Respirators assigned for higher environmental concentrations may be used at lower exposure levels. Quantitative fit testing is required for all tight-fitting air purifying respirators where airborne concentration of cadmium exceeds 10 times the TWA PEL (10 X 5 ug/m(3) = 50 ug/m(3)). A full facepiece respirator is required when eye irritation is experienced.
[c] HEPA means High-efficiency Particulate Air.
[d] Fit testing, qualitative or quantitative, is required.
SOURCE: Respiratory Decision Logic, NIOSH, 1987.

1910.1027(m)(4)

"Employee information and training."

1910.1027(m)(4)(i)

The employer shall institute a training program for all employees who are potentially exposed to cadmium, assure employee participation in the program, and maintain a record of the contents of such program. Training must be provided prior to initial assignment and at least annually.

1910.1027(n)(4)

"Training." The employer shall certify that employees have been trained by preparing a certification record which includes the identity of the person trained, the signature of the employer or the person who conducted the training, and the date the training was completed. The certification records shall be prepared at the completion of training and shall be maintained on file for one (1) year beyond the date of training of that employee.

1910.1027(f)(2)
"Compliance Program."

1910.1027(f)(2)(i)

Where the PEL is exceeded, the employer shall establish and implement a written compliance program to reduce employee exposure to or below the PEL by means of engineering and work practice controls, as required by paragraph (f)(1) of this section. To the extent that engineering and work practice controls cannot reduce exposures to or below the PEL, the employer shall include in the written compliance program the use of appropriate respiratory protection to achieve compliance with the PEL.

1910.1027(f)(2)(ii)

Written compliance programs shall include at least the following:

1910.1027(f)(2)(ii)(A)

A description of each operation in which cadmium is emitted; e.g., machinery used, material processed, controls in place, crew size, employee job responsibilities, operating procedures, and maintenance practices;

..1910.1027(f)(2)(ii)(B)

1910.1027(f)(2)(ii)(B)

A description of the specific means that will be employed to achieve compliance, including engineering plans and studies used to determine methods selected for controlling exposure to cadmium, as well as, where necessary, the use of appropriate respiratory protection to achieve the PEL;

1910.1027(f)(2)(ii)(C)

A report of the technology considered in meeting the PEL;

1910.1027(f)(2)(ii)(D)

Air monitoring data that document the sources of cadmium emissions;

1910.1027(f)(2)(ii)(E)

A detailed schedule for implementation of the program, including documentation such as copies of purchase orders for equipment, construction contracts, etc.

1910.1027(f)(2)(ii)(F)

A work practice program that includes items required under paragraphs (h), (i), and (j) of this section;

1910.1027(f)(2)(ii)(G)

A written plan for emergency situations, as specified in paragraph (h) of this section; and

1910.1027(f)(2)(ii)(H)

Other relevant information.

1910.1027(f)(2)(iii)

The written compliance programs shall be reviewed and updated at least annually, or more often if necessary, to reflect significant changes in the employer's compliance status.

..1910.1027(f)(2)(iv)

1910.1027(f)(2)(iv)

Written compliance programs shall be provided upon request for examination and copying to affected employees, designated employee representatives as well as to the Assistant Secretary, and the Director.

1910.1027(f)(3)(iv)

Procedures shall be developed and implemented to minimize employee exposure to cadmium when maintenance of ventilation systems and changing of filters is being conducted.

1910.1027(g)(3)(ii)

The employer must provide an employee with a powered air-purifying respirator instead of a negative-pressure respirator when an employee who is entitled to a respirator chooses to use this type of respirator and such a respirator provides adequate protection to the employee.

1910.1027(h)

"Emergency Situations." The employer shall develop and implement a written plan for dealing with emergency situations involving substantial releases of airborne cadmium. The plan shall include provisions for the use of appropriate respirators and personal protective equipment. In addition, employees not essential to correcting the emergency situation shall be restricted from the area and normal operations halted in that area until the emergency is abated.

1910.1027(i)

"Protective work clothing and equipment."

1910.1027(i)(1)

"Provision and Use." If an employee is exposed to airborne cadmium above the PEL or where skin or eye irritation is associated with cadmium exposure at any level, the employer shall provide at no cost to the employee, and assure that the employee uses, appropriate protective work clothing and equipment that prevents contamination of the employee and the employee's garments. Protective work clothing and equipment includes, but is not limited to:

1910.1027(i)(1)(i)

Coveralls or similar full-body work clothing;

1910.1027(i)(1)(ii)

Gloves, head coverings, and boots or foot coverings; and,

..1910.1027(i)(1)(iii)

1910.1027(i)(1)(iii)

Face shields, vented goggles, or other appropriate protective equipment that complies with 29 CFR 1910.133.

1910.1027(i)(2)

"Removal and Storage."

1910.1027(i)(2)(i)

The employer shall assure that employees remove all protective clothing and equipment contaminated with cadmium at the completion of the work shift and do so only in change rooms provided in accordance with paragraph (j)(1) of this section.

1910.1027(i)(2)(ii)

The employer shall assure that no employee takes cadmium-contaminated protective clothing or equipment from the workplace, except for employees authorized to do so for purposes of laundering, cleaning, maintaining, or disposing of cadmium contaminated protective clothing and equipment at an appropriate location or facility away from the workplace.

1910.1027(i)(2)(iii)

The employer shall assure that contaminated protective clothing and equipment, when removed for laundering, cleaning, maintenance, or disposal, is placed and stored in sealed, impermeable bags or other closed, impermeable containers that are designed to prevent dispersion of cadmium dust.

1910.1027(i)(2)(iv)

The employer shall assure that bags or containers of contaminated protective clothing and equipment that are to be taken out of the change rooms or the workplace for laundering, cleaning, maintenance or disposal shall bear labels in accordance with paragraph (m)(3) of this section.

..1910.1027(i)(3)

1910.1027(i)(3)

"Cleaning, replacement, and disposal."

1910.1027(i)(3)(i)

The employer shall provide the protective clothing and equipment required by paragraph (i)(1) of this section in a clean and dry condition as often as necessary to maintain its effectiveness, but in any event at least weekly. The employer is responsible for cleaning and laundering the protective clothing and equipment required by this paragraph to maintain its effectiveness and is also responsible for disposing of such clothing and equipment.

1910.1027(i)(3)(ii)

The employer also is responsible for repairing or replacing required protective clothing and equipment as needed to maintain its effectiveness. When rips or tears are detected while an employee is working they shall be immediately mended, or the work suit shall be immediately replaced.

1910.1027(i)(3)(iii)

The employer shall prohibit the removal of cadmium from protective clothing and equipment by blowing, shaking, or any other means that disperses cadmium into the air.

1910.1027(i)(3)(iv)

The employer shall assure that any laundering of contaminated clothing or cleaning of contaminated equipment in the workplace is done in a manner that prevents the release of airborne cadmium in excess of the permissible exposure limit prescribed in paragraph (c) of this section.

1910.1027(i)(3)(v)

The employer shall inform any person who launders or cleans protective clothing or equipment contaminated with cadmium of the potentially harmful effects of exposure to cadmium and that the clothing and equipment should be laundered or cleaned in a manner to effectively prevent the release of airborne cadmium in excess of the PEL.

Advanced American Construction, Inc.
Safety Management Standard

SMS 8 – Commercial Diving Safety

Record of Changes

Change Made	Description	Date
General	Revise SMS 4 with SMS 8 Revision 4	8/1/2008
1.0	Replace General Provisions SMS 4 with Current Version SMS 8	8/1/2008
Appendix C	Replace equipment procedures test sheets SMS 4 with current version SMS 8	8/1/2008
Appendix F	Replace Navy Dive Tables Rev.5 with Navy Dive Tables Rev.6	8/1/2008
Appendix F	Replace Navy Flow Charts Rev. 5 with Navy Flow Charts Rev.6	8/1/2008
Appendix F	Replace Navy Treatment Tables Rev.5 with Navy Treatment Tables Rev.6	8/1/2008
Appendix F	Remove ADC Guidelines for Treatment of Decompression Sickness	8/1/2008
Appendix G	Replace Diving Bends and Treatment Report (2006) with Current Diving Bends and Treatment Report (2008)	8/1/2008
Appendix I	Replace Coast Guard 46 CFR Ch.1 (1989 Edition) with Current Coast Guard 46 CFR Ch.1 (2007 Edition)	8/1/2008
Appendix I	Replace OSHA 29 CFR 1910.401 Subpart T with OSHA 29 CFR 1910 Sub Part T (2006)	8/1/2008
Appendix I	Replace Oregon OSHS Division 2 29CFR 1910 (2004) with Oregon OSHS Division 2 29CFR 1910 (2006)	8/1/2008

ADVANCED AMERICAN CONSTRUCTION, INC.
SAFETY MANAGEMENT STANDARD
SMS 8
COMMERCIAL DIVING SAFETY

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ADVANCED AMERICAN CONSTRUCTION SAFETY MANAGEMENT STANDARD

COMMERCIAL DIVING

1.1 General Provisions

A. Purpose

This manual is intended to provide details of the procedures and requirements necessary to safely and efficiently conduct commercial diving operations. These Advanced American Construction adopted standards are to aid in ensuring the safety and well being of the commercial diver.

These adopted standards apply to all types of work, whether inshore or offshore, involving diving operations.

Nothing contained in this manual shall be construed to take the place of any law, rule or regulation of any governmental agency.

B. Scope

The rules contained in this Division shall apply to those places of employment where work is conducted underwater or in any other liquid, and related support operations conducted in connection with all types of work and employments, including general industry, construction, ship repairing, ship building and ship breaking. However, this standard does not apply to any diving operation:

1. Performed solely for instruction, for recreational purposes, using open-circuit, compressed-air SCUBA and conducted within the no decompression limits:

2. Performed solely for search, rescue, or related public safety purposes by or under the control of a governmental agency; or

3. Governed by 45 CFR Part 46 (Protection of Human Subjects, U.S. Department of Health and Human Services) or equivalent rules or regulations established by another federal agency, which regulated research, development, or related purposes involving human subjects.

4. Defined as scientific diving and which is under the direction and control of a diving program containing at least the following element:

    a) Diving safety manual, which includes at a minimum: Procedures covering all diving operations specific to the program; procedures for emergency care, including recompression and evacuation; and criteria for diver training and certification.
    b) Diving control (safety) board, with the majority of its members being active divers, which shall at a minimum have the authority to: Approve and monitor diving projects; review and revise the diving safety manual; assure compliance with the manual; certify the depths to which a diver has been trained; take disciplinary action for unsafe practices; and, assure adherence to the buddy system (a diver is accompanied by and is in continuous contact with another diver in the water) for SCUBA diving.

C. **Application in Emergencies**

An employer may deviate from the requirements of this standard to the extent necessary to prevent or minimize a situation which is likely to cause death, serious physical harm, or major environmental damage, provided that the employer:

1. Notifies the Area Director, Occupational Safety and Health Administration within 48 hours of the onset of the emergency situation indicating the nature of the emergency and extent of the deviation from the prescribed regulations; and
2. Upon request from the Area Director, submits such information in writing.

D. **Employer Obligation**

The employer shall be responsible for compliance with:

1. All provisions of this standard of general applicability; and
2. All requirements pertaining to specific diving modes to the extent diving operations in such modes are conducted.

2.1 Definitions

A. Terms outlined in this division are defined in **Appendix A Glossary.**

3.1 Personal Qualifications and Requirements

A. **General**

1. Each dive team member shall have the experience or training necessary to perform assigned tasks in a safe and healthful manner.
2. Each dive team member shall have experience or training in the following:
   a) Technical Proficiency- The use of tools, equipment and systems relevant to assigned tasks;
   b) Diving Proficiency- Techniques of the assigned diving mode; and
   c) Field Experience- Diving Operations and emergency procedures.
3. All dive team members shall be trained in cardiopulmonary resuscitation and first aid (American Red Cross standard course or equivalent).
4. Dive team members who are exposed to or control the exposure of others to hyperbaric conditions shall be trained in diving-related physics and physiology.
5. For persons who operate decompression chambers, knowledge of chamber operations.

A person lacking the required experience and proficiency outlined above may be assigned limited tasks, under the direction of an experienced and qualified individual, in order to obtain the experience and level of proficiency required.

B. **Assignments (Appendix H Manning)**

1. Each dive team member shall be assigned tasks in accordance with the employee's experience or training, except that limited additional tasks may be assigned to an employee undergoing training provided that these tasks are performed under the direct supervision of an experienced dive team member.
   a) Knowledge and skills gained through training or experience in the following:
      (1) **Diving Procedures and Techniques**
      (2) **Emergency Procedures**
      (3) **Physiology as it relates to diving**
      (4) **Diving Equipment**
      (5) **First Aid and CPR**

3-B-Assignments cont.

2. The employer shall not require a dive team member to be exposed to hyperbaric conditions against the employee's will, except when necessary to complete decompression or treatment procedures.
3. The employer shall not permit a dive team member to dive or be otherwise exposed to hyperbaric conditions for the duration of any temporary physical impairment or condition which is known to the employer and is likely to affect adversely the safety or health of a dive team member.

C. **Designated person-in-charge**

1. The employer or an employee designated by the employer shall be at the dive location in charge of all aspects of the diving operation affecting the safety and health of dive team members.
2. The designated person-in-charge shall have experience and training in the conduct of the assigned diving operation.

4.1 Medical Requirements

A. **General**

1. The employer shall determine that dive team members who are, or are likely to be, exposed to hyperbaric conditions are medically fit to perform assigned tasks in a safe and healthful manner.
2. The employer shall provide a copy of the medical requirements of this standard; and a summary of the nature and extent of hyperbaric conditions to which the dive team member will be exposed, including diving modes and types of work to be assigned.
3. The employee that is likely to be exposed to hyperbaric conditions must provide to the employer an annual physical, that outlines the employee's medical condition, accompanied with a physician's opinion that the employee is medically fit to dive or to be otherwise exposed to hyperbaric conditions.

B. **Frequency of Medical examination**

1. Required prior to initial hyperbaric exposure with the employer, unless an equivalent medical examination has been given within the preceding 12 months and the employer has obtained the results of the examination, and an opinion from the examining physician; and
2. At one year intervals from the date of initial examination or last equivalent examination; and/or
3. After an injury or illness requiring hospitalization of more than 24 hours, or known decompression sickness audio-vestibular or central nervous system dysfunction.

C. **Medical Examination Content Requirements**

1. Medical examinations (**Appendix B Medical Form**) conducted initially and annually shall consist of the following:
   a) Medical history;
   b) Diving – related work history;
   c) Basic Physical examination;
   d) The tests required by Table 1; and
   e) Any additional tests the physician considers necessary.

4-C-Medical Requirements Cont.

2. Medical examinations conducted after an injury or illness requiring hospitalization of more than 24 hours shall be appropriate to the nature and extent of the injury or illness as determined by the examining physician.

TABLE 1
TESTS FOR DIVING MEDICAL EXAMINATION

TEST	INITIAL EXAM	ANNUAL EXAM
Chest X-Ray	X	
Visual Acuity	X	X
Color Blindness	X	
EKG: Standard 12 L		note a.
Hearing Test	X	X
Hematocrit or Hemoglobin	X	
Sickle Cell Index	X	
White Blood Count	X	X
Urinalysis	X	X

Note a. Test to be given to the employee once, at age 35 or over.

3. After any medical examination required by this division, the employer shall obtain a written report prepared by the examining physician containing:
   a) The results of the medical examination; and
   b) The examining physician's opinion of the employee's fitness to be exposed to hyperbaric conditions, including any recommended restrictions or limitations to such exposure (see **Appendix B Medical Form**).

D. **Determination of employee fitness for hyperbaric conditions**

1. The employer shall determine the extent and nature of the dive team member's fitness to engage in diving or be otherwise exposed to hyperbaric conditions consistent with recommendations in the examining physician's report.
2. If the examining physician has recommended a restriction or limitation on the dive team member's exposure to hyperbaric conditions, and the affected employee does not concur, a second physician selected by the employee shall render a medical opinion on the nature and extent of the restriction or limitation, if any.
3. If the recommendation of the second opinion differs from that of the examining (first) physician, and if the employer an employee are unable to agree on the nature and extent of the restriction or limitation, and opinion from a third physician selected by the first two physicians shall be obtained. The employer's determination of the dive team member's fitness shall be consistent with the medical opinion of the third physician, unless the employer and employee reach an agreement which is otherwise consistent with the recommendation or opinion of at least two of the physicians involved.
4. Nothing in this procedure shall be construed to prohibit either a dive team member from accepting, or an employer from offering, an assignment which is otherwise consistent with at least one medical opinion while a final determination on the employee's fitness is pending.

GENERAL OPERATIONS PROCEDURES

5.1 Safe Practices Manual

A. General

1. The employer shall develop and maintain a safe practices manual, which shall be made available at the dive location to each dive team member.
2. Contents
   a) The safe practices manual shall contain a copy of this division and the employer's policies for implementing the requirements of this division.
   b) For each diving mode engaged in, the safe practices manual shall include:
      (1) Safety procedures and checklists for diving operations;
      (2) Assignments and responsibilities of the dive team members;
      (3) Equipment procedures and checklists; and
3. Emergency procedures for fire, equipment failure, adverse environmental conditions, and medical illness and injury. **(Appendix D Dive Plan & Emergency Response Plan)**

6.1 Pre-Dive Procedures

A. General

1. The employer shall comply with the following requirements prior to each diving operation, unless otherwise specified.
2. The employer develop and maintain a list of the available sources of emergency aid, and make the list available at the company's principal place of business, at the field operations office, and to those who may have need for it to fulfill the company's emergency response plan. **(Appendix D Dive Plan & Emergency Response Plan)**

B. Emergency Aid

1. A list shall be kept at the dive location of the telephone or call numbers of the following:
   a) An operational decompression chamber (if not at the dive location);
   b) Accessible hospitals or medical treatment facility;
   c) Available physicians;
   d) Air of ground transportation
   e) U.S. Coast Guard Rescue Coordination Center.
   f) Sheriff's office (for inland operations only)
2. Two-way communications shall be available and accessible at any diving or hyperbaric work site in order to engage emergency services as required.

C. First Aid Supplies

1. A first aid kit appropriate for the diving operation and approved by a physician shall be available at the dive location.
2. When used in a decompression chamber or bell, the first aid kit shall be suitable for use under hyperbaric conditions.
3. In addition to any other first aid supplies, an American Red Cross standard first aid handbook or equivalent, and a bag type manual resuscitator with transparent mask and tubing shall be available at the dive location.

6.0-Pre-Dive Procedures Cont.

D. **Planning and Assessment.** Planning of a diving operation shall include and assessment of the safety and health aspects of the following**: (Appendix D Dive Plan & Emergency Response Plan & Appendix E -Job Hazard Analysis)**

1. Diving mode;
2. Surface and underwater conditions and hazards;
   a) Potential for diver fouling or entrapment
   b) Differential pressure hazard including but not limited to:
      (1) Underwater discharges, dredging, major intakes, pumps, sluices, suctions or valve culverts.
      (2) Any activity that would expose the diver to differential pressure.
   c) Diving in contaminated liquid, including but not limited to:
      (1) Chemical, micro-biological or radiological contamination
      (2) Any thermal or toxic threat to the diver
   d) Limited Access or penetration situations. A diver entering a pipe, tunnel, wreck, or similarly enclosed or confining structure that limits direct access to the surface, shall:
      (1) Have an underwater tender at the point of entry
      (2) Be equipped with an appropriate diver-carried reserve gas breathing supply
3. Breathing gas supply (including reserves);
   a) A diver –carried reserve breathing supply must be provided when diving deeper than 60 fsw, on dives requiring decompression regardless of depth, when direct ascent to the surface is not available, or when bell diving except whe5r heavy gear is worn.
   b) A diver-carried reserve breathing gas supply shall supply a physiologically appropriate mixture for the depths involved.
   c) Diver-carried reserve breathing gas supplies must provide a positive indication to the diver that his reserve has been actuated. Such an indication can be the requirement for the diver to open a valve, a visual signal, or other appropriate method.
   d) The diver-carried reserve breathing supply shall be of sufficient duration for use until the diver can reach the surface, reach another source of breathing media, or be reached by the standby diver equipped with another source of breathing media.
   e) In all cases, the activation of the diver's reserve shall cause the dive to be aborted. The reason for activation of the diver's reserve must be ascertained and corrected prior to continued use of the involved equipment.
4. Thermal protection;
5. Diving equipment and systems;
6. Dive team assignments and physical fitness of dive team members (including any impairment known to the employer);
7. Designation of a stand-by diver
   a) Stand-by diver at dive station, suitably dressed and ready to dive.
8. Repetitive dive designation or residual inert gas status of dive team members;
9. Decompression and treatment procedures (including altitude corrections); and
10. Emergency procedures.

E. **Decompression Chamber (Recompression Capability reference 8.0-C)**

1. For any dive in excess of 80 fsw, dives deeper than 60 fsw when liveboating, or dives requiring decompression there will be provided a dual-lock decompression chamber having a minimum capability of 6 ATA (equivalent to 165 fsw) ready for use at the dive site.
2. Job specific conditions that may require a decompression chamber:
   a) Dive site location
   b) Multi-day and/or repetitive diving operations
   c) Potential for diver fouling or entrapment
   d) Other potential hazards or factors which may cause the diver to incur decompression obligations

6.0-E-2 Decompression Chamber Cont

e) Liveboating operations

F. **Hazardous activities.**

1. To minimize hazards to the dive team, diving operations shall be coordinated with other activities in the vicinity, which are likely to interfere with the diving operation.
2. Diving operations shall not take place wherever hazardous activities or conditions in the vicinity posed a safety hazard to the diver or impair the support personnel from safely carrying out their work tasks.
3. In no case shall the diver be required to dive against his will.
4. Activities should be outlined in a Job Hazard Analysis (**Appendix E -Job Hazard Analysis**)

G. **Employee briefing.**

1. Dive team members shall be briefed on:
   a) The task to be undertaken;
   b) Safety procedures for the diving mode;
   c) Any unusual hazards or environmental conditions likely to affect the safety of the diving operation; and
   d) Any modifications to operating procedures necessitated by the specific diving operation.
2. Prior to making individual dive team member assignments, the employer shall inquire into the dive team member's current state of physical fitness, and indicate to the dive team member the procedure for reporting physical problems or adverse physiological effects during and after the dive.
3. Before each dive the diver shall be instructed to report any physical condition, problems, or adverse physiological effects that may render him unfit to dive.

H. **Equipment Inspection.**

1. The breathing gas supply system including reserve breathing gas supplies, masks, helmets, thermal protection, and bell handling mechanism (when appropriate) shall be inspected prior to each dive.

I. **Personal Protective Equipment**

1. The appropriate ANSI approved personal protective equipment shall be worn when required. These items include, but are not limited to:
   a) Protective head gear
   b) Protective foot wear
   c) Protective Eye wear
   d) Personal flotation device to appropriate regulatory standard
   e) Hearing protection
   f) Safety harness with approved double locking elastic lanyard
   g) Respiratory equipment
2. Appropriate personal protective clothing shall be worn as necessary to provide protection against hazards encountered in the work environment.

J. **Warning signal.**

1. When diving from surfaces other than vessels in areas capable of supporting marine traffic, a rigid replica of the international code flag "A" at least on meter in height shall be displayed at the dive location in a manner, which allows all-round visibility, and shall be illuminated during night diving operations.

7.1 Procedures During Dive

A. General

1. The employer shall comply with the following requirements, which are applicable to each diving operation unless otherwise specified.

B. Water entry and exit

1. A means capable of supporting the diver shall be provided for entering an exiting the water.
2. The mean provided for exiting the water shall extend below the water surface.
3. A means shall be provided to assist an injured diver from the water or into a bell.

C. Communications

1. An operational two-way voice communication system shall be used between:
   a) Each surface supplied air or mixed-gas diver and a dive team member at the dive location or bell (when provided or required); and
   b) The bell and the dive location.
2. An operational, two-way communication system shall be available at the dive location to obtain emergency assistance.
3. A means of communication or signaling shall be provided between the diver and his tender.
4. If communications or signal system from the diver's position cease to function, the diver shall immediately be brought (accounting for required decompression) to the surface, and resolve the communication problem.

D. Decompression Tables.

1. Decompression, repetitive, and no-decompression tables (as appropriate) shall be at the dive location. (Appendix E US Navy Dive Tables, Nitrox Tables)

E. Dive Profiles.

1. A depth-time profile, including when appropriate any breathing gas changes, shall be maintained for each diver during the dive including decompression.
2. Record must be kept for each diver's hyperbaric exposure **(Appendix G Dive Records)**
3. Each employer shall establish and maintain a record of each diver's hyperbaric exposure. This record shall contain the following:
   a) Name and address of the company
   b) Location, time and date of diving operations
   c) Names of the dive supervisor, diver and tender
   d) Depth of dive
   e) Bottom time
   f) Approximate water temperature and thermal protection used
   g) Environmental conditions (approximate sea state, underwater visibility, and underwater currents)
   h) Decompression tables and schedules used
   i) Elapsed time since last pressure exposure if less than 24 hours or repetitive dive designation
   j) Breathing mixture used and composition
   k) Type of work performed
   l) Type of diving equipment worn
   m) Any unusual conditions

7.0-E-Dive Profiles Cont.

n) For each dive for which decompression sickness is suspected or symptoms are evident, the following additional information shall be recorded and maintained:
   (1) Description of decompression sickness symptoms including depth and time of onset
   (2) Description and results of treatments

F. **Hand-held power tools and equipment**

1. Hand-held electrical tools and equipment shall be de-energized before being placed into or retrieved from the water.
2. Hand-held power tools shall not be supplied with power from the dive location until requested by the diver.
3. Electrical hand-held power tools must meet the requirements of Chapter 8, Electrical Safety, Attachment 2, PPE, Tools and Equipment.

G. **Welding and burning**

1. A current supply switch to interrupt the current flow to the welding or burning electrode shall be:
   a) Tended by a dive team member in voice communication with the diver performing the welding or burning; and
   b) Kept in the open position except when the diver is welding or burning.
2. The welding machine frame shall be grounded.
3. Welding and burning cables, electrode holders, and connections shall be capable of carrying the maximum current required by the work, and shall be properly insulated.
4. Insulated gloves shall be provided to divers performing welding and burning operations.
5. Prior to welding or burning on closed compartments, structures or pipes, which contain a flammable vapor or in which a flammable vapor may be generated by the work, they shall be vented, flooded, or purged with a mixture of gasses which will not support combustion.

H. **Explosives**

1. Employers shall transport, store, and use explosives in accordance with this section and the applicable provisions of 1910.109 and 1926.912 of Title 29 of the Code of Federal Regulations.
2. Electrical continuity of explosive circuits shall not be tested until the diver is out of the water.
3. Explosives shall not be detonated while the diver is in the water.

I. **Termination of Dive**

1. The working interval of a dive shall be terminated when;
   a) Directed by the dive supervisor and /or the person in charge
   b) The diver requests termination
   c) The diver fails to respond correctly to communications or signals from a dive team member
   d) Communications are lost and can not be quickly re-established between the diver, the tender, the diving supervisor and, in live boating operations, the person controlling the vessel
   e) The diver begins to use the diver-carried reserve breathing gas or the dive-location reserve breathing gas.

8.1 Post-Dive Procedures

A. General

1. The employer shall comply with the following requirements, which are applicable after each diving operation, unless otherwise specified.

B. Precautions

1. After completion of any dive, the employer shall:
   a) Check the physical condition of the diver;
   b) Instruct the diver to report any physical problems or adverse physiological effects including symptoms of decompression sickness;

8.0 Precautions Cont.

   c) Advise the diver of the location of a decompression chamber which is ready for use; and
   d) Alert the diver to the potential hazards of flying after diving.
      (1) Within 12 hours after decompression from a non-saturation dive
      (2) Within 24 hours after decompression from a HeO2 saturation dive
2. For any dive outside the no-decompression limits, deeper than 100 fsw or using mixed gas as a breathing mixture, the employer shall instruct the diver to remain awake and in the vicinity of the decompression chamber which is at the dive location for at least one hour after the dive (including decompression or treatment as appropriate).
3. On any dive that results in decompression sickness, proper medical authority should be consulted prior to flying after treatment.

C. Recompression Capability

1. A decompression chamber capable of recompressing the diver at the surface to a minimum of 165 fsw (6 ATA) shall be available at the dive location for:
   a) Surface-supplied air diving to depths deeper than 100 fsw and shallower than 220 fsw;
   b) Mixed gas diving shallower than 300 fsw; or
   c) Diving outside the no-decompression limits shallower than 300 fsw.
   d) Additional requirements reference Section 6.0-E-2
2. A decompression chamber capable of recompressing the diver at the surface to the maximum depth of the dive shall be available at the dive location for dives deeper than 300 fsw.
3. The decompression chamber shall be:
   a) Dual-lock;
   b) Multiplace; and
   c) Located within 5 minutes of the dive location.
4. The decompression chamber shall be equipped with:
   a) A pressure gauge for each pressurized compartment designed for human occupancy;
   b) A built-in-breathing-system with a minimum of one mask per occupant;
   c) A two-way voice communication system between occupants and a dive team member at the dive location;
   d) A viewport; and
   e) Illumination capability to light the interior.
5. Treatment tables, treatment gas appropriate to the diving mode, and sufficient gas to conduct treatment shall be available at the dive location. **(Appendix G Dive Records)**
6. A dive team member shall be available at the dive location during and for at least one hour after the dive to operate the decompression chamber (when required or provided).

D. **Record of dive (Reference Section 7.0-E- Dive Profiles)**

1. The following information shall be recorded **(Appendix G Dive Records)** and maintained for each diving operation:
   a) Names of dive team members including designated person-in-charge;
   b) Date, time, and location;
   c) Diving modes used;
   d) General nature of work performed;
   e) Approximate underwater and surface conditions (visibility, water temperature, and current); and
   f) Maximum depth and bottom time for each diver.
2. For each dive outside the no-decompression limits, deeper than 100 fsw or using mixed gas, the following additional information shall be recorded and maintained:
   a) Depth-time and breathing gas profiles;
   b) Decompression table designation (including modification); and
   c) Elapsed time since last pressure exposure if less than 24 hours or repetitive dive designation for each diver.
3. For each dive in which decompression sickness is suspected or symptoms are evident, the following additional information shall be recorded and maintained:
   a) Description of decompression sickness symptoms (including depth and time of onset); and
   b) Description and results of treatment.
4. Decompression procedure assessment. The employer shall:
   a) Investigate and evaluate each incident of decompression sickness based on the recorded information, consideration of the past performance of decompression table used, and individual susceptibility;
   b) Take appropriate corrective action to reduce the probability of recurrence of decompression sickness; and
   c) Prepare a written evaluation of decompression procedure assessment, including any corrective action taken, within 45 days of the incident of decompression sickness.

9.1 Scuba Diving

A. **General**

1. Employers engaged in SCUBA diving shall comply with the following requirements, unless otherwise specified.

B. **Limits**

1. SCUBA diving shall *not* be conducted:
   a) At depths deeper than 130 fsw
   b) At depths deeper than 100 fsw or outside the no-decompression limits unless a decompression chamber is ready for use;
   c) Against currents exceeding one (1) knot unless line-tended; or
   d) In enclosed or physically confining spaces unless line-tended.

C. **Procedures.**

1. A standby diver shall be available while a diver is in the water.
2. A diver shall be line-tended form the surface, or accompanied by another diver in the water in continuous visual contact during the diving operations. Audio communications are not required if communication can be established with the tender through safety line – line pull signals.
3. A diver shall be stationed at the underwater point of entry when diving is conducted in enclosed or physically confining spaces.

C-Procedures Cont.

4. A diver-carried reserve breathing gas supply shall be provided for each diver consisting of:
   a) A manual reserve (J valve); or
   b) An independent reserve cylinder with a separate regulator or connected to the underwater breathing apparatus.
   c) The valve of the reserve breathing gas supply shall be in the closed position prior to the dive.
5. The planned dive time of SCUBA diving operation shall not exceed the no decompression limits or the air supply duration.
6. Cylinder pressure shall be determined immediately before each dive.
7. Each diver shall be equipped with a knife, bottom timer, and depth gage.
8. Each diver shall be equipped with a weight belt , with a quick release buckle. Weight belt assembly is to be independent of cylinder harness.
9. Each diver shall be equipped with a cylinder harness, with quick release capability to the diver.
10. A personal flotation device shall be worn except for diving in enclosed spaces.

10.1 Surface-Supplied Air Diving

A. General

1. Employers engaged in surface-supplied air diving shall comply with the following requirements, unless otherwise specified.

B. Limits

1. Surface-supplied air diving shall not be conducted at depths deeper than 190 fsw, except that dives with bottom times of 30 minutes or less may be conducted to depths of 220 fsw.
2. A decompression chamber shall be ready for use at the dive location for any dive outside the no-decompression limits or deeper than 100 fsw.
3. A bell shall be used for dives with an in water decompression time greater than 120 minutes, except when heavy gear is worn or diving is conducted in physically confining spaces.

C. Procedures

1. The approximate depth of each dive shall be determined prior to the start of operations.
2. Minimum Personnel ref. **(Appendix H Manning)**.
3. Each diver shall be equipped with:
   a) A separate safety harness with a positive buckling device. The harness shall distribute the load of the diver's body , and shall prevent any strain from being placed on the diver's mask or helmet.
   b) A weight belt appropriate for the conditions of the dive.
4. The breathing mixture supplied to the diver must be composed of a mixture of gases that is appropriate for the depth of the dive.
5. Each diver shall be continuously tended while in the water.
6. A diver shall be stationed at the underwater point of entry when diving is conducted in enclosed or physically confining spaces.
7. Each diving operation shall have a primary breathing gas supply sufficient to support divers for the duration of the planned dive including decompression.
8. For dives deeper than 100 fsw or outside the no-decompression limits:
   a) A separate dive team member shall tend each diver in the water;
   b) A standby diver shall be available while a diver is in the water;
   c) A diver-carried reserve breathing gas supply shall be provided for each diver except when heavy gear is worn; and

C-8-Procedures Cont.

d) A dive-location reserve breathing gas supply shall be provided.

9. For heavy-gear diving deeper than 100 fsw or outside the no-decompression limits:
   a) An extra breathing gas hose capable of supplying breathing gas to the diver in the water shall be available to the standby diver.
   b) An inwater stage shall be provided to divers in the water.
10. Except when heavy gear is worn or where physical space does not permit, a diver-carried reserve breathing gas supply shall be provided whenever the diver is prevented by the configuration of the dive area from ascending directly to the surface.

11.1 Mixed-Gas Diving

A. General

1. Employers engaged in mixed-gas diving shall comply with the following requirements, unless otherwise specified.

B. Limits

1. Mixed –gas diving shall be conducted only when:
   a) A decompression chamber is ready for use at the dive location; and
      (1) A bell is used at depths greater than 220 fsw or when the dive involves inwater decompression time of greater than 120 minutes, except when heavy gear is worn or when diving in physically confining spaces; or
      (2) A closed bell is used at depths greater than 300 fsw, except when diving is conducted in physically confining spaces.

C. Procedures

1. The approximate depth of each dive shall be determined prior to the start of operations.
2. Minimum Personnel ref. **(Appendix H Manning)**.
3. Each diver shall be equipped with:
   a) A separate safety harness with a positive buckling device. The harness shall distribute the load of the diver's body , and shall prevent any strain from being placed on the diver's mask or helmet.
   b) A weight belt appropriate for the conditions of the dive.
4. A separate dive team member shall tend each diver in the water.
5. A standby diver shall be available while a diver is in the water.
6. A diver shall be stationed at the underwater point of entry when diving is conducted in enclosed or physically confining spaces.
7. Each diving operation shall have a primary breathing gas supply sufficient to support divers for the duration of the planned dive including decompression.
8. Each diving operation shall have a dive-location reserve breathing gas supply.
9. When heavy gear is worn:
   a) An extra breathing gas hose capable of supplying breathing gas to the diver in the water shall be available to the standby diver; and
   b) An inwater stage shall be provided to divers in the water.
10. An inwater stage shall be provided for divers without access to a bell for dives deeper than 100 fsw or outside the no-decompression limits.
11. When a closed bell is used, one dive team member in the bell shall be available and tend the diver in the water.
12. Except when heavy gear is worn or where physical space does not permit, a diver-carried reserve breathing gas supply shall be provided for each diver:
    a) Diving deeper than 100 fsw or outside the no-decompression limits; or
    b) Prevented by the configuration of the dive area from directly ascending to the surface.

12.1 Liveboating

A. General

1. Employers engaged in diving operations involving liveboating shall comply with the following requirements.

B. Limits

1. Diving operations involving liveboating shall not be conducted:
   a) With an inwater decompression time of greater than 120 minutes;
   b) Using surface-supplied air at depths deeper than 190 fsw, except that dives with bottom times of 30 minutes or less may be conducted to depths of 220 fsw;

12.0-B-Limits Cont.

   c) Using mixed gas at depths greater than 220 fsw;
   d) In rough seas which significantly impede diver mobility or work function; or
   e) In other than daylight hours.

C. Procedures

1. The propeller of the vessel shall be stopped before the diver enters or exits the water.
2. A device shall be used which minimizes the possibility of entanglement of the diver's hose in the propeller of the vessel.
3. At no time will the tender and/or supervisor allow themselves or the boat to get in a position where the dive hose's direction and location is not easily viewed.
4. Two-way voice communication between the designated person-in-charge and the person controlling the vessel shall be available while the diver is in the water.
5. A standby diver shall be available while a diver is in the water.
6. A diver-carried reserve breathing gas supply shall be carried by each diver engaged in liveboating operations.

13.1 Equipment

A. General

1. All employers shall comply with the following requirements, unless otherwise specified.
2. Each equipment modification, repair, test, calibration or maintenance service shall be recorded by means of tagging or logging system, and include the date and nature of work performed, and the name or initials of the person performing the work.
3. For purposes of this standard, air supply systems shall include:
   a) Air supplied directly to the diver;
   b) Compressed systems used to fill air cylinders (tanks);
   c) Compressed air cylinders (tanks); and
   d) Compressed oxygen cylinder.

B. Air Compressor System

1. Compressors used to supply air to the diver shall be equipped with a volume tank with a check valve on the inlet side, a pressure gauge, a relief valve, and a drain valve.

2. Air compressor intakes shall be located away from areas containing exhaust or other contaminants.
3. Respirable air supplied to a diver shall not contain:
   a) A level of carbon monoxide (CO) greater than 20 ppm.
   b) A level of carbon dioxide (CO2) greater than 1000 ppm.
   c) A level of oil mist greater than 5 milligrams per cubic meter; or
   d) A noxious or pronounced odor.

13.0-3-Equiptment

4. The output of air compressor systems shall be tested for air purity every 6 months by means of samples taken at the connection to the distribution system, except that non-oil lubricated compressors need not be tested for oil mist.
5. Tests for carbon monoxide shall be conducted on the air in supply systems as follows:
   a) At least daily for air supplied directly to the diver; and
   b) At least once for each group or batch of cylinders filled or purchased.

C. **Breathing Gas supply hoses**

1. Breathing gas supply hoses shall:
   a) Have a working pressure at least equal to the working pressure of the total breathing gas system;
   b) Have a rated bursting pressure at least equal to 4 times the working pressure;
   c) Be tested at least annually to 1.5 times their working pressure; and
   d) Have their open ends taped, capped or plugged when not in use.
   e) Be visually examined and pressure tested after each repair or alteration.
2. Breathing gas supply hose connectors shall:
   a) Be made of corrosion-resistant materials;
   b) Have a working pressure at least equal to the working pressure of the hose to which they are attached; and
   c) Be resistant to accidental disengagement.
3. Umbilicals shall:
   a) Be marked in 10-ft. increments to 100 feet beginning at the diver's end, and in 50 ft. increments thereafter;
   b) Be made of kink-resistant materials; and
   c) Have a working pressure greater than the pressure equivalent to the maximum depth of the dive (relative to the supply source) plus 100 psi.

D. **Employer Insurance**

1. The employer shall insure that the requirements of 1910.430(d) through 1910.430(i) are met, regardless of where compressed gas cylinder (tanks) are purchased or filled.

E. **Buoyancy Control**

1. Helmets or masks connected directly to the dry suit or other buoyancy-changing equipment shall be equipped with an exhaust valve.
2. A dry suit or other buoyancy-changing equipment not directly connected to the helmet or mask shall be equipped with an exhaust valve.
3. When used for SCUBA diving, a buoyancy compensator shall have an inflation source separate from the breathing gas supply.
4. A inflatable flotation device capable of maintaining the diver at the surface in a face-up position, having a manually activated inflation source independent of the breathing supply, an oral inflation device, and an exhaust valve shall be used for SCUBA diving.

F. **Compressed Gas Cylinders**

1. Compressed gas cylinders shall:
   a) Be designed, constructed and maintained in accordance with the applicable provisions of 29 1910.101 and 1910.169 through 1910.171.
   b) Be stored in a ventilated area and protected from excessive heat;
   c) Be secured from falling; and
   d) Have shut-off valves recessed into the cylinder or protected by a cap, except when in use or manifolded, or when used for SCUBA diving.

G. **Decompression Chambers**

1. Each decompression chamber manufactured after the effective date of this standard, shall be built and maintained in accordance with their ASME Code or equivalent.
2. Each decompression chamber manufactured after the effective date of this standard, shall be maintained in conformity with the code requirements to which it was built, or equivalent.
3. Each decompression chamber shall be equipped with:
   a) Means to maintain the atmosphere below a level of 25 percent oxygen by volume;
   b) Mufflers on intake and exhaust lines, which shall be regularly inspected and maintained;
   c) Suction guards on exhaust line openings; and
   d) A means for extinguishing fire, and shall be maintained to minimize sources of ignition and combustible material.

H. **Gauges and Timekeeping Devices**

1. Gauges indicating diver depth, which can be read, at the dive location shall be used for all dives except SCUBA.
2. Each depth gauge shall be deadweight tested or calibrated against a master reference gauge every 6 months, and when there is a discrepancy greater than two percent (2 percent) of full scale between any two equivalent gauges.
3. A cylinder pressure gauge capable of being monitored by the diver during the dive shall be worn by each SCUBA diver.
4. A timekeeping device shall be available at each dive location.

I. **Masks and Helmets**

1. Surface-supplied air and mixed-gas masks and helmets shall have:
   a) A non-return valve at the attachment point between helmet or mask and hose which shall close readily an positively; and
   b) An exhaust valve.
2. Surface-supplied air masks and helmets shall have a minimum ventilation rate capability of 4.5 acfm at any depth at which they are operated or the capability of maintaining the diver's inspired carbon dioxide partial pressure below 0.02 ATA when the diver is producing carbon dioxide at the rate of 1.6 standard liters per minute.
3. Be appropriate for the task intended.
4. Plumbing for communication system.
5. Maintained per manufacturers specifications.
6. Be able to accept a bail out bottle supply.

J. **Oxygen Safety**

1. Equipment used with oxygen or mixtures containing over forty percent (40%) by volume oxygen shall be designated for oxygen service.
2. Components (except umbilicals) exposed to oxygen or mixtures containing over forty percent (40%) by volume shall be cleaned of flammable materials before use.
3. Oxygen systems over 125 psig and compressed air systems over 500 psig shall have slow-opening shut-off valves.

K. **Weights and Harnesses**

1. Except when heavy gear is worn, divers shall be equipped with a weight belt or assembly capable of quick release.

13.0-K-Equiptment Cont.

2. Except when heavy gear is worn or in SCUBA diving, each diver shall wear a safety harness with:
   a) A positive buckling device;
   b) An attachment point for the umbilical to prevent strain on the mask or helmet; and
   c) A lifting point to distribute the pull force of the line over the diver's body.

14.1 Recordkeeping Requirements

A. Recording and reporting

1. The employer shall record the occurrence of any diving-related injury or illness, which requires any dive team member to be hospitalized for 24 hours or more, specifying the circumstances of the incident and the extent of any injuries or illness.

B. Availability of records

1. Upon the request of the Assistant Secretary of Labor for Occupational Safety and Health, or the Director, National Institute for Occupational Safety and Health, Department of Health and Human Services of their designees, the employer shall make available for inspection and copying any record or document required by this standard.

2. Records and documents required by this standard shall be provided upon request to employees, designated representatives, and the Assistant Secretary in accordance with 29 CFR 1910.20(a)-(e) and (g)-(i). Safe practices manuals (1910.420), depth-time profiles (1910.422), recordings of dives (1910.423), decompression procedure assessment evaluations (1910.423), and records of hospitalizations (1910.440) shall be provided in the same manner as employee exposure records or analyses using exposure or medical records. Equipment inspections and testing records which pertain to employees (1910.430) shall also be provided upon request to employees and their designated representatives.
3. Records and documents required by this standard shall be retained by the employer for the following period:
   a) Dive team member medical records (physician's reports) – 5 years;
   b) Safe practices manual - current document only;
   c) Depth-time profile – until completion of the recording of dive, or until completion of decompression procedure assessment where there has been an incident of decompression sickness;
   d) Recording of dive – 1 year, except 5 years where there has been an incident of decompression sickness;
   e) Decompression procedure assessment evaluations – 5 years;
   f) Equipment inspections and testing records – current entry or tag, or until equipment is withdrawn from service;
   g) Records of hospitalizations – 5 years.
4. After the expiration of the retention period of any record required to be kept for five (5) years, the employer shall forward such records to the National Institute for Occupational Safety and Health, Department of Health and Human Services.
5. In the event the employer ceases to do business;
   a) The successor employer shall receive and retain all dive and employee medical records required by this standard; or
   b) If there is no successor employer, dive and employee medical records shall be forwarded to the National Institute for Occupational Safety and Health, Department of Health and Human Services.

15.1 References

A. **Occupational Safety and Health Standards, 29, CFR 1910, Subpart T.**

B. **Department of Transportation, U.S. Coast Guard, Subchapter-V, Marine Occupational Safety and Health Standards, Part 197, subpart B- Commercial Diving Operations.**

C. **NAVSEA 0910-LP-106-0957, U.S. Navy Diving Manuals.**

D. **The Department of National Defence (Canada), Defence and Civil Institute of Environmental Medicine (DCIEM) 86-R-35, DCIEM Diving Manual.**

E. **EM 385-1-1, U.S. Army Corp of Engineers Safety and Health Requirements Manual, Section 30, Contract Diving Operations.**

F. **Bureau of Reclamation, Reclamation Safety and Health Standards, Section 29, Marine and Diving Operations.**

G. **Association of Diving Contractors International, Consensus Standards for Commercial Diving Operations, Fifth Edition, 2004.**

ADVANCED AMERICAN CONSTRUCTION

AAC MANAGEMENT STANDARD

SMS 8- Commercial Diving Safety

GLOSSARY

GLOSSARY

ACFM

Actual cubic feet per minute – refers to the volume of gas supplied to a diver, bell, etc., at ambient pressure.

AMBIENT PRESSURE

The surrounding pressure, at depth (actual or simulated, in a hyperbaric chamber) to which the diver, bell, etc., is subjected.

APPOPRIATE BREATHING MIXTURE

A breathing mixture which, having regard to the system and equipment used in the diving operations, the work undertaken in those operations, and the conditions in which the depth at which they are to be carried out, is suitable in content and temperature and of adequate pressure.

ASCENT TIMES

The time interval between leaving the bottom when the dive is terminated, and reaching the surface. (1 ata.)

ASME CODE OR EQUIVALENT

ASME (American Society of Mechanical Engineers) Boiler and Pressure Vessel Code, Section VIII, or an equivalent code which the employer can demonstrate to be equally effective.

ATA

Atmosphere absolute – total pressure; including atmospheric, to which a diver, bell, etc., is subjected.

ATM

Atmosphere – a unit equivalent to 14.7 psi or 760 millimeters of mercury.

BAILOUT

An emergency situation where a diver leaves bottom and comes directly to the surface, exceeding normal controlled ascent rates and missing scheduled decompression water stops.

BAILOUT BOTTLE

See Diver-Carried Reserve Breathing Gas

BELL

An enclosed compartment, pressurized (closed bell) or unpressurized (open bell), which allows the diver to be transported to and from the underwater work area and which may be used as a temporary refuge during diving operations.

BENDS

See Decompression Sickness

BIBS

Built-In Breathing System – A breathing gas system built into all Deck Chambers and SDC's by which emergency breathing gas or a treatment gas can be supplied to the diver through an oral-nasal mask.

BOTTOM TIME

The total elapsed time in minutes from the time that the diver leaves the surface in descent to the time that the diver begins ascent.

BREATHING SYSTEM
Device or apparatus for delivering respirable breathing mixture.

BURSTNIG PRESSURE
The pressure at which a pressure containment device would fail structurally.

CLEANED FOR OXYGEN SERVICE
Cleaning of equipment or system to ensure elimination of all hydrocarbons and other potentially dangerous contaminants when system is to be used in oxygen service. See also Oxygen Cleaning.

CNS
Central Nervous System.

COMPRESSOR
A machine that raises air or other gases to a pressure above one atmosphere.

CPR
Cardio-Pulmonary Resuscitation – a combination of artificial respiration and artificial circulation.

CYLINDER
A pressure vessel for the storage of gas.

DDC
Deck Compression Chamber – DDC (deck compression chamber) PVHO (Pressure Vessel for Human Occupancy) – a deck chamber of controlled pressurization and depressurization used for decompression, recompression, treatment of diving injuries, or submarine medicine, or as a surface habitat for saturation divers.

DECOMPRESSION
Releasing from pressure or compression; following a specific decompression table or procedure during ascent; ascending in the water or experiencing decreasing pressure in the chamber.

DECOMPRESSION CHAMBER
A pressure vessel for human occupancy such as a surface decompression chamber, closed bell, or deep diving system used to decompress divers and to treat decompression sickness.

DECOMPRESSION SCHEDULE
A time-depth profile with a specific bottom time and depth, whose application is calculated to reduce the pressure on a diver safely.

DECOMPRESSION SICKNESS
A condition with a variety of symptoms which causes the formation of bubbles of gas in the blood or other tissues of the diver during or subsequent to ascent or other pressure reduction.

DECOMPRESSION TABLE
A profile or set of profiles of depth-time relationships for ascent rates and breathing mixtures to be followed after a specific depth-time exposure or exposures.

DEPTH
The actual depth of the dive measured in feet below the water's surface. For purposes of determining pressure equivalents, these measurements are assumed to salt water at 0.445 pounds per square inch per foot of depth (0.445 psi/ft depth). Fresh water equals 0.432 psi/ft depth.

DIVE LOCATION
A surface or vessel from which a diving operation is conducted or supported.

DIVE-LOCATION RESERVE BREATING GAS
A supply system of air or mixed gas (as appropriate) at the dive location which is independent of the primary supply system and sufficient to support divers during the planned decompression.

DIVE TEAM
Divers and diver support personnel involved in a diving operation; including the diving supervisor in charge.

DIVER
An employee working in water using under water apparatus which supplies compressed breathing gas at the ambient pressure.

DIVER-CARRIED RESERVE BREATHING GAS
A diver-carried supply of air or mixed gas (as appropriate) sufficient under standard operating conditions to allow the diver to reach the surface, or another source of breathing gas, or to be reached by a standby diver.

DIVER WORN EQUIPMENT
That equipment required for the safety and well being of the diver, worn or attached to the diver while underwater.

DIVER'S INDICATOR LIGHT
A light attached to a diver for the purpose of indicating the position of the diver when he is on the surface of the water.

DIVING BELL
See Submersible Decompression Chamber/SDC.

DIVING MODE
A type of diving requiring specific equipment, procedures and techniques (SCUBA, surface-supplied air, or mixed gas).

DIVING OPERATIONS
Any work operation in which some type of diving; or work underwater which involves planned human exposure to increased pressures to perform the job.

DIVING SUPERINTENDENT
The Superintendent, Supervisor, Lead Diver or Diver-in-Charge, have complete responsibility for the safety of the diving operation including the responsibility for the safety and health of all diving personnel.

D.P.I.C. - "Designated Person In Charge" The Superintendent, Supervisor, Lead Diver or Diver-in-Charge, have complete responsibility for the safety of the diving operation including the responsibility for the safety and health of all diving personnel.

DRY SUIT
A diving suit designed to exclude water from the surface of the body.

D.S.
Dive Supervisor.

EXHAUST VALVE

A valve controlling the venting of gas from a DDC, diver's helmet, suit or buoyancy changing equipment.

EMBOLISM

See gas embolism.

FIZZING

A general feeling of itchiness or sensation of skin irritation.

FSW

A foot of sea water. A unit of pressure generally defined as 1/33 of a standard atmosphere, which represents the pressure exerted by a foot of sea water having a specific gravity of 1.027, equal to approximately 0.445 pounds per square inch.

GAS EMBOLISM

A condition caused by expanding gasses which have been taken into and retained in the lungs while breathing under pressure, being forced into the bloodstream or other tissues during ascent or decompression.

HARNESS

The combination of straps and fasteners used to attach equipment and his umbilical to the diver.

HEAVY GEAR

Diver-worn deep-sea dress including helmet, breastplate, dry suit, and weighted shoes.

HELIUM UNSCRAMBLER – UNSCRAMBLER – SPEECH UNSCRAMBLER

An electronic device designed to render intelligible the words spoken in a helium hyperbaric environment.

HIGH PRESSURE NERVOUS SYNDROME (HPNS)

A group of symptoms including uncoordination, tremors of the extremities, disorientation, nausea, dizziness and brief lapses of consciousness occurring at depths of 500 feet or deeper.

HYPERBARIC CONDITIONS

Pressure conditions in excess of surface pressure.

HYPOTHERMIA

Profound loss of body heat.

INWATER STAGE

A suspended underwater platform which supports a diver in the water.

KLUGE HOSE

See pneumofathometer.

LIFE SUPPORT TECHNICIAN

Responsible for safe operation of living chambers and reports to Diving Supervisor.

LIVEBOATING

The practice of supporting a surfaced-supplied air or mixed gas diver from a vessel which is underway.

LST

Life Support Technician/Rack Operator.

MAXIMUM WORKING PRESSURE

The maximum pressure to which a pressure containment device can be exposed under operating conditions (usually the pressure setting of the pressure relief device).

MASTER

See Person-in-Charge

MAWP

Maximum allowable working pressure. See maximum Working Pressure.

MIXED GAS DIVING

A diving technique in which the diver is supplied with a gas mixture other than air for respiration.

MULTIPLACE

A decompression chamber designed to be used by more than one person at a time.

NIGGLES

A general, feeling of itchiness or sensation of skin irritation.

NO DECOMPRESSION DIVING

Diving which involves depths and times shallow and short enough so that the ascent can be made to the surface without water stops or subsequent chamber decompressions.

NO DECOMPRESSION LIMITS

The depth-time of the "no-decompression limits and repetitive dive group designation table for no-decompression air dives", U.S. Navy Diving Manual or equivalent limits which the employer can demonstrate to be equally effective.

NON-RETURN VALVE (CHECK VALVE)

A one-way check valve installed in a gas system to permit gas flow in one direction only. All diving helmets must have a non-return valve at the gas supply inlet to prevent depressurization of the helmet and the resultant squeeze, should the gas supply be lost.

OVERBOTTOM PRESSURE

The pressure above ambient, at which a breathing gas supply must be supplied to the helmet/mask so that the diver will have a sufficient supply of gas.

OXYGEN CLEANING

Special cleaning process for equipment to be used in oxygen systems which removes all flammables.

OXYGEN COMPATIBILITY

The ability of a substance to come in contact with high-pressure oxygen without ignition.

OXYGEN TOXICITY

A medical emergency resulting in convulsions and unconsciousness if gone unchecked, caused by breathing a high partial pressure of oxygen under pressure.

PARTIAL PRESSURE

That portion of the total gas pressure exerted by particular constituent of the breathing mixture.

PERSON-IN-CHARGE (MASTER, BARGE, CAPTAIN, INSTALLATION MANAGER)

In the relation to the craft/barge/structure, includes the captain or any other person made responsible by the owner for the vessel of facility, its operation, and the safety, health and welfare of those on board.

PNEUMOFATHOMETER – KLUGE – PNEUMO

A depth-measuring device consisting of an open-end hose fixed to the diver, with the surface end connected to a gas supply and pressure gauge (usually marked in fsw). Gauge measures pressure required to discharge water to depth of diver.

PSI

Pounds per Square inch. An expression of pressure, one atmosphere equals 14.7 psi.

PVHO

Pressure Vessel for Human Occupancy – See deck decompression chamber.

RACK OPERATOR

See Life Support Technician.

RELIEF VALVE

A pressure-relieving device that prevents pressure from rising above a preset level.

SATURATION DIVING

Procedures in accordance with which a diver is continuously subjected to an ambient pressure greater than atmospheric pressure so that his body tissues and blood become saturated with the inert element of the breathing gas. Once the divers body becomes saturated, he can remain within a specified zone for an unlimited time without incurring additional decompression obligation.

SCIENTIFIC DIVING

Diving performed solely as a necessary part of a scientific, research, or educational activity by employees whose sole purpose for diving is to perform scientific research tasks. Scientific diving does not include performing any tasks usually associated with commercial diving such as: Placing or removing heavy objects underwater; inspection of pipelines and similar objects; construction; demolition; cutting or welding; or the use of explosives.

SCUBA

Acronym for Self Contained Breathing Apparatus. Used to describe apparatus in which the inspired air is delivered by demand regulator and exhaled into the surrounding water (open-circuit) and the air supply is carried on the diver's back.

SCUBA DIVING

A diving mode independent of surface supply in which the diver uses open circuit self-contained underwater breathing apparatus.

SDC (Submersible Decompression Chamber) – SCC (Submersible Compression Chamber)

A pressurized bell in which the divers can be transferred to the underwater worksite and return to the surface under pressure.

SQUEEZE

A lack of equalization between parts of the body or between the body and equipment. Extreme cases can cause severe injury or death.

STANDBY DIVER

A diver at the dive location available to assist a diver in the water.

SURFACE SUPPLIED AIR DIVING

A Diving mode in which the diver in the water is supplied from the dive location with compressed air for breathing.

TREATMENT TABLES

A depth, time and breathing gas profile designed to treat a diver for gas embolism or decompression sickness.

UMBILICAL

The composite hose bundle between a dive location and a diver or bell, or between a diver and a bell, which supplies the diver with breathing gas, communications, power, or heat as appropriate to the diving mode or conditions, and includes a safety line between the diver and the dive location.

UNLIMITED DURATION EXCURSION TABLES

Two tables for use with saturation excursion diving which limit upward and downward excursions, and provide a zone in which the diver can move freely without regard to the number of excursions or their duration.

VALVE

A device that starts, stops or regulates the flow of fluids.

VOLUME TANK

A pressure vessel connected to the outlet of a gas supply and used as a gas reservoir.

WEIGHT BELT

A belt worn by a diver to achieve desired buoyancy.

WORKING PRESSURE

The maximum pressure to which a pressure containment device may be exposed under standard operating conditions.

WORK SITE

An underwater location where work is performed.

ADVANCED AMERICAN CONSTRUCTION

AAC MANAGEMENT STANDARD

SMS 8- Commercial Diving Safety

MEDICAL FORM

ASSOCIATION OF DIVING CONTRACTORS INTERNATIONAL
MEDICAL HISTORY FORM

Company's Name _____ Date _____

1. Last Name	First Name	Middle Name	2. Date of Birth	Sex	3. SSN or PASSPORT No.
4. Address (Number, Street, City, State, Zip Code)				5. Area Code/Telephone Number	
6. Position	7. Spouse Name		8. CHECK ONE ( ) Single ( ) Married	( ) Divorced ( ) Widowed	
9. No. Children	10. Next of Kin/Relationship/Address/Telephone Number				

11. My Present State of Health is: ( ) Excellent ( ) Good ( ) Fair ( ) Poor

12. MEDICAL HISTORY: Have you ever had or been treated for:

YES	NO		YES	NO		YES	NO	
____	____	Skin Rash	____	____	Abnormal Heart Rhythm	____	____	Rheumatism
____	____	Convulsions	____	____	Fainting Spells	____	____	Back Strain
____	____	Epilepsy	____	____	Heart Trouble	____	____	Dislocations
____	____	Head Injury	____	____	Asthma	____	____	Paralysis
____	____	Disabling Headaches	____	____	Coughing of Blood	____	____	Muscle Weakness
____	____	Nervous Breakdown	____	____	Tuberculosis	____	____	Knee Injury or "Trick Knee"
____	____	Uncorrectable Vision	____	____	Shortness of Breath	____	____	Shoulder Injury
____	____	Color Vision Defect	____	____	Lung Trouble	____	____	Arthritis
____	____	Eye Trouble (not glasses)	____	____	Chronic Cough	____	____	Broken Bones
____	____	Eye Surgery	____	____	Gallbladder Trouble	____	____	Spine Problems
____	____	Defective Hearing	____	____	Stomach Trouble or Ulcers	____	____	Swollen Ankles
____	____	Ear Trouble	____	____	Jaundice	____	____	Foot Trouble
____	____	Perforated Eardrum	____	____	Rupture	____	____	Elbow Injury
____	____	Hay Fever	____	____	Liver Disease	____	____	Diabetes
____	____	Nose Bleed	____	____	Appendicitis	____	____	Tumor or Cancer
____	____	Airway Obstruction	____	____	Kidney Trouble	____	____	Goiter or Thyroid Trouble
____	____	Chest Pain	____	____	Protein or Sugar in Urine	____	____	Blood Disease
____	____	Heart Murmur	____	____	Blood in Urine	____	____	Anemia: Sickle Cell or Other
____	____	Rheumatic Fever	____	____	Rectal Bleeding	____	____	Irregular Menses
____	____	Varicose Veins	____	____	Hemorrhoids (Piles)	____	____	Painful Menstrual Cycle
____	____	Heart Attack	____	____	Gas Pains	____	____	Pregnancy
____	____	Giddiness/Loss of Balance	____	____	Sleep-walking	____	____	Pneumothorax ("collapsed lung")
____	____	Severe Motion Sickness	____	____	Claustrophobia	____	____	Any Sexually Transmitted Disease
____	____	Unconsciousness	____	____	Mental Illness	____	____	Contagious Disease
____	____	Concussion or Head Injury	____	____	High Blood Pressure	____	____	Other Illness or Injury or Any Other Medical Condition

PLEASE EXPLAIN THE DETAILS OF ITEMS CHECKED YES: _____

13. LIST ALL SURGERIES, SERIOUS ILLNESSES, OR INJURIES: YEAR

14. ANSWER THE FOLLOWING QUESTIONS:

Every Item Checked Yes Must Be Fully Explained Below	YES	NO		YES	NO
Do you have any physical defects or any partial disabilities?			Have you been advised to have a surgical operation or medical treatment that has not been done?		
Do you have any condition that may require special work assignment?			Have you ever resigned, been terminated, or changed jobs for medical reasons?		
Have you ever been rejected or rated for insurance, employment, license, or armed forces for health reasons?			Have you ever been dismissed from employment because of excess use of alcohol or drugs?		
Have you had significant exposure to mining dust, asbestos, silica, or toxic chemicals?			Do you presently use marijuana, LSD, narcotics, or any controlled substances?		
Have you ever had ill effects from any work that you have done?			Do you have any allergies or reactions to food, chemicals, drugs, insect stings, or marine life?		
Are you taking any type of medications including patient medicines?			Are you presently under the care of a physician? Give physician's name and address below.		

COMMENTS: _____

15. MY PERSONAL PHYSICIAN IS:

16. HOW LONG HAVE YOU BEEN DIVING? ___
Max. Depth: Surface Air _____
Surface Mixed Gases _____
Longest Bottom Time: Air _____
Mixed Gas _____

HAVE YOU MADE ANY SATURATION DIVES? ( ) YES ( ) NO
Gas Mix: Heliox ☐ Trimix ☐ Nitrox ☐
Max. Depth_____ Total Duration (Days) _____

17. DIVING EXPERIENCE: (NUMBER OF YEARS EXPERIENCE) AIR_____ MIXED GASES_____ SATURATION _____

HAVE YOU PASSED AN OXYGEN TOLERANCE TEST? _____ NAME OF COMPANY/SCHOOL _____

18. NUMBER OF DECOMPRESSION INCIDENTS:

Bends: Pain Only_____ Neurological_____ Serious Symptoms: Chokes_____ Inner Ear _____

List any residuals: _____

19. IN DIVING HAVE YOU HAD A HISTORY OF: (Provide details of dates and severity)

Gas Embolism ___
Oxygen Toxicity _____
CO_2 Toxicity _____
CO Toxicity _____
Ear/Sinus Squeeze _____
Ear Drum Rupture_____
Deafness _____

Lung Squeeze ___
Near Drowning _____
Asphyxiation _____
Vertigo (Dizziness) _____
Pneumothorax _____
Nitrogen Narcosis _____
Loss of Consciousness _____

20. Have you been involved in a diving accident (decompression sickness or others) since your last physical examination? _____
Date of last physical examination: _____

For what company or organization were you examined last? _____
Name and address of physician who performed your last examination.

21. Have you ever had any of the following? If so, give approximate date:

( ) Chest X-Ray _____
( ) Longbone Series _____
( ) Back (Spine) X-Ray _____
( ) ENG _____
( ) EEG _____
( ) EMG _____

( ) Nerve Condition Studies _____
( ) Pulmonary Function Studies _____
( ) Audiogram _____
( ) EKG _____
( ) Exercise EKG _____
( ) Treadmill EKG _____

22. Physician's Remarks: _____

I CERTIFY THAT I HAVE REVIEWED THE FOREGOING INFORMATION SUPPLIED BY ME AND THAT IT IS TRUE AND COMPLETE TO THE BEST OF MY KNOWLEDGE. I UNDERSTAND THAT LEAVING OUT OR MISREPRESENTING FACTS CALLED FOR ABOVE MAY BE CAUSE FOR REFUSAL OF EMPLOYMENT OR SEPARATION FROM THE COMPANY. I AUTHORIZE ANY OF THE DOCTORS, HOSPITALS, OR CLINICS MENTIONED ABOVE TO FURNISH THE COMPANY MEDICAL EXAMINER WITH A COMPLETE TRANSCRIPT OF MY MEDICAL RECORD FOR PURPOSES OF PROCESSING MY PHYSICAL EXAM.

DATE NAME (print)

ASSOCIATION OF DIVING CONTRACTORS INTERNATIONAL
PHYSICAL EXAMINATION FORM

Company's Name _____	Date of Examination	Date of Birth

1. Last Name	First Name	Middle Name	2. SSN or PASSPORT No.

3. Height (inches)	4. Weight	5. Temperature	6. Blood Pressure Right Left	7. Pulse/Rhythm

8. General Appearance/Hygiene	9. Nutrition	10. Build ( ) Slender ( ) Muscular ( ) Obese

11. Distant Vision: Snellan	12. Near Vision: Jaeger
R. 20/ _____ Corr. to 20/ _____	R. _____ % Corr. to _____
L. 20/ _____ Corr. to 20/ _____	L. _____ % Corr. to _____

13. Color Vision (Test and Results)	Field of Vision R. % L. %	Contact Lenses ( ) Yes ( ) No

Normal	Check each item in appropriate column (enter NE for Not Evaluating)	Abnormal	Remarks
	16. Head, Face, and Scalp		
	17. Neck		
	18. Eyes		
	19. Fundus		
	20. Ears - General (Int. and Ext. Canal)		
	21. Eustachian Tube Function		
	22. Drum Perforation		
	23. Nose (Septal Alignment)		
	24. Sinuses		
	25. Mouth and Throat		
	26. Lungs and Chest (Includes Breasts)		
	27. Heart (Thrust, Size, Rhythm, Sounds)		
	28. Pulses (Equality, etc.)		
	29. Vascular System (Varicosities, etc.)		
	30. Abdomen and Viscera		
	31. Hernia (All Types)		
	32. Endocrine System		
	33. G-U System		
	34. Upper Extremities (Strength, ROM)		
	35. Lower Extremities (Except Feet)		
	36. Feet		
	37. Spine		
	38. Skin, Lymphatics		
	39. Anus and Rectum		
	40. Sphincter Tone		
	41. Pelvic Exam		

NEUROLOGICAL EXAMINATION

42. SENSORIUM _____

43. CRANIAL NERVES

I Olfactory _____
II Optic _____
III Oculomotor _____
IV Trochlear _____
V Trigeminal _____
VI Abducent _____
VII Facial _____
VIII Auditory _____
IX Glossopharyngeal _____
X Vagus _____
XI Spinal Accessory _____
XII Hypoglossal _____

PATHOLOGICAL SUPERFICIAL

44. REFLEXES: DEEP TENDON (Gradation of 4)

	Right	Left
Triceps		
Biceps		
Patella		
Achilles		

	Right	Left
Babinski		
Hoffman		
Clonus		

Ankle

Upper Abdomen ___
Lower Abdomen _____
Cremasteric _____

45. CEREBELLAR FUNCTION

	YES	NO
Ataxia		
Tremor (Intention)		
Finger to Nose		
Heel to Shin (Sliding)		

46. POWER AND TONE OF MUSCLES

Right Upper Extremity _
Left Upper Extremity _
Right Lower Extremity _
Left Lower Extremity _____

47. PROPRIOCEPTION-STE REOGNOSIS

	Right	Left
Joint Position Sense		
Astereognosis		

48. ROMBERG SIGN

49. UNTERBURGER (If Performed) Degrees 10 _____
Sec. _____
20 Sec. _____
30 Sec. L.

50. NYSTAGMUS

	YES	NO
End Point		
Pathological		

51. SENSATIONS _____

Hot Cold _____
Sharp _____ Soft _____
Two Point Discrimination NL__ABN __

52. Additional remarks regarding abnormal findings on physical

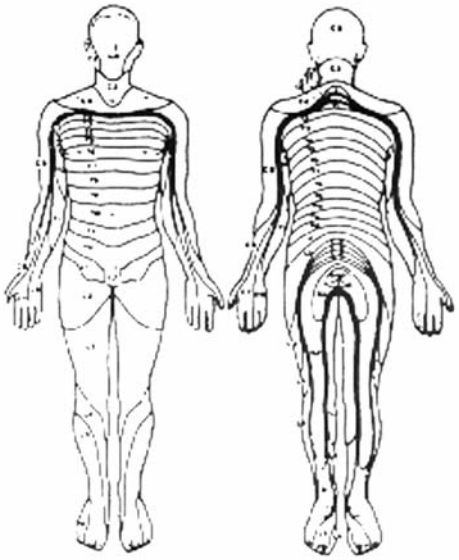

Diagram in areas of altered sensations, surgical scars and traumatic scars.

LABORATORY FINDINGS

53. **URINALYSIS**

Color _____ Sugar _____
Appearance _____ Blood _____
Sp. Gravity _____ Ketones _____
pH _____ Bilirubin _____
Albumin _____ Microscopic _____

54. **BLOOD TESTS**

WBC _____ Serology
RBC _____ Test _____
Blood Type and Rh ___

55. **PULMONARY FUNCTION**

FVC _____
FEV _____
FEV/FVC _____

56. **X-RAY**

Chest (14 x 17) _____
Lumbosacral Spine _____
Long Bone Series ___
Other _____

57. **ELECTROCARDIOGRAM**

Static _____

Stress or Exercise _____

58. **AUDIOGRAM PURE TONE**

HZ	500	1000	2000	3000	4000	6000	8000
Right							
Left							

59. **SMA-12** | **Drug Screen**

This examinee is:
( ) Fit for diving
( ) Fit for employment
( ) Unfit

This certificate is issued subject to conditions(s) that:
( ) No restrictions
( ) Restrictions: _____

Summarize findings resulting in disqualification:

_____

Date of Examination

_____

Name of Examinee

Name and Address of Physician (Print/Type)

_____

Signature of Physician

MEDICAL HISTORY

611.75m

(To be completed by applicant)

NAME:_____AGE:_____HEIGHT:__inches WEIGHT:_____pounds

ADDRESS:_____PHONE:(_____)

1. a. Do you have previous experience in diving? YES___NO
   b. Have you done any flying? YES___NO
   c. If yes, did you have trouble equalizing pressure in ears or sinuses? YES___NO
   d. Can you go to the bottom of a swimming pool without discomfort in the ears of sinuses? YES___NO

2. a. Do you participate regularly in active sports? YES___NO
   b. If yes, specify sports:
   c. If no, indicate exercise you normally obtain:

3. Have you ever been rejected for service or employment for medical reasons? YES___NO
   (If yes, explain in "remarks" or discuss with physician)

4. When was your last physical examination? DATE_____RESULTS

5. When was you last chest X-ray? DATE_____RESULTS
6. Have you had an electrocardiogram? YES___NO____DATE_____RESULTS
7. Have you had an electroencphalogram? YES___NO____DATE_____RESULTS

CHECK IF YOU HAVE OR HAD, ANY OF THE FOLLOWING. EXPLAIN IN "REMARKS", GIVE DATES & PERTINENT INFORMATION, OR DISCUSS WITH PHYSICIAN.

8. Frequent colds or sore throat . . . . . ___
9. Hay fever or sinus trouble . . . . . ___
10. Chronic trouble breathing through nose ___
11. Painful or running ear, mastoid trouble broken eardrum . . . . . ___
12. Hardness of hearing . . . . . ___
13. Asthma or shortness of breath after moderate exercise . . . . . ___
14. History of pleurisy . . . . . ___
15. Chest pain or persistent cough . . . . . ___
16. Fatigability. . . . . ___
17. Spells of fast, irregular or pounding heartbeat. . . . . ___
18. High or low blood-pressure . . . . . ___
19. Any kind of "heart trouble" . . . . . ___
20. Frequent upset stomach, heartburn or indigestion; peptic ulcer . . . . . ___
21. Frequent diarrhea or blood in stool . . . ___
22. Stomach or backache lasting more than a day or two . . . . . ___
23. Rheumatism, arthritis or joint trouble . . ___
24. Kidney or bladder disease; blood, sugar or albumin in urine . . . . . ___
25. Dizzy or fainting spells or fits . . . . . .
26. Trouble sleeping, frequent nightmares or sleepwalking . . . . . .
27. Nervous breakdown or periods of marked nervousness or depression. . . . . .
28. A phobia for closed-in space, large open spaces or high places . . . . . .
29. Any neurological or psychological condition
30. Train, sea or air sickness . . . . . .
31. Alcoholism or any drug or narcotic habit
32. Recent gain or loss of weight or appetite
33. Jaundice or hepatitis . . . . . .
34. Tuberculosis . . . . . .
35. Diabetes . . . . . .
36. Rheumatic Fever . . . . . .
37. Dental bridgework or plate . . . . . .
38. Susceptible to panic . . . . . .
39. Pain from altitude or flying . . . . . .
40. Broken bone, serious sprain or strain, dislocated joint. . . . . .
41. Head injury causing unconsciousness. . .
42. Severe or frequent headaches . . . . . .
43. Any serious accident, injury or illness not mentioned above . . . . . .

REMARKS

(Identify question number being explained)

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____I have not withheld any information and the above is accurate to the best of my knowledge.

Signature:_____

(Applicant) (Date)

I have reviewed this information with the applicant.

Signature:_____

(Physician) (Date)

MEDICAL EXAMINATION

611.75m

(To be completed by physician)

NAME:_____ **DATE OF BIRTH:**_____

ADDRESS:_____ **PHONE: (____)**_____

A. MEDICAL HISTORY: Is there significant history which would disqualify applicant from diving? **YES___ NO___**
(See accompanying Medical History)

B. EXAMINATION: Blood Pressure: Systolic_____ Diastolic_____ Post-exertion

Pulse rate - Resting_____/Minute After exercise /Minute

(Please check items below if considered abnormal and indicate under "remarks", the pertinent details.)

1. General appearance, including obesity, gross deformity, postural abnormalities . . . . . ___
2. Head and neck . . . . . ___
3. Eyes, visual acuity, need corrective lenses ___
4. Nose and sinuses . . . . . ___
5. Ears, including hearing, otitis, eustachian tube orifice, external perforations . . . . . ___
6. Spine. . . . . ___
7. Lungs and chest . . . . . ___
8. Heart. . . . . ___
9. Abdomen . . . . . ___
10. Inguinal rings . . . . . ___
11. Genitalia . . . . . ___
12. Anus and rectum. . . . . ___
13. Eye grounds exam . . . . . .
14. Upper extremities . . . . . .
15. Lower extremities . . . . . .
16. Neurological . . . . . .
17. Psychiatric, including apparent motivation regarding diving, emotional stability, claustrophobia . . . . . .
18. Skin reactions or eruptions . . . . . .
19. Breath holding test:____minutes____seconds
20. Chest X-ray . . . . . .
21. Chest fluoroscope . . . . . .
22. Valsalva maneuver . . . . . .
23. Mouth and throat . . . . . .
24. Oxygen tolerance test . . . . . .

REMARKS:

_____

_____

_____

_____

_____

_____

IMPRESSIONS:
(Check one)

☐ **APPROVAL -** I find no defects which I consider incompatible with diving.

☐ **CONDITIONAL APPROVAL -** I do not consider diving in this applicant's best interest, but find no defects which present marked risk. I have discussed my impression with the applicant.

☐ **DISAPPROVAL -** This applicant has defects which in my opinion clearly would constitute unacceptable hazards to his health and safety in diving.

Signature_____
Physician

Address_____

Phone (____)_____ **Date:**_____

NPD Form 285
MEDEXAM.FRM

ADVANCED AMERICAN CONSTRUCTION

AAC MANAGEMENT STANDARD

SMS 8- Commercial Diving Safety

EQUIPMENT PROCEDURE CHECK LIST

Advanced American Construction Safety Management Standard
EQUIPMENT PROCEDURES CHECKLIST

SMS 8- Commercial Diving Safety

Equipment Procedures Checklist

Before each Diving Project, use this form to evaluate your overall Diving Project Equipment Assembly. Use the guidelines for determination of appropriate Dive Station Assembly. Adjust this form as necessary to meet job specific requirements .

EQUIPMENT PROCEDURES CHECKLIST	
☐ **MOBILIZATION EQUIPMENT LIST**	Develop an equipment list determined by job specific requirements. Itemized Equipment Numbers.
☐ **Equipment Preparation**	Assemble Dive Station complete with Primary system and Secondary System. 1. Check equipment during setup. 2. Check Dive Helmets- Supply Hose, Communications, general conditions. 3. Check all equipment for superficial wear, tears, dents, distortion, or other discrepancies. 4. Check tools to be used during the dive for working condition.
☐ **Diver Equipment**	1. Dive Helmet. Nonreturn Valve. 2. Harness 3. Bailout Bottle (Record Pressure on Dive Log) 4. Weightbelt 5. Check Dive Suit general condition.
☐ **Diving Systems**	1. Check that the Primary & Secondary breathing supply is available with a capacity in terms of purity, volume, supply pressure to completely service all divers including decompression. 2. Check that system assemblies are free of other area hazards. Check hose routing. 3. Check Compressor Intake. Maintain clear of equipment exhaust. 4. Bleed Filters & Volume Tanks of condensed moisture. 5. Check inline valves. Secure and tag as required. 6. Check Supply Gauge Pressures. 7. Check HP cylinders for contents, pressure, and delivery capability.
☐ **Compressors**	1. Check that equipment is current with the Maintenance Program. 2. Check oil, fuel, and coolant fluid prior to startup. Add as required. 3. Check general operating conditions during warm-up of compressors. 4. Check valves for proper alignment. Label remote valves to prevent unauthorized operation. 5. Check belt and guard conditions.
☐ **Dive Hoses**	1. Check that hoses are in accordance with the Maintenance Program. 2. Ensure hoses are clear of deck hazards, and have a clear lead and are protected from damage. 3. Check hoses for general condition, observing for wear or other discrepancies. 4. Check hoses for fitting leaks. Tighten as necessary.

Advanced American Construction Safety Management Standard

EQUIPMENT PROCEDURES CHECKLIST

SMS 8- Commercial Diving Safety

Equipment Procedures Checklist

Before each Diving Project, use this form to evaluate your overall Diving Project Equipment Assembly. Use the guidelines for determination of appropriate Dive Station Assembly. Adjust this form as necessary to meet job specific requirements .

EQUIPMENT PROCEDURES CHECKLIST	
☐ **Systems Test**	1. Complete all Primary & Secondary Systems assembly. 2. Verify flow to Divers Helmets. 3. Verify Diver Communications. 4. Ensure Breathing Gas is suitable for working depth of the dive. 5. Check Primary & Secondary Air flow to Chamber Supply.
☐ **Recompression Chamber Checkout**	1. Check that the chamber is completely free and clear of all combustible materials. 2. Check Primary and Secondary air supply to chamber and all pressure gauges. 3. Check that the chamber is free of all odors or other "contaminants". 4. Hook up and test all communications. 5. Check all chamber BIBS supplies. Verify sufficient breathing media is available. 6. Check all doors and seals. 7. Verify location of medical kit, and maintain in close proximity of the chamber.
☐ **Final Preparations.**	1. Verify that all necessary records, logs, and timesheets are on the diving station. 2. Verify that time keeping device is at the dive station. 3. Check that appropriate decompression tables are readily at hand. 4. Establish safe means of diver access to the water.
☐ **Equipment Documentation**	Equipment testing ceritifications are to be performed and maintained testing frequency as indicated in appropriate test forms. (See attached test forms)-. **CERTIFICATE OF CHAMBER HYDRO TEST , CERTIFICATE OF DIVING HOSE INSPECTION, CERTIFICATE OF PRESSURE VESSEL INSPECTION, AND BREATHING AIR ANALYSIS.** 1. Equipment tested is to have visible label indicating test date, and/or Certification copy affixed to the equipment. 2. Equipment is to be retested after repair or alteration has been performed. 3. Testing documentation is to be on File and available upon request.

Advanced American Construction, Inc.
8444 NW St. Helens Rd. PO Box 83599
Portland, OR 97283
Phone: (503) 445-9000 • Fax: (503) 546-3031
Website: www.aadiving.com

CERTIFICATE OF CHAMBER HYDRO TEST

Hydro Test Pressure shall be 1.25 times the working pressure for PVHO Type 1 recompression chambers and 1.25 times the working pressure for PVHO Type 2 recompression chambers every three years, OR pneumatic test pressure shall be the max working pressure every three years.

TYPE OF INSPECTION: **HYDRO** / **PNEUMATIC**

1. Pressure at start of test: _____
2. Pressure at completion of test: _____
3. Time duration of test, minimum of 10 minutes: _____ Yes _____ No
4. Ambient air temperature at start of test: _____
5. Ambient air temperature on completion: _____
6. Equipment Serial Number: _____
7. Equipment Description: _____
8. External Appearance: Excellent _____
   Good _____
   Unsatisfactory _____
9. Internal Appearance: Excellent _____
   Good _____
   Unsatisfactory _____
10. Noxious Yes _____ No _____
    Corrective Action Taken: _____
11. Oil or Water Residues: Yes_____ No _____
12. Fittings Inspected: Yes_____ No _____
    Corrective Action Taken: _____
13. Is tank under US Coast Guard inspection codes: Yes_____ No _____
    Corrective Action Taken: _____

14. Pressure relief valve: _____ Yes P.S.I. Setting: _____

    Relief Valve Test: O.K _____ Yes _____ No

15. Flow Control Check Valve: _____ Yes _____ No

    Correction Action Taken: _____

16. Defects found and corrective actions taken:

    _____

    _____

I hereby certify that the test taken verify that this PVHO recompression chamber currently meets standards described under the US Coast Guard DOT Regulations, CFR 46 Subpart B, Commercial Diving Operations General Provisions, Subsection 197.462. Tests shall be performed hydrostatically every three years, or pneumatically every three years and/or after any repair, or alteration of the pressure boundary.

Test Date: _____

Test Operator: _____ Witness: _____

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Phone: (503) 445-9000 • Fax: (503) 650-8230
Website: www.aadiving.com

CERTIFICATE OF ANNUAL PRESSURE VESSEL INSPECTION

1. Equipment Serial Number: _____
2. Equipment Description: _____
3. External Appearance: Excellent _____ Good _____
4. Internal Appearance: Excellent _____ Good _____
5. Noxious Odor: Yes_____No _____
6. Oil or Water Residues Internal: Yes No _____
7. All connection fittings are Brass or Stainless: Yes _____ No _____
8. Is tank under USCG inspection codes? Yes_____ No_____
9. Pressure Relief Valve: Yes _____ P.S.I. Setting: _____
10. Flow Control Check Valve: Yes _____ No _____
11. Annual Pneumatic Test Pressure: _____
12. Hydrostatic or Pneumatic Test Date: _____ / _____

Notes: _____

_____

I hereby certify that the test taken verify that this pressure vessel is currently meeting the standards described under the A.S.M.E. codes for pressure vessels. Visual inspection shall be performed annually, hydrostatically tested every 5th year, pneumatically tested every 3rd year, and/or after any repair, and/or alteration of the pressure boundary.

Test Operator: _____ Test Date: _____

Advanced American Construction, Inc.

8444 NW St. Helens Rd. PO Box 83599
Portland, OR 97283
Phone: (503) 445-9000 • Fax: (503) 650-8230
Website: www.aadiving.com

CERTIFICATE OF COMPRESSOR SYSTEM FILTER INSPECTION

1. Equipment Serial Number: _____
2. Equipment Description: _____
3. External Appearance: Excellent _____
   Good _____
4. Internal Appearance: Excellent _____
   Good _____
5. Primary Filter Change: Yes _____
   No _____
6. Secondary Filter Change: Yes _____
   No _____
7. Noxious Odor: Yes _____
   No _____
8. Oil or Water Residue: Yes _____
   No _____
9. All Connection Fittings are Brass or Stainless: Yes _____
   No _____
10. Is Filter Under USCG Inspection Codes: Yes _____
    No _____
11. Flow Control Check Valve: Yes _____
    No _____

I Hereby certify that the test taken verify that this pressure vessel is currently meeting the standards described under the A.S.M.E. codes for filter vessels. Visual inspection shall be performed every six months or after any repair and/or alteration of the pressure boundary.

Test Operator: _____ Test Date: _____
Exp. Date: _____

Advanced American Construction, Inc.
8444 NW St. Helens Rd. PO Box 83599
Portland, OR 97283
Phone: (503) 445-9000 • Fax: (503) 650-8230
Website: www.aadiving.com

BREATHING AIR ANALYSIS
CGA INC. ANSI/CGA G-7

COMPRESSOR # OR BOTLE BANK_____

ANALYSIS TEST RESULTS		MAX
CARBON MONOXIDE	10 PPM	
CARBON DIOXIDE	1000 PPM	
OIL MIST	5.0	
OXYGEN	23.5%	
ODOR	NONE	

THE COMPRESSED AIR WAS TESTED FOR ALL OF THE ABOVE PARAMETERS AND DOES MEET THE REQUIREMENTS FOR GRADE D BREATHING AIR. THIS TEST SHALL BE TAKEN 6 MONTHS FROM THE PERFORMED DATE ABOVE.

DATE: _____

ANALYST: _____

Advanced American Construction, Inc.

8444 NW St. Helens Rd. PO Box 83599
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CERTIFICATE OF DIVING HOSE INSPECTION

Test results of Inspection:

1. Equipment Serial Number & Description _____

2. External Appearance: Excellent _____
   Good _____
   Unsatisfactory _____

3. Internal Pressure Test PSI:_____ Time:_____ Pass: _____ Fail: _____

4. Mechanical Fittings Appearance: Excellent _____
   Good _____
   Unsatisfactory _____

5. Mechanical Fittings to Hose Test 200 lbs. Pull 400 PSI
   Pass: Fail:

6. Pnemo Hose: Excellent _____
   Good _____
   Unsatisfactory _____

   Pass:_____ Fail: _____

7. Communication Cable:
   Excellent _____
   Good _____
   Unsatisfactory _____

   Pass: _____ Fail: _____

8. Communication Audio Test: Pass: Fail:

9. Oil or Water Residues Internal: Yes _____ No

I hereby certify that the test described above have been conducted as detailed. Tests shall be performed on an annual basis.

Test Operator:_____ Test Date : _____

ADVANCED AMERICAN CONSTRUCTION

AAC MANAGEMENT STANDARD

SMS 8- Commercial Diving Safety

EMERGENCY PROCEDURES

DIVE PLANS

Advanced American Construction, Inc.
Marine Construction and Consulting
8444 NW St. Helens Rd.
P.O. Box 83599
Portland, OR 97283
503 – 445 – 9000
FAX 650-8230

Dive Plan and Specifications

PROJECT TITLE: _____
PROJECT OWNER: _____
AAC JOB #: _____
DIVE PLAN SUBMITTED - _____

SECTION 10) Date of Dive and Dive Locations:

(Table 10 A)

DATE	**LOCATION**

SECTION 20) Purpose of Dives:
Divers will perform the following tasks:

_____
_____
_____
_____

SECTION 30) Dive Personnel: _____
_____
Crew members may change slightly prior to the work date. Any changes made shall be coordinated through the DDC to ensure compliance. All diver qualification information is located at the ACOE Portland District Office, through Rick Benoit, DDC, and at the AAC Portland, Oregon Office.

SECTION 40) Work Rotation: A man dive crew will be used for the described tasks outlined in section 20. Work will be performed in a single 8 - 10hr. shifts. Work rotation will be determined by the on-site Dive Supervisor. The Dive Supervisor will take in account for task familiarity, physical condition, health and recent hyperbaric exposure. Indicated dive team personell may change prior to the job date due to required dive crew size and availability. The dive plan shall be modified indicating modifications / changes in dive team personnel.

SECTION 50) Dive Supervisors:_____. All Dive Supervisor qualification information is on file at the Advanced American Construction, Oregon City Office, and US Army Corp of Engineers, Portland District Office, through Rick Benoit, DDC.

SECTION 55) Dive Crew Personnel:

- **A.** Dive Crew Personnel outlined in table 55 A includes sufficient crew for performing dives to a depth of_____fsw, and if decompression is required.
- **B.** Dive Crew Personnel outlined in table 55 A may be altered as job requirements dictate.
- **C.** Positions (Description) rotate among dive team personnel throughout daily operations.

(Table 55 A)

DESCRIPTION	**QUANTITY**
Dive Supervisor (s)	
Diver (s)	
Standby Diver (s)	
Tender (s)	
Time Keeper (s)	
Chamber Operator (s)	

SECTION 60) Time of Dive: Between _____hours and _____ hours.

SECTION 70) Type of Dive: Surface-Supplied Air Dive.

SECTION 80) Depth of Dive:

A. Depths indicated are based off Reference depths from Dive Operations Specifications.

NOTE: (Verification of water depth should be made onsite as to account for fluctuation in pool elevation and increased water depth)

(Table 80 A)

LOCATION	**MAXIMUM DIVE DEPTH**
	_____FSW
	_____FSW
	_____FSW

SECTION 90) Dive Tables:

- **A.** US Navy No Decompression Tables
- **B.** US Navy table 7-4 Residual Nitrogen timetable for repetitive dives
- **C.** US Navy table 7-5 Standard Air Decompression Table

SECTION 100) Individual Dive Time:

(Table 100 A)

LOCATION	Water Depth FSW	DIVE SCHEDULE	PLANNED DIVE TIME (min.) No Decompression Required	MAXIMUM DIVE TIME (min.) No Decompression Required

SECTION 110) Decompression:

- **A.** No decompression will be planned for work conducted at this location, and at this planned depth unless can be performed safely, and not interfere with site operations and activity.
- **B.** Limit In Water Decompression to manageble requirement, accounting for Inherent site conditions.

SECTION 120) Water Temperature: Approximately_____degrees Fahrenheit.

SECTION 125) Thermal Protection: Dry Suit

SECTION 130) Water Turbidity (Diver Visibility): Approximately to feet.

SECTION 140) Diving Inspector:

- **A.** Owner Representative

SECTION 150) Pre-Dive Conference:

- **A.** A daily on-site meeting will be held at the begining of each work shift, and reviewed prior to individual dives. Topics are subject to, but not limited to the following:
  - **a.** Lock out of potential energy hazards.
  - **b.** Scope of work to be performed by the dive crew.
  - **c.** Diving personnel will have their positions designated prior to the start of the dive.
  - **d.** Review of Lock out energy hazards.
  - **e.** Conflicting work occuring in vicinity of dive operations.
  - **f.** Review of Dive Plan, Emergency Management Plan, and Hazard Analysis.

SECTION 155) Post-Dive Conference:

- **A.** Upon completion of each diving operation, or at the end of each work shift, a dive team briefing shall be conducted. Topics are subject to, but not limited to the following:
  - **a.** Advised of location of nearest recompression chamber
  - **b.** Reflect on the days activity, Review the positive points, near misses, and lessons learned.
  - **c.** Cautioned to limitation of post dive activity
    - **i.** Repetitive Dives
    - **ii.** Flying or ascent to altitude.

SECTION 160) Diver's Documentation:

A. Dive Team Personnel have records on file in the Advanced American Construction, Inc. Oregon City Office, and with the Army Corp of Engineers Portland Districts Office. Personnel records include, and are not limited to the following:

- **a.** Commercial Dive Certifications
- **b.** OSHA 10 Course - Collatoral duty of Supervisor.
- **c.** Current Physical
- **d.** CPR Certification
- **e.** First Aid Certification
- **f.** Oxygen Provider Certification
- **g.** Hazardous Waste Operations Training - 40 hr.

SECTION 170) Special Equipment and Tools used:

A. Tools required for the scope of work to be performed are to be listed.

(Table 170 A)

Equipment & Tool Description	**NOTES:**

SECTION 180) Special Hazards:

A. Clearances Required: All necessary clearances will be approved and supervised by the on-site Dive Supervisor and Dive Safety Inspector. Clearances to be reviewed and explained to the Dive Supervisor, so there is a clear understanding what may impact the dive operation.

B. The dive will proceed after machinery and equipment that may impact the dive is tagged out and confirmed through the safe clearance proceedure.

- **a.** Items that are tagged out are to be reviewed with dive team personnel. (Section 150)

C. The Dive Master and The Owner Representative shall be in continuous communication by radios. (Through onsite DSI)

- **a.** Crane operations working with the dive crew shall include external voice speakers capable of being heard by the crane operator.
- **b.** The Crane operator working with the dive crew is to only acknowledge crane signals given by the Dive Master.
- **c.** Crane operator to maintain position at Crane during diving operations.

SECTION 190) Emergency Services:

A. Emergency Numbers must be posted at the job site / Dive Station.

B. Reference: **EMERGENCY MANAGEMENT PLAN.**

C. Emergency Phone Numbers Project Specific must be entered in space provided.

a. Advanced American Construction, Inc. 503-445-9000

b. Project Phone:

c. Hospitals: **911**

d. Ambulances: **911**

e. Police **911**

f. Air Support: Life Flight (Also 911) 800-452-7434

g. Air Lift Northwest: 800-426-2430

h. Chemtrec 800-424-9300

i. Divers Alert Network: 1-919-684-8111

j. Offsite recompression Chamber

Providence Med. Center Portland, OR 503-215-1111

Virginia Mason Med. Center Seattle,WA 206-223-2385

k. Rick Benoit - ACOE DDC Portland District 503-808-4312

Rick Benoit - CELL: 503-705-6731

l. Mike Remmington – ACOE DDC Walla Walla Dist. 509-282-7731

m. Doctors

1. William Spisak – Providence Med 503-282-7731
2. Kevin Walters – Hyperbaric MD
    1. Cell Phone 503-314-1030
    2. Home Phone 503-825-1595

SECTION 200) Operational Procedures:

A. The dive will proceed as related machinery and equipment to the dive have been tagged out and confirmed through the safe clearance procedure.

B. Voice communications will be established with the diver from the surface and backed up with line pull signals. In the event that voice communications are lost, the diver shall be signaled by line pulls to surface immediately, and diving operations will be curtailed until voice communications can be reestablished.

SECTION 210) Minimum Required Equipment:

1. Air Supply Systems
    - Dedicated Primary Air Supply Source - Compressor or HP Air.
    - Secondary Emergency air supply - Compressor or HP Air
    - Dive Rack - Monitor air supply with valves and gauges.
2. Knife for each diver.
3. Pneumo-fathometer.
4. Diving Signal Chart for tending lines.
5. Full surface supplied outfit with hard hat.
6. Communications system.
7. First-aid kit, min. 16 unit OSHA approved.
   Backboard/Stokes Litter with floatation and 4 straps with quick-release buckles
8. Compressor with filters for breathing air. Sufficient fuel for job.
9. Minimum of 300 feet of air hose. (2 ea.)
10. Current U.S. Navy Dive Manual.
11. Provide a written record and video (DVD or VHS format) recording of the dive to Owner Representative
12. ABC fire extinguisher.

13. Corps required diving equipment (EM 385-1-1,Section 30. E.)
14. Miscellaneous common hand tools, including tape measures.
15. Bailout Bottle (minimum 30 cubic ft.)
16. Recompression Chamber
17. Dive Flag (Alpha and Divers Down flag)

SECTION 220) Individual Dive Plan:

A. Divers tasks include the following steps: (This space provided for additional space only. To be used for activity not outlined or discussed in section 20. Change in dive plan must be authorized by the DDC.)

SECTION 230) Comprehensive Dive Plan:

The dive operations will be conducted as outlined in Section 20. Chamber operations (if required) will be performed by the Dive Supervisor or designated tender working under the direction of the Dive Supervisor. Periods of which diving is required will be scheduled with the Owner Representative. The Dive Crew will review for appropriate SAFE CLEARANCE (LOCKOUT).

Surface Supplied Air Diving will be utilized for this project. Primary & Secondary suface supplied air systems will supply the diver air. Primary Air supply will be supplied from a designated / Isolated 350 cfm Air Compressor system. Secondary source will be supplied through a secondary HP Bottle Bank system. Systems are plumbed to the Dive Rack, in which operational systems may be monitored. Divers umbilical hose / air hose and communications will be maintained continuously between the diver and the top side crew. A tertiary air supply, or "30 cf bail out bottle" will be worn by the diver. Decompression, if required, will be performed "in water", referencing the US Navy Standard Air Decompression Table.

Surface supply air equipment components meet regular certification and inspection. Documentation is submitted prior to operations, and is also attatched to each component as required.

Divers working under this contract will have current record of ADC certification, First Aid / CPR training, Oxygen Provider, Nitrox Certification, Hazardous Materials Training, and Anual medical evaluation. Working divers are on record with the USACOE Portland District as qualified personel. Daily records will be maintained, and will be provided to the USACOE Dive Safty Inspector daily.

Daily predive meetings will be held, discussing the days workplan activity and review of the attached Emergency Management Plan and Hazard Analysis. Any deviation from this basic outline will be adressed for approval with the onsite Owner Representative, specified in the predive meeting, and added to the dive plan in Section 220.

SECTION 240) Final Statement:

- **A.** If for any reason the dive plan, as approved, is altered in mission, depth, personnel, or equipment, the Owner Representative shall be contacted in order that they might review any revision and accept the alteration prior to actual operation. Presentation of the alteration or any deviation from this basic outline will be to the Owner Representative for approval.
- **B.** All diving activities will be accomplished in accordance with:
  - **a.** EM 385-1-1, 3 November 2003, U.S Army Corp of Engineers Safety and Health Requirements Manual, Section 30, Contract diving Operations.
  - **b.** NPPR 385-1-93 Portland District USACE, Diving Safety Regulation.
  - **c.** NAVSEA 0910-LP-106-0957 U.S NAVY Diving Manuals.
  - **d.** Occupational Safety and Health Standards, 29, CFR 1910, SubpartT.
  - **e.** Association of Diving Contractors (ADCI) Consensus Standards for Commercial Diving and Underwater Operations - 2004.

Only those individuals who have received approval by the Owner Representative will be used in the performance of this contract.

- **C. REQUIREMENTS OF Owner Representative_____.**
  - **a.** During diving operations, the Owner Representative will be available on an as-needed basis.
  - **b.** Confirmation of equipment being tagged out under the safe clearance procedure shall be confirmed by the Dive Supervisor and Owner Representative, and reviewed with the Dive Team prior to daily dive operations.

This dive plan has been accepted this _ _ day of _ _____, 2008

_____ _____

Owner Representative **Dive Supervisor- Advanced American Construction**

Advanced American Construction, Inc.

Marine Construction and Consulting

8444 NW St. Helens Rd.
P.O. Box 83599
Portland, OR 97283
503 – 445 – 9000
FAX 650-8230

Emergency Management Plan

PROJECT TITLE: _____

_____

_____

AAC JOB #:

EMERGENCY MANAGEMENT PLAN - Rev. # Date:

PLAN PREPARED BY:

DATE	LOCATION

Notice is hereby given that Advanced American Construction, Inc. Has set forth the following operations policy:

Safety shall be the prime consideration of all officers and employees of Advanced American Construction, Inc. All employees shall read and receive a copy of the comprehensive and continuing safety program.

In the planning of diving operations, the job superintendent or designated "Person in Charge" shall carefully observe the state of the water conditions, weather tides currents and any other potential hazards that may be encountered, both above and underwater.

Further, all officers and employees of Advanced American Construction, Inc. shall comply with all aspects of the Oregon Safety Code for Places of Employment, Chapter 25, Commercial Diving and Compressed Air Work, of the workmen's compensation board; sub part, "The Commercial Diving Operations" of the Occupational Safety and Health Standards act; U.S. Army Corps of Engineers safety manual as they pertain to each individual job.

Each employee shall hold a current Red Cross First Aid, CPR, O2 provider and maintain a current annual physical.

In the event of an accident, all work shall be suspended and all necessary action taken to insure the welfare of the injured person. The Advanced American Construction, Inc. office shall be notified immediately of the accident and the necessary reports shall be completed. No work shall continue until a solution has been devised to prevent further accidents. When questions occur as to an operation, the senior Dive Supervisor or diver shall be responsible to adhering to both AAC Operations Manual and Safety Manual.

If the solution cannot be found within these manuals and any type of safety is in question, no other work shall be performed until such time as it has been approved by the Advanced American Construction, Inc. office.

All necessary clearance shall be taken and tagged out during the diving operation. Hazardous sources that are identified and tagged out, must be reviewed with the working dive team.

Emergency Phone Numbers & Transport Plan.

All emergencies – The primary means of activating emergency services shall be through the Project Inspector, via the on-site Dive Safety Inspector (DSI), who will be in direct contact with the Project Control Room during the progress of work. The secondary means of activating the emergency services will be through an onsite phone located in the Dive Station. Verify that Emergency Phone contacts are accurate for location of the work. **(Phone #'s verified for accuracy by_____ Date:_____)**

Transport of subjects as deemed applicable to the nature of the injury. Primary means of transport is maintained through Activation of emergency response systems for transport of subjects. If not possible, Secondary means of transport is through self resources.

Onsite determination is required - Secondary means must only be implemented in the event the primary systems are not effective. Identify location for egress, vehicle transportation, and emergency services location. **(ref. attached contact phone numbers & map directions).**

All coordination will be the responsibility of the onsite Dive Supervisor, or Designated Person in Charge (DPIC). Maintain emergency phone numbers, and Map directions for emergency facilities. A checklist is provided for jobsite specific details, and is to be completed onsite and reviewed in Daily Pre Dive Meetings.

WORKSITE CHECKLIST - SECONDARY VICTIM TRANSPORT

1. Location of emergency equipment onsite - _____
2. Optimal location for egress of victim -_____
3. Transport Vehicle & Location - _____
4. Vehicle Location (Near Egress Location) - _____
5. Driver of Vehicle - _____
6. Secondary Driver of the Vehicle -_____
7. Map Directions to Emergency Facility -_____

PROJECT ADDRESS:

Emergency Phone Numbers

a.	Advanced American Construction, Inc.		**503-650-8207**
b.	Project Phone:		
c.	Hospitals:		**911**
d.	Ambulances:		**911**
e.	Police		**911**
f.	Air Support: Life Flight (also 911)		800-452-7434
g.	Air Lift Northwest:		800-426-2430
h.	Chemtrec		800-424-9300
i.	Divers Alert Network:		1-919-684-8111
j.	Offsite recompression Chamber		
	Providence Med. Center Portland, OR		503-215-1111
	Virginia Mason Med. Center Seattle, WA		206-223-2385
k.	Project Contact:		
l.	**Doctors**		
	William Spisak Providence Med.		**503-282-7731**
	Kevin Walters Hyperbaric MD	**Cell**	**503-314-1030**
		Home	**503-825-1595**

NOTES:

Additional Space for Applicable Project Phone Numbers:

_____

_____

_____

DIRECTIONS TO MEDICAL FACILITY:

_____

_____

_____

_____

_____

Onsite Emergency Response Equipment

Emergency Equipment required onsite:

- Communications - VHF Radio, Cell Phone
- First Aid Kit
- Fire Extinguishers (1 for each piece of operating equipment)

Equipment is to be maintained onsite at an accessible location.

Emergency Procedures.

Procedure to deal with entrapped or fouled diver.

Dive Supervisor shall talk to the diver and direct the diver to follow and coil his hose to the point of the foul at this time the diver shall try to free his hose. If the diver is unsuccessful, the Standby Diver in the water will assist the first diver in freeing his hose. Both divers shall then return to the surface.

Action upon loss of vital Diver support equipment.

1. Establish standby breathing media system.
2. Order the diver to surface immediately.
3. Inform the diver of the situation as he ascends toward the surface.
4. Abort dive until the cause has been fully corrected.

Action upon loss of air.

1. Re-establish breathing media supply by:
   - Activating topside secondary breathing media supply.
   - Notify diver to go on bail-out bottle
   - Activate pnemo air supply for possible insertion into diver's helmet.
2. Alert the standby diver. If required, send standby diver to diver for assistance.
3. Diver to resurface, and abort dive until the cause has been fully corrected.

Action upon loss of communications.

1. Attempt to establish line-pull signals.
2. Put air to diver's pnemo.
3. Alert Standby diver. Send standby diver if line-pull signals cannot be established.
4. Signal diver to leave bottom. Stop diver at water stops if required.

Lost Diver Plan.

Surface supplied diver maintained with umbilical. If the diver should become confused as to his position on the bottom, the divemaster shall order him to face his air supply hose (umbilical). The surface crew will pick up on the divers hose (umbilical) and bring him to the surface for reorientation.

Injured Diver In Water Plan.

1. Diver informs topside / determine nature of injury.
2. Alert standby diver, and diploy standby diver if further assessment is needed, or to assist diver to surface.
3. Proper decompression should be followed unless the extent of the injury does not allow completion inwater.
4. Apply first aid as necessary and transport as applicable to injury. Coordinate and notify medical assistance and emergency evacuation if necessary.

Action upon discovery of fire.

1. Remove Diver from water immediately if in imminent danger, accounting for required decompression.
2. Control fire. Fire extinguisher, water or smother.
3. Contact Project Representative.
4. Contact Local Fire Department if necessary.

Severance of Divers Umbilical.

1. Establish gas supply to diver's pnemo.
2. Diver activate bail-out bottle.
3. Alert standby diver, and diploy standby diver if communications Can not be established via. 2-way or line pulls signals.
4. Terminate dive, return diver to surface, and follow proper decompression procedure if applicable.

Oxygen Toxicity in Water.

1. Noted signs of oxygen toxicity or symptoms reported by the diver.
2. Reduce Oxygen partial pressure (switch to air).
3. Ventilate and wait for symptoms to subside, then wait for 15 minutes.
4. Recommence oxygen at point of interruption.
5. If symptoms recur, switch to applicable air schedule.

Emergency Evacuation.

1. Notify diver of emergency and terminate the dive.
2. Decompress diver according to applicable decompression schedule if diver is not in imminent danger.
3. If in danger follow omitted decompression procedures.
4. Evacuate unessential crew to a safe area.
5. Inform onsite representative and home office and inform them of conditions.

Diver Blow Up / Uncontrolled Ascent.

1. Definition: Unexpected surfacing of the diver from depths in excess of 20 feet.
2. Diver must exhale continuously to avoid embolism.
3. Diver to slow ascent by exhaust of air from suit (if applicable), and position body in horizontal position to increase body surface area.
4. If diver is within no decompression limits, upon surfacing should be observed for at least 1 hour, for potential symptoms.
5. Implement Omitted Decompression procedure for Uncontrolled Ascent requiring decompression.

Diver Loss of Consciousness.

1. Evaluate the situation, and potential hazards.
2. Verify the gas supply and switch to standby system if contamination is suspect
3. Alert standby diver, and deploy standby diver if further assessment is needed, or to assist diver to surface.
4. Standby diver to ventilate Divers hat, and reposition the diver to open the airway.
5. Proper decompression should be followed unless the diver has not regained consciousness, and does not allow completion in water.
6. Apply first aid & CPR - Recompress and treat accordingly.

Injury of Topside Crew with Diver In Water.

1. Notify diver of emergency and terminate the dive.
2. Decompress diver according to applicable decompression schedule if diver is not in imminent danger.
3. Implement First Aid as required, and take care of the Topside emergency.

Man Overboard

1. Notify diver of emergency and terminate the dive.
2. Decompress diver according to applicable decompression schedule if diver is not in imminent danger.
3. Alert Crew & deploy life ring to aid in the recover of Man Over Board.
4. Personnel exposure to cold water (Man Overboard)
    a) Minimize movement, do not swim unless can reach a fellow survivor, boat, or floating object. Swimming lowers body temperature.
    b) Maintain head and body out of the water to fullest extent possible. If available, pull up on large debris to decrease body exposure to water. (fig. 1)
5. Deploy Safety Boat and/ or alert BRZ Boat (If Applicable) as required to assist in recovery.
6. Upon recovery implement First Aid as required.

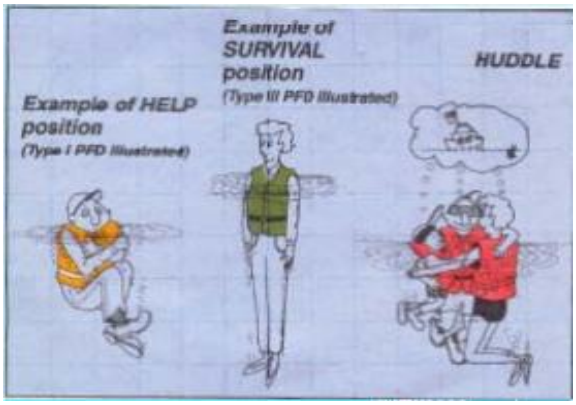

Fig. 1 Survival Position

ADVANCED AMERICAN CONSTRUCTION

AAC MANAGEMENT STANDARD

SMS 8- Commercial Diving Safety

JOB SAFETY ANALYSIS

STANDARD FORM

Advanced American Construction

ADVANCED AMERICAN CONSTRUCTION, INC.

DIVING DIVISION

8444 NW St. Helens Rd. P.O. Box 83599

Portland, Oregon 97283

503-445-9000 *Fax 503-650-8230*

www.aadiving.com

Job

PROJECT TITLE:

DESCRIPTION:

AAC JOB #:

DATE:

HAZARD ANALYSIS

Steps	Issues	Job Requirements	OK
Mobilization	Access to jobsite	Use Owner approved staging area and access locations.	
	Active Construction Operations	Be aware of concurrent activity that is occurring near the worksite. ie. crane operation, overhead work, construction operations.	
	Equipment Failure	Inspect equipment daily - Refer to AAC Equipment Procedures Checklist (SMS 4 - Appendix C)	
		Preventative maintenance to be conducted on regular intervals.	
	Pre job safety meeting	Perform safety meeting with review of scope to be performed.	
		Identify any potential hazard for lockout - tag out. Isolate potential hazard through the safe clearance procedures.	
Diving Operations	Dive Planning & Pre-Dive Meetings	Perform clearances under safe clearance procedures.	
		Review Clearances with Dive Team Personnel, and inform what hazards are applicable.	
		Review the scope of work to be performed.	
		Review Pertinent Dive Tables.	
	Water Safety	Life Jackets to be properly worn at all times while on the water.	
	Diver access, water entry.	Enter water from not more than 3 feet.	
		Establish Safe Access for Divers.	

Steps	Issues	Job Requirements	OK
	Equipment malfunction.	All equipment shall be inspected prior to the commencement of each dive and malfunctions shall be corrected before the dive begins.	____
		Perform equipment and systems inspection prior to each dive.	____
	Debris in water.	Divers and tenders to look for debris in water prior and during diving operation.	____
	Dive hoses, dive suits, communication equipment.	Check all hose for ware or abrasion or damaged fittings, repair or replace if required.	____
		Check divers equipment. Log bailout pressure in the dive record sheet.	____
		Check lead of hoses to verify condition does not interfere with other equipment, heat sources, or construction activity equipment.	____
	Dive hose fouling.	Diver will be tended in such a manor to minimize hose fouling.	
	Divers dress in area.	Inspect suit for tears, damaged fittings and proper size for the diver.	____
	Divers communications.	Check communications prior to dive, have spare communication box set up at dive station. Make sure all members of the dive crew know the divers line pull signals.	____
		When two divers are in the water at the same time, and crane operations are involved: 1) Confirm Signal with both divers. 2) Crane Signals to be given by Dive Master Only.	____
	Use of Crane.	Crane operator to take signals from the Dive Master, Stay clear of all loads.	____
		Divers to be aware of pinch points during in water operations involving crane.	____
	Dive records.	Dive records shall be kept for each diver for each dive. Stopwatches will be kept separately for each diver. Emergency operations manual will be on site.	____

Steps	Issues	Job Requirements	OK
Decompression Diving	Decompression Sickness (The Bends)	Follow the applicable dive table & Schedule. US Navy Unlimited / No Decompression Limits and Repetitive Group Designation Table. US Navy Residual Nitrogen Timetable for Repetitive Dives. US Navy Standard Air Decompression Table.	____
		Pneumofathometer, use only a calibrated Pneumo or physically measure the divers depth.	____
		Only qualified personnel to track divers bottom time and decompression schedule.	____
		Depth of Dive: Track divers deepest depth, maximum depth, and decompression stage depth.	____
		Ascent Time: Track accurately divers ascent time, for the depth of dive.	____
		Surface Interval: Track time out of water, between dives.	
		Time keeper to monitor depth and bottom time closely.	
		Place diver on oxygen and transport to the nearest recompression chamber or hyperbaric facility as soon as possible.	____
		Enter into Guidelines for Treatment Of Decompression Incidents Flow Charts. Treat as applicable.	____
		Notify AAC main office. Implement Line of Communication through Emergency Management Plan.	____
	Hydration	Provide clean drinking water at the dive station at all times. Make sure that dehydration is prevented by asking each diver to drink plenty of liquids before each dive and that when the diver surfaces that the tender or the Dive Supervisor reminds the diver to drink some liquids.	____

Steps	Issues	Job Requirements	OK
	Omitted Decompression	NO SYMPTOMS: If the 30 FSW or deeper stops were not completed - TREAT US Navy Treatment Table 5 - if less than 30 minutes of omitted decompression. US Navy Treatment Table 6 - if equal or greater than 30 minutes of omitted decompression.	____
		Enter Flow Charts for Omitted Decompression.	
General duties	Emergency preparedness	Participate in emergency drills and be aware of evacuation routes	
		Make sure that medical emergency numbers, names and telephone numbers of designated physicians, ambulance service and hospitals are posted	____
		Make sure that first aid providers are onsite and supplies are adequate for chemical and physical hazards present; and that MSDS's and early return to work packets are available	____
		Know where the first aid supplies are located and who the responders are.	____
		Scheduled testing of air systems & hoses.	____
		Ensure Dive Station is clear of other deck equipment and hazards.	____
		Trace out Dive Station system ensure primary & secondary systems are operational.	____
		Perform pre dive equipment checks,	____
	Dive Support Boat.	Wear hard hat	____
		Wear safety shoes or devices for any tasks where objects that could cause foot injuries could drop	____
		All project personnel shall keep appropriate look out for river traffic in area.	____
		If contact cannot be made with incoming traffic, the diver should be alerted to situation in case he has to leave the bottom to avoid any close calls with river traffic.	____

Steps	Issues	Job Requirements	OK
	Dive Support Boat.	Secure motors while the diver is in the water.	
		Notify the diver if barge movement is to occur while the diver is in the water.	____
		Notify transfer boat of when diver is in the water.	
		Display Divers Alpha flag when diver is in the water to give notice to other crew and river traffic that dive operations are in progress.	____
	Exposure to high noise Environments or tasks	Wear properly fitted hearing protection that has an adequate hearing protection rating for the noise levels to which you are exposed. Inspect and repair or replace as needed	____
	Slips/trips/falls	Do clean-up of work area prior to all breaks and at the end of each shift	____
		Report any areas that are continual problems to supervisor and safety committee immediately to correct	____
		Wear shoes with non-slip soles	
		Keep all work surfaces well maintained and free of trip, and slip hazards	____
		Keep work areas organized and free from debris and trip hazards (extension cords/tools). Clear obstructions in work area that may be a hazard.	____
Equipment to be used.	Surface Supply Dive Equip.	Air compressor Systems Air purity check every 6 months, and documented.	____
		Maintain system Air purity checks with each operation.	
		Non return valve on Divers Hat to be checked prior to each dive.	
	Video Equipment.	Visual inspection of all electrical connection and wire jacket conditions.	____
	Under water Burning & Welding	Adequate grounding of system.	
		Welding cables, electrode holders and connections shall be properly insulated, and capable of carrying the minimum current required by the work.	____

Steps	Issues	Job Requirements	OK
		Welding electrical circuits shall have a positive disconnect switch (knife switch). The knife switch shall remain open except at diver command during actual welding or burning.	____
		Insulated gloves shall be worn.	____
		To avoid explosion, properly vent closed compartments to prevent build up of explosive inert gas.	____
	Hand-Held Power Tools	Tools shall have a constant pressure switch control.	____
		Hand-held power tools shall not be supplied with power from the dive location until requested by the diver.	____
		Diver to verify area clear before hand-held power tools are used .ie. dive hose, power hose, other divers hose.	____
	Use of Crane.	Crane operator to take signals from the Dive Master, Stay clear of all loads.	____
		Divers to be informed by topside communications of crane movement. An external speaker in connection with the working diver will be installed to keep topside crew informed of diver crane signals.	____
Additional Steps: (TO BE ADDED ONSITE)	1.	A.	____
		B.	____

ADVANCED AMERICAN CONSTRUCTION, INC.
DIVING DIVISION
8444 NW St. Helens Rd. P.O. Box 83599
Portland, Oregon 97283
503-445-9000 *Fax 503-650-8230*
www.aadiving.com

PROJECT TITLE:
DESCRIPTION:

AAC JOB #:

DATE:

HAZARD ANALYSIS

The Dive Master has reviewed all applicable safe clearances, and reviewed them with the dive team members. The contents of this JSA, including added protective measures identified onsite, have been reviewed.

SIGNATURES OF MEETING ATTENDEES

1)	11)
2)	12)
3)	13)
4)	14)
5)	15)
6)	16)
7)	17)
8)	18)
9)	19)
10)	20)

DIVE SUPERVISOR

OWNER REPRESENTATIVE / INSPECTOR

ADVANCED AMERICAN
CONSTRUCTION, INC.
DIVING DIVISION
8444 NW St. Helens Rd. P.O. Box 83599
Portland, Oregon 97283
503-445-9000 *Fax 503-650-8230*
www.aadiving.com

PROJECT TITLE:
DESCRIPTION:

AAC JOB #:

DATE:

DAILY PRE-DIVE MEETING

DATE_____ **MEETING NO.**_____

LOCATION OF DIVE: _____

DIVE MASTER: _____

CLEARANCES REQUIRED: _____

_____

CLEARANCES APPROVED: YES ☐ **NO** ☐

SPECIAL HAZARDS DISCUSSED: _____

_____

_____

_____

_____

DIVERS: _____

_____

_____

STANDBY DIVER:_____

TENDERS:_____

TIME KEEPER:_____

CRANE OPERATOR:_____

DIVE SAFETY OFFICER:_____

SIGNATURES OF ATTENDEES:

1.	**6.**
2.	**7.**
3.	**8.**
4.	**9.**
5.	**10.**

ADVANCED AMERICAN CONSTRUCTION

AAC MANAGEMENT STANDARD

SMS 8- Commercial Diving Safety

DIVE TABLES

TREATMENT TABLES

Table 9-7. *No-Decompression Limits and Repetitive Group Designators for No-Decompression Air Dives.*

Depth (fsw)	No-Stop Limit	Repetitive Group Designation															
		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	Z
10	Unlimited	57	101	158	245	426	*										
15	Unlimited	36	60	88	121	163	217	297	449	*							
20	Unlimited	26	43	61	82	106	133	165	205	256	330	461	*				
25	595	20	33	47	62	78	97	117	140	166	198	236	285	354	469	595	
30	371	17	27	38	50	62	76	91	107	125	145	167	193	223	260	307	371
35	232	14	23	32	42	52	63	74	87	100	115	131	148	168	190	215	232
40	163	12	20	27	36	44	53	63	73	84	95	108	121	135	151	163	
45	125	11	17	24	31	39	46	55	63	72	82	92	102	114	125		
50	92	9	15	21	28	34	41	48	56	63	71	80	89	92			
55	74	8	14	19	25	31	37	43	50	56	63	71	74				
60	60	7	12	17	22	28	33	39	45	51	57	60					
70	48	6	10	14	19	23	28	32	37	42	47	48					
80	39	5	9	12	16	20	24	28	32	36	39						
90	30	4	7	11	14	17	21	24	28	30							
100	25	4	6	9	12	15	18	21	25								
110	20	3	6	8	11	14	16	19	20								
120	15	3	5	7	10	12	15										
130	10	2	4	6	9	10											
140	10	2	4	6	8	10											
150	5	2	3	5													
160	5		3	5													
170	5			4	5												
180	5			4	5												
190	5			3	5												

* Highest repetitive group that can be achieved at this depth regardless of bottom time.

Table 9-8. *Residual Nitrogen Time Table for Repetitive Air Dives.*

Locate the diver's repetitive group designation from his previous dive along the diagonal line above the table. Read horizontally to the interval in which the diver's surface interval lies.

Next, read vertically downward to the new repetitive group designation. Continue downward in this same column to the row that represents the depth of the repetitive dive. The time given at the intersection is residual nitrogen time, in minutes, to be applied to the repetitive dive.

* Dives following surface intervals longer than this are not repetitive dives. Use actual bottom times in the Air Decompression Tables to compute decompression for such dives.

	Repetitive Group at the End of the Surface Interval															
Dive Depth	Z	O	N	M	L	K	J	I	H	G	F	E	D	C	B	A
10	**	**	**	**	**	**	**	**	**	**	**	427	246	159	101	58
15	**	**	**	**	**	**	**	**	450	298	218	164	122	89	61	37
20	**	**	**	**	**	462	331	257	206	166	134	106	83	62	44	27
25	†	†	470	354	286	237	198	167	141	118	98	79	63	48	34	21
30	372	308	261	224	194	168	146	126	108	92	77	63	51	39	28	18
35	245	216	191	169	149	132	116	101	88	75	64	53	43	33	24	15
40	188	169	152	136	122	109	97	85	74	64	55	45	37	29	21	13
45	154	140	127	115	104	93	83	73	64	56	48	40	32	25	18	12
50	131	120	109	99	90	81	73	65	57	49	42	35	29	23	17	11
55	114	105	96	88	80	72	65	58	51	44	38	32	26	20	15	10
60	101	93	86	79	72	65	58	52	46	40	35	29	24	19	14	9
70	83	77	71	65	59	54	49	44	39	34	29	25	20	16	12	8
80	70	65	60	55	51	46	42	38	33	29	25	22	18	14	10	7
90	61	57	52	48	44	41	37	33	29	26	22	19	16	12	9	6
100	54	50	47	43	40	36	33	30	26	23	20	17	14	11	8	5
110	48	45	42	39	36	33	30	27	24	21	18	16	13	10	8	5
120	44	41	38	35	32	30	27	24	22	19	17	14	12	9	7	5
130	40	37	35	32	30	27	25	22	20	18	15	13	11	9	6	4
140	37	34	32	30	27	25	23	21	19	16	14	12	10	8	6	4
150	34	32	30	28	26	23	21	19	17	15	13	11	9	8	6	4
160	32	30	28	26	24	22	20	18	16	14	13	11	9	7	5	4
170	30	28	26	24	22	21	19	17	15	14	12	10	8	7	5	3
180	28	26	25	23	21	19	18	16	14	13	11	10	8	6	5	3
190	26	25	23	22	20	18	17	15	14	12	11	9	8	6	5	3

Residual Nitrogen Times (Minutes)

** Residual Nitrogen Time cannot be determined using this table (see paragraph 9-9.1 subparagraph 8 for instructions).

† Read vertically downward to the 30 fsw repetitive dive depth. Use the corresponding residual nitrogen times to compute the equivalent single dive time. Decompress using the 30 fsw air decompression table.

Table 9-9. *Air Decompression Table.*
(DESCENT RATE 75 FPM—ASCENT RATE 30 FPM)

Bottom Time (min)	Time to First Stop (M:S)	Gas Mix	DECOMPRESSION STOPS (FSW) Stop times (min) include travel time, except first and first O_2 stop 100	90	80	70	60	50	40	30	20	Total Ascent Time (M:S)	Chamber O_2 Periods	Repet Group
30 FSW														
371	1:00	AIR									0	1:00	0	Z
		AIR/O_2									**0**	1:00		
380	0:20	AIR									5	6:00	0.5	Z
		AIR/O_2									**1**	2:00		
In-Water Air/O_2 Decompression or $SurDO_2$ Recommended														
420	0:20	AIR									22	23:00	0.5	Z
		AIR/O_2									**5**	6:00		
480	0:20	AIR									42	43:00	0.5	
		AIR/O_2									**9**	10:00		
540	0:20	AIR									71	72:00	1	
		AIR/O_2									**14**	15:00		
Exceptional Exposure: In-Water Air Decompression ---------- In-Water Air/O_2 Decompression or $SurDO_2$ Required														
600	0:20	AIR									92	93:00	1	
		AIR/O_2									**19**	20:00		
660	0:20	AIR									120	121:00	1	
		AIR/O_2									**22**	23:00		
720	0:20	AIR									158	159:00	1	
		AIR/O_2									**27**	28:00		
35 FSW														
232	1:10	AIR									0	1:10	0	Z
		AIR/O_2									**0**	1:10		
240	0:30	AIR									4	5:10	0.5	Z
		AIR/O_2									**2**	3:10		
In-Water Air/O_2 Decompression or $SurDO_2$ Recommended														
270	0:30	AIR									28	29:10	0.5	Z
		AIR/O_2									**7**	8:10		
300	0:30	AIR									53	54:10	0.5	Z
		AIR/O_2									**13**	14:10		
330	0:30	AIR									71	72:10	1	Z
		AIR/O_2									**18**	19:10		
360	0:30	AIR									88	89:10	1	
		AIR/O_2									**22**	23:10		
Exceptional Exposure: In-Water Air Decompression ---------- In-Water Air/O_2 Decompression or $SurDO_2$ Required														
420	0:30	AIR									134	135:10	1.5	
		AIR/O_2									**29**	30:10		
480	0:30	AIR									173	174:10	1.5	
		AIR/O_2									**38**	44:10		
540	0:30	AIR									228	229:10	2	
		AIR/O_2									**45**	51:10		
600	0:30	AIR									277	278:10	2	
		AIR/O_2									**53**	59:10		
660	0:30	AIR									314	315:10	2.5	
		AIR/O_2									**63**	69:10		
720	0:30	AIR									342	343:10	3	
		AIR/O_2									**71**	82:10		

Table 9-9. *Air Decompression Table (Continued).*
(DESCENT RATE 75 FPM—ASCENT RATE 30 FPM)

Bottom Time (min)	Time to First Stop (M:S)	Gas Mix	DECOMPRESSION STOPS (FSW) Stop times (min) include travel time, except first and first O_2 stop 100	90	80	70	60	50	40	30	20	Total Ascent Time (M:S)	Chamber O_2 Periods	Repet Group
40 FSW														
163	1:20	AIR									0	1:20	0	O
		AIR/O_2									**0**	1:20		
170	0:40	AIR									6	7:20	0.5	O
		AIR/O_2									**2**	3:20		
180	0:40	AIR									14	15:20	0.5	Z
		AIR/O_2									**5**	6:20		
In-Water Air/O_2 Decompression or $SurDO_2$ Recommended ----------														
190	0:40	AIR									21	22:20	0.5	Z
		AIR/O_2									**7**	8:20		
200	0:40	AIR									27	28:20	0.5	Z
		AIR/O_2									**9**	10:20		
210	0:40	AIR									39	40:20	0.5	Z
		AIR/O_2									**11**	12:20		
220	0:40	AIR									52	53:20	0.5	Z
		AIR/O_2									**12**	13:20		
230	0:40	AIR									64	65:20	1	Z
		AIR/O_2									**16**	17:20		
240	0:40	AIR									75	76:20	1	Z
		AIR/O_2									**19**	20:20		
Exceptional Exposure: In-Water Air Decompression ---------- In-Water Air/O_2 Decompression or $SurDO_2$ Required ----------														
270	0:40	AIR									101	102:20	1	Z
		AIR/O_2									**26**	27:20		
300	0:40	AIR									128	129:20	1.5	
		AIR/O_2									**33**	34:20		
330	0:40	AIR									160	161:20	1.5	
		AIR/O_2									**38**	44:20		
360	0:40	AIR									184	185:20	2	
		AIR/O_2									**44**	50:20		
420	0:40	AIR									248	249:20	2.5	
		AIR/O_2									**56**	62:20		
480	0:40	AIR									321	322:20	2.5	
		AIR/O_2									**68**	79:20		
Exceptional Exposure: In-Water $Air/0_2$ Decompression ---------- $SurDO_2$ Required----------														
540	0:40	AIR									372	373:20	3	
		AIR/O_2									**80**	91:20		
600	0:40	AIR									410	411:20	3.5	
		AIR/O_2									**93**	104:20		
660	0:40	AIR									439	440:20	4	
		AIR/O_2									**103**	119:20		
Exceptional Exposure: $SurDO_2$ ----------														
720	0:40	AIR									461	462:20	4.5	
		AIR/O_2									**112**	128:20		

Table 9-9. *Air Decompression Table (Continued).*
(DESCENT RATE 75 FPM—ASCENT RATE 30 FPM)

Bottom Time (min)	Time to First Stop (M:S)	Gas Mix	DECOMPRESSION STOPS (FSW) Stop times (min) include travel time, except first and first O_2 stop 100	90	80	70	60	50	40	30	20	Total Ascent Time (M:S)	Chamber O_2 Periods	Repet Group
45 FSW														
125	1:30	AIR									0	1:30	0	N
		AIR/O_2									**0**	1:30		
130	0:50	AIR									2	3:30	0.5	O
		AIR/O_2									**1**	2:30		
140	0:50	AIR									14	15:30	0.5	O
		AIR/O_2									**5**	6:30		
In-Water Air/O_2 Decompression or SurDO$_2$ Recommended ----------														
150	0:50	AIR									25	26:30	0.5	Z
		AIR/O_2									**8**	9:30		
160	0:50	AIR									34	35:30	0.5	Z
		AIR/O_2									**11**	12:30		
170	0:50	AIR									41	42:30	1	Z
		AIR/O_2									**14**	15:30		
180	0:50	AIR									59	60:30	1	Z
		AIR/O_2									**17**	18:30		
190	0:50	AIR									75	76:30	1	Z
		AIR/O_2									**19**	20:30		
Exceptional Exposure: In-Water Air Decompression ---------- In-Water Air/O_2 Decompression or SurDO$_2$ Required ----------														
200	0:50	AIR									89	90:30	1	Z
		AIR/O_2									**23**	24:30		
210	0:50	AIR									101	102:30	1	Z
		AIR/O_2									**27**	28:30		
220	0:50	AIR									112	113:30	1.5	Z
		AIR/O_2									**30**	31:30		
230	0:50	AIR									121	122:30	1.5	Z
		AIR/O_2									**33**	34:30		
240	0:50	AIR									130	131:30	1.5	Z
		AIR/O_2									**37**	43:30		
270	0:50	AIR									173	174:30	2	
		AIR/O_2									**45**	51:30		
300	0:50	AIR									206	207:30	2	
		AIR/O_2									**51**	57:30		
330	0:50	AIR									243	244:30	2.5	
		AIR/O_2									**61**	67:30		
360	0:50	AIR									288	289:30	3	
		AIR/O_2									**69**	80:30		
Exceptional Exposure: In-Water Air/0_2 Decompression ---------- SurDO$_2$ Required----------														
420	0:50	AIR									373	374:30	3.5	
		AIR/O_2									**84**	95:30		
480	0:50	AIR									431	432:30	4	
		AIR/O_2									**101**	117:30		
Exceptional Exposure: SurDO$_2$ ----------														
540	0:50	AIR									473	474:30	4.5	
		AIR/O_2									**117**	133:30		

Table 9-9. *Air Decompression Table (Continued).*
(DESCENT RATE 75 FPM—ASCENT RATE 30 FPM)

Bottom Time (min)	Time to First Stop (M:S)	Gas Mix	DECOMPRESSION STOPS (FSW) Stop times (min) include travel time, except first and first O_2 stop 100	90	80	70	60	50	40	30	20	Total Ascent Time (M:S)	Chamber O_2 Periods	Repet Group
50 FSW														
92	1:40	AIR									0	1:40	0	M
		AIR/O_2									**0**	1:40		
95	1:00	AIR									2	3:40	0.5	M
		AIR/O_2									**1**	2:40		
100	1:00	AIR									4	5:40	0.5	N
		AIR/O_2									**2**	3:40		
110	1:00	AIR									8	9:40	0.5	O
		AIR/O_2									**4**	5:40		
In-Water Air/O_2 Decompression or SurdO_2 Recommended ----------														
120	1:00	AIR									21	22:40	0.5	O
		AIR/O_2									**7**	8:40		
130	1:00	AIR									34	35:40	0.5	Z
		AIR/O_2									**12**	13:40		
140	1:00	AIR									45	46:40	1	Z
		AIR/O_2									**16**	17:40		
150	1:00	AIR									56	57:40	1	Z
		AIR/O_2									**19**	20:40		
160	1:00	AIR									78	79:40	1	Z
		AIR/O_2									**23**	24:40		
Exceptional Exposure: In-Water Air Decompression ---------- In-Water Air/O_2 Decompression or SurdO_2 Required ----------														
170	1:00	AIR									96	97:40	1	Z
		AIR/O_2									**26**	27:40		
180	1:00	AIR									111	112:40	1.5	Z
		AIR/O_2									**30**	31:40		
190	1:00	AIR									125	126:40	1.5	Z
		AIR/O_2									**35**	36:40		
200	1:00	AIR									136	137:40	1.5	Z
		AIR/O_2									**39**	45:40		
210	1:00	AIR									147	148:40	2	
		AIR/O_2									**43**	49:40		
220	1:00	AIR									166	167:40	2	
		AIR/O_2									**47**	53:40		
230	1:00	AIR									183	184:40	2	
		AIR/O_2									**50**	56:40		
240	1:00	AIR									198	199:40	2	
		AIR/O_2									**53**	59:40		
270	1:00	AIR									236	237:40	2.5	
		AIR/O_2									**62**	68:40		
300	1:00	AIR									285	286:40	3	
		AIR/O_2									**74**	85:40		
Exceptional Exposure: In-Water Air/O_2 Decompression ---------- SurdO_2 Required----------														
330	1:00	AIR									345	346:40	3.5	
		AIR/O_2									**83**	94:40		
360	1:00	AIR									393	394:40	3.5	
		AIR/O_2									**92**	103:40		
Exceptional Exposure: SurdO_2 ----------														
420	1:00	AIR									464	465:40	4.5	
		AIR/O_2									**113**	129:40		

Table 9-9. *Air Decompression Table (Continued).*
(DESCENT RATE 75 FPM—ASCENT RATE 30 FPM)

Bottom Time (min)	Time to First Stop (M:S)	Gas Mix	DECOMPRESSION STOPS (FSW) Stop times (min) include travel time, except first and first O_2 stop 100	90	80	70	60	50	40	30	20	Total Ascent Time (M:S)	Chamber O_2 Periods	Repet Group
55 FSW														
74	1:50	AIR									0	1:50	0	L
		AIR/O_2									**0**	1:50		
75	1:10	AIR									1	2:50	0.5	L
		AIR/O_2									**1**	2:50		
80	1:10	AIR									4	5:50	0.5	M
		AIR/O_2									**2**	3:50		
90	1:10	AIR									10	11:50	0.5	N
		AIR/O_2									**5**	6:50		
In-Water Air/O_2 Decompression or SurdO_2 Recommended ----------														
100	1:10	AIR									17	18:50	0.5	O
		AIR/O_2									**8**	9:50		
110	1:10	AIR									34	35:50	0.5	O
		AIR/O_2									**12**	13:50		
120	1:10	AIR									48	49:50	1	Z
		AIR/O_2									**17**	18:50		
130	1:10	AIR									59	60:50	1	Z
		AIR/O_2									**22**	23:50		
140	1:10	AIR									84	85:50	1	Z
		AIR/O_2									**26**	27:50		
Exceptional Exposure: In-Water Air Decompression ---------- In-Water Air/O_2 Decompression or SurdO_2 Required ----------														
150	1:10	AIR									105	106:50	1.5	Z
		AIR/O_2									**30**	31:50		
160	1:10	AIR									123	124:50	1.5	Z
		AIR/O_2									**34**	35:50		
170	1:10	AIR									138	139:50	1.5	Z
		AIR/O_2									**40**	46:50		
180	1:10	AIR									151	152:50	2	Z
		AIR/O_2									**45**	51:50		
190	1:10	AIR									169	170:50	2	
		AIR/O_2									**50**	56:50		
200	1:10	AIR									190	191:50	2	
		AIR/O_2									**54**	60:50		
210	1:10	AIR									208	209:50	2.5	
		AIR/O_2									**58**	64:50		
220	1:10	AIR									224	225:50	2.5	
		AIR/O_2									**62**	68:50		
230	1:10	AIR									239	240:50	2.5	
		AIR/O_2									**66**	77:50		
240	1:10	AIR									254	255:50	3	
		AIR/O_2									**69**	80:50		
Exceptional Exposure: In-Water Air/0_2 Decompression ---------- SurdO_2 Required----------														
270	1:10	AIR									313	314:50	3.5	
		AIR/O_2									**83**	94:50		
300	1:10	AIR									380	381:50	3.5	
		AIR/O_2									**94**	105:50		
330	1:10	AIR									432	433:50	4	
		AIR/O_2									**106**	122:50		
Exceptional Exposure: SurdO_2 ----------														
360	1:10	AIR									474	475:50	4.5	
		AIR/O_2									**118**	134:50		

Table 9-9. *Air Decompression Table (Continued).*
(DESCENT RATE 75 FPM—ASCENT RATE 30 FPM)

Bottom Time (min)	Time to First Stop (M:S)	Gas Mix	DECOMPRESSION STOPS (FSW) Stop times (min) include travel time, except first and first O_2 stop 100	90	80	70	60	50	40	30	20	Total Ascent Time (M:S)	Chamber O_2 Periods	Repet Group
60 FSW														
60	2:00	AIR									0	2:00	0	K
		AIR/O_2									**0**	2:00		
65	1:20	AIR									2	4:00	0.5	L
		AIR/O_2									**1**	3:00		
70	1:20	AIR									7	9:00	0.5	L
		AIR/O_2									**4**	6:00		
80	1:20	AIR									14	16:00	0.5	N
		AIR/O_2									**7**	9:00		
In-Water Air/O_2 Decompression or $SurDO_2$ Recommended ----------														
90	1:20	AIR									23	25:00	0.5	O
		AIR/O_2									**10**	12:00		
100	1:20	AIR									42	44:00	1	Z
		AIR/O_2									**15**	17:00		
110	1:20	AIR									57	59:00	1	Z
		AIR/O_2									**21**	23:00		
120	1:20	AIR									75	77:00	1	Z
		AIR/O_2									**26**	28:00		
Exceptional Exposure: In-Water Air Decompression ---------- In-Water Air/O_2 Decompression or $SurDO_2$ Required ----------														
130	1:20	AIR									102	104:00	1.5	Z
		AIR/O_2									**31**	33:00		
140	1:20	AIR									124	126:00	1.5	Z
		AIR/O_2									**35**	37:00		
150	1:20	AIR									143	145:00	2	Z
		AIR/O_2									**41**	48:00		
160	1:20	AIR									158	160:00	2	Z
		AIR/O_2									**48**	55:00		
170	1:20	AIR									178	180:00	2	
		AIR/O_2									**53**	60:00		
180	1:20	AIR									201	203:00	2.5	
		AIR/O_2									**59**	66:00		
190	1:20	AIR									222	224:00	2.5	
		AIR/O_2									**64**	71:00		
200	1:20	AIR									240	242:00	2.5	
		AIR/O_2									**68**	80:00		
210	1:20	AIR									256	258:00	3	
		AIR/O_2									**73**	85:00		
220	1:20	AIR									278	280:00	3	
		AIR/O_2									**77**	89:00		
Exceptional Exposure: In-Water $Air/0_2$ Decompression ---------- $SurDO_2$ Required----------														
230	1:20	AIR									300	302:00	3.5	
		AIR/O_2									**82**	94:00		
240	1:20	AIR									321	323:00	3.5	
		AIR/O_2									**88**	100:00		
270	1:20	AIR									398	400:00	4	
		AIR/O_2									**102**	119:00		
Exceptional Exposure: $SurDO_2$ ----------														
300	1:20	AIR									456	458:00	4.5	
		AIR/O_2									**115**	132:00		

Table 9-9. *Air Decompression Table (Continued).*
(DESCENT RATE 75 FPM—ASCENT RATE 30 FPM)

Bottom Time (min)	Time to First Stop (M:S)	Gas Mix	DECOMPRESSION STOPS (FSW) Stop times (min) include travel time, except first and first O_2 stop 100	90	80	70	60	50	40	30	20	Total Ascent Time (M:S)	Chamber O_2 Periods	Repet Group
70 FSW														
48	2:20	AIR									0	2:20	0	K
		AIR/O_2									**0**	2:20		
50	1:40	AIR									2	4:20	0.5	K
		AIR/O_2									**1**	3:20		
55	1:40	AIR									9	11:20	0.5	L
		AIR/O_2									**5**	7:20		
60	1:40	AIR									14	16:20	0.5	M
		AIR/O_2									**8**	10:20		
In-Water Air/O_2 Decompression or SurDO_2 Recommended														
70	1:40	AIR									24	26:20	0.5	N
		AIR/O_2									**13**	15:20		
80	1:40	AIR									44	46:20	1	O
		AIR/O_2									**17**	19:20		
90	1:40	AIR									64	66:20	1	Z
		AIR/O_2									**24**	26:20		
100	1:40	AIR									88	90:20	1.5	Z
		AIR/O_2									**31**	33:20		
Exceptional Exposure: In-Water Air Decompression ---------- In-Water Air/O_2 Decompression or SurDO_2 Required ----------														
110	1:40	AIR									120	122:20	1.5	Z
		AIR/O_2									**38**	45:20		
120	1:40	AIR									145	147:20	2	Z
		AIR/O_2									**44**	51:20		
130	1:40	AIR									167	169:20	2	Z
		AIR/O_2									**51**	58:20		
140	1:40	AIR									189	191:20	2.5	
		AIR/O_2									**59**	66:20		
150	1:40	AIR									219	221:20	2.5	
		AIR/O_2									**66**	78:20		
160	1:20	AIR								1	244	247:00	3	
		AIR/O_2								**1**	**72**	85:00		
Exceptional Exposure: In-Water Air/0_2 Decompression ---------- SurDO_2 Required														
170	1:20	AIR								2	265	269:00	3	
		AIR/O_2								**1**	**78**	91:00		
180	1:20	AIR								4	289	295:00	3.5	
		AIR/O_2								**2**	**83**	97:00		
190	1:20	AIR								5	316	323:00	3.5	
		AIR/O_2								**3**	**88**	103:00		
200	1:20	AIR								9	345	356:00	4	
		AIR/O_2								**5**	**93**	115:00		
210	1:20	AIR								13	378	393:00	4	
		AIR/O_2								**7**	**98**	122:00		
Exceptional Exposure: SurDO_2														
240	1:20	AIR								25	454	481:00	5	
		AIR/O_2								**13**	**110**	140:00		

Table 9-9. *Air Decompression Table (Continued).*
(DESCENT RATE 75 FPM—ASCENT RATE 30 FPM)

Bottom Time (min)	Time to First Stop (M:S)	Gas Mix	DECOMPRESSION STOPS (FSW) Stop times (min) include travel time, except first and first O_2 stop 100	90	80	70	60	50	40	30	20	Total Ascent Time (M:S)	Chamber O_2 Periods	Repet Group
80 FSW														
39	2:40	AIR									0	2:40	0	J
		AIR/O_2									**0**	2:40		
40	2:00	AIR									1	3:40	0.5	J
		AIR/O_2									**1**	3:40		
45	2:00	AIR									10	12:40	0.5	K
		AIR/O_2									**5**	7:40		
In-Water Air/O_2 Decompression or $SurDO_2$ Recommended ----------														
50	2:00	AIR									17	19:40	0.5	M
		AIR/O_2									**9**	11:40		
55	2:00	AIR									24	26:40	0.5	M
		AIR/O_2									**13**	15:40		
60	2:00	AIR									30	32:40	1	N
		AIR/O_2									**16**	18:40		
70	2:00	AIR									54	56:40	1	O
		AIR/O_2									**22**	24:40		
80	2:00	AIR									77	79:40	1.5	Z
		AIR/O_2									**30**	32:40		
Exceptional Exposure: In-Water Air Decompression ---------- In-Water Air/O_2 Decompression or $SurDO_2$ Required ----------														
90	2:00	AIR									114	116:40	1.5	Z
		AIR/O_2									**39**	46:40		
100	1:40	AIR								1	147	150:20	2	Z
		AIR/O_2								**1**	**46**	54:20		
110	1:40	AIR								6	171	179:20	2	Z
		AIR/O_2								**3**	**51**	61:20		
120	1:40	AIR								10	200	212:20	2.5	
		AIR/O_2								**5**	**59**	71:20		
130	1:40	AIR								14	232	248:20	3	
		AIR/O_2								**7**	**67**	86:20		
Exceptional Exposure: In-Water $Air/0_2$ Decompression ---------- $SurDO_2$ Required----------														
140	1:40	AIR								17	258	277:20	3.5	
		AIR/O_2								**9**	**73**	94:20		
150	1:40	AIR								19	285	306:20	3.5	
		AIR/O_2								**10**	**80**	102:20		
160	1:40	AIR								21	318	341:20	4	
		AIR/O_2								**11**	**86**	114:20		
170	1:40	AIR								27	354	383:20	4	
		AIR/O_2								**14**	**90**	121:20		
Exceptional Exposure: $SurDO_2$ ----------														
180	1:40	AIR								33	391	426:20	4.5	
		AIR/O_2								**17**	**96**	130:20		
210	1:40	AIR								50	474	526:20	5	
		AIR/O_2								**26**	**110**	158:20		

Table 9-9. *Air Decompression Table (Continued).*
(DESCENT RATE 75 FPM—ASCENT RATE 30 FPM)

Bottom Time (min)	Time to First Stop (M:S)	Gas Mix	DECOMPRESSION STOPS (FSW) Stop times (min) include travel time, except first and first O_2 stop 100	90	80	70	60	50	40	30	20	Total Ascent Time (M:S)	Chamber O_2 Periods	Repet Group
90 FSW														
30	3:00	AIR									0	3:00	0	I
		AIR/O_2									**0**	3:00		
35	2:20	AIR									4	7:00	0.5	J
		AIR/O_2									**2**	5:00		
40	2:20	AIR									14	17:00	0.5	L
		AIR/O_2									**7**	10:00		
In-Water Air/O_2 Decompression or SurDO_2 Recommended														
45	2:20	AIR									23	26:00	0.5	M
		AIR/O_2									**12**	15:00		
50	2:20	AIR									31	34:00	1	N
		AIR/O_2									**17**	20:00		
55	2:20	AIR									39	42:00	1	O
		AIR/O_2									**21**	24:00		
60	2:20	AIR									56	59:00	1	O
		AIR/O_2									**24**	27:00		
70	2:20	AIR									83	86:00	1.5	Z
		AIR/O_2									**32**	35:00		
Exceptional Exposure: In-Water Air Decompression ---------- In-Water Air/O_2 Decompression or SurDO_2 Required ----------														
80	2:00	AIR								5	125	132:40	2	Z
		AIR/O_2								**3**	**40**	50:40		
90	2:00	AIR								13	158	173:40	2	Z
		AIR/O_2								**7**	**46**	60:40		
100	2:00	AIR								19	185	206:40	2.5	
		AIR/O_2								**10**	**53**	70:40		
110	2:00	AIR								25	224	251:40	3	
		AIR/O_2								**13**	**61**	86:40		
Exceptional Exposure: In-Water Air/O_2 Decompression ---------- SurDO_2 Required														
120	1:40	AIR							1	29	256	288:20	3.5	
		AIR/O_2							1	**15**	**70**	98:40		
130	1:40	AIR							5	28	291	326:20	3.5	
		AIR/O_2							5	**15**	**78**	110:40		
140	1:40	AIR							8	28	330	368:20	4	
		AIR/O_2							8	**15**	**86**	126:40		
Exceptional Exposure: SurDO_2														
150	1:40	AIR							11	34	378	425:20	4.5	
		AIR/O_2							11	**17**	**94**	139:40		
160	1:40	AIR							13	40	418	473:20	4.5	
		AIR/O_2							13	**21**	**100**	151:40		
170	1:40	AIR							15	45	451	513:20	5	
		AIR/O_2							15	**23**	**106**	166:40		
180	1:40	AIR							16	51	479	548:20	5.5	
		AIR/O_2							16	**26**	**112**	176:40		
240	1:40	AIR							42	68	592	704:20	7.5	
		AIR/O_2							42	**34**	**159**	267:00		

Table 9-9. *Air Decompression Table (Continued).*
(DESCENT RATE 75 FPM—ASCENT RATE 30 FPM)

Bottom Time (min)	Time to First Stop (M:S)	Gas Mix	DECOMPRESSION STOPS (FSW) Stop times (min) include travel time, except first and first O_2 stop 100	90	80	70	60	50	40	30	20	Total Ascent Time (M:S)	Chamber O_2 Periods	Repet Group
100 FSW														
25	3:20	AIR									0	3:20	0	H
		AIR/O_2									**0**	3:20		
30	2:40	AIR									3	6:20	0.5	J
		AIR/O_2									**2**	5:20		
35	2:40	AIR									15	18:20	0.5	L
		AIR/O_2									**8**	11:20		
In-Water Air/O_2 Decompression or $SurDO_2$ Recommended ----------														
40	2:40	AIR									26	29:20	1	M
		AIR/O_2									**14**	17:20		
45	2:40	AIR									36	39:20	1	N
		AIR/O_2									**19**	22:20		
50	2:40	AIR									47	50:20	1	O
		AIR/O_2									**24**	27:20		
55	2:40	AIR									65	68:20	1.5	Z
		AIR/O_2									**28**	31:20		
60	2:40	AIR									81	84:20	1.5	Z
		AIR/O_2									**33**	35:20		
Exceptional Exposure: In-Water Air Decompression ---------- In-Water Air/O_2 Decompression or $SurDO_2$ Required ----------														
70	2:20	AIR								11	124	138:00	2	Z
		AIR/O_2								**6**	**39**	53:00		
80	2:20	AIR								21	160	184:00	2.5	Z
		AIR/O_2								**11**	**45**	64:00		
90	2:00	AIR							2	28	196	228:40	2.5	
		AIR/O_2							2	**15**	**52**	82:00		
Exceptional Exposure: In-Water $Air/0_2$ Decompression ---------- $SurDO_2$ Required----------														
100	2:00	AIR							9	28	241	280:40	3	
		AIR/O_2							9	**14**	**66**	102:00		
110	2:00	AIR							14	28	278	322:40	3.5	
		AIR/O_2							14	**15**	**75**	117:00		
120	2:00	AIR							19	28	324	373:40	4	
		AIR/O_2							19	**15**	**84**	136:00		
Exceptional Exposure: $SurDO_2$ ----------														
150	1:40	AIR						3	26	46	461	538:20	5	
		AIR/O_2						3	26	**24**	**108**	183:40		

Table 9-9. *Air Decompression Table (Continued).*
(DESCENT RATE 75 FPM—ASCENT RATE 30 FPM)

Bottom Time (min)	Time to First Stop (M:S)	Gas Mix	DECOMPRESSION STOPS (FSW) Stop times (min) include travel time, except first and first O_2 stop 100	90	80	70	60	50	40	30	20	Total Ascent Time (M:S)	Chamber O_2 Periods	Repet Group
110 FSW														
20	3:40	AIR									0	3:40	0	H
		AIR/O_2									**0**	3:40		
25	3:00	AIR									3	6:40	0.5	I
		AIR/O_2									**2**	5:40		
30	3:00	AIR									14	17:40	0.5	K
		AIR/O_2									**7**	10:40		
In-Water Air/O_2 Decompression or SurDO_2 Recommended ----------														
35	3:00	AIR									27	30:40	1	M
		AIR/O_2									**14**	17:40		
40	3:00	AIR									39	42:40	1	N
		AIR/O_2									**20**	23:40		
45	3:00	AIR									50	53:40	1	O
		AIR/O_2									**26**	29:40		
50	3:00	AIR									71	74:40	1.5	Z
		AIR/O_2									**31**	34:40		
Exceptional Exposure: In-Water Air Decompression ---------- In-Water Air/O_2 Decompression or SurDO_2 Required ----------														
55	2:40	AIR								5	85	93:20	1.5	Z
		AIR/O_2								**3**	**33**	44:20		
60	2:40	AIR								13	111	127:20	2	Z
		AIR/O_2								**7**	**36**	51:20		
70	2:40	AIR								26	155	184:20	2.5	Z
		AIR/O_2								**13**	**43**	64:20		
80	2:20	AIR							9	28	200	240:00	2.5	
		AIR/O_2							9	**15**	**53**	90:20		
Exceptional Exposure: In-Water Air/0_2 Decompression ---------- SurDO_2 Required----------														
90	2:20	AIR							17	29	248	297:00	3.5	
		AIR/O_2							17	**15**	**67**	112:20		
100	2:20	AIR							25	28	295	351:00	3.5	
		AIR/O_2							25	**15**	**78**	131:20		
110	2:00	AIR						5	26	28	353	414:40	4	
		AIR/O_2						5	26	**15**	**90**	154:00		
Exceptional Exposure: SurDO_2 ----------														
120	2:00	AIR						10	26	35	413	486:40	4.5	
		AIR/O_2						10	26	**18**	**101**	173:00		
180	1:40	AIR					3	23	47	68	593	736:20	7.5	
		AIR/O_2					3	23	47	**34**	**159**	298:00		

Table 9-9. *Air Decompression Table (Continued).*
(DESCENT RATE 75 FPM—ASCENT RATE 30 FPM)

Bottom Time (min)	Time to First Stop (M:S)	Gas Mix	DECOMPRESSION STOPS (FSW) Stop times (min) include travel time, except first and first O_2 stop 100	90	80	70	60	50	40	30	20	Total Ascent Time (M:S)	Chamber O_2 Periods	Repet Group
120 FSW														
15	4:00	AIR									0	4:00	0	F
		AIR/O_2									**0**	4:00		
20	3:20	AIR									2	6:00	0.5	H
		AIR/O_2									**1**	5:00		
25	3:20	AIR									8	12:00	0.5	J
		AIR/O_2									**4**	8:00		
In-Water Air/O_2 Decompression or SurDO$_2$ Recommended ----------														
30	3:20	AIR									24	28:00	0.5	L
		AIR/O_2									**13**	17:00		
35	3:20	AIR									38	42:00	1	N
		AIR/O_2									**20**	24:00		
40	3:20	AIR									51	55:00	1	O
		AIR/O_2									**27**	31:00		
45	3:20	AIR									72	76:00	1.5	Z
		AIR/O_2									**33**	37:00		
Exceptional Exposure: In-Water Air Decompression ---------- In-Water Air/O_2 Decompression or SurDO$_2$ Required ----------														
50	3:00	AIR								9	86	98:40	1.5	Z
		AIR/O_2								**5**	**33**	46:40		
55	3:00	AIR								19	116	138:40	2	Z
		AIR/O_2								**10**	**35**	53:40		
60	3:00	AIR								27	142	172:40	2	Z
		AIR/O_2								**14**	**39**	61:40		
70	2:40	AIR							12	29	189	233:20	2.5	
		AIR/O_2							12	**15**	**50**	85:40		
Exceptional Exposure: In-Water Air/0_2 Decompression ---------- SurDO$_2$ Required----------														
80	2:40	AIR							24	28	246	301:20	3	
		AIR/O_2							24	**14**	**67**	118:40		
90	2:20	AIR						7	26	28	303	367:00	3.5	
		AIR/O_2						7	26	**15**	**79**	140:20		
100	2:20	AIR						14	26	28	372	443:00	4	
		AIR/O_2						14	26	**15**	**94**	167:20		
Exceptional Exposure: SurDO$_2$ ----------														
110	2:20	AIR						21	25	38	433	520:00	5	
		AIR/O_2						21	25	**20**	**104**	188:20		
120	2:00	AIR					3	23	25	47	480	580:40	5.5	
		AIR/O_2					3	23	25	**24**	**113**	211:00		

Table 9-9. *Air Decompression Table (Continued).*
(DESCENT RATE 75 FPM—ASCENT RATE 30 FPM)

Bottom Time (min)	Time to First Stop (M:S)	Gas Mix	DECOMPRESSION STOPS (FSW) Stop times (min) include travel time, except first air and first O_2 stop 100	90	80	70	60	50	40	30	20	Total Ascent Time (M:S)	Chamber O_2 Periods	Repet Group
130 FSW														
10	4:20	AIR									0	4:20	0	E
		AIR/O_2									**0**	4:20		
15	3:40	AIR									1	5:20	0.5	G
		AIR/O_2									**1**	5:20		
20	3:40	AIR									4	8:20	0.5	I
		AIR/O_2									**2**	6:20		
In-Water Air/O_2 Decompression or SurDO_2 Recommended ----------														
25	3:40	AIR									17	21:20	0.5	K
		AIR/O_2									**9**	13:20		
30	3:40	AIR									34	38:20	1	M
		AIR/O_2									**18**	22:20		
35	3:40	AIR									49	53:20	1	N
		AIR/O_2									**26**	30:20		
40	3:20	AIR								3	67	74:00	1.5	Z
		AIR/O_2								**2**	**31**	37:00		
Exceptional Exposure: In-Water Air Decompression ---------- In-Water Air/O_2 Decompression or SurDO_2 Required ----------														
45	3:20	AIR								12	84	100:00	1.5	Z
		AIR/O_2								**6**	**33**	48:00		
50	3:20	AIR								22	116	142:00	2	Z
		AIR/O_2								**11**	**35**	55:00		
55	3:00	AIR							4	28	145	180:40	2	Z
		AIR/O_2							4	**15**	**39**	67:00		
60	3:00	AIR							12	28	170	213:40	2.5	Z
		AIR/O_2							12	**15**	**45**	81:00		
Exceptional Exposure: In-Water Air/0_2 Decompression ---------- SurDO_2 Required----------														
70	2:40	AIR						1	26	28	235	293:20	3	
		AIR/O_2						1	26	**14**	**63**	117:40		
80	2:40	AIR						12	26	28	297	366:20	3.5	
		AIR/O_2						12	26	**15**	**78**	144:40		
90	2:40	AIR						21	26	28	374	452:20	4	
		AIR/O_2						21	26	**15**	**94**	174:40		
Exceptional Exposure: SurDO_2 ----------														
100	2:20	AIR					6	23	26	38	444	540:00	5	
		AIR/O_2					6	23	26	**20**	**106**	204:20		
120	2:20	AIR					17	23	28	57	533	661:00	6	
		AIR/O_2					17	23	28	**29**	**130**	255:20		
180	2:00	AIR				13	21	45	57	94	658	890:40	9	
		AIR/O_2				13	21	45	57	**46**	**198**	417:20		

Table 9-9. *Air Decompression Table (Continued).*
(DESCENT RATE 75 FPM—ASCENT RATE 30 FPM)

Bottom Time (min)	Time to First Stop (M:S)	Gas Mix	DECOMPRESSION STOPS (FSW) Stop times (min) include travel time, except first and first O_2 stop 100	90	80	70	60	50	40	30	20	Total Ascent Time (M:S)	Chamber O_2 Periods	Repet Group
140 FSW														
10	4:40	AIR									0	4:40	0	E
		AIR/O_2									**0**	4:40		
15	4:00	AIR									2	6:40	0.5	H
		AIR/O_2									**1**	5:40		
20	4:00	AIR									7	11:40	0.5	J
		AIR/O_2									**4**	8:40		
In-Water Air/O_2 Decompression or $SurDO_2$ Recommended ----------														
25	4:00	AIR									26	30:40	1	L
		AIR/O_2									**14**	18:40		
30	4:00	AIR									44	48:40	1	N
		AIR/O_2									**23**	27:40		
35	3:40	AIR								4	59	67:20	1.5	O
		AIR/O_2								**2**	**30**	36:20		
Exceptional Exposure: In-Water Air Decompression ---------- In-Water Air/O_2 Decompression or $SurDO_2$ Required ----------														
40	3:40	AIR								11	80	95:20	1.5	Z
		AIR/O_2								**6**	**33**	48:20		
45	3:20	AIR							3	21	113	141:00	2	Z
		AIR/O_2							3	**11**	**34**	57:20		
50	3:20	AIR							7	28	145	184:00	2	Z
		AIR/O_2							7	**14**	**40**	70:20		
55	3:20	AIR							16	28	171	219:00	2.5	Z
		AIR/O_2							16	**15**	**45**	85:20		
Exceptional Exposure: In-Water $Air/0_2$ Decompression ---------- $SurDO_2$ Required----------														
60	3:00	AIR						2	23	28	209	265:40	3	
		AIR/O_2						2	23	**15**	**55**	109:00		
70	3:00	AIR						14	25	28	276	346:40	3.5	
		AIR/O_2						14	25	**15**	**74**	142:00		
80	2:40	AIR					2	24	25	29	362	445:20	4	
		AIR/O_2					2	24	25	**15**	**91**	175:40		
Exceptional Exposure: $SurDO_2$ ----------														
90	2:40	AIR					12	23	26	38	443	545:20	5	
		AIR/O_2					12	23	26	**19**	**107**	210:40		

Table 9-9. *Air Decompression Table (Continued).*
(DESCENT RATE 75 FPM—ASCENT RATE 30 FPM)

Bottom Time (min)	Time to First Stop (M:S)	Gas Mix	DECOMPRESSION STOPS (FSW) Stop times (min) include travel time, except first air and first O_2 stop 100	90	80	70	60	50	40	30	20	Total Ascent Time (M:S)	Chamber O_2 Periods	Repet Group
150 FSW														
5	5:00	AIR									0	5:00	0	C
		AIR/O_2									**0**	5:00		
10	4:20	AIR									1	6:00	0.5	F
		AIR/O_2									**1**	6:00		
15	4:20	AIR									3	8:00	0.5	H
		AIR/O_2									**2**	7:00		
20	4:20	AIR									14	19:00	0.5	K
		AIR/O_2									**8**	13:00		
In-Water Air/O_2 Decompression or SurDO$_2$ Recommended ----------														
25	4:20	AIR									35	40:00	1	M
		AIR/O_2									**19**	24:00		
30	4:00	AIR								3	51	58:40	1.5	O
		AIR/O_2								**2**	**26**	32:40		
35	4:00	AIR								11	72	87:40	1.5	Z
		AIR/O_2								**6**	**31**	46:40		
Exceptional Exposure: In-Water Air Decompression ---------- In-Water Air/O_2 Decompression or SurDO$_2$ Required ----------														
40	3:40	AIR							4	18	102	128:20	2	Z
		AIR/O_2							4	**9**	**34**	56:40		
45	3:40	AIR							10	25	140	179:20	2	Z
		AIR/O_2							10	**13**	**39**	71:40		
50	3:20	AIR						3	15	28	170	220:00	2.5	Z
		AIR/O_2						3	15	**15**	**45**	87:20		
Exceptional Exposure: In-Water Air/0$_2$ Decompression ---------- SurDO$_2$ Required----------														
55	3:20	AIR						6	22	28	211	271:00	3	
		AIR/O_2						6	22	**15**	**56**	113:20		
60	3:20	AIR						11	26	28	248	317:00	3	
		AIR/O_2						11	26	**15**	**66**	132:20		
70	3:00	AIR					3	24	25	28	330	413:40	4	
		AIR/O_2					3	24	25	**15**	**84**	170:00		
Exceptional Exposure: SurDO$_2$ ----------														
80	3:00	AIR					15	23	26	35	430	532:40	4.5	
		AIR/O_2					15	23	26	**18**	**104**	205:00		
90	2:40	AIR				3	22	23	26	47	496	620:20	5.5	
		AIR/O_2				3	22	23	26	**24**	**118**	239:40		
120	2:20	AIR			3	20	22	23	50	75	608	804:00	8	
		AIR/O_2			3	20	22	23	50	**37**	**168**	355:40		
180	2:00	AIR		2	19	20	42	48	79	121	694	1027:40	10.5	
		AIR/O_2		2	19	20	42	48	79	**58**	**222**	537:20		

Table 9-9. *Air Decompression Table (Continued).*
(DESCENT RATE 75 FPM—ASCENT RATE 30 FPM)

Bottom Time (min)	Time to First Stop (M:S)	Gas Mix	DECOMPRESSION STOPS (FSW) Stop times (min) include travel time, except first air and first O_2 stop 100	90	80	70	60	50	40	30	20	Total Ascent Time (M:S)	Chamber O_2 Periods	Repet Group
160 FSW														
5	5:20	AIR									0	5:20	0	C
		AIR/O_2									**0**	5:20		
10	4:40	AIR									1	6:20	0.5	F
		AIR/O_2									**1**	6:20		
15	4:40	AIR									5	10:20	0.5	I
		AIR/O_2									**3**	8:00		
In-Water Air/O_2 Decompression or $SurDO_2$ Recommended ----------														
20	4:40	AIR									22	27:20	0.5	L
		AIR/O_2									**12**	17:20		
25	4:20	AIR								3	41	49:00	1	N
		AIR/O_2								**2**	**21**	28:00		
30	4:00	AIR							1	8	60	73:40	1.5	O
		AIR/O_2							1	**5**	**28**	39:00		
Exceptional Exposure: In-Water Air Decompression ---------- In-Water Air/O_2 Decompression or $SurDO_2$ Required ----------														
35	4:00	AIR							4	14	84	106:40	1.5	Z
		AIR/O_2							4	**8**	**32**	54:00		
40	4:00	AIR							12	20	130	166:40	2	Z
		AIR/O_2							12	**11**	**37**	70:00		
45	3:40	AIR						5	13	28	164	214:20	2.5	Z
		AIR/O_2						5	13	**14**	**44**	85:40		
Exceptional Exposure: In-Water $Air/0_2$ Decompression ---------- $SurDO_2$ Required----------														
50	3:40	AIR						10	19	28	207	268:20	3	
		AIR/O_2						10	19	**15**	**54**	112:40		
55	3:20	AIR					2	12	26	28	248	320:00	3	
		AIR/O_2					2	12	26	**14**	**67**	135:20		
60	3:20	AIR					5	18	25	29	290	371:00	3.5	
		AIR/O_2					5	18	25	**15**	**77**	154:20		
Exceptional Exposure: $SurDO_2$ ----------														
70	3:20	AIR					15	23	26	29	399	496:00	4.5	
		AIR/O_2					15	23	26	**15**	**99**	197:20		
80	3:00	AIR				6	21	24	25	44	482	605:40	5.5	
		AIR/O_2				6	21	24	25	**23**	**114**	237:00		

Table 9-9. *Air Decompression Table (Continued).*
(DESCENT RATE 75 FPM—ASCENT RATE 30 FPM)

Bottom Time (min)	Time to First Stop (M:S)	Gas Mix	DECOMPRESSION STOPS (FSW) Stop times (min) include travel time, except first air and first O_2 stop 100	90	80	70	60	50	40	30	20	Total Ascent Time (M:S)	Chamber O_2 Periods	Repet Group
170 FSW														
5	5:40	AIR									0	5:40	0	D
		AIR/O_2									**0**	5:40		
10	5:00	AIR									2	7:40	0.5	G
		AIR/O_2									**1**	6:40		
15	5:00	AIR									7	12:40	0.5	J
		AIR/O_2									**4**	9:40		
In-Water Air/O_2 Decompression or SurDO_2 Recommended														
20	4:40	AIR								1	29	35:20	1	L
		AIR/O_2								**1**	**15**	21:20		
25	4:20	AIR							1	6	46	58:00	1	N
		AIR/O_2							1	**4**	**23**	33:20		
Exceptional Exposure: In-Water Air Decompression ---------- In-Water Air/O_2 Decompression or SurDO_2 Required														
30	4:20	AIR							5	11	72	93:00	1.5	Z
		AIR/O_2							5	**6**	**29**	45:20		
35	4:00	AIR						2	9	17	113	145:40	2	Z
		AIR/O_2						2	9	**9**	**35**	65:00		
40	4:00	AIR						6	13	23	155	201:40	2.5	Z
		AIR/O_2						6	13	**12**	**43**	84:00		
Exceptional Exposure: In-Water Air/0_2 Decompression ---------- SurDO_2 Required														
45	4:00	AIR						12	16	28	194	254:40	2.5	
		AIR/O_2						12	16	**15**	**51**	109:00		
50	3:40	AIR					5	12	23	28	243	315:20	3	
		AIR/O_2					5	12	23	**15**	**65**	134:40		
55	3:40	AIR					9	16	25	28	287	369:20	3.5	
		AIR/O_2					9	16	25	**15**	**76**	155:40		
60	3:20	AIR				2	11	21	26	28	344	436:00	4	
		AIR/O_2				2	11	21	26	**15**	**87**	181:20		
Exceptional Exposure: SurDO_2														
70	3:20	AIR				7	19	24	25	39	454	572:00	5	
		AIR/O_2				7	19	24	25	**20**	**109**	228:20		
80	3:20	AIR				17	22	23	26	53	525	670:00	6	
		AIR/O_2				17	22	23	26	**27**	**128**	267:20		
90	3:00	AIR			7	20	22	23	37	66	574	752:40	7	
		AIR/O_2			7	20	22	23	37	**33**	**148**	318:20		
120	2:40	AIR		9	19	20	22	42	60	94	659	928:20	9	
		AIR/O_2		9	19	20	22	42	60	**46**	**198**	454:00		
180	2:20	AIR	10	18	19	40	43	70	97	156	703	1159:00	11.5	
		AIR/O_2	10	18	19	40	43	70	97	**75**	**228**	648:00		

Table 9-9. *Air Decompression Table (Continued).*
(DESCENT RATE 75 FPM—ASCENT RATE 30 FPM)

Bottom Time (min)	Time to First Stop (M:S)	Gas Mix	DECOMPRESSION STOPS (FSW) Stop times (min) include travel time, except first air and first O_2 stop 100	90	80	70	60	50	40	30	20	Total Ascent Time (M:S)	Chamber O_2 Periods	Repet Group
180 FSW														
5	6:00	AIR									0	6:00	0	D
		AIR/O_2									**0**	6:00		
10	5:20	AIR									3	9:00	0.5	G
		AIR/O_2									**2**	8:00		
15	5:20	AIR									11	17:00	0.5	J
		AIR/O_2									**6**	12:00		
In-Water Air/O_2 Decompression or $SurDO_2$ Recommended ----------														
20	5:00	AIR								4	34	43:40	1	M
		AIR/O_2								**2**	**18**	25:40		
25	4:40	AIR							4	7	54	70:20	1.5	O
		AIR/O_2							4	**4**	**26**	39:40		
Exceptional Exposure: In-Water Air Decompression ---------- In-Water Air/O_2 Decompression or $SurDO_2$ Required ----------														
30	4:20	AIR						2	7	14	83	111:00	1.5	Z
		AIR/O_2						2	7	**7**	**31**	57:20		
35	4:20	AIR						5	13	19	138	180:00	2	Z
		AIR/O_2						5	13	**10**	**40**	78:20		
Exceptional Exposure: In-Water $Air/0_2$ Decompression ---------- $SurDO_2$ Required----------														
40	4:00	AIR					2	11	12	28	175	232:40	2.5	Z
		AIR/O_2					2	11	12	**14**	**47**	96:00		
45	4:00	AIR					7	11	20	28	231	301:40	3	
		AIR/O_2					7	11	20	**15**	**61**	129:00		
50	3:40	AIR				1	11	13	25	28	276	358:20	3.5	
		AIR/O_2				1	11	13	25	**15**	**74**	153:40		
55	3:40	AIR				5	11	19	26	28	336	429:20	4	
		AIR/O_2				5	11	19	26	**14**	**87**	181:40		
Exceptional Exposure: $SurDO_2$ ----------														
60	3:40	AIR				8	13	24	25	31	405	510:20	4.5	
		AIR/O_2				8	13	24	25	**16**	**100**	205:40		
70	3:20	AIR			3	13	21	24	25	48	498	636:00	5.5	
		AIR/O_2			3	13	21	24	25	**25**	**118**	253:20		

Table 9-9. *Air Decompression Table (Continued).*
(DESCENT RATE 75 FPM—ASCENT RATE 30 FPM)

Bottom Time (min)	Time to First Stop (M:S)	Gas Mix	DECOMPRESSION STOPS (FSW) Stop times (min) include travel time, except first air and first O_2 stop 100	90	80	70	60	50	40	30	20	Total Ascent Time (M:S)	Chamber O_2 Periods	Repet Group
190 FSW														
5	6:20	AIR									0	6:20	0	D
		AIR/O_2									**0**	6:20		
10	5:40	AIR									4	10:20	0.5	H
		AIR/O_2									**2**	8:20		
In-Water Air/O_2 Decompression or SurDO_2 Recommended ----------														
15	5:40	AIR									17	23:20	0.5	K
		AIR/O_2									**9**	15:20		
20	5:00	AIR							1	7	37	50:40	1	N
		AIR/O_2							1	**4**	**19**	30:00		
25	4:40	AIR						2	6	9	67	89:20	1.5	Z
		AIR/O_2						2	6	**5**	**28**	46:40		
Exceptional Exposure: In-Water Air Decompression ---------- In-Water Air/O_2 Decompression or SurDO_2 Required ----------														
30	4:40	AIR						6	8	14	111	144:20	2	Z
		AIR/O_2						6	8	**8**	**35**	67:40		
35	4:20	AIR					3	8	13	22	160	211:00	2.5	Z
		AIR/O_2					3	8	13	**12**	**44**	90:20		
Exceptional Exposure: In-Water Air/0_2 Decompression ---------- SurDO_2 Required----------														
40	4:20	AIR					7	12	14	29	210	277:00	3	
		AIR/O_2					7	12	14	**15**	**56**	119:20		
45	4:00	AIR				2	11	12	23	28	262	342:40	3.5	
		AIR/O_2				2	11	12	23	**15**	**70**	148:00		
50	4:00	AIR				7	11	16	26	28	321	413:40	4	
		AIR/O_2				7	11	16	26	**15**	**83**	178:00		
Exceptional Exposure: SurDO2 ----------														
55	3:40	AIR			2	10	10	24	25	30	396	501:20	4.5	
		AIR/O_2			2	10	10	24	25	**16**	**98**	204:40		
60	3:40	AIR			5	10	16	24	25	40	454	578:20	5	
		AIR/O_2			5	10	16	24	25	**21**	**108**	233:40		
90	3:20	AIR		11	19	20	21	28	51	83	626	863:00	8.5	
		AIR/O_2		11	19	20	21	28	51	**42**	**177**	408:40		
120	3:00	AIR	15	17	19	20	37	46	79	113	691	1040:40	10.5	
		AIR/O_2	15	17	19	20	37	46	79	**55**	**219**	550:20		

Table 9-9. *Air Decompression Table (Continued).*
(DESCENT RATE 75 FPM—ASCENT RATE 30 FPM)

Bottom Time (min)	Time to First Stop (M:S)	Gas Mix	DECOMPRESSION STOPS (FSW) Stop times (min) include travel time, except first air and first O_2 stop 100	90	80	70	60	50	40	30	20	Total Ascent Time (M:S)	Chamber O_2 Periods	Repet Group
200 FSW														
Exceptional Exposure														
5	6:00	AIR									1	7:40	0.5	
		AIR/O_2									**1**	7:40		
10	6:00	AIR									2	8:40	0.5	
		AIR/O_2									**1**	7:40		
15	5:40	AIR								2	22	30:20	0.5	
		AIR/O_2								**1**	**11**	18:20		
20	5:20	AIR							5	6	43	60:00	1	
		AIR/O_2							5	**4**	**21**	36:20		
25	5:00	AIR						5	6	11	78	105:40	1.5	
		AIR/O_2						5	6	**6**	**29**	52:00		
30	4:40	AIR					4	5	11	18	136	179:20	2	
		AIR/O_2					4	5	11	**9**	**40**	79:40		
35	4:20	AIR				1	6	10	13	26	179	240:00	2.5	
		AIR/O_2				1	6	10	13	**13**	**49**	102:20		
40	4:20	AIR				3	10	12	18	28	243	319:00	3	
		AIR/O_2				3	10	12	18	**15**	**65**	138:20		
45	4:20	AIR				8	11	12	26	28	300	390:00	3.5	
		AIR/O_2				8	11	12	26	**15**	**79**	166:20		
50	4:00	AIR			3	10	11	20	26	28	377	479:40	4.5	
		AIR/O_2			3	10	11	20	26	**15**	**95**	200:00		
210 FSW														
Exceptional Exposure														
5	6:20	AIR									1	8:00	0.5	
		AIR/O_2									**1**	8:00		
10	6:20	AIR									5	12:00	0.5	
		AIR/O_2									**3**	10:00		
15	6:00	AIR								5	26	37:40	1	
		AIR/O_2								**3**	**13**	22:40		
20	5:20	AIR						2	6	7	50	71:00	1.5	
		AIR/O_2						2	6	**4**	**24**	42:20		
25	5:00	AIR					2	6	7	13	94	127:40	1.5	
		AIR/O_2					2	6	7	**7**	**32**	65:00		
30	4:40	AIR				2	5	6	13	21	156	208:20	2	
		AIR/O_2				2	5	6	13	**11**	**43**	90:40		
35	4:40	AIR				5	6	12	14	28	214	284:20	3	
		AIR/O_2				5	6	12	14	**14**	**58**	124:40		
40	4:20	AIR			2	6	11	12	22	28	271	357:00	3.5	
		AIR/O_2			2	6	11	12	22	**15**	**74**	157:20		
45	4:20	AIR			4	10	11	16	25	29	347	447:00	4	
		AIR/O_2			4	10	11	16	25	**15**	**89**	190:20		
50	4:20	AIR			9	10	11	23	26	35	426	545:00	4.5	
		AIR/O_2			9	10	11	23	26	**18**	**104**	221:20		

Table 9-9. *Air Decompression Table (Continued).*
(DESCENT RATE 75 FPM—ASCENT RATE 30 FPM)

Bottom Time (min)	Time to First Stop (M:S)	Gas Mix	DECOMPRESSION STOPS (FSW) Stop times (min) include travel time, except first air and first O_2 stop 100	90	80	70	60	50	40	30	20	Total Ascent Time (M:S)	Chamber O_2 Periods	Repet Group
220 FSW														
Exceptional Exposure														
5	6:40	AIR									2	9:20	0.5	
		AIR/O_2									**1**	8:20		
10	6:40	AIR									8	15:20	0.5	
		AIR/O_2									**4**	11:20		
15	6:00	AIR							1	7	30	44:40	1	
		AIR/O_2							1	**4**	**15**	27:00		
20	5:40	AIR						5	6	7	63	87:20	1.5	
		AIR/O_2						5	6	**4**	**27**	48:40		
25	5:20	AIR					5	6	8	14	119	158:00	2	
		AIR/O_2					5	6	8	**7**	**38**	75:20		
30	5:00	AIR				5	5	8	13	24	174	234:40	2.5	
		AIR/O_2				5	5	8	13	**13**	**47**	102:00		
35	4:40	AIR			3	5	9	11	18	28	244	323:20	3	
		AIR/O_2			3	5	9	11	18	**15**	**66**	142:40		
40	4:20	AIR		1	4	9	11	11	26	28	312	407:00	4	
		AIR/O_2		1	4	9	11	11	26	**15**	**82**	179:20		
250 FSW														
Exceptional Exposure														
5	7:40	AIR									3	11:20	0.5	
		AIR/O_2									**2**	10:20		
10	7:20	AIR								2	15	25:00	0.5	
		AIR/O_2								**1**	**8**	17:00		
15	6:40	AIR						3	7	7	41	65:20	1	
		AIR/O_2						3	7	**4**	**21**	42:40		
20	6:00	AIR				2	6	5	7	12	106	144:40	2	
		AIR/O_2				2	6	5	7	**6**	**35**	73:00		
25	5:40	AIR			4	5	5	7	13	24	175	239:20	2.5	
		AIR/O_2			4	5	5	7	13	**13**	**47**	105:40		
30	5:20	AIR		4	4	5	9	11	20	28	257	344:00	3.5	
		AIR/O_2		4	4	5	9	11	20	**14**	**70**	153:20		
35	5:00	AIR	2	5	4	10	11	14	25	29	347	452:40	4	
		AIR/O_2	2	5	4	10	11	14	25	**15**	**89**	196:00		
300 FSW														
Exceptional Exposure														
5	9:20	AIR									6	16:00	0.5	
		AIR/O_2									**3**	13:00		
10	8:20	AIR						2	5	7	32	55:00	1	
		AIR/O_2						2	5	**4**	**16**	36:20		
15	7:20	AIR			1	4	5	6	6	10	102	142:00	1.5	
		AIR/O_2			1	4	5	6	6	**5**	**35**	75:20		
20	6:40	AIR	1	4	5	5	5	6	14	28	196	271:20	2.5	
		AIR/O_2	1	4	5	5	5	6	14	**15**	**52**	124:40		
25	6:40	AIR	7	4	5	5	10	12	25	29	305	409:00	3.5	
		AIR/O_2	7	4	5	5	10	12	25	**15**	**80**	180:20		

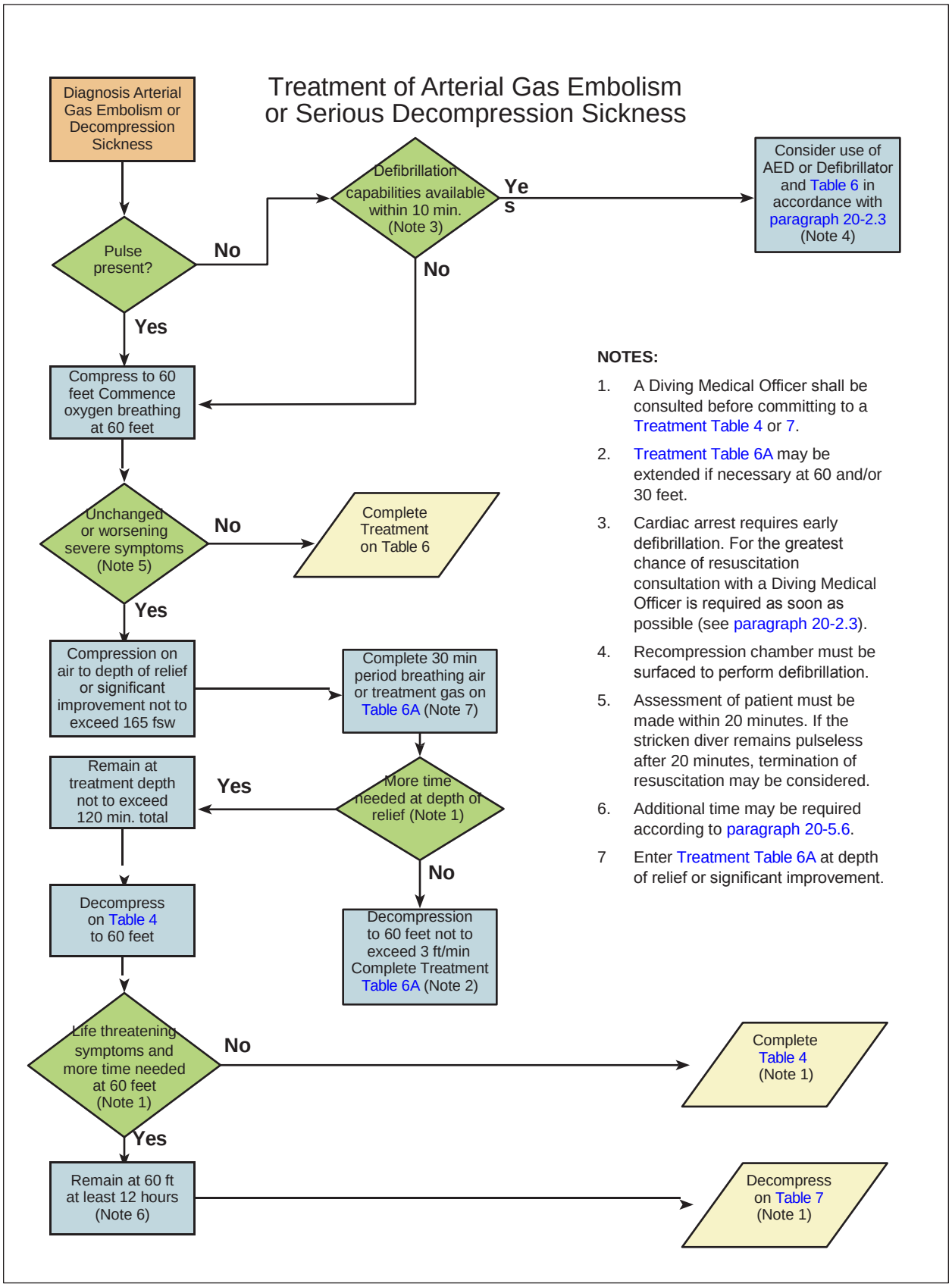

Figure 20-1. Treatment of Arterial Gas Embolism or Serious Decompression Sickness.

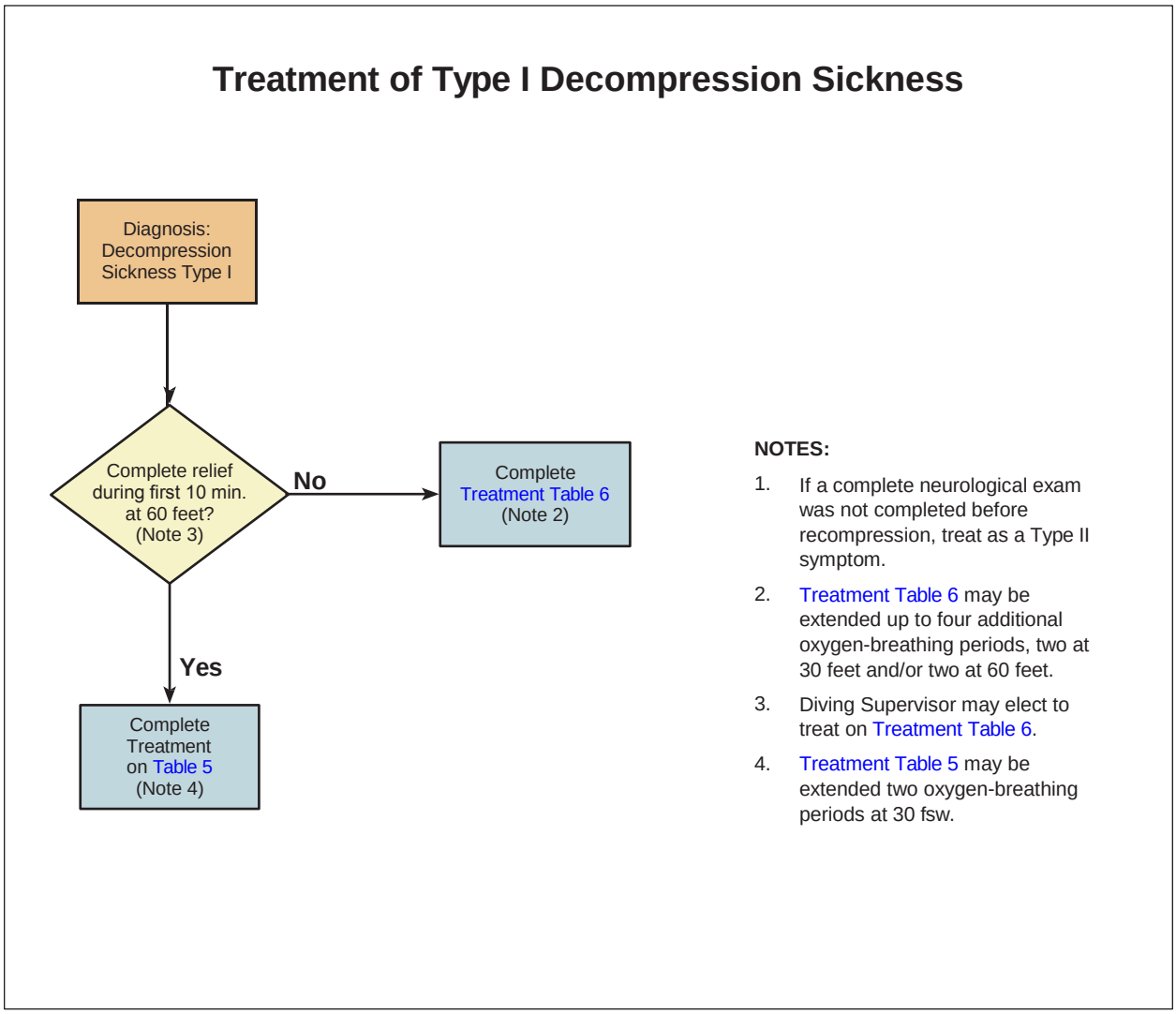

Figure 20-2. Treatment of Type I Decompression Sickness.

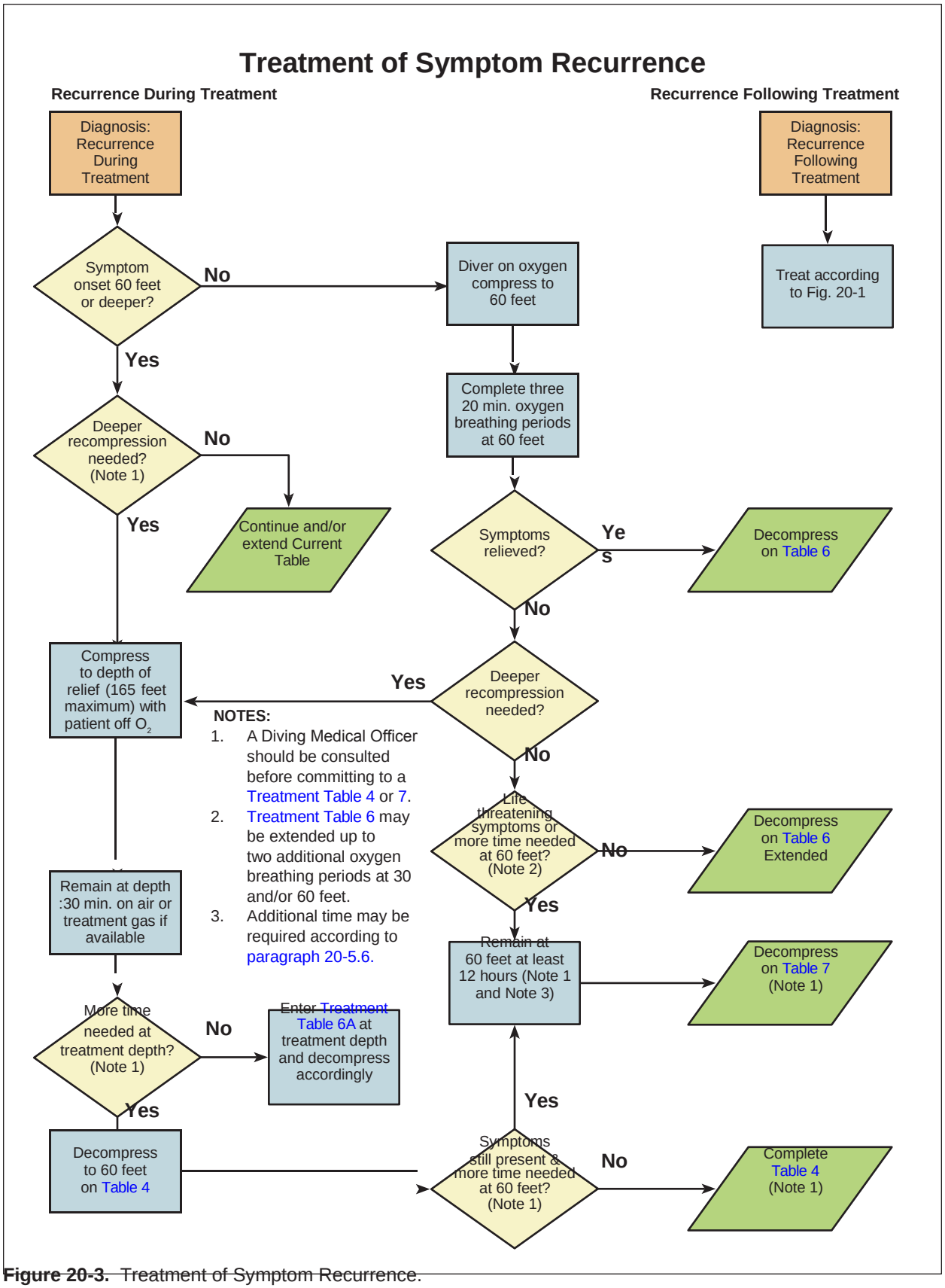

Figure 20-3. Treatment of Symptom Recurrence.

Treatment Table 5

1. Descent rate - 20 ft/min.
2. Ascent rate - Not to exceed 1 ft/min. Do not compensate for slower ascent rates. Compensate for faster rates by halting the ascent.
3. Time on oxygen begins on arrival at 60 feet.
4. If oxygen breathing must be interrupted because of CNS Oxygen Toxicity, allow 15 minutes after the reaction has entirely subsided and resume schedule at point of interruption (see paragraph 20-7.11.1.1)
5. Treatment Table may be extended two oxygen-breathing periods at the 30-foot stop. No air break required between oxygen-breathing periods or prior to ascent.
6. Tender breathes 100 percent O_2 during ascent from the 30-foot stop to the surface. If the tender had a previous hyperbaric exposure in the previous 18 hours, an additional 20 minutes of oxygen breathing is required prior to ascent.

Treatment Table 5 Depth/Time Profile

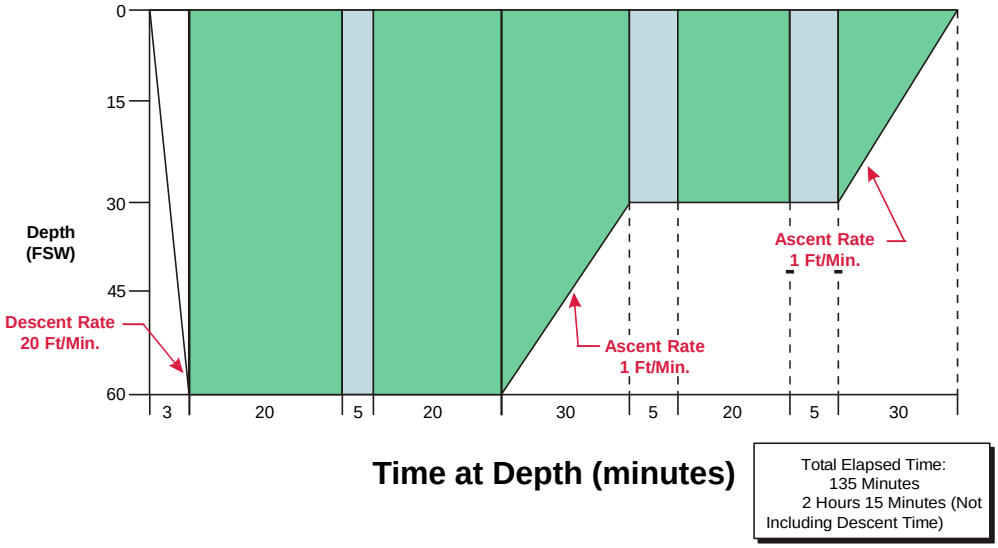

Figure 20-4. Treatment Table 5.

Treatment Table 6

1. Descent rate - 20 ft/min.
2. Ascent rate - Not to exceed 1 ft/min. Do not compensate for slower ascent rates. Compensate for faster rates by halting the ascent.
3. Time on oxygen begins on arrival at 60 feet.
4. If oxygen breathing must be interrupted because of CNS Oxygen Toxicity, allow 15 minutes after the reaction has entirely subsided and resume schedule at point of interruption (see paragraph 20-7.11.1.1).
5. Table 6 can be lengthened up to 2 additional 25-minute periods at 60 feet (20 minutes on oxygen and 5 minutes on air), or up to 2 additional 75-minute periods at 30 feet (15 minutes on air and 60 minutes on oxygen), or both.
6. Tender breathes 100 percent O_2 during the last 30 min. at 30 fsw and during ascent to the surface for an unmodified table or where there has been only a single extension at 30 or 60 feet. If there has been more than one extension, the O_2 breathing at 30 feet is increased to 60 minutes. If the tender had a hyperbaric exposure within the past 18 hours an additional 60-minute O_2 period is taken at 30 feet.

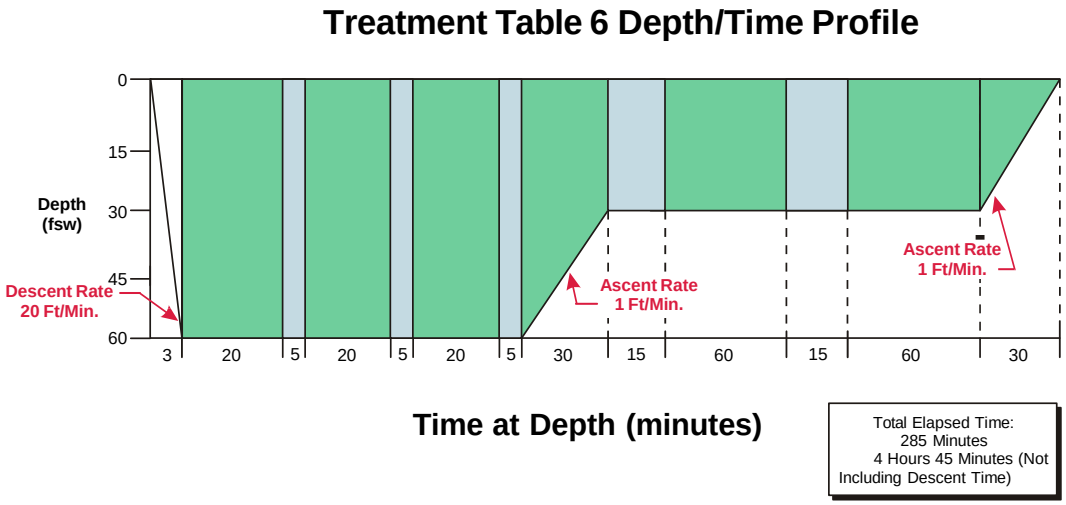

Figure 20-5. Treatment Table 6.

Treatment Table 6A

1. Descent rate - 20 ft/min.
2. Ascent rate - 165 fsw to 60 fsw not to exceed 3 ft/min, 60 fsw and shallower, not to exceed 1 ft/min. Do not compensate for slower ascent rates. Compensate for faster rates by halting the ascent.
3. Time at treatment depth does not include compression time.
4. Table begins with initial compression to depth of 60 fsw. If initial treatment was at 60 feet, up to 20 minutes may be spent at 60 feet before compression to 165 fsw. Contact a Diving Medical Officer.
5. If a chamber is equipped with a high-O_2 treatment gas, it may be administered at 165 fsw and shallower, not to exceed 3.0 ata O_2 in accordance with paragraph 20-7.10. Treatment gas is administered for 25 minutes interrupted by 5 minutes of air. Treatment gas is breathed during ascent from the treatment depth to 60 fsw.
6. Deeper than 60 feet, if treatment gas must be interrupted because of CNS oxygen toxicity, allow 15 minutes after the reaction has entirely subsided before resuming treatment gas. The time off treatment gas is counted as part of the time at treatment depth. If at 60 feet or shallower and oxygen breathing must be interrupted because of CNS oxygen toxicity, allow 15 minutes after the reaction has entirely subsided and resume schedule at point of interruption (see paragraph 20-7.11.1.1).
7. Table 6A can be lengthened up to 2 additional 25-minute periods at 60 feet (20 minutes on oxygen and 5 minutes on air), or up to 2 additional 75-minute periods at 30 feet (60 minutes on oxygen and 15 minutes on air), or both.
8. Tender breathes 100 percent O_2 during the last 60 minutes at 30 fsw and during ascent to the surface for an unmodified table or where there has been only a single extension at 30 or 60 fsw. If there has been more than one extension, the O_2 breathing at 30 fsw is increased to 90 minutes. If the tender had a hyperbaric exposure within the past 18 hours, an additional 60 minute O_2 breathing period is taken at 30 fsw.
9. If significant improvement is not obtained within 30 minutes at 165 feet, consult with a Diving Medical Officer before switching to Treatment Table 4.

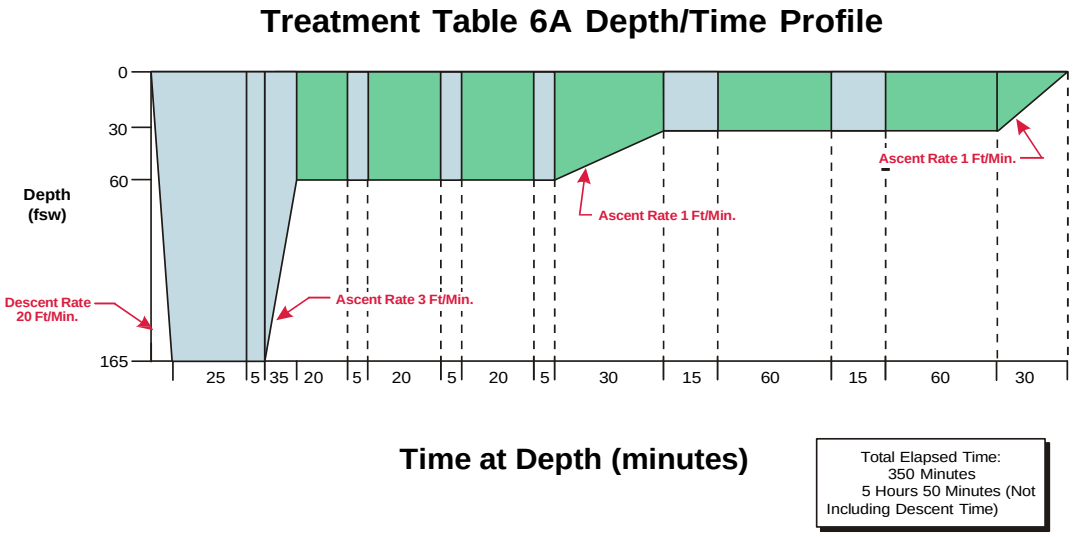

Figure 20-6. Treatment Table 6A.

Treatment Table 4

1. Descent rate - 20 ft/min.
2. Ascent rate - 1 ft/min.
3. Time at 165 feet includes compression.
4. If only air is available, decompress on air. If oxygen is available, patient begins oxygen breathing upon arrival at 60 feet with appropriate air breaks. Both tender and patient breathe oxygen beginning 2 hours before leaving 30 feet. (see paragraph 20-5.5).
5. Ensure life-support considerations can be met before committing to a Table 4. (see paragraph 20-7.5) Internal chamber temperature should be below 85° F.
6. If oxygen breathing is interrupted, no compensatory lengthening of the table is required.
7. If switching from Treatment Table 6A or 3 at 165 feet, stay a maximum of 2 hours at 165 feet before decompressing.
8. If the chamber is equipped with a high-O_2 treatment gas, it may be administered at 165 fsw, not to exceed 3.0 ata O_2. Treatment gas is administered for 25 minutes interrupted by 5 minutes of air.

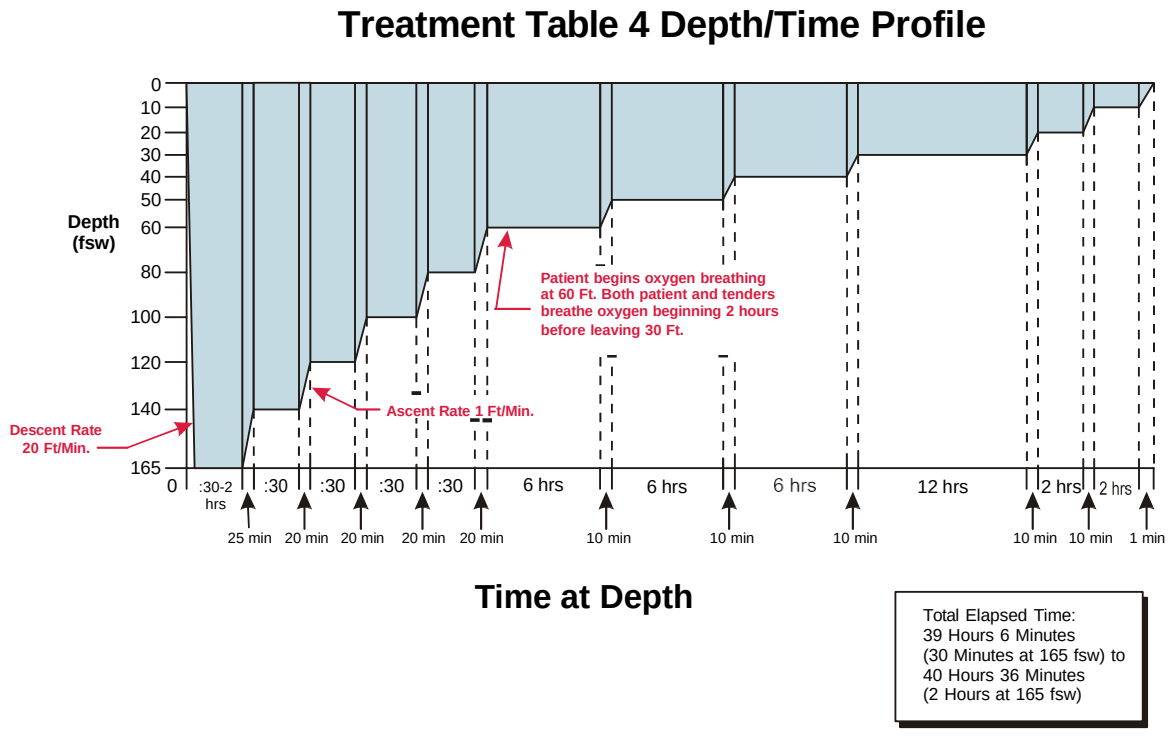

Figure 20-7. Treatment Table 4.

Treatment Table 7

1. Table begins upon arrival at 60 feet. Arrival at 60 feet is accomplished by initial treatment on Table 6, 6A or 4. If initial treatment has progressed to a depth shallower than 60 feet, compress to 60 feet at 20 ft/min to begin Table 7.
2. Maximum duration at 60 feet is unlimited. Remain at 60 feet a minimum of 12 hours unless overriding circumstances dictate earlier decompression.
3. Patient begins oxygen breathing periods at 60 feet. Tender need breathe only chamber atmosphere throughout. If oxygen breathing is interrupted, no lengthening of the table is required.
4. Minimum chamber O_2 concentration is 19 percent. Maximum CO_2 concentration is 1.5 percent SEV (11.4 mmHg). Maximum chamber internal temperature is 85°F (paragraph 20-7.5).
5. Decompression starts with a 2-foot upward excursion from 60 to 58 feet. Decompress with stops every 2 feet for times shown in profile below. Ascent time between stops is approximately 30 seconds. Stop time begins with ascent from deeper to next shallower step. Stop at 4 feet for 4 hours and then ascend to the surface at 1 ft/min.
6. Ensure chamber life-support requirements can be met before committing to a Treatment Table 7.
7. A Diving Medical Officer should be consulted before committing to this treatment table.

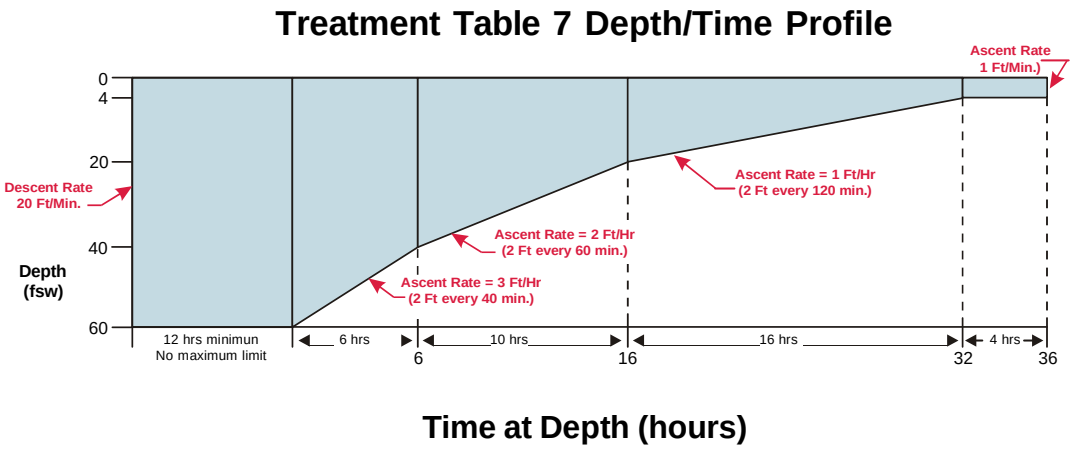

Figure 20-8. Treatment Table 7.

Treatment Table 8

1. Enter the table at the depth which is exactly equal to or next greater than the deepest depth attained in the mask recompression. The descent rate is as fast as tolerable.
2. The maximum time that can be spent at the deepest depth is shown in the second column. The maximum time for 225 fsw is 30 minutes; for 165 fsw, 3 hours. For an asymptomatic diver, the maximum time at depth is 30 minutes for depths exceeding 165 fsw and 2 hours for N_2O_2, depths equal to or shallower than 165 fsw.
3. Decompression is begun with a 2-fsw reduction in after pressure if the depth is an even number. Decompression is begun with a 3-fsw reduction in pressure if the depth is an odd number. Subsequent stops are carried out every 2 fsw. Stop times are given in column three. The stop time begins when leaving the previous depth. Ascend to the next stop in approximately 30 seconds.
4. Stop times apply to all stops within the band up to the next quoted depth. For example, for ascent from 165 fsw, stops for 12 minutes are made at 162 fsw and at every two-foot interval to 140 fsw. At 140 fsw, the stop time becomes 15 minutes. When traveling from 225 fsw, the 166-foot stop is 5 minutes; the 164-foot stop is 12 minutes. Once begun, decompression is continuous. For example, when decompressing from 225 feet, ascent is not halted at 165 fsw for 3 hours. However, ascent may be halted at 60 fsw and shallower for any desired period of time.
5. While deeper than 165 fsw, a helium-oxygen mixture with 16-36 percent oxygen may be breathed by to reduce narcosis. A 64/36 helium-oxygen mixture is the preferred treatment gas. At 165 fsw and shallower, a HeO_2 or N_2O_2 mix with a ppO_2 not to exceed 3.0 ata may be given to the diver as a treatment gas. At 60 fsw and shallower, pure oxygen may be given to the divers as a treatment gas. For all treatment gases (HeO_2, and O_2), a schedule of 25 minutes on gas and 5 minutes on chamber air should be followed for a total of four cycles. Additional oxygen may be given at 60 fsw a 2-hour interval of chamber air. See Treatment Table 7 for guidance. If high O_2 breathing is interrupted, no lengthening of the table is required.
6. To avoid loss of the chamber seal, ascent may be halted at 4 fsw and the total remaining stop time of 240 minutes taken at this depth. Ascend directly to the surface upon completion of the required
7. Total ascent time from 225 fsw is 56 hours, 29 minutes. For a 165-fsw recompression, total ascent time is 53 hours, 52 minutes, and for a 60-fsw recompression, hours, 0 minutes.

Depth (fsw)	Max Time at Initial Treatment Depth (hours)	2-fsw Stop Times (minutes)
225	0.5	5
165	3	12
140	5	15
120	8	20
100	11	25
80	15	30
60	Unlimited	40
40	Unlimited	60

Figure 20-9. Treatment Table 8.

Treatment Table 9

1. Descent rate - 20 ft/min.
2. Ascent rate - 20 ft/min. Rate may be slowed to 1 ft/min depending upon the patient's medical condition.
3. Time at 45 feet begins on arrival at 45 feet.
4. If oxygen breathing must be interrupted because of CNS Oxygen Toxicity, oxygen breathing may be restarted 15 minutes after all symptoms have subsided. Resume schedule at point of interruption (see paragraph 20-7.11.1.1).
5. Tender breathes 100 percent O_2 during last 15 minutes at 45 feet and during ascent to the surface regardless of ascent rate used.
6. Patient may breathe air or oxygen during ascent.
7. If patient cannot tolerate oxygen at 45 feet, this table can be modified to allow a treatment depth of 30 feet. The oxygen breathing time can be extended to a maximum of 3 to 4 hours.

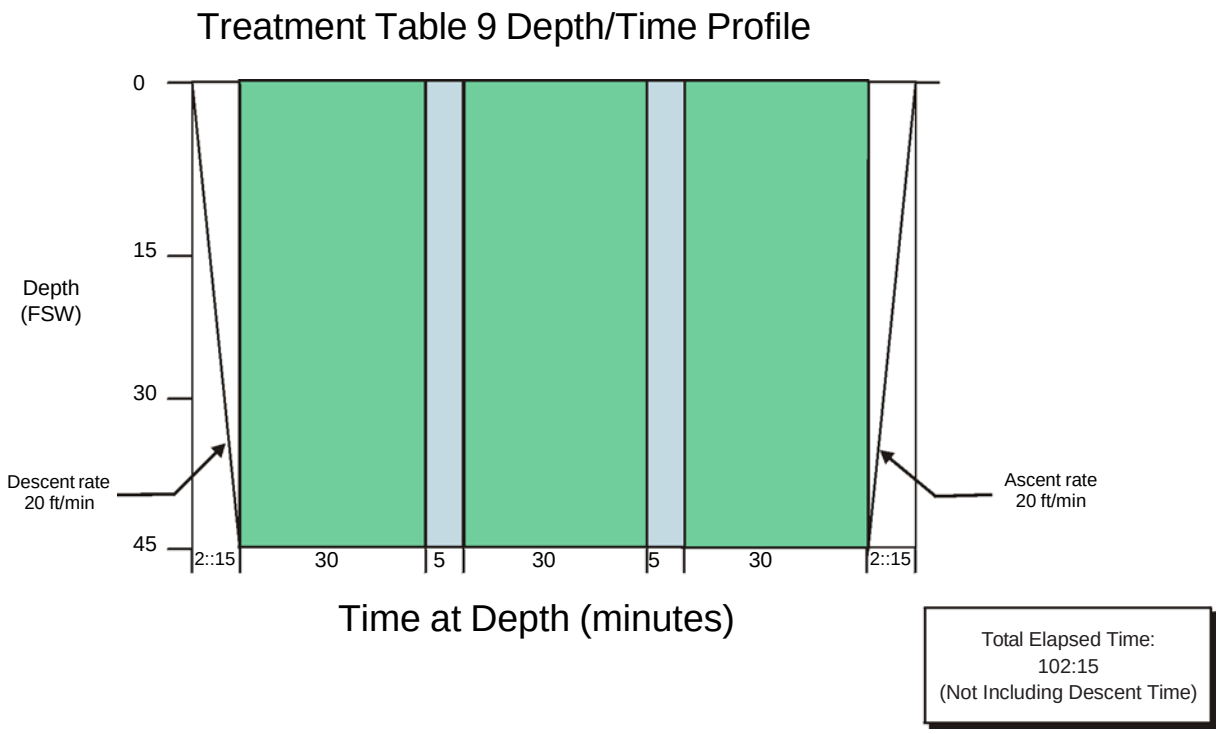

Figure 20-10. Treatment Table 9.

Air Treatment Table 1A

1. Descent rate - 20 ft/min.
2. Ascent rate - 1 ft/min.
3. Time at 100 feet includes time from the surface.

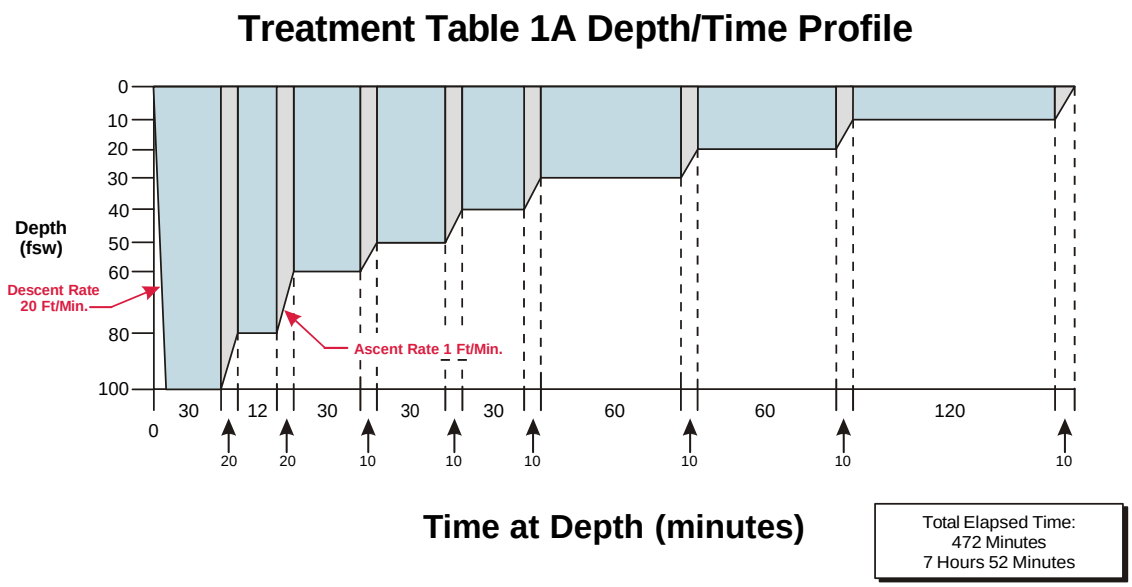

Figure 20-11. Air Treatment Table 1A.

Air Treatment Table 2A

1. Descent rate - 20 ft/min.
2. Ascent rate - 1 ft/min.
3. Time at 165 feet includes time from the surface.

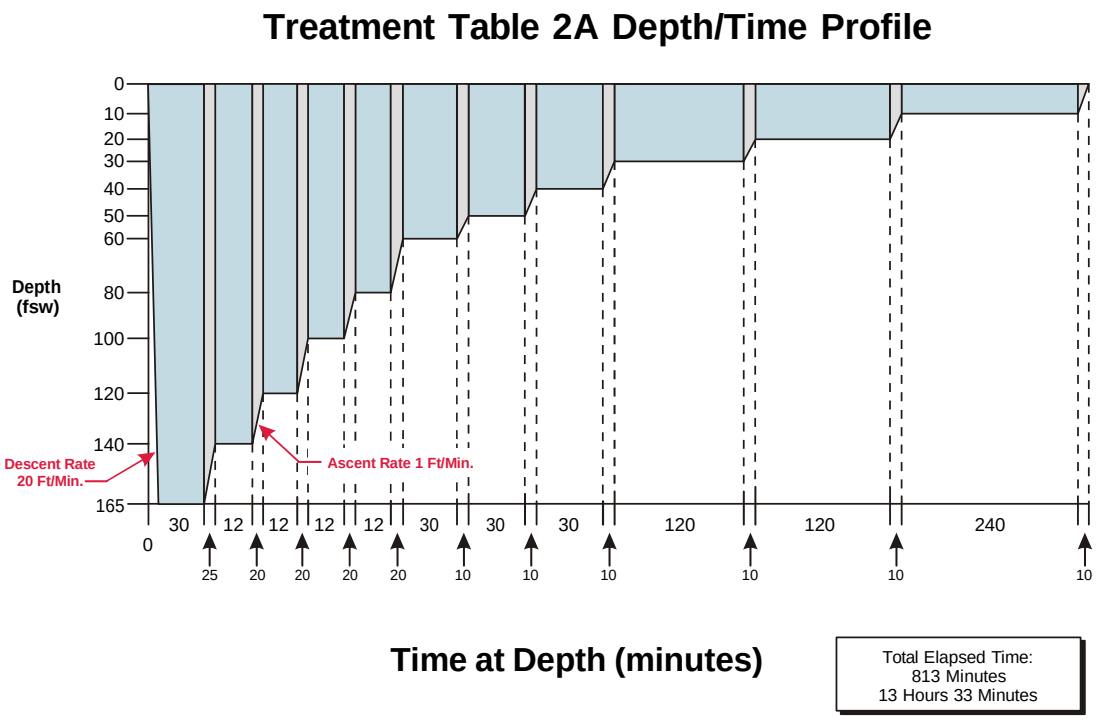

Figure 20-12. Air Treatment Table 2A.

Air Treatment Table 3

1. Descent rate - 20 ft/min.
2. Ascent rate - 1 ft/min.
3. Time at 165 feet-includes time from the surface.

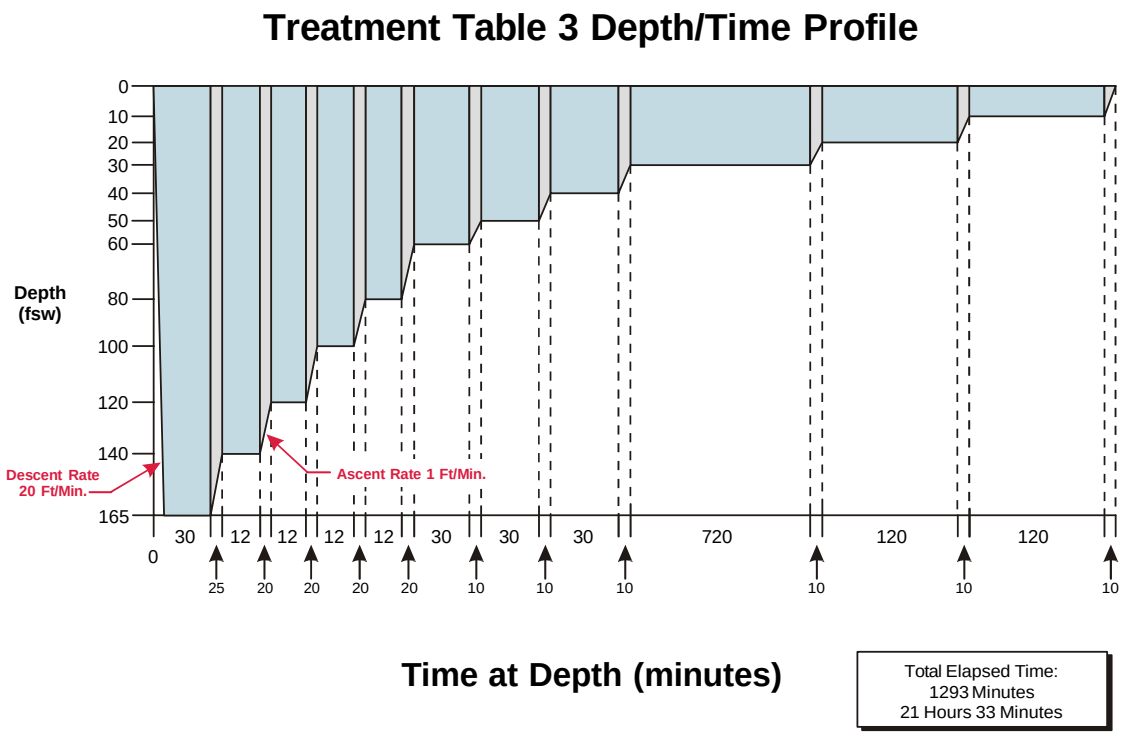

Figure 20-13. Air Treatment Table 3.

ADVANCED AMERICAN CONSTRUCTION

AAC MANAGEMENT STANDARD

SMS 8- Commercial Diving Safety

DIVE RECORD

STANDARD FORM

DIVE SHEET **ADVANCED AMERICAN CONSTRUCTION, INC.**

JOB NO: _____

JOB NAME: _____

LOCATION: _____

DIVE NUMBER: _____

DATE: _____

DAY: **S M T W T F S**

DIVER: _____ STAND-BY: _____

BAIL OUT PSI: _____ BAIL OUT PSI: _____

TENDER: _____

LEFT SURFACE: _____ MAX DEPTH: _____

REACHED BOTTOM: _____ WATER DEPTH: _____

LEFT BOTTOM: _____ WATER TEMP: _____

TIME TO FIRST STOP: _____ CURRENT: _____

REACHED SURFACE: _____ VISIBILITY: _____

TOTAL BOTTOM TIME: _____ TOTAL DIVE TIME: _____

TABLE & SCHEDULE USED:

TIME:	WORK DESCRIPTION

DIVER'S CONDITION		REMARKS	

Dive No:__ Depth: _____ Date: _____

Diver: _____

Tender / Chamber Operator: _____

Decompression Schedule:

Reach Depth Chamber _____				NOTES AND CHAMBER VENT LOG
DEPTH	TIME	MEDIA		
REACH SURFACE CHAMBER _____				DIVER CONDITION AFTER DECOMPRESSION _____

OXYGEN REACTION SYMPTOMS:

Twitching or tremors of facial muscles and lips; nausea; dizziness; vomiting; convulsions; anxiety; confusion; restlessness and irritability; maised; disturbances of vision and narrowing of visual fields; incoordination; tremors of arms and legs; numbness or tingling of fingers or toes; fainting and spasmodic breathing.

BE ALERT FOR SIGNS OR SYMPTOMS OF REACTIONS.

IF OXYGEN INTOLERANCE OCCURS:

1. Halt ascent; secure oxygen to mask; maintain constant depth; notify Dive Supervisor.
2. Fifteen minutes after the reaction has entirely subsided resume the schedule at the point of its interruption.

NOTES

A. Do not alter this schedule or table without permission from Dive Supervisor.
B. Return this form and stopwatch to Dive Supervisor when completed in full.
C. Ventilate chamber two out of every five minutes when oxygen is used and one out of five when using air.
D. Clean chamber daily, and as needed after each use.
E. Clean chamber masks daily with soap and fresh water. Rinse and wipe with clean dry cloth. Vinegar or alcohol swab may be used to guard against fungus.
F. Gauge oxygen banks after each use.

NEVER:

1. Use oil and oxygen fitting or pieces of equipment.
2. Allow gas supply tanks to be depleted or reach low capacity.
3. Allow damage to door seals and dogs.
4. Leave doors dogged after pressurization.
5. Allow open flames, matches, cigarette lighters or pipes to be carried into the chamber.
6. Permit electrical appliances to be used in the chamber.

PRESSURE BANK #1: START _____ FINISH _____

PRESSURE BANK #2: START _____ FINISH _____

DIVER NAME (SIGNATURE) TENDER NAME (SIGNATURE)

DIVING BENDS AND TREATMENT REPORT

DIVER'S NAME: _____ JOB: _____ BARGE: _____ DATE: _____

TENDERS'S NAME: _____ DIVE#: _____ TIME: _____

SUMMARY OF DIVE: DATE:_____ L.S._____ L.B._____ R.S._____ R.S.C._____

TYPE OF SYMPTOM: PAIN ONLY:_____ SERIOUS:_____ BODY LOCATION:_____

TREATMENT TABLE USED: _____ TYPE OF WORK: _____

Depth Ft.	Time Min.	Media	Total Time	Clock Time	Depth Ft.	Time Min.	Media	Total Time	Clock Time	Depth Ft.	Time Min.	Media	Note
			TIME LEFT SURFACE			**TABLE 6A**		**TIME LEFT SURFACE**			**TABLE 4**		**TABLE 4 ASCENT RATES FOR ALL SLIDES ARE 1FSW / MINUTE EXCEPT FROM 10 FSW TO SURFACE**
					165	30	Air			165	30/120	Air	
					165/60	35	Air			140	30	Air	
TABLE 5			**TIME LEFT SURFACE**		**TABLE 6**			**TIME LEFT SURFACE**		120	30	Air	
60	20	Oxy.			60	20	Oxy.			100	30	Air	
60	5	Air			60	5	Air			80	30	Air	
60	20	Oxy.			60	20	Oxy.			60	6 hrs.	Air	
					60	5	Air			50	6 hrs.	Air	
					60	20	Oxy.			40	6 hrs.	Air	
					60	5	Air			30	11 hrs.	Air	
60/30	30	Oxy.			60/30	30	Oxy.			30	1 hr.	Oxy.	
30	5	Air			30	15	Air			20	11 hrs.	Air	
30	20	Oxy.			30	60	Oxy.			20	1 hr.	Oxy.	
30	5	Air			30	15	Air			10	1 hr.	Air	
					30	60	Oxy.			10	1 hr.	Oxy.	
30/0	30	Oxy.			30/0	30	Oxy.			10/0	1 min.	Oxy.	
Reach Surface Chamber					Reach Surface Chamber					Reach Surface Chamber			

INSTRUCTIONS FOR USE OF TABLES 5 AND 6

1. **Choice of Table: The Short**- Table 5 or Table 6 is used for treatment of "pain only" bends if all pain is completely relieved within 10 minutes of reaching 60 feet.
   The Long- (285 minutes) schedule of Table 6 is used for all serious symptoms for recurrence, or if pain is not completely resolved after 10 minutes 1t 60 feet.
2. **Oxygen Breathing:Commence** Commence O2 breathing prior to descent. Descent time is not counted as time at 60 feet.
3. **Descent:** Normal rate of descent is 20 feet per minute. A more rapid descent is desirable if more serious symptoms are present.
4. **Ascent:** Ascent is continuous at 1 foot per minute. Do not compensate for slowing of the rate by subsequent acceleration. Do compensate if the rate is exceeded. If necessary halt ascent and hold depth while ventilating the chamber.
5. **Relief not Complete:** If relief is not complete at 60 feet, proceed with Table 6 and observe patient's condition closely for any change, lengthen the schedule if thought necessary, or compress to 165 feet and treat patient on Table 4.
6. **Recurrence:** If symptoms recur of if new symptoms appear during course of treatment with Tables 5 or 6, return to 60 feet and retreat the patient on Table 6.
7. **Serious Symptoms:** Unconsciousness, convulsions, weakness, or inability to use arms or legs, air embolism, any visual disturbances, dizziness, loss of speech or hearing, chokes bends under pressure.
8. **Tender:** Tender routinely breathes chamber air if the treatment schedule is lengthened or if the treatment constitutes a repetitive dive for the tender, he must breathe oxygen for the final 30 minutes of ascent from 30 feet to the surface.

INSTRUCTIONS FOR USE OF TABLES 5A AND 6A

1. **Recompression** to 165 feet should be accomplished at 20 fsw/min
2. If serious or major symptoms or signs persist beyond 15 minutes, but show signs of moderating within 30 minutes (total bottom time), proceed to 60 feet at 25 feet per minute and begin oxygen as in Table 6A.
3. Should serious symptoms and signs persist beyond 30 minutes at 165 feet without moderation, begin treatment on Table 4.
4. **Recurrence:** If symptoms recur or if new symptoms appear during the course of treatment with Table 6A, return to 60 feet and retreat patient according to Table 6A.
5. **Relief not complete:** If relief is not complete at 0 feet, proceed with Table6A and observe patient's condition closely for any change, lengthen the schedule if thought necessary or compress to 165 feet and treat patient on Table 4.
6. **Oxygen Toxicity:** Should oxygen intolerance develop during the course of treatment, discontinue the oxygen until 15 minutes after reaction has entirely subsided, then resume the schedule at its point of interruption.
7. **Tenders:** Inside tenders routinely breath air, however, if treatment constitutes a repetitive dive for a tender he must breathe O2 from 30 feet to the surface.
8. **Serious Symptoms:** Unconsciousness continues, major paralysis, or weakness, cranial nerve signs, cerebellar signs.

DIVER'S CONDITION AFTER TREATMENT: _____

DIVER'S CONDITION 12 HRS. AFTER TREATMENT: _____

DISPOSITION: _____

_____ SIGNATURE OF DIVER TREATED

_____ SIGNATURE OF PERSON SUBMITTING THE REPORT

SEND THIS REPORT AND SUPERVISORS ACCIDENT REPORT TO DIVERS DIVISION OFFICE

ADVANCED AMERICAN CONSTRUCTION, INC.
DIVING DIVISION
8444 NW St. Helens Rd. P.O. Box 83599
Portland, Oregon 97283
503-445-9000 *Fax 503-650-8230*
www.aadiving.com

PROJECT TITLE:
PROJECT DESCRIPTION:
AAC JOB #:
DATE:

DAILY WORK LOG

DATE_____ **DIVE NO._____- DIVE NO. _____**

Time	Description

ADVANCED AMERICAN CONSTRUCTION

AAC MANAGEMENT STANDARD

SMS 8- Commercial Diving Safety

CREW REQUIREMENTS

MANNING

Advanced American Construction Safety Management Standard
CREW REQUIREMENTS / MANNING

SMS 8- Commercial Diving Safety

Crew Requirements / Manning

The minimum number of personnel comprising a dive team must be taken into consideration not only the direct requirements of work to be performed, but also the other activities or factors that may lead to more support personnel required. (IE. Crane Operations, Boat Operations, Equipment Tending) When an additional diver is required for inwater work, an additional tender is also required. This is also applicable with penetration dives.

Positions in the dive crew are determined at the start of work operations. Positions may be changed in dive rotation.

MINIMUM CREW REQUIREMENTS	LIMITATIONS / REQUIREMENTS
3-MAN CREW **1. Diver** **2. Standby Diver** **3. Tender**	Surface Supplied Air Diving 0 – 80 FSW, with No Decompression. An additional dive crew member may be required if: 1. Equipment being used need attention and may interfere with diving operations. 2. Crane Operations. 3. Remote locations inwich equipment monitoring may be required away from the physical dive station. 4. Diver is to enter a physically confining space, which may require inwater tender personnel.
4-MAN CREW **1. Diver** **2. Standby Diver** **3. Tender** **4. Dive Master / DiveSupervisor**	Surface Supplied Air Diving 80 – 130 FSW, or when decompression is required. An additional dive crew member may be required if: 1. Equipment being used need attention and may interfere with diving operations. 2. Crane Operations. 3. Remote locations inwich equipment monitoring may be required away from the physical dive station. 4. Diver is to enter a physically confining space, which may require inwater tender personnel.
5-MAN CREW **1. Diver** **2. Standby Diver** **3. (2) Tenders** **4. Dive Master / DiveSupervisor**	Surface Supplied Air Diving 130 – 220 FSW, or when decompression is required. An additional dive crew member may be required if: 1. Equipment being used need attention and may interfere with diving operations. 2. Crane Operations. 3. Remote locations inwich equipment monitoring may be required away from the physical dive station. 4. Diver is to enter a physically confining space, which may require inwater tender personnel.

Advanced American Construction Safety Management Standard
CREW REQUIREMENTS / MANNING

SMS 8- Commercial Diving Safety

Crew Assignments and Responsibilities

Titles, duties, responsibilities, and capabilities of crew personel vary amongst members of the Dive Crew. Individual crew members have required duties and respondibilities. Essential of each individual job, a member of the Dive Crew has an assigned Designated Person in Charge (DPIC).

Positions in the dive crew are determined at the start of work operations. Positions may be changed or altered throughout dive rotation.

It is the responsibility of every member of the Dive Team to be aware of all dangers to himself, as well as to his fellow workers. Every member of the Dive Team shall, AT ALL TIMES, keep the safety of everyone as his first priority.

Duties / Responsibilities include, but not necessarily are limited to the following:

POSITION	DUTIES / RESPONSIBILITIES
DIVE SUPERVISOR **DIVEMASTER** **DESIGNATED PERSON IN CHARGE**	1. Responsible for Understanding Project Specific Work Plan 2. Safety – Perform hazard assessment and perform pre dive safety meetings. 3. Emergency – Manage and direct other Dive Crew Members in emergency situations. 4. Assign duties of other Dive Crew Members, and Direct other members of the Dive Team 5. Detailed briefing with Dive Crew Members for tasks to be performed and potential hazards. 6. Review of Hazardous Energy Sources through Lock out – Tag out procedures. 7. Maintain proper dive profiles and decompression schedules. 8. Maintain dive logs and project specific report information. 9. Assign position to other Dive Crew Member upon changing of position in crew.
DIVER	1. Perform specific Tasks in the water and topside as assigned by the DPIC. In the event the diver is assigned a task for which he does not consider himself confident either by training and/or experience, the diver shall notify the DPIC. 2. Safety of himself as well as other Dive Crew Members. 3. Maintain dive log book , current certifications including First Aid, CPR, and O2 provider, and, medical examinations. 4. Act as a Standby Diver or Tender as Directed. 5. Act as a chamber operator as required. 6. Assist as an chamber attendant as required for decompression treatments. 7. Assist in the training of new personel and fellow Dive Crew Members.
STANDBY DIVER	1. Capable and qualified to carry out duties / responsibilities of Diver. 2. Remain at immediate Dive Location prepared to enter the water at the direction of the DPIC.
TENDER	1. Establish and maintain an operational Dive Station. 2. Safety of himself as well as other Dive Crew Members. 3. Set up and operate all equipment as directed by the DPIC. 4. Assist divers in dressing; perform equipment check prior to diver entering water. 5. Tend the diver' s umbilical, remaining aware of amount of hose required. 6. Assit in topside work as directed. 7. Maintain a clean dive station. 8. Decompression Chamber operations.

ADVANCED AMERICAN CONSTRUCTION

AAC MANAGEMENT STANDARD

SMS 8- Commercial Diving Safety

FEDERAL DIVING

REGULATIONS

SUBCHAPTER V—MARINE OCCUPATIONAL SAFETY AND HEALTH STANDARDS

PART 197—GENERAL PROVISIONS

Subpart A [Reserved]

Subpart B—Commercial Diving Operations

Subpart C—Benzene

AUTHORITY: 33 U.S.C. 1509; 43 U.S.C. 1333; 46 U.S.C. 3306, 3703, 6101; Department of Homeland Security Delegation No. 0170.1.

SOURCE: CGD 76–009, 43 FR 53683, Nov. 16, 1978, unless otherwise noted.

Subpart A [Reserved]

Subpart B—Commercial Diving Operations

GENERAL

§ 197.200 Purpose of subpart.

This subpart prescribes rules for the design, construction, and use of equipment, and inspection, operation, and safety and health standards for commercial diving operations taking place from vessels and facilities under Coast Guard jurisdiction.

§ 197.202 Applicability.

(a)) This subpart applies to commer-cial diving operations taking place at any deepwater port or the safety zone thereof as defined in 33 CFR part 150; from any artificial island, installation, or other device on the Outer Conti-nental Shelf and the waters adjacent thereto as defined in 33 CFR part 147 or otherwise related to activities on the Outer Continental Shelf; and from all vessels required to have a certificate of inspection issued by the Coast Guard including mobile offshore drilling units regardless of their geographic location, or from any vessel connected with a deepwater port or within the deepwater port safety zone, or from any vessel en-gaged in activities related to the Outer Continental Shelf; except that this sub-part does not apply to any diving oper-ation—

(1) Performed solely for marine scientific research and development purposes by educational institutions;

(2) Performed solely for research and development for the advancement of diving equipment and technology; or

(3) Performed solely for search and rescue or related public safety purposes by or under the control of a governmental agency.

(b)) Diving operations may deviate from the requirements of this subpart to the extent necessary to prevent or minimize a situation which is likely to cause death, injury, or major environ-mental damage. The circumstances leading to the situation, the deviations made, and the corrective action taken, if appropriate, to reduce the possibility of recurrence shall be recorded by the diving supervisor in the logbook as re-quired by § 197.482(c).

§ 197.203 Right of appeal.

Any person directly affected by a decision or action taken under this subchapter, by or on behalf of the Coast Guard, may appeal therefrom in accordance with subpart 1.03 of this chapter.

[CGD 88–033, 54 FR 50382, Dec. 6, 1989]

§ 197.204 Definitions.

As used in this subpart:

ACFM means actual cubic feet per minute.

ANSI Code1 means the B31.1 American National Standards Institute ''Code for Pressure Piping, Power Piping.''

ASME Code means the American Society of Mechanical Engineers ''Boiler and Pressure Vessel Code.''

ASME PVHO–1 means the ANSI/ASME standard ''Safety Standard for Pressure Vessels for Human Occupancy.''

ATA means a measure of pressure expressed in terms of atmosphere absolute (includes barometric pressure).

Bell means a compartment either at ambient pressure (open bell) or pressurized (closed bell) that allows the diver to be transported to and from the underwater work site, allows the diver access to the surrounding environment, and is capable of being used as a refuge during diving operations.

Bottom time means the total elapsed time measured in minutes from the time the diver leaves the surface in descent to the time to the next whole minute that the diver begins ascent.

Breathing gas/breathing mixture means the mixed-gas, oxygen, or air as appropriate supplied to the diver for breathing.

Bursting pressure means the pressure at which a pressure containment device would fail structurally.

Commercial diver means a diver engaged in underwater work for hire excluding sport and recreational diving and the instruction thereof.

Commercial diving operation means all activities in support of a commercial diver.

Cylinder means a pressure vessel for the storage of gases under pressure.

Decompression chamber means a pressure vessel for human occupancy such

as a surface decompression chamber, closed bell, or deep diving system especially equipped to recompress, decompress, and treat divers.

Decompression sickness means a condition caused by the formation of gas or gas bubbles in the blood or body tissue as a result of pressure reduction.

Decompression table means a profile or set of profiles of ascent rates and breathing mixtures designed to reduce the pressure on a diver safely to atmospheric pressure after the diver has been exposed to a specific depth and bottom time.

Depth means the maximum pressure expressed in feet of seawater attained by a diver and is used to express the depth of a dive.

Dive location means that portion of a vessel or facility from which a diving operation is conducted.

Dive team means the divers and diver support personnel involved in a diving operation, including the diving supervisor.

Diver means a person working beneath the surface, exposed to hyperbaric conditions, and using underwater breathing apparatus.

Diver-carried reserve breathing gas means a supply of air or mixed-gas, as appropriate, carried by the diver in addition to the primary or secondary breathing gas supplied to the diver.

Diving installation means all of the equipment used in support of a commercial diving operation.

Diving mode means a type of diving requiring SCUBA, surface-supplied air, or surface-supplied mixed-gas equipment, with related procedures and techniques.

Diving stage means a suspended platform constructed to carry one or more divers and used for putting divers into the water and bringing them to the surface when in-water decompression or a heavy-weight diving outfit is used.

Diving supervisor means the person having complete responsibility for the safety of a commercial diving operation including the responsibility for the safety and health of all diving personnel in accordance with this subpart.

Facility means a deepwater port, or an artificial island, installation, or other device on the Outer Continental Shelf subject to Coast Guard jurisdiction.

Fsw means feet of seawater (or equivalent static pressure head).

Gas embolism means a condition caused by expanding gases, which have been taken into and retained in the lungs while breathing under pressure, being forced into the bloodstream or other tissues during ascent or decompression.

Heavy-weight diving outfit means diver-worn surface-supplied deep-sea dress.

Hyperbaric conditions means pressure conditions in excess of surface atmospheric pressure.

Injurious corrosion means an advanced state of corrosion which may impair the structural integrity or safe operation of the equipment.

Liveboating means the support of a surfaced-supplied diver from a vessel underway.

Maximum working pressure means the maximum pressure to which a pressure containment device can be exposed under operating conditions (usually the pressure setting of the pressure relief device).

No-decompression limits means the air depth and bottom time limits of appendix A.

Pressure vessel means a container capable of withstanding an internal maximum working pressure over 15 psig.

Psi(g) means pounds per square inch (gage).

PVHO means pressure vessel for human occupancy but does not include pressure vessels for human occupancy that may be subjected to external pressures in excess of 15 psig but can only be subjected to maximum internal pressures of 15 psig or less (i.e., submersibles, or one atmosphere observation bells).

Saturation diving means saturating a diver's tissues with the inert gas in the breathing mixture to allow an extension of bottom time without additional decompression.

SCUBA diving means a diving mode in which the diver is supplied with a compressed breathing mixture from diver carried equipment.

Standby diver means a diver at the dive location available to assist a diver in the water.

Surface-supplied air diving means a diving mode in which the diver is supplied from the dive location or bell with compressed breathing air including oxygen or oxygen enriched air if supplied for treatment.

Surface-supplied mixed-gas diving means a diving mode in which the diver is supplied from the dive location or bell with a compressed breathing mixture other than air.

Timekeeping device means a device for measuring the time of a dive in minutes.

Treatment table means a depth, time, and breathing gas profile designed to treat a diver for decompression sickness.

Umbilical means the hose bundle between a dive location and a diver or bell, or between a diver and a bell, that supplies the diver or bell with a lifeline, breathing gas, communications, power, and heat as appropriate to the diving mode or conditions.

Vessel means any waterborne craft including mobile offshore drilling units required to have a Certificate of Inspection issued by the Coast Guard or any waterborne craft connected with a deepwater port or within the deepwater port safety zone, or any waterborne craft engaged in activities related to the Outer Continental Shelf.

Volume tank means a pressure vessel connected to the outlet of a compressor and used as an air reservoir.

Working pressure means the pressure to which a pressure containment device is exposed at any particular instant during normal operating conditions.

§ 197.205 Availability of standards.

(a)) Several standards have been incorporated by reference in this subchapter. The incorporation by reference has been approved by the Director of the Federal Register under the provisions of 1 CFR part 51.

(b)) The standards are available from the appropriate organizations whose addresses are listed below:

(1) American National Standards Institute, 11 West 42nd Street, New York, NY 10036.

(2) American Society of Mechanical Engineers, United Engineering Center, 345 East 47th Street, New York, NY 10017.

[CGD 76–009, 43 FR 53683, Nov. 16, 1978, as amended by CGD 96–041, 61 FR 50735, Sept. 27, 1996]

§ 197.206 Substitutes for required equipment, materials, apparatus, arrangements, procedures, or tests.

(a)) The Coast Guard may accept substitutes for equipment, materials, apparatus, arrangements, procedures, or tests required in this subpart if the substitute provides an equivalent level of safety.

(b)) In any case where it is shown to the satisfaction of the Commandant that the use of any particular equipment, material, apparatus, arrangement, procedure, or test is unreasonable or impracticable, the Commandant may permit the use of alternate equipment, material, apparatus, arrangement, procedure, or test to such an extent and upon such conditions as will insure, to his satisfaction, a degree of safety consistent with the minimum standards set forth in this subpart.

§ 197.208 Designation of person-in-charge.

(a)) The owner or agent of a vessel or facility without a designated master shall designate, in writing, an individual to be the person-in-charge of the vessel or facility.

(b)) Where a master is designated, the master is the person-in-charge.

§ 197.210 Designation of diving supervisor.

The name of the diving supervisor for each commercial diving operation shall be—

(a)) Designated in writing; and

(b)) Given to the person-in-charge prior to the commencement of any commercial diving operation.

EQUIPMENT

§ 197.300 Applicability.

(a)) Each diving installation used on each vessel or facility subject to this subpart must meet the requirements of this subpart.

(b)) In addition to the requirements of this subpart, equipment which is permanently installed on vessels and is part of the diving installation must meet Subchapters F and J of this chapter.

(c)) All repairs and modifications to pressure vessels used for commercial diving operations must be made in accordance with the requirements of section VIII, division 1 or division 2 of the ASME Code, ASME PVHO–1, part 54 of this chapter, or 49 CFR 173.34, as applicable.

(d)) All repairs and modifications to pressure piping used for commercial diving operations must be made in accordance with the requirements of the ANSI Code or part 56 of this chapter, as applicable.

§ 197.310 Air compressor system.

A compressor used to supply breathing air to a diver must have—

(a)) A volume tank that is—

(1) Built and stamped in accordance with section VIII, division 1 of the ASME Code with—

(i) A check valve on the inlet side;

(ii) A pressure gage;

(iii) A relief valve; and

(iv) A drain valve; and

(2) Tested after every repair, modification, or alteration to the pressure boundaries as required by §197.462;

(b)) Intakes that are located away from areas containing exhaust fumes of internal combustion engines or other hazardous contaminants;

(c)) An efficient filtration system; and

(d) Slow-opening shut-off valves when

the maximum allowable working pressure of the system exceeds 500 psig.

§ 197.312 Breathing supply hoses.

(a) Each breathing supply hose must—

(1) Have a maximum working pressure that is equal to or exceeds —

(i) The maximum working pressure of the section of the breathing supply system in which used; and

(ii) The pressure equivalent of the maximum depth of the dive relative to the supply source plus 100 psig;

(2) Have a bursting pressure of four times its maximum working pressure;

(3) Have connectors that—

(i) Are made of corrosion-resistant material;

(ii) Are resistant to accidental disengagement; and

(iii) Have a maximum working pressure that is at least equal to the maximum working pressure of the hose to which they are attached; and

(4) Resist kinking by—

(i)) Being made of kink-resistant materials; or

(ii) Having exterior support.

(b) Each umbilical must—

(1) Meet the requirements of paragraph (a) of this section; and

(2) Be marked from the diver or open bell end in 10-foot intervals to 100 feet and in 50-foot intervals thereafter.

§ 197.314 First aid and treatment equipment.

(a)) Each dive location must have—

(1) A medical kit approved by a physician that consists of—

(i)) Basic first aid supplies; and

(ii) Any additional supplies necessary to treat minor trauma and illnesses resulting from hyperbaric exposure;

(2) A copy of an American Red Cross Standard First Aid handbook;

(3) A bag-type manual resuscitator with transparent mask and tubing; and

(4) A capability to remove an injured diver from the water.

(b)) Each diving installation must have a two-way communications system to obtain emergency assistance except when the vessel or facility ship-to-shore, two-way communications system is readily available.

(c)) Each dive location supporting mixed-gas dives, dives deeper than 130 fsw, or dives outside the no-decompression limits must meet the requirements of paragraph (a) of this section and have—

(1) A decompression chamber;

(2) Decompression and treatment tables;

(3) A supply of breathing gases sufficient to treat for decompression sickness;

(4) The medical kit required by paragraph (a)(1) of this section that is—

(i)) Capable of being carried into the decompression chamber; and

(ii) Suitable for use under hyperbaric conditions; and

(5) A capability to assist an injured diver into the decompression chamber.

§ 197.318 Gages and timekeeping devices.

(a)) A gage indicating diver depth must be at each dive location for surface-supplied dives.

(b)) A timekeeping device must be at each dive location.

§ 197.320 Diving ladder and stage.

(a)) Each diving ladder must—

(1) Be capable of supporting the weight of at least two divers;

(2) Extend 3 feet below the water surface;

(3) Be firmly in place;

(4) Be available at the dive location for a diver to enter or exit the water unless a diving stage or bell is provided; and

(5) Be—(i) Made of corrosion-resistant material; or

(ii) Protected against and maintained free from injurious corrosion.

(b)) Each diving stage must—

(1) Be capable of supporting the weight of at least two divers;

(2) Have an open-grating platform;

(3) Be available for a diver to enter or exit the water from the dive location and for in-water decompression if the diver is—

(i) Wearing a heavy-weight diving outfit; or

(ii) Diving outside the no-decompression limits, except when a bell is provided; and

(4) Be—(i) Made of corrosion-resistant material; or

(ii) Protected against and maintained free from injurious corrosion.

§ 197.322 Surface-supplied helmets and masks.

(a)) Each surface-supplied helmet or mask must have—

(1) A nonreturn valve at the attachment point between helmet or mask and umbilical that closes readily and positively;

(2) An exhaust valve; and

(3) A two-way voice communication system between the diver and the dive location or bell.

(b)) Each surface-supplied air helmet or mask must—

(1) Ventilate at least 4.5 ACFM at any depth at which it is operated; or

(2) Be able to maintain the diver's inspired carbon dioxide partial pressure below 0.02 ATA when the diver is producing carbon dioxide at the rate of 1.6 standard liters per minute.

§ 197.324 Diver's safety harness.

Each safety harness used in surface-supplied diving must have—

(a)) A positive buckling device; and

(b)) An attachment point for the umbilical life line that—

(1) Distributes the pulling force of the umbilical over the diver's body; and

(2) Prevents strain on the mask or helmet.

§ 197.326 Oxygen safety.

(a)) Equipment used with oxygen or oxygen mixtures greater than 40 per-cent by volume must be designed for such use.

(b)) Oxygen systems with pressures greater than 125 psig must have slow-opening shut-off valves except pressure boundary shut-off valves may be ball valves.

§ 197.328 PVHO—General.

(a)) Each PVHO, contracted for or purchased after February 1, 1979, must be built and stamped in accordance with ASME PVHO–1.

(b)) Each PVHO, contracted for or constructed before February 1, 1979, and not Coast Guard approved, must be submitted to the Coast Guard for approval prior to February 1, 1984.

(c)) To be approved under paragraph (b), a PVHO must be—

(1) Constructed in accordance with part 54 of this chapter; or—

(2) Be built in accordance with section VIII, division 1 or division 2 of the ASME Code; and—

(i)) Have the plans approved in accord-ance with §54.01–18 of this chapter;

(ii) Pass the radiographic and other survey tests of welded joints required by section VIII, division 1 or division 2, as appropriate, of the ASME Code; and

(iii) Pass—(A) The hydrostatic test described in §54.10–10 of this chapter; or

(B) The pneumatic test described in §54.10–15 of this chapter and such additional tests as the Officer-in-Charge, Marine Inspection (OCMI) may require.

(d)) Each PVHO must—

(1) Have a shut-off valve located within 1 foot of the pressure boundary on all piping penetrating the pressure boundary;

(2)) Have a check valve located within
1 foot of the pressure boundary on all piping exclusively carrying fluids into the PVHO;

(3) Have the pressure relief device required by ASME PVHO–1;

(4) Have a built-in breathing system with at least one mask per occupant stored inside each separately pressurized compartment;

(5) Have a two-way voice communications system allowing communications between an occupant in one pressurized compartment of the PVHO and—

(i)) The diving supervisor at the dive location;

(ii) Any divers being supported from the same PVHO; and

(iii) Occupants of other separately pressurized compartments of the same PVHO;

(6) If designed to mechanically couple to another PVHO, have a two-way communications system allowing communications between occupants of each PVHO when mechanically coupled;

(7) Have a pressure gage in the interior of each compartment that is—

(i)) Designed for human occupancy; and

(ii) Capable of having the compartment pressure controlled from inside the PVHO;

(8) Have viewports that allow observation of occupants from the outside;

(9) Have viewports that meet the requirements of ASME PVHO–1 except those PVHO's approved under paragraph (b) of this section which have nonacrylic viewports;

(10) Have means of illumination sufficient to allow an occupant to—

(i) Read gages; and

(ii) Operate the installed systems within each compartment;

(11) Be designed and equipped to minimize sources of combustible materials and ignition;

(12) Have a protective device on the inlet side of PVHO exhaust lines;

(13) Have a means of extinguishing a fire in the interior;

(14) Have a means of maintaining the oxygen content of the interior atmosphere below 25 percent surface equivalent by volume when pressurized with air as the breathing mixture;

(15) Have a means of maintaining the interior atmosphere below 2 percent surface equivalent carbon dioxide by volume;

(16) Have a means of overriding and controlling from the exterior all interior breathing and pressure supply controls;

(17) Have a speech unscrambler when used with mixed-gas;

(18) Have interior electrical systems that are designed for the environment in which they will operate to minimize the risk of fire, electrical shock to personnel, and galvanic action of the PVHO; and

(19) Be tested after every repair, modification, or alteration to the pressure boundaries as required by §197.462.

§197.330 PVHO—Closed bells.

(a)) Except as provided in paragraph (b) of this section, each closed bell must meet the requirements of §197.328 and—

(1) Have underwater breathing apparatus for each occupant stored inside each separately pressurized compartment;

(2) Have an umbilical;

(3) Have lifting equipment attached to the closed bell capable of returning the occupied closed bell when fully flooded to the dive location;

(4) Be capable of recompressing on the surface to the maximum design diving depth;

(5) Be constructed and equipped as required by §197.332;

(6) Have an emergency locating device designed to assist personnel on the surface in acquiring and maintaining contact with the submerged PVHO if the umbilical to the surface is severed;

(7) Have a capability to remove an injured diver from the water; and

(8) Have a life support capability for the intact closed bell and its occupants for—

(i)) Twelve hours after an accident severing the umbilical to the surface when the umbilical to the surface is

the only installed means of retrieving the closed bell; or

(ii) A period of time, at least equal to 1 hour plus twice the time required to retrieve the bell from its designed operating depth and attach an auxiliary lifesupport system, after an accident severing the umbilical to the surface when the umbilical is one of the two independent installed means of retrieving the closed bell, each meeting the requirements of paragraph (a)(3) of this section.

(b)) A closed bell that does not meet the requirements of paragraphs (a)(3), (a)(4), and (a)(5) of this section, must be capable of attachment to another PVHO that—

(1) Allows the transfer of personnel and diver's equipment under pressure from the closed bell to the PVHO;

(2) Meets the requirements of paragraph (a)(3) of this section;

(3) Is capable of attachment to a decompression chamber meeting the requirements of paragraphs (a)(4) and (a)(5) of this section; and

(4) Allows the transfer of personnel and diver's equipment under pressure from the PVHO to the decompression chamber.

§ 197.332 PVHO—Decompression chambers.

Each decompression chamber must—

(a) Meet the requirements of §197.328;

(b) Have internal dimensions sufficient to accommodate a diver lying in a horizontal position and another person tending the diver;

(c)) Have a capability for ingress and egress of personnel and equipment while the occupants are under pressure; (d) Have a means of operating all installed man-way locking devices, except disabled shipping dogs, from both sides of a closed hatch;

(e)) Have interior illumination sufficient to allow visual observation, diagnosis, and medical treatment of an occupant.

(f) Have one bunk for each two occupants;

(g)) Have a capability that allows bunks to be seen over their entire lengths from the exterior;

(h)) Have a minimum pressure capability of—

(1) 6 ATA, when used for diving to 300 fsw; or

(2) The maximum depth of the dive, when used for diving operations deeper than 300 fsw, unless a closed bell meeting the requirements of §197.330(a) (3), (4), and (5) is used;

(i)) Have a minimum pressurization rate of 2 ATA per minute to 60 fsw and at least 1 ATA per minute thereafter;

(j) Have a decompression rate of 1 ATA per minute to 33 fsw;

(k) Have an external pressure gage for each pressurized compartment;

(l) Have a capability to supply breathing mixtures at the maximum rate required by each occupant doing heavy work; and

(m) Have a sound-powered headset or telephone as a backup to the communications system required by §197.328(c) (5) and (6), except when that communications system is a sound-powered system.

§ 197.334 Open diving bells.

Each open diving bell must—

(a)) Have an upper section that provides an envelope capable of maintaining a bubble of breathing mixture available to a diver standing on the lower section of the platform with his body through the open bottom and his head in the bubble;

(b)) Have lifting equipment capable of returning the occupied open bell to the dive location;

(c)) Have an umbilical; and

(d)) Be—(1) Made of corrosion-resisting material; or

(2) Protected against and maintained free from injurious corrosion.

§ 197.336 Pressure piping.

Piping systems that are not an integral part of the vessel or facility, carrying fluids under pressures exceeding 15 psig must—

(a)) Meet the ANSI Code;

(b)) Have the point of connection to the integral piping system of the vessel or facility clearly marked; and

(c)) Be tested after every repair, modification, or alteration to the pressure boundaries as set forth in § 197.462.

§ 197.338 Compressed gas cylinders.

Each compressed gas cylinder must—

(a) Be stored in a ventilated area;

(b) Be protected from excessive heat;
(c) Be prevented from falling;
(d)) Be tested after any repair, modification, or alteration to the pressure boundaries as set forth in § 197.462; and
(e)) Meet the requirements of—
(1) Part 54 of this chapter; or
(2) 49 CFR 173.34 and 49 CFR part 178, subpart C.

§ 197.340 Breathing gas supply.

(a)) A primary breathing gas supply for surface-supplied diving must be sufficient to support the following for the duration of the planned dive:
(1) The diver.
(2) The standby diver.
(3) The decompression chamber, when required by §197.432(e)(2) or by §197.434(a) for the duration of the dive and for one hour after completion of the planned dive.
(4) A decompression chamber when provided but not required by this subpart.
(5) A closed bell when provided or required by §197.434(d).
(6) An open bell when provided or required by §197.432(e)(4) or by §197.434(c).
(b) A secondary breathing gas supply for surface-supplied diving must be sufficient to support the following:
(1) The diver while returning to the surface.
(2) The diver during decompression.
(3) The standby diver.
(4) The decompression chamber when required by §197.432(e)(2) or by §197.434(a) for the duration of the dive and one hour after the completion of the planned dive.
(5) The closed bell while returning the diver to the surface.
(6) The open bell while returning the diver to the surface.
(c)) A diver-carried reserve breathing gas supply for surface-supplied diving must be sufficient to allow the diver to—
(1) Reach the surface.
(2) Reach another source of breathing gas; or
(3) Be reached by a standby diver equipped with another source of breathing gas for the diver.
(d)) A primary breathing gas supply for SCUBA diving must be sufficient to support the diver for the duration of the planned dive through his return to

the dive location or planned pick-up point.

(e)) A diver-carried reserve breathinggas supply for SCUBA diving must be sufficientto allow the diver to return to the dive location or planned pick-uppoint from the greatest depth of theplanned dive.

(f) Oxygen used for breathing mix-tures must—

(1) Meet the requirements of Federal Specification BB-0–925a; and

(2) Be type 1 (gaseous) grade A or B. (g) Nitrogen used for breathing mix-
tures must—

(1) Meet the requirements of Federal Specification BB-N–411c;

(2) Be type 1 (gaseous);

(3) Be class 1 (oil free); and

(4) Be grade A, B, or C.

(h)) Helium used for breathing mix-tures must be grades A, B, or C pro-duced by the Federal Government, orequivalent.

(i)) Compressed air used for breathingmixtures must—

(1) Be 20 to 22 percent oxygen by vol-ume;

(2) Have no objectionable odor; and

(3) Have no more than—

(i)) 1,000 parts per million of carbondioxide;

(ii) 20 parts per million carbon mon-oxide;

(iii) 5 milligrams per cubic meter of solid and liquid particulates including oil; and

(iv) 25 parts per million of hydro-carbons (includes methane and all other hydrocarbons expressed as meth-ane).

§ 197.342 Buoyancy-changing devices.

(a)) A dry suit or other buoyancy-changing device not directly connected to the exhaust valve of the helmet ormask must have an independent ex-haust valve.

(b)) When used for SCUBA diving, abuoyancy-changing device must have an inflation source separate from thebreathing gas supply.

§ 197.344 Inflatable floatation devices.

An inflatable floatation device for SCUBA diving must—

(a)) Be capable of maintaining thediver at the surface in a faceup posi-tion;

(b)) Have a manually activated inflation device ;
(c)) Have an oral inflation device ;
(d)) Have an over-pressure relief device ; and
(e)) Have a manually operated exhaust valve.

§ 197.346 Diver's equipment.

(a)) Each diver using SCUBA must have—
(1) Self-contained underwater breathing equipment including—
(i)) A primary breathing gas supply with a cylinder pressure gage readable by the diver during the dive ; and
(ii) A diver-carried reserve breathing gas supply provided by—
(A)) A manual reserve (J valve); or
(B)) An independent reserve cylinder connected and ready for use;
(2) A face mask;
(3) An inflatable floatation device ;
(4) A weight belt capable of quick release;
(5) A knife;
(6) Swim fins or shoes;
(7) A diving wristwatch; and
(8) A depth gage.
(b)) Each diver using a heavyweight diving outfit must—
(1) Have a helmet group consisting of helmet, breastplate, and associated valves and connections;
(2) Have a diving dress group consisting of a basic dress that encloses the body (except for head and hands) in a tough, waterproof cover, gloves , shoes , weight assembly, and knife;
(3) Have a hose group consisting of the breathing gas hose and fittings, the control valve, the lifeline, communications cable , and a pneumofathometer; and
(4) Be provided with a helmet cushion and weighted shoes .
(c)) Each surface-supplied diver operation using a heavyweight diving outfit must have an extra breathing gas hose with attaching tools available to the standby diver.
(d)) Each diver using a lightweight diving outfit must have—
(1) A safety harness ;
(2) A weight assembly capable of quick release;
(3) A mask group consisting of a lightweight mask and associated valves and connections;
(4) A diving dress group consisting of wet or dry diving dress , gloves , shoes or fins, and knife; and
(5) A hose group consisting of the breathing gas hose and fittings, the control valve, the lifeline, communications cable , and a pneumofathometer (if the breaking strength of the communications cable is at least equal to that required for the lifeline, the communications cable can serve as the lifeline).
(e)) Each surface-supplied air diver operation within the no-decompression limits and to depths of 130 fsw or less must have a primary breathing gas supply at the dive location.
(f) Each surface-supplied dive operation outside the no-compression limits, deeper than 130 fsw, or using mixed-gas as a breathing mixture must have at the dive location—
(1) A primary breathing gas supply; and
(2) A secondary breathing gas supply.
(g) Each diver diving outside the no-decompression limits, deeper than 130 fsw, or using mixed-gas must have a diver-carried reserve breathing gas supply except when using a heavyweight diving outfit or when diving in a physically confining area.

OPERATIONS

§ 197.400 Applicability.

Diving operations may only be conducted from a vessel or facility subject to the subpart if the regulations in this subpart are met.

§ 197.402 Responsibilities of the person-in-charge.

(a)) The person-in-charge shall—
(1) Be fully cognizant of the provisions of this subpart;
(2) Prior to permitting any commercial diving operation to commence, have—
(i)) The designation of the diving supervisor for each diving operation as required by § 197.210;
(ii) A report on—
(A)) The nature and planned times of the planned diving operation; and
(B)) The planned involvement of the vessel or facility, its equipment, and its personnel in the diving operation.

(b)) Prior to permitting any co mmeric al divi ng ope ra tion in volvi nglivebo ating to commence, the person-in-charge shall insure that—

(1) A means of rapid comm unications with the divi ng supervisor while the diver is entering, in, or leaving the water is establis hed; and

(2) A boat and crew for diver pickup in the event of an emergency is provided .

(c)) The person-in-charge shall ins ure that a boat and crew for SCUBA diver pic kup is provided when SCUBA divers are not line-tended from the dive loca-tion.

(d)) The person-in-charge shall coor di-nate the activities on and of the vessel or facili ty with the divi ng super visor.

(e)) The person-in-charge shall ins ure that the vessel or facility equipm ent and personnel are kept clear of the dive loc ation except after coordinating with the divi ng supervisor.

§ 197.404 Responsibilities of the diving supervisor.

(a)) The divi ng supervisor shall—

(1) Be fully cog nizant of the provisions of this subpart;

(2) Be fully cog nizant of the provisions of the operations manual required by § 197.420;

(3) Insure that divi ng operations conducted from a vessel or facili ty subject to this subpart meet the regulations in this subpart;

(4) Prior to the comm encement of any co mmercial divi ng ope ra tion, provide the report required by § 197.402 to the person-in-charge;

(5) Coordinate with the person-in-charge any changes that are made to the report required by § 197.402; and

(6) Promptly notify the person-in-charge of any divi ng related casualty, accident, or injury .

(b)) The divi ng supervisor is in charge of the planning and execution of t he divi ng ope ra tion including the respo n-sibili ty for the safety and health of t he dive team.

§ 197.410 Dive procedures.

(a)) The divi ng supervisor shall ins ure that—

(1) Before comm encing divi ng operations, dive team members are briefed on—

(i) The tasks to be undertaken;

(ii) Any unu sual hazards or environmental conditions likely to affect the safety of the divi ng ope ra tion; and

(iii) Any modifications to the operations manual or proced ures including safe ty proced ures necessi tated by the speci fic divi ng ope ra tion;

(2) The breathing gas suppl y systems, masks, helmets, thermal protection, when provided , and bell lifting equipment, when a bell is provided or required, are inspec ted prior to each diving ope ra tion;

(3) Each diver is instructed to repo rt any p hy sic al proble ms or p hy siologic al effects including aches, pains, curr ent ill nesses , or symptoms of deco mpression sickness prior to each dive ;

(4) A dep th, bottom time profile , including any breathing mixture chan ges , is maintained at the dive location for each diver during the dive , excep t that SCUBA divers shall maintain their own profiles ;

(5) A two-way voice comm unication system is used between—

(i)) Each surface-supplied diver and a dive team member at the dive loca tio n or bell (when provided); and

(ii) The bell (when provided) and the dive loc ation;

(6) A two-way comm unication system is available at the dive loc ation to obtain emergency assis tance;

(7) After the comp letion of each dive —

(i)) The p hy sic al co ndition of the diver is checked by—

(A)) Vis ual obse rvation; and

(B)) Questioning the diver about his phy sic al well -bei ng;

(ii) The diver is instructed to repo rt any phy sic al proble ms or adverse phy siologic al effects including aches, pains, curr ent ill nesses , or symptoms of decompressio n sickness or gas embolis m;

(iii) The diver is advised of the location of an ope ra tional deco mpressio n cha mber; and

(iv) The diver is alerted to the potential hazards of flying after divi ng;

(8) For any dive outside the no-decompressio n li mits, deepe r than 130 fsw, or using mixed-gas as a breathing mixture—

(i) A dep th, time, deco mpressio n profile including breathing mixture

changes is maintained for each diver at the dive location;

(ii) The diver is instructed to remain awake and in the vicinity of the dive location decompression chamber for at least one hour after the completion of a dive, decompression, or treatment; and

(iii) A dive team member, other than the diver, is trained and available to operate the decompression chamber; and

(9) When decompression sickness or gas embolism is suspected or symptoms are evident, a report is completed containing—

(i)) The investigation for each incident including—

(A)) The dive and decompression profiles;

(B)) The composition, depth, and time of breathing mixture changes;

(C) A description of the symptoms including depth and time of onset; and

(D)) A description and results of the treatment;

(ii) The evaluation for each incident based on—

(A)) The investigation;

(B)) Consideration of the past performance of the decompression table used; and

(C) Individual susceptibility; and

(iii) The corrective action taken, if necessary, to reduce the probability of recurrence.

(b)) The diving supervisor shall ensure that the working interval of a dive is terminated when he so directs or when—

(1) A diver requests termination;

(2) A diver fails to respond correctly to communications or signals from a dive team member;

(3) Communications are lost and cannot be quickly reestablished between—

(i) The diver and a dive team member at the dive location; or

(ii) The person-in-charge and the diving supervisor during livebo ating operations; or

(4) A diver begins to use his diver-carried reserve breathing gas supply.

§ 197.420 Operations manual.

(a)) The diving supervisor shall—

(1) Provide an operations manual to the person-in-charge prior to commencement of any diving operation; and

(2) Make an operations manual available at the dive location to all members of the dive team.

(b)) The operations manual must be modified in writing when adaptation is required because of—

(1) The configuration or operation of the vessel or facility; or

(2) The specific diving operation as planned.

(c)) The operations manual must provide for the safety and health of the divers.

(d)) The operations manual must contain the following:

(1) Safety procedures and checklists for each diving mode used.

(2) Assignments and responsibilities of each dive team member for each diving mode used.

(3) Equipment procedures and checklists for each diving mode used.

(4) Emergency procedures for—

(i) Fire;

(ii) Equipment failure;

(iii) Adverse environmental conditions including, but not limited to, weather and sea state;

(iv) Medical illness; and

(v) Treatment of injury.

(5) Procedures dealing with the use of—

(i) Hand-held power tools;

(ii) Welding and burning equipment; and

(iii) Explosives.

SPECIFIC DIVING MODE PROCEDURES

§ 197.430 SCUBA diving.

The diving supervisor shall insure that—

(a)) SCUBA diving is not conducted—

(1) Outside the no-decompression limits;

(2) At depths greater than 130 fsw;

(3) Against currents greater than one (1) knot unless line-tended; and

(4) If a diver cannot directly ascend to the surface unless line-tended;

(b)) The SCUBA diver has the equip-ment required by §197.346(a);

(c)) A standby diver is available while a diver is in the water;

(d)) A diver is line-tended from the surface or accompanied by another diver in the water in continuous visual contact during the diving operation;

(e)) When a diver is in a physically confining space, another diver is stationed at the underwater point of entry and is line-tending the diver; and

(f) A boat is available for diver pick-up when the divers are not line-tended from the dive location.

§ 197.432 Surface-supplied air diving.

The diving supervisor shall insure that—

(a)) Surface-supplied air diving is conducted at depths less than 190 fsw, except that dives with bottom times of 30 minutes or less may be conducted to depths of 220 fsw;

(b)) Each diving operation has a primary breathing gas supply;

(c)) Each diver is continuously tended while in the water;

(d)) When a diver is in a physically confining space, another diver is stationed at the underwater point of entry and is line-tending the diver;

(e)) For dives deeper than 130 fsw or outside the no-decompression limits—

(1) Each diving operation has a secondary breathing gas supply;

(2) A decompression chamber is ready for use at the dive location;

(3) A diving stage is used except when a bell is provided;

(4) A bell is used for dives with an in-water decompression time greater than 120 minutes, except when the diver is using a heavy-weight diving outfit or is diving in a physically confining space;

(5) A separate dive team member tends each diver in the water;

(6) A standby diver is available while a diver is in the water; and

(7) Each diver has a diver-carried reserve breathing gas supply except when using a heavy-weight diving outfit or when diving in a physically confining space; and

(f) The surface-supplied air diver has the equipment required by §197.346 (b) or (d).

§ 197.434 Surface-supplied mixed-gas diving.

The diving supervisor shall insure that—

(a)) When mixed-gas diving is conducted, a decompression chamber or a closed bell meeting the requirements of
§197.332 is ready for use at the dive location;

(b)) A diving stage is used except when a bell is provided;

(c)) A bell is used for dives deeper than 220 fsw or when the dive involves in-water decompression times greater than 120 minutes, except when the diver is using a heavy-weight diving outfit or is diving in a physically con-fining space;

(d)) A closed bell is used for dives at depths greater than 300 fsw, except when diving is conducted in a phys-ically confining space;

(e)) A separate dive team member tends each diver in the water;

(f) A standby diver is available dur-ing all nonsaturation dives;

(g)) When saturation diving is con-ducted—

(1) A standby diver is available when the closed bell leaves the dive location until the divers are in saturation; and

(2) A member of the dive team at the dive location is a diver able to assist in the recovery of the closed bell or its oc-cupants, if required;

(h)) When closed bell operations are conducted, a diver is available in the closed bell to assist a diver in the water;

(i)) When a diver is in a physically confining space, another diver is sta-tioned at the underwater point of entry and is line-tending the diver;

(j)) Each diving operation has a pri-mary and secondary breathing gas sup-ply meeting the requirements of
§197.340; and

(k) The surface-supplied mixed-gas diver has the equipment required by
§197.346 (b) or (d).

§197.436 Liveboating.

(a)) During liveboating operations, the person-in-charge shall insure that—

(1) Diving is not conducted in seas that impede station-keeping ability of the vessel;

(2) Liveboating operations are not conducted—

(i) From 1 hour after sunset to 1 hour before sunrise; or

(ii) During periods of restricted visi-bility;

(3) The propellers of the vessel are stopped before the diver enters or exits the water; and

(4) A boat is ready to be launched with crew in the event of an emergency.

(b)) As used in paragraph (a)(2)(ii) of this section, *restricted visibility* means any condition in which vessel navig a- tional visibility is restricted by fog, mist, falling snow, heavy rainstorms, sandstorms or any other similar causes.

(c)) During livebo ating operations, the diving supervisor shall insure that—

(1) Diving is not conducted at depths greater than 220 fsw;

(2) Diving is not conducted in seas that impede diver mobility or work function;

(3) A means is used to prevent the diver's hose from entangling in the propellers of the vessel ;

(4) Each diver carries a reserve breathing gas supply;

(5) A standby diver is available while a diver is in the water;

(6) Diving is not conducted with in-water decompression times greater than 120 minutes; and

(7) The person-in-charge is notified before a diver enters or exits the water.

PERIODIC TESTS AND INSPECTIONS OF DIVING EQUIPMENT

§ 197.450 Breathing gas tests.

The diving supervisor shall insure that—

(a)) The output of each air compressor is tested and meets the requirements of
§ 197.340 for quality and quantity by means of samples taken at the connection point to the distribution system—

(1) Every 6 months; and

(2) After every repair or modification.

(b)) Purchased supplies of breathing mixtures supplied to a diver are checked before being placed on line for—

(1) Certification that the supply meets the requirements of § 197.340; and

(2) Noxious or offensive odor and oxygen percentage;

(c)) Each breathing supply system is checked, prior to commencement of diving operations, at the umbilical or underwater breathing apparatus connection point for the diver, for noxious or offensive odor and presence of oil mist; and

(d)) Each breathing supply system, supplying mixed-gas to a diver, is checked, prior to commencement of diving operations, at the umbilical or underwater breathing apparatus connection point for the diver, for percent-age of oxygen.

§ 197.452 Oxygen cleaning.

The diving supervisor shall ensure that equipment used with oxygen or oxygen mixtures greater than 40 percent by volume is cleaned of flammable materials—

(a)) Before being placed into service ; and

(b)) After any repair, alteration, modification, or suspected contamina-tion.

§ 197.454 First aid and treatment equipment.

The diving supervisor shall ensure that medical kits are checked monthly to insure that all required supplies are present.

§ 197.456 Breathing supply hoses.

(a)) The diving supervisor shall insure that—

(1) Each breathing supply hose is pressure tested prior to being placed into initial service and every 24 months thereafter to 1.5 times its maximum working pressure;

(2) Each breathing supply hose assembly, prior to being placed into initial service and after any repair, modification, or alteration, is tensile tested by—

(i)) Subjecting each hose-to-fitting connection to a 200 pound axial load; and

(ii) Passing a visual examination for evidence of separation, slippage, or other damage to the assembly;

(3) Each breathing supply hose is periodically checked for—

(i)) Damage which is likely to affect pressure integrity; and

(ii) Contamination which is likely to affect the purity of the breathing mixture delivered to the diver; and

(4) The open ends of each breathing supply hose are taped, capped, or plugged when not in use.

(b)) To meet the requirements of paragraph (a)(3) of this section, each breathing supply hose must be—

(1) Carefully inspected before being shipped to the dive location;

(2) Visually checked during daily operation; and

(3) Checked for noxious or offensive odor before each diving operation.

§ 197.458 Gages and timekeeping devices.

The diving supervisor shall insure that—

(a)) Each depth gage and timekeeping device is tested or calibrated against a master reference gage or time-keeping device every 6 months;

(b)) A depth gage is tested when a dis-crepancy exists in a depth gage reading greater than 2 percent of full scale be-tween any two gages of similar range and calibration;

(c)) A timekeeping device is tested when a discrepancy exists in a timekeeping device reading greater than one-quarter of a minute in a 4-hour period between any two timekeeping devices; and

(d)) Each depth gage and timekeeping device is inspected before diving oper-ations are begun.

§ 197.460 Diving equipment.

The diving supervisor shall insure that the diving equipment designated for use in a dive under § 197.346 is inspected before each dive.

§ 197.462 Pressure vessels and pressure piping.

(a)) The diving supervisor shall ensure that each pressure vessel, including each volume tank, cylinder and PVHO, and each pressure piping system is ex-amined and tested as required by this section and after any repair, modifica-tion or alteration to determine that they are in satisfactory condition and fit for the service intended.

(b)) Pressure vessels and pressure pip-ing shall be examined annually for me-chanical damage or deterioration. Any defect that may impair the safety of the pressure vessel or piping shall be repaired and pressure tested to the sat-isfaction of the Officer in Charge, Ma-rine Inspection.

(c)) The following tests shall be con-ducted at least every three years:

(1) All piping permanently installed on a PVHO shall be pressure tested.

(2) PVHOs subject to internal pressure shall be leak tested at the maximum allowable working pressure using the breathing mixture normally used in service.

(3) Equivalent nondestructive testing may be conducted in lieu of pressure testing. Proposals to use nondestructive testing in lieu of pressure testing shall be submitted to the Officer in Charge, Marine Inspection.

(d)) Unless otherwise noted, pressure tests conducted in accordance with this section shall be either hydrostatic tests or pneumatic tests.

(1) When a hydrostatic test is conducted on a pressure vessel, the test pressure shall be no less than 1.25 times the maximum allowable working pressure.

(2) When a pneumatic test is conducted on a pressure vessel, the test pressure shall be the maximum allowable working pressure stamped on the nameplate.

(3) When a pneumatic test is conducted on piping, the test pressure shall be no less than 90 percent of the setting of the relief device.

(4) Pressure tests shall be conducted only after suitable precautions are taken to protect personnel and equipment.

(5) When pressure tests are conducted on pressure vessels or pressure piping, the test pressure shall be maintained for a period of time sufficient to allow examination of all joints, connections and high stress areas.

[CGD 95–028, 62 FR 51220, Sept. 30, 1997]

RECORDS

§ 197.480 Logbooks.

(a)) The person-in-charge of a vessel or facility, that is required by 46 U.S.C. 11301 to have an official logbook, shall maintain the logbook on form CG–706.

(b)) The person-in-charge of a vessel or facility not required by 46 U.S.C. 11301 to have an official logbook, shall maintain, on board, a logbook for mak-ing the entries required by this sub-part.

(c)) The diving supervisor conducting commercial diving operations from

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vessel or facility subject to this subpart shall maintain a logbook for making the entries required by this subpart.

[CGD 76–009, 43 FR 53683, Nov. 16, 1978, as amended by CGD 95–028, 62 FR 51220, Sept. 30, 1997]

§ 197.482 Logbook entries.

(a)) The person-in-charge shall insure that the following information is recorded in the logbook for each commercial diving operation:

(1) Date, time, and location at the start and completion of dive operations.

(2) Approximate underwater and surface conditions (weather, visibility, temperatures, and currents).

(3) Name of the diving supervisor.

(4) General nature of work performed.

(b) The diving supervisor shall insure that the following information is recorded in the logbook for each commercial diving operation:

(1) Date, time, and location at the start and completion of each dive operation.

(2) Approximate underwater and surface conditions (weather, visibility, temperatures, and currents).

(3) Names of dive team members including diving supervisor.

(4) General nature of work performed.

(5) Repetitive dive designation or elapsed time since last hyperbaric exposure if less than 24 hours for each diver.

(6) Diving modes used.

(7) Maximum depth and bottom time for each diver.

(8) Name of person-in-charge.

(9) For each dive outside the no-decompression limits, deeper than 130 fsw, or using mixed-gas, the breathing gases and decompression table designations used.

(10) When decompression sickness or gas embolis is suspected or symptoms are evident—

(i) The name of the diver; and

(ii) A description and results of treatment.

(11) For each fatality or any diving related injury or illness that results in incapacitation of more than 72 hours or requires any dive team member to be hospitalized for more than 24 hours—

(i) The date;

(ii) Time;

(iii) Circumstances; and

(iv) Extent of any injury or illness.

(c)) The diving supervisor shall insure that the following is recorded in the logbook for each diving operation deviating from the requirements of this subpart:

(1) A description of the circumstances leading to the situation.

(2) The deviations made.

(3) The corrective action taken, if appropriate, to reduce the possibility of recurrence.

(d)) The diving supervisor shall insure that a record of the following is maintained:

(1) The date and results of each check of the medical kits.

(2) The date and results of each test of the air compressor.

(3) The date and results of each check of breathing mixtures.

(4) The date and results of each check of each breathing supply system.

(5) The date, equipment cleaned, general cleaning procedure, and names of persons cleaning the diving equipment for oxygen service.

(6) The date and results of each test of the breathing supply hoses and system.

(7) The date and results of each inspection of the breathing gas supply system.

(8) The date and results of each test of depth gages and timekeeping devices.

(9) The date and results of each test and inspection of each PVHO.

(10) The date and results of each inspection of the diving equipment.

(11) The date and results of each test and inspection of pressure piping.

(12) The date and results of each test and inspection of volume tanks and cylinders.

(e)) The diving supervisor shall insure that a notation concerning the location of the information required under paragraph (d) is made in the logbook.

NOTE: 46 U.S.C. 11301 requires that certain entries be made in an official logbook in addition to the entries required by this section; and 46 U.S.C. 11302 prescribes the manner of making those entries.

[CGD 76–009, 43 FR 53683, Nov. 16, 1978, as amended by USCG–1999–6216, 64 FR 53229, Oct. 1, 1999]

§ 197.484 Notice of casualty.

(a)) In addition to the requirements of subpart 4.05 of this chapter and 33 CFR 146.30, the person-in-charge shall notify the Officer-in-Charge, Marine Inspection, as soon as possible after a divingcasualty occurs, if the casualty involves any of the following:

(1) Loss of life.

(2) Diving-related injury to any person causing incapacitation for more than 72 hours.

(3) Diving-related injury to any person requiring hospitalization for more than 24 hours.

(b)) The notice required by this section must contain the following:

(1) Name and official number (if applicable) of the vessel or facility.

(2) Name of the owner or agent of the vessel or facility.

(3) Name of the person-in-charge.

(4) Name of the diving supervisor.

(5) Description of the casualty including presumed cause.

(6) Nature and extent of the injury to persons.

(c)) The notice required by this section is not required if the written report required by §197.486 is submitted within 5 days of the casualty.

[CGD 76–009, 43 FR 53683, Nov. 16, 1978, as amended by CGD 95–072, 60 FR 50469, Sept. 29, 1995]

§ 197.486 Written report of casualty.

The person-in-charge of a vessel or facility for which a notice of casualty was made under §197.484 shall submit a report to the Officer-in-Charge, Marine Inspection, as soon as possible after the casualty occurs, as follows:

(a)) On Form CG–2692, when the divinginstallation is on a vessel.

(b)) Using a written report, in narrative form, when the diving installation is on a facility. The written reportmust contain the information required by §197.484.

(c)) The report required by this section must be accompanied by a copy of the report required by §197.410(a)(9) when decompression sickness is involved.

(d)) The report required by this section must include information relating to alcohol or drug involvement as required by §4.05–12 of this chapter.

(The reporting requirement in paragraph (a) was approved by OMB under control number 1625–0001)

[CGD 76–009, 43 FR 53683, Nov. 16, 1978, as amended by CGD 82–023, 47 FR 35748, Aug. 16, 1982; 48 FR 43328, Sept. 23, 1983; CGD 84–099, 52 FR 47536, Dec. 14, 1987; USCG–2006–25697, 71 FR 55747, Sept. 25, 2006]

§ 197.488 Retention of records after casualty.

(a)) The owner, agent, or person-in-charge of a vessel or facility for which a report of casualty is made under §197.484 shall retain all records onboard that are maintained on the vessel or facility and those records required by this subpart for 6 months after the report of a casualty is made or until advised by the Officer-in-Charge, Marine Inspection, that records need not be retained onboard.

(b)) Therecords required by paragraph (a) of this section to be retained onboard include, but are not limited to, the following:

(1) All logbooks required by §197.480.

(2) All reports required by §197.402(a)(2)(ii), §197.404(a)(4), §197.410(a)(9).

(c)) The owner, agent, person-in-charge, or diving supervisor shall, upon request, make the records described inthis section available for examinationby any Coast Guard official authorized to investigate the casualty.

Subpart C—Benzene

SOURCE: CGD 88–040, 56 FR 52135, Oct. 17, 1991, unless otherwise noted.

§ 197.501 Applicability.

(a)) Except for vessels satisfying paragraph (b) of this section, this subpartapplies to all Coast Guard inspected vessels, including tank ships andbarges, that are carrying benzene orbenzene containing liquids in bulk ascargo.

(b)) This subpart does not apply tovessels that are carrying only liquid cargoes containing less than 0.5% benzene by volume.

Directives

CPL 02-00-143 - 29 CFR Part 1910, Subpart T – Commercial Diving Operations

Directives - Table of Contents

- **Record Type:** Instruction
- **Old Directive Number:** CPL 02-00-143
- **Title:** 29 CFR Part 1910, Subpart T – Commercial Diving Operations
- **Information Date:** 08/11/2006
- **Standard Number:** 1910; 1915; 1918; 1926

OSHA INSTRUCTION

DIRECTIVE NUMBER: CPL 02-00-143	**EFFECTIVE DATE:** August 11, 2006
SUBJECT: 29 CFR Part 1910, Subpart T - Commercial Diving Operations	

ABSTRACT

Purpose: This instruction provides guidelines for the occupational safety and health standard for commercial diving operations, 29 CFR Part 1910, Subpart T.This instruction provides guidelines for the occupational safety and health standard for commercial diving operations, 29 CFR Part 1910, Subpart T.

Scope: OSHA-wide.

References: A. 29 CFR Part 1910, General Industry Standards.
B. 29 CFR Part 1915, Shipyard Employment Standards.
C. 29 CFR Part 1918, Longshoring Standards.
D. 29 CFR Part 1926, Construction Standards.
E. OSHA 2003-2008 Strategic Management Plan.

Cancellation: OSHA Directive STD 01-17-001, October 30, 1978.

State Impact: State adoption is not required (see section VII).
[State Adoption Summary]

Action Offices: National, Regional, and Area Offices.

Originating Office: Directorate of Enforcement Programs.

Contact: Director, Office of Maritime Enforcement
200 Constitution Ave., N.W., Room N-3610
Washington, DC 20210
(202) 693-2399

By and Under the Authority of
Edwin G. Foulke, Jr.
Assistant Secretary

Executive Summary

This instruction provides guidance to Occupational Safety and Health Administration (OSHA) National, Regional, and Area Offices; industry employer and employee groups; State programs; and federal agencies concerning OSHA's policy and procedures for implementing intervention and inspection programs to reduce injuries, illnesses and fatalities, or eliminate workplace hazards regarding commercial diving operations. This instruction provides tools to support intervention and inspection programs in the commercial diving industry. This instruction:

- Supports DOL's Strategic Plan Performance Goal 3.1 for increased emphasis on improving occupational safety and health in shipyard employment.
- Supports the reduction of occupational exposure to hazards through direct intervention, and the promotion of a safety and health culture through compliance assistance, cooperative programs, and strong leadership.
- Supports maximizing OSHA's effectiveness and efficiency by strengthening its capabilities and infrastructure.

Significant Changes

This instruction has been revised and updated to include significant changes as follows:

- Provides OSHA compliance officers, consultants and other interested government and industry parties with information to support interventions involving commercial diving operations and minimize employee exposure to hazards.
- Updates guidance and information for: the main text of the directive related to application, background, inspection guidelines, and general inspection procedures; no-decompression air dives (Appendix D); international code flag "Alpha" (Appendix F); and requirements for the primary diving modes (Appendix H).
- Consolidates previously issued interpretations of commercial diving operations standards, and answers to commonly asked questions related to commercial diving operations, into an appendix (Appendix A).
- Provides guidance pertaining to OSHA's authority (Appendix B), exclusions and exemptions from the standard (Appendix C), requirements and duties of diving-tenders (Appendix E), and OSHA injury and illness reporting and recordkeeping specific to commercial diving (Appendix G).
- Provides a checklist for commercial diving operations (Appendix I) to improve the consistency and efficiency of inspections of diving equipment, systems, and operations.
- Delivers available commercial diving operations safety and health information in a web-based format with electronic links to noted references.

TABLE OF CONTENTS

I. **Purpose**.This instruction provides OSHA's National, Regional, and Area area Offices; industry employer and employee groups; State state programs; and federal agencies with guidance concerning OSHA's policy and procedures on the enforcement of safety and health standards for commercial diving. The purpose of this instruction is to provide comprehensive guidance that will allow OSHA offices to establish or support intervention and inspection programs in the commercial diving industry by revising and updating OSHA STD 01-17-001, dated October 30, 1978. Further, this instruction provides guidance and information to ensure compliance with commercial diving operations standards and the consistent enforcement of these standards.

II. **Scope**. This instruction applies OSHA-wide to all programmed and unprogrammed compliance inspections, consultation interventions, and other activities such as compliance assistance, cooperative programs, training, and education related to commercial diving operations.

III. **Cancellations**. This instruction supersedes the following:

STD 01-17-001, 29 CFR 1910.401 - 1910.441, Subpart T - ("Commercial Diving Operations"), October 30, 1978.

IV. **Significant Changes**. This instruction has been revised and updated to include significant changes as follows:

- Provides OSHA compliance officers, consultants, and other interested government and industry parties, with information to support interventions involving commercial diving operations, and to minimize employee exposure to hazards.
- Updates guidance and information for: the main text of the directive related to application, background, inspection guidelines, and general inspection procedures; no-decompression air dives (Appendix D); international code flag "Alpha" (Appendix F); and requirements for the primary diving modes (Appendix H).
- Consolidates previously issued interpretations of commercial diving operations standards, and answers to commonly asked questions related to commercial diving operations, into an appendix (Appendix A).
- Provides guidance pertaining to OSHA's authority (Appendix B), exclusions and exemptions from the standard (Appendix C), requirements and duties of diving-tenders (Appendix E), and OSHA injury and illness reporting and recordkeeping specific to commercial diving (Appendix G).
- Provides a comprehensive checklist for commercial diving operations (Appendix I) to improve the consistency and efficiency of inspections of diving equipment, systems, and operations.
- Delivers available commercial diving operations safety and health information in a web-based format with electronic links to noted references.

V. **References**

A. 29 CFR Part 1910, General Industry Standards.

B. 29 CFR Part 1915, Shipyard Employment Standards.

C. 29 CFR Part 1917, Marine Terminals Standards.

D. 29 CFR Part 1918, Longshoring Standards.

E. 29 CFR Part 1926, Construction Standards.

F. OSHA Strategic Management Plan 2006-2011.

G. OSHA Directives.

1. CSP 01-00-002, State-Plan Policies and Procedures Manual, March 21, 2001.
2. CPL 02-00-103, Field Inspection Reference Manual (FIRM), September 26, 1994.
3. CPL 02-00-142, Shipyard "Tool Bag" Directive, August 3, 2006.
4. CPL 02-00-135, Recordkeeping Policies and Procedures Manual (RKM), December 30, 2004.
5. CPL 02-01-020, OSHA/U.S. Coast Guard Authority over Vessels, November 8, 1996.

H. Other References.

1. OSHA Maritime Web Page.
2. OSHA Publications.
3. U.S. Navy Diving Manual (Revision 5).
4. Association of Diving Contractors International, Consensus Standard for Commercial Diving and Underwater Operations.

VI. **Expiration Date**. This instruction will remain in effect until canceled or superseded by instruction or notice.

VII. **Federal Program Change**. This instruction describes a federal program change. States are expected to have enforcement policies and procedures in place which are at least as effective as those in this instruction.

Because of the significant nature of the policy changes contained in this instruction, notice of intent to adopt identical or different policies and procedures in response to this instruction is required. See section XV, paragraph A.9, and Appendix B of this instruction for a discussion of federal and State jurisdiction.

The States policy and procedures regarding enforcement of the commercial diving standard must be accessible to all interested parties. Where the State's policy differs from the federal standards, States may either post their policy on their State Plan's website and provide a link to OSHA or submit their policy to OSHA in electronic format, for posting on OSHA's website. An explanation of the differences, including an indication of whether the State's commercial diving standard is identical to or different from the federal standards, must also be submitted for posting. Where the State's policies and federal standards are identical, a statement to that effect with appropriate State references may be sufficient for posting.

VIII. **Action Information**.

A. **Responsible Office**. Directorate of Enforcement Programs (DEP), Office of Maritime Enforcement (OME).

B. **Action Offices**. National, Regional, and Area Offices; Consultation Project Managers.

C. **Information Offices**. State-Plan States.

IX. **Actions Required**. The policies and procedures set forth in this instruction are effective immediately and will remain in effect until canceled by proper authority. OSHA Regional Administrators, Area Directors, and National Office Directors must ensure that the policies and procedures set forth in this instruction are followed.

Regional Administrators also must also ensure that the State-Plan State Designees and Consultation Program Managers in their regions are informed of the requirements of this instruction and encourage the involvement of Consultation Programs in commercial diving operations.

X. **Federal Agencies**. This instruction describes a change that may affect federal agencies. It is the responsibility of the head of each federal agency to establish and maintain an effective and comprehensive safety and health program. Executive Order 12196, Section 1-201, and 29 CFR 1960.16, require s federal agencies to adopt policies and procedures necessary to provide a level of protection equivalent to that provided by Federal OSHA standards and regulations.

XI. **Definitions**. Refer to section XV, paragraph B, of this instruction for relevant definitions.

XII. **Application**. This instruction applies OSHA-wide to all interventions, inspections, and violation-abatement assistance related to commercial diving. This instruction also applies to OSHA outreach efforts that include compliance assistance, cooperative programs, training, and education.

Further, this instruction applies to all State consultation programs with jurisdiction authority over commercial diving activities. State consultation programs are expected to provide safety and health program assistance, training, education, hazard identification, and abatement assistance to employers.

XIII. **Background**. The initial standard for commercial diving operations was issued in the Federal Register, July 22, 1977 (see

42 FR 37650). The preamble, from pages 37650 to 37668, contains information and background on the purposes and intent of the standard.

In 1979, 29 CFR 1910.411 *Medical requirements* of the original diving standards promulgated on July 22, 1977, was challenged successfully in a court case, *Taylor Diving & Salvage Company v. Department of Labor*, 599 F.2d 622 (5th Circuit 1979); OSHA subsequently removed this section from 29 CFR Part 1910, Subpart T.

On November 26, 1982, OSHA published a provision (see 29 CFR 1910.401(a)(2)(iv)) exempting scientific diving from coverage under 29 CFR Part 1910, Subpart T (see Federal Register notice47 FR 53357). This exemption applied only when: (1) the diving operation meets the Agency's definition of scientific diving; (2) the diving operation is part of a diving program that uses a safety manual; and (3) the diving program is directed and controlled by a diving-control board that conforms to specified criteria. However, the United Brotherhood of Carpenters and Joiners (UBCJ) subsequently challenged this exemption in a federal appellate court (see **United Brotherhood of Carpenters and Joiners v. Department of Labor**, No. 82-2509 (D.C. Cir. 1982)). On April 4, 1984, this court issued an unpublished memorandum and order in which it stated that OSHA must provide the UBCJ with an opportunity to submit evidence to the public record regarding the exemption, and make a clear distinction between commercial and scientific diving. The Agency then reopened the public record to allow the UBCJ and other members of the public to submit additional evidence regarding the exemption, and to propose interpretive guidelines that it would be used to distinguish between commercial and scientific diving (see Federal Register notice 49 FR 29105). After carefully considering the new evidence submitted to the record, OSHA published on January 9, 1985, a notice in the **Federal Register** reinstating the conditions for the scientific exemption specified earlier for 29 CFR 1910.401(a)(2)(iv), and establishing the interpretive guidelines by which it will be determined whether the diving operation is scientific or commercial (see Federal Register notice 47 FR 53357).

On February 17, 2004 (see Federal Register notice 69 FR 7351), OSHA amended 29 CFR Part 1910, Subpart T - ("Commercial Diving Operations"), to allow recreational diving instructors and diving guides to comply with an alternative set of requirements instead of the decompression chamber requirements in the existing 29 CFR Part 1910, Subpart T standards. The final rule applies only when these employees engage in recreational diving instruction and diving-guide duties; use an open-circuit, a semi-closed-circuit, or a closed-circuit self-contained underwater-breathing apparatus supplied with a breathing gas that has a high percentage of oxygen mixed with nitrogen; dive to a maximum depth of 130 feet of sea water; and remain within the no-decompression limits specified for the partial pressure of nitrogen in the breathing-gas mixture. This final rule became effective on March 18, 2004.

XIV. **Inspection Guidelines**.

A. Compliance Safety and Health Officers (CSHOs) shall not perform any type of diving during the course of an investigation or inspection.

B. Only those CSHOs that have received diver familiarization training, or are otherwise qualified by similar training or experience, shall make diving inspections. In urgent situations, a CSHO without diving familiarization training may initiate and conduct a diving inspection until a CSHO with such training is available.

C. Area Offices that have offshore activities may obtain Oil and Gas Development Maps for each State having such operations. These maps are available from the respective State for State territorial waters (example: in Alaska these maps are available from the Alaska Department of Natural Resources – Department of Oil and Gas), and from the U. S. Department of the Interior – Minerals Management Service (MMS) for coastal waters beyond State territorial waters.

D. Normal variance procedures are in effect with respect to the diving standard. When employers indicate that they have a variance request pending that has not yet been acted upon, a citation shall still be issued for any violation. The employer should be informed that the variance request will be taken into account in considering the proper abatement period or proposed penalty. Questions regarding variances shall be referred to OSHA's National Office, Directorate of Science, Technology and Medicine, Office of Technical Programs and Coordination Activities.

XV. **General Inspection Procedures**.

A. **29 CFR 1910.401 *Scope and application***.

1. Scope.

   This standard applies (except as noted in section XV, paragraph A.5.b of this instruction) to all commercial diving and related support operations subject to OSHA authority. As with all OSHA standards, the legal responsibility for compliance rests solely on the employer. Employers are expected to comply with all standards or parts of standards that apply to the tasks in which their employees are engaged.

2. Authority.

   In general, OSHA authority over commercial diving operations is the same as OSHA authority over any other industry as expressed under Section 4(a) of the Occupational Safety and Health Act of 1970. Since OSHA covers all employment and places of employment within a State, the Act's requirements apply to both inland commercial diving operations and any other type of employment within the State territorial waters for coastal States and from other land masses listed in Section 4(a) of the Act (extends seaward for 3-nautical miles from the general coastline at ordinary (mean) water; except for Texas, the Gulf Coast of Florida, and Puerto Rico where it extends seaward for 9-nautical miles from the general coastline at ordinary (mean) water); in the case of the Great Lakes and St. Lawrence Seaway, the limit extends from the coastline to the established international boundary lines with Canada. Section 4(a) also covers workplaces beyond the State territorial waters that are engaged in employment operations in connection with the Outer Continental

Shelf (OCS) lands (NOTE: "lands" not "vessels"), and work related to these operations. See Appendix B of this instruction for further guidance related to authority that is specific to commercial diving operations

3. Applicable Standards.

   Commercial diving operations must be in compliance with 29 CFR Part 1910, Subpart T.

   NOTE: 29 CFR 1928.21(b) reads, "Except to the extent specified in paragraph (a) of this section, the standards contained in Subparts B through T and Subpart Z of Part 1910 of this title dodoes not apply to agricultural operations." Agricultural operations include the following Standard Industry Classification (SIC) and North American Industry Classification System (NAICS) codes:

   1987 U.S. SIC MATCHED TO 20021997 NAICS U.S.

1987 SIC Code	1987 U.S. SIC Description	2002 NAICS Code	2002 NAICS U.S. Description
01	Agricultural Production - Crops	111	Crop Production
02	Agricultural Production - Livestock and Animal Specialties	112	Animal Production
071	Soil Preparation - Services	115112	Soil Preparation, Planting, and Cultivating
0721	Crop Planting, Cultivating and Protecting	115112	Soil Preparation, Planting, and Cultivating
0722	Crop Harvesting, Primarily by Machine	115113	Crop Harvesting, Primarily by Machine
0724	Cotton Ginning	115111	Cotton Ginning
0761	Farm Labor Contractors and Crew Leaders	115115	Farm Labor Contractors and Crew Leaders
0762	Farm Management Services	115116	Farm Management Service

   NOTE: The classification of aquaculture industry operations depends upon specific conditions. Operations that are part of the controlled growing and harvesting of fish, shellfish, and plants in fresh, brackish, and marine waters are covered by the OSHA standards for agriculture, 29 CFR Part 1928. Any aquaculture operations that are not uniquely agricultural and not part of the controlled growing and harvesting of fish, shellfish, and plants (such as the processing of harvested fish) would be covered by OSHA's Commercial Diving Operations Standard, 29 CFR Part 1910, Subpart T - Commercial Diving Operations. Other types of diving activities (such as inspecting and maintaining underwater piping equipment) also are covered by 29 CFR Part 1910, Subpart T. Diving operations conducted by agricultural employees engaged in employments under the above- listed SIC or NAICS codes may not be covered by 29 CFR Part 1910, Subpart T. Contractors of agricultural employers who do not fall within these SIC or NAICS codes are covered by 29 CFR Part 1910, General Industry Standards.

4. Precedence of Standards.

   When a provision of 29 CFR 1910, Subpart T, differs or conflicts with any other OSHA standard, the requirements of 29 CFR 1910, Subpart T, shall take precedence when applied to diving operations. The CSHO should review 29 CFR 1910.5 for guidance before issuing a citation for a violation of a general industry standard to an employer engaged in diving operations. Questions regarding this procedure shall be referred to the OSHA's National Office, Directorate of Enforcement Programs.

5. Citing Standards.

   a. The proper standards to cite for violations shall be determined by the type of work that the diving operation requires. For example:

      i. Repairs on a vessel requiring a diver to examine damage to the hull. These violations would be cited, as appropriate, under 29 CFR Part 1910, Subpart T (see 1910.4010 - 1910.441).

         NOTE: 29 CFR Part 1910, Subpart T - Commercial Diving Operations, is incorporated into 29 CFR Part 1915 by 29 CFR 1915.6. (see CPL 02-00-142, Shipyard "Tool Bag" Directive).

      ii. Maintenance work requiring a diver to enter a sewer line to free debris from a strainer. These violations would be cited, as appropriate, under 29 CFR Part 1910, Subpart T (see 1910.401 - 1910.441).

      iii. Work on a dock that requires a diver to perform construction work (construction work includes the actual erection, alteration, and repair of the dock). These violations would be cited under 29 CFR Part 1926, Subpart Y, with specific reference to the appropriate section of 29 CFR Part 1910, Subpart T (see 1910.401 - 1910.441).

      iv. If the CSHO is not sure which standard applies to the operation, then the CSHO shall cite both standards (one in the alternative).

b. The commercial diving operations standard does not apply to diving operations under the following conditions:

i. 29 CFR 1910.401(a)(2)(i). Diving for instructional purposes by persons using only open-circuit, compressed air, self-contained underwater- breathing apparatus (SCUBA) within the no-decompression limits.

NOTE: OSHA standards do not apply to individuals engaged in recreation or sport diving (generally SCUBA) that is not related to employment.

ii. 29 CFR 1910.401(a)(2)(ii). Diving solely for search, rescue, or related public-safety purposes by or under the control of a government agency.

NOTE: Diving contractors who perform such emergency service not under the control of a government agency, but as an independent contractor for private purposes, do not fall under this exclusion. However, they may be covered by the provisions concerning application of the standard in an emergency (see 29 CFR 1910.401(b)).

iii. 29 CFR 1910.401(a)(2)(iii). Diving operations when performed for research, development, and related activities in which human subjects are involved. These operations are covered by the standards contained in 45 CFR Part 46, Protection of Human Subjects, administered by the U.S. Department of Health and Human Services (previously known as the U.S. Department of Health Education and Welfare), or equivalent federal standards.

iv. 29 CFR 1910.401(a)(2)(iv) and 29 CFR Part 1910, Subpart T, Appendix B. Diving operations that are defined as scientific diving and which are under the direction and control of a diving program containing all elements specified in the commercial diving operations standard.

v. Section 4(b)(1) of the OSH Act. Those specific working conditions of diving operations over which other federal agencies exercise statutory authority to prescribe or enforce standards or regulations affecting occupational safety and health. Questions regarding OSHA's authority shall be referred to OSHA's National Office, Office of Maritime Enforcement (see Appendix B of this instruction for additional guidance).

NOTE: Appendix C of this instruction provides additional discussion and information regarding exclusions and exemptions from OSHA's commercial diving standard.

6. Federal Agency Coverage and Application

a. U.S. Coast Guard.

The U.S. Coast Guard has prescribed diving regulations under 46 CFR, Chapter I, Part 197, Subpart B - *Commercial Diving Operations.* The U.S. Coast Guard regulations state that they apply to commercial diving operations taking place: at any deepwater port or the safety zone thereof as specified by 33 CFR Part 150 (see NOTE below); from any artificial island, installation, or other device on the Outer Continental Shelf (OCS) and the waters adjacent thereto as defined in 33 CFR Part 147, or otherwise related to activities on the OCS; from all vessels with a valid certificate of inspection issued by the U.S. Coast Guard (i.e., "inspected" vessels), including mobile offshore drilling units regardless of their geographic location; from any vessel connected with a deepwater port or within the deepwater port safety zone; and from any vessel engaged in activities related to the OCS.

NOTE: "Deepwater port" means any fixed or floating man-made structure other than a vessel, or any group of structures, located **beyond State territorial waters**, and that are used or intended for use as a port or terminal for the transportation, storage, or further handling of oil or natural gas for transportation to any State, and for other uses including the transportation of oil or natural gas from the United States' Outer Continental Shelf. The term includes all components and equipment, including pipelines, pumping stations, service platforms, buoys, mooring lines, and similar facilities to the extent they are located seaward of the high-water mark. In the case of natural gas, the term includes all components and equipment, including pipelines, pumping or compressor stations, service platforms, buoys, mooring lines, and similar facilities, to the extent that they are located seaward of the high-water mark and do not include interconnecting facilities. The local U.S. Coast Guard Marine Safety Office can provide detailed guidance regarding deepwater ports, the associated safety zones, and the identification of related components and equipment.

b. Other Federal Agencies.

The Department of the Navy (DON) requires compliance with the U.S. Navy Diving Manual (Revision 5). For civilian employees, this manual includes additional provisions which provide protection equivalent to the OSHA diving standard. DON civilian divers are identified as all permanent DON employees who have been formally trained at an approved U.S. Navy diving school. Commercial divers contracted by DON who are not permanent government employees are not subject to these provisions. The additional provisions for DON civilian divers include: limiting the maximum diving depths and in-water decompression times; having a recompression chamber onsite for all SCUBA and surface-supplied air diving deeper than 100 fsw, and for all mixed-gas diving; and having an emergency gas supply ("come-home bottle" or "bail-out bottle") for any dive greater than 60 fsw, planned decompression dives, or any dive for which direct access to the surface is not available. The complete list of DON restrictions for DON civilian diver employees is included in the U.S. Navy Diving Manual (see Volume 2, section 6-8.9; Revision 5). Furthermore, DON civilian diver employees are exempt from regulation by OSHA when conducting uniquely military operations.

NOTE: Other federal agencies, such as the U.S. Army Corps of Engineers and the Federal Highway

Administration, have developed diving requirements for their own employees and contractor employees. However, when the diving operations are subject to OSHA authority (see section XV, paragraph A, of this instruction) the OSHA diving standard continues to cover these employees, and commercial diving operations conducted by federal employees or their contractors must meet, but may exceed, the requirements of 29 CFR Part 1910, Subpart T.

7. Inspection Priorities.

   Diving operations that do not fall within one of the exemption categories listed in this section, and that involve an employer-employee relationship, are covered by 29 CFR Part 1910, Subpart T. Inspection priorities shall be followed as stated in CPL 02-00-103, Field Inspection Reference Manual (FIRM), with respect to different types of diving operations.

8. 29 CFR 1910.401(b) Application in Emergencies.

   a. This exclusion was included in the standard to allow the designated person-in-charge discretion to deviate from the requirements of the standard in situations where death or serious harm to individuals, or major environmental damage (such as an oil or other hazardous material leak, or repairs to a municipal dam gate to avoid or mitigate flooding), is likely to occur or continue to occur, but only to the extent that such action is immediately necessary to prevent or minimize the harm or damage. This exclusion applies only for the duration of the emergency. The employer is required to notify the nearest OSHA Area Office within 48 hours of the onset of the situation requiring such deviation. The Area Director may request that the employer submit a written record (such as a facsimile, e-mail or letter) of the notification within 48 hours of the request for a written record, or as otherwise agreed to, explaining what deviations from the standard were made and what additional precautions were instituted to provide for the safety and health of the employees during the emergency. Failure of the employer to notify the OSHA Area Office of the emergency situation within the specified time shall be considered a violation of this provision of the standard. These incidents shall be closely monitored to ensure that this provision is not abused. A pattern of repeated deviations shall be cause for an inspection.

   b. This emergency provision does not apply to situations involving only economic or property damage.

9. Federal and State Authority.

   a. All State-Plan States have promulgated a commercial diving standard either identical to 29 CFR Part 1910, Subpart T, or at least as effective as the OSHA standard (California, Michigan, Oregon, and Washington have State diving standards that differ from the federal standards). (A description of such differences will be made available by these State-Plan States to affected employers and employees through the State-Plan States' website or other means.)

   b. Federal OSHA enforces its diving standard whenever commercial diving operations are being conducted by private-sector employees in States under Federal OSHA enforcement authority, and in maritime operations not covered by a State-Plan State (see the appropriate subpart of 29 CFR Part 1952). The dive location (see section XV, paragraph B.11, of this instruction) determines which entity has authority. Federal OSHA does not have authority over State and local government employees.

   c. States with approved plans enforce the diving standard: when commercial diving operations are being conducted by private-sector employees not engaged in shipyard employment or marine terminal activities (e.g., equipment repair, sewer maintenance, or construction); in maritime operations (i.e., shipyard employment and marine terminals) as provided by their plans, in California, Minnesota, Oregon, Vermont, and Washington; and with regard to State and local government employees (see, however, the exemption for search, rescue, and related public-safety diving by or under the control of a government agency in Appendix C of this instruction).

      NOTE: See Appendix B of this instruction for additional information related to OSHA's jurisdiction.

B. **29 CFR 1910.402 *Definitions***.

1. **Acfm**: Actual cubic feet per minute.

2. **ASME Code or equivalent**: ASME (American Society of Mechanical Engineers) Boiler and Pressure Vessel Code, Section VIII, or an equivalent code which the employer can demonstrate to be equally effective.

   NOTE: "Equivalent" means equipment that is designed, built, and maintained to standards that will provide employees with at least the same level of protection as equipment that meets the ASME Boiler and Pressure Vessel Code, Unfired Pressure Vessels, Section VIII. The employer shall be responsible for demonstrating equivalency. Questions regarding equivalency should be referred to OSHA's National Office, Office of Maritime Enforcement.

3. **ATA**: Atmosphere absolute.

4. **Bell**: An enclosed compartment, pressurized (closed bell) or unpressurized (open bell), which allows the diver to be transported to and from the underwater work area and which may be used as a temporary refuge during diving operations.

5. **Bottom time**: The total elapsed time measured in minutes from the time when the diver leaves the surface in descent to the time that the diver begins ascent (i.e., the diver "leaves the bottom").

6. **Bursting pressure**: The pressure at which a pressure containment device would fail structurally.

7. **Cylinder**: A pressure vessel for the storage of gases.

8. **Decompression chamber**: A pressure vessel for human occupancy such as a surface decompression chamber, closed bell, or deep diving system used to decompress divers and to treat decompression sickness.

   NOTE: As used in this standard, the term "decompression chamber" refers to any pressure vessel for human occupancy used to decompress divers and to treat decompression sickness. A closed bell, if used as a decompression chamber, shall meet the design criteria stated in 29 CFR 1910.430(f).

9. **Decompression sickness**: A condition with a variety of symptoms which may result from gas or bubbles in the tissues of divers after pressure reduction.

10. **Decompression table**: A profile or set of profiles of depth-time relationships for the ascent rates and breathing mixtures to be followed after a specific depth-time exposure or exposures.

11. **Dive location**: A surface or vessel from which a diving operation is conducted.

    NOTE: The term "dive location" refers to the surface location from which diving operations are conducted such as a vessel, barge, wharf, pier, riverbank, or offshore rig, and does not mean the diver's underwater work location.

12. **Dive-location reserve breathing gas**: A supply system of air or mixed-gas (as appropriate) at the dive location which is independent of the primary supply system and sufficient to support divers during the planned decompression.

13. **Dive team**: Diver and support employees involved in a diving operation, including the designated person-in-charge.

14. **Diver**: An employee working in water using an underwater apparatus which supplies compressed breathing gas at the ambient pressure.

15. **Diver-carried reserve breathing gas**: A diver-carried supply of air or mixed-gas (as appropriate) sufficient under standard operating conditions to allow the diver to reach the surface, another source of breathing gas, or to be reached by a standby diver.

16. **Diving mode**: A type of diving requiring specific equipment, procedures and techniques (SCUBA, surface-supplied air, or mixed-gas).

17. **Fsw**: Feet of seawater (or equivalent static pressure head).

    NOTE: An example of equivalent static pressure head would be the pressure of air inside a pressurized decompression chamber.

18. **Heavy gear**: Diver-worn deep-sea dress, including helmet, breastplate, dry suit, and weighted shoes.

    NOTE: Advances in diving equipment and technology have led to heavy gear that does not include a breastplate. Surface-supplied diving gear, including helmet, dry suit, and weighted shoes (i.e., with the helmet directly connected to the dry suit, forming a self-contained pressure envelope for the diver) constitutes heavy gear as well.

19. **Hyperbaric conditions**: Pressure conditions in excess of surface pressure.

20. **Inwater stage**: A suspended underwater platform that supports a diver in the water.

21. **Liveboating**: The practice of supporting a surfaced-supplied air or mixed-gas diver from a vessel which is underway.

22. **Mixed-gas diving**: A diving mode in which the diver is supplied in the water with a breathing gas other than air.

    NOTE: For diving operations, air is a mixture of oxygen and nitrogen with an oxygen content of 19.5 - 23.5 percent. Breathing gas mixtures with an oxygen content less than 19.5 percent or greater than 23.5 percent, or that use gases other than oxygen and nitrogen (excluding trace gases such as those found in compressed atmospheric air), constitute a mixed gas for the purposes of commercial diving.

23. **No-decompression limits**: The depth-time limits of the "no-decompression limits and repetitive dive group designation table for no-decompression air dives," U.S. Navy Diving Manual or equivalent limits which the employer can demonstrate to be equally effective.

    NOTE: The term "no-decompression limits" applies to those depth-time combinations for which decompression of the diver is not required. The no-decompression tables from the U.S. Navy Diving Manual are included in Appendix D of this instruction.

24. **Psi(g)**: Pounds per square inch (gauge).

25. **Scientific diving**: Means diving performed solely as a necessary part of a scientific, research, or educational activity by employees whose sole purpose for diving is to perform scientific research tasks. Scientific diving does not include performing any tasks usually associated with commercial diving such as but not limited to: placing or removing heavy objects underwater; inspection of pipelines and similar objects; construction; demolition; cutting or welding; or the use of explosives.

    NOTE: Additional guidance is provided in Appendix C of this instruction.

26. **SCUBA diving**: A diving mode independent of surface supply in which the diver uses open-circuit self-contained underwater breathing apparatus.

27. **Standby diver**: A diver at the dive location available to assist a diver in the water.

    NOTE: The requirement that the standby diver be at the dive location, which is a location on the surface (such as the shore, a pier, or a dock) or on the deck of a vessel, eliminates the possibility that another diver in the water or at another dive location would be considered a standby diver. Standby divers do not necessarily have to be fully dressed, but must be available to render the necessary assistance in a timely manner. The term "available" means to be clothed and equipped, and ready to enter the water at a moment's notice. Gear such as face masks, air cylinders, and harnesses can be donned quickly, and need not be worn until the standby diver is required to enter the water.

28. **Surface-supplied air diving**: A diving mode in which the diver in the water is supplied from the dive location with compressed air for breathing.

29. **Treatment table**: A depth-time and breathing-gas profile designed to treat decompression sickness.

30. **Umbilical**: The composite hose bundle between a dive location and a diver or diving bell, or between a diver and a diving bell, which supplies the diver or diving bell with breathing gas, communications, power, or heat as appropriate to the diving mode or conditions, and includes a safety line between the diver and the dive location.

31. **Volume tank**: A pressure vessel connected to the outlet of a compressor and used as an air reservoir.

32. **Working pressure**: The maximum pressure to which a pressure containment device may be exposed under standard operating conditions.

C. **29 CFR 1910.410 *Qualifications of dive team***.

1. The level of experience or training required by the standard depends upon the job the employees are required to do. All dive-team members must have either experience or training in the use of tools, equipment, systems, techniques, operations, operational procedures, and emergency procedures that are pertinent to, and necessary for, the assigned tasks for the diving mode (i.e., SCUBA, surface-supplied air, or mixed-gas diving). It is essential that those dive-team members who are exposed to hyperbaric conditions, or those members who control the exposure of others, have knowledge of the physiological effects of diving and the related effects of pressure. Accordingly, this standard also requires that employees be trained in diving-related physics and physiology. Employee qualifications achieved through field experience or classroom training, or both, may be used to meet the requirements of the standard. For example:

    a. Most divers begin as tenders and advance to diving status after a period of field experience and/or classroom training. A diving-tender trainee performing on-the-job training will be assigned as a tender only under the supervision of a qualified diver.

    b. Tenders are members of the dive team who provide surface-support to divers at the diving location. A tender employed in shallow-water air diving is required to have a basic understanding of the breathing-air system, the operating and emergency procedures, and knowledge of the care and use of equipment. See Appendix E of this instruction for additional guidance regarding the responsibilities and duties of tenders.

    c. A mixed-gas diver conducts underwater work using mixed-gas as the breathing medium. Mixed-gas divers are required to have an advanced understanding of diving, including a working knowledge of mixed-gas equipment such as a decompression chamber, diving bell, and mixed-gas breathing supply system, and operational and emergency procedures associated with mixed-gas diving. In addition, the mixed-gas diver must have an understanding of the physics and physiology of mixed-gas diving.

    d. Chamber operators are required to have experience or training in conducting decompression procedures, knowledge of the physics and physiology of decompression, and the operation of the decompression equipment to which they are assigned.

    e. Each dive-team member must be trained in cardiopulmonary resuscitation and standard first aid. The American Red Cross standard course or equivalent training is specified by the standard. Employees completing this training are issued a card certifying that they have successfully completed the course. Any first-aid training meeting the requirements of 29 CFR 1910.151(b) and 1926.50(c) will meet the requirements of the standard (such as first-aid courses offered by the American Heart Association, American Petroleum Institute, National Safety Council, U.S. Bureau of Mines, and American College of Orthopedic Surgeons).

2. The following methods may be used to check diving qualifications:

    a. Field experience.

        i. Employment records.

        ii. Written statements from previous employers.

        iii. Written statements from diving officers or commanding officers (military).

        iv. Field operations records.

        v. The employee's diving logs.

    b. Diving proficiency.

        i. Company field operations records.

ii. Federal service operations records (such as from the Army Corps of Engineers, NOAA, or military).

iii. The employee's diving logs.

c. Technical training.

i. Federal service qualification certificates (such as from the Army Corps of Engineers, NOAA, or military).

ii. Diving school certificates of completion.

iii. Company training program completion statements or equivalent proof of competency.

iv. Valid commercial diver certification card for the appropriate training level issued by the Association of Diving Contractors International.

3. Under 29 CFR 1910.410(b)(1), employers must generally assign tasks to dive-team members according to their experience and training. Additionally, the phrase "known to the employer" in 29 CFR 1910.410(b)(3) means that the designated person-in-charge must inquire into each dive-team member's health prior to a task assignment. The employer also is required in 29 CFR 1910.421(f)(2) to advise dive-team members of the procedures for reporting physical problems or adverse physiological effects during and after diving. Consistent with these provisions, an employer cannot require dive-team members to dive or otherwise work under hyperbaric conditions when they: (1) have any ailment that is likely to adversely affect the safety or health of any member of the dive team; (2) lack the necessary training or education; or (3) refuse to work under such conditions. However, should a diver request termination during a dive, it may be necessary to prolong the diver's exposure to hyperbaric conditions to complete decompression or medical recompression treatment to avoid serious physical harm or death to the diver.

4. Under 29 CFR 1910.410(c), the designated person-in-charge (DPIC)(commonly referred to as the "diving supervisor" or the "diving foreman") is immediately responsible for the safety and health of the dive team. The DPIC can be the employer or an employer representative chosen by the employer. The DPIC shall have experience in, and knowledge of, all phases of the diving operation for which he/she is responsible. The DPIC shall be stationed at the dive location, and shall **not** be stationed at another dive location (i.e., he/she must be stationed at one dive location and be responsible only for the diving operation at that location). The DPIC can be a diver, when qualified as a diver, and when another dive-team member is available at the dive location. This dive-team member must be trained and capable of performing the necessary functions of the DPIC's duties, when the DPIC is a diver in the water. The qualifications of the DPIC can be checked using the same methods listed in section XV, paragraph C.2, of this instruction.

D. **29 CFR 1910.420 *Safe practices manual***.

1. This standard requires that the employer develop and maintain a safe practices manual that includes information and procedures relating to the safety and health of the dive-team members. The manual must contain a copy of the commercial diving operations standard and a statement of the employer's policy for ensuring compliance with the standard. The employer may refer to the safe practices manual as the diving manual, employer's operational log, or diving guide. The manual must be at the dive location and available to all dive-team members.

2. The safe practices manual must provide a written operational procedure for each diving mode used by the employer. The CSHO shall review the manual to determine if it contains safety procedures and checklists for diving operations, assignments and responsibilities of the dive-team members, equipment procedures and checklists, and emergency procedures (at a minimum: fire, equipment malfunction or failure, adverse environmental conditions, and medical illness and injury). The safe practices manual guidance and procedures must be supplemented with additional information specific to each diving operation. This supplemental information is obtained during pre-dive planning and assessment (see 29 CFR 1910.421(d)), and promulgated to the dive-team members during the employee briefing (see 29 CFR 1910.421(f)).

   NOTE: The "Consensus Standards for Commercial Diving and Underwater Operations" published by the Association of Diving Contractors International is recognized as meeting the general requirements of a safe practices manual.

E. **29 CFR 1910.421 *Pre-dive procedures***.

1. The provisions of this section must be followed by the employer for all diving modes, with the designated person-in-charge responsible for overall compliance with these provisions and briefing dive-team members.

2. 29 CFR 1910.421(b) *Emergency aid*. The CSHO shall determine whether the emergency aid list is complete and is available to all dive-team members. This list must contain the telephone or call numbers of: the nearest operational decompression chamber (if a chamber is not required at the dive location); accessible hospital(s); the available physician (s); the means of transportation available for use in the event of an emergency; and the nearest U.S. Coast Guard Rescue Coordination Center.

3. 29 CFR 1910.421(c) *First aid supplies*. The CSHO shall determine whether a first-aid kit is available at the dive location. The first-aid kit provided at the dive location must be appropriate for the diving operations, and approved by a physician. If it is to be used in a pressure chamber, such as a decompression chamber or a diving bell, the first-aid kit must be suitable for use under hyperbaric conditions because some items in a standard kit (such as bottles of liquid, mercury thermometers, or ammonia ampoules) may burst under pressure. In addition to any other first-aid or medical supplies, the kit must include an American Red Cross standard first-aid handbook, or an equivalent handbook, and a bag-type resuscitator with a transparent hose and mask (so that the operator can see that the diver's air passages are

clear).

4. 29 CFR 1910.421(d) *Planning and assessment*. This provision requires the employer to include in the planning of a diving operation an assessment of the safety and health features of the diving mode, surface and underwater conditions and hazards, primary and reserve breathing-gas supply, thermal protection, diving equipment and systems, dive-team assignments and the physical fitness of dive-team members (including any impairments known to the employer), repetitive dive designation or residual inert-gas status of divers, decompression chamber procedures (including any altitude corrections), and emergency procedures. The employer typically assigns this planning task to the designated person-in-charge. Most of the information required by this provision should be in the safe practices manual (see 29 CFR 1910.420). Some information may not be found in the manual because it cannot be determined until the dive team reaches the dive location. The CSHO can question the dive-team members to determine that the employer has complied with the requirements of this provision.

   NOTE: 29 CFR 1910.421(d) can be cited for any identified hazard that was not addressed properly by an employer when they planned and conducted an assessment of the diving operation or work to be performed.

5. 29 CFR 1910.421(e) *Hazardous activities*. Hazards encountered during diving operations such as weather, water temperature, current, and bottom conditions must be recognized and taken into account during the planning and execution of the operation. When other operations being conducted in the vicinity (such as dredging, marine traffic, or movement of materials directly above the dive location and/or area of the dive) are likely to interfere with the diving operation, the designated person-in-charge shall plan the operation only after appropriate coordination with persons responsible for the other activities so that any hazard exposures to the diver(s) or other dive-team members will be eliminated. Failure to plan for such conditions, or to coordinate activities, shall be a basis for a citation.

6. 29 CFR 1910.421(f) *Employee briefing*. The employee briefing is usually conducted by the designated person-in- charge just prior to the diver(s) entering the water. The dive-team members shall be briefed on the tasks to be undertaken, safety procedures for the diving mode, any unusual hazards or environmental conditions likely to affect the safety of the diving operation, and any modifications to operating procedures necessitated by the specific diving operation. The designated person-in-charge also must advise the dive-team members of the procedures for reporting physical problems or adverse physiological effects during and after the dive. It is particularly important that the designated person-in-charge inquire into each dive-team member's current state of physical fitness before making assignments. To determine compliance, the CSHO can question dive-team members and observe the diving operation, if one is ongoing.

7. 29 CFR 1910.421(g) *Equipment inspection*.

   a. The equipment-inspection requirement prior to each dive relates directly to the equipment-checklist requirement in the safe practices manual. The breathing-supply system, including reserve breathing-gas supplies, masks, helmets, thermal protection, and diving bell-handling mechanisms (when appropriate) must be inspected prior to each diving operation. Pre-dive equipment inspection items are those that are critical for the safety of the dive operation. For surface-supplied diving, the breathing-supply system equipment inspection includes diving umbilicals as defined in 29 CFR 1910.402, *Definitions*. The inspection of an umbilical includes a visual inspection of the breathing-gas hose, communications cable, and the safety line between the diver and the dive location, and power cables and hot-water hoses as appropriate. This inspection ensures that the umbilical has the required components, that the components are properly rigged and married together, and that all components are in good working condition (no leaks, tears, or damage). Umbilicals being used for diving operations with missing components or components in a condition that pose a hazard to the diver or dive team (such as a cut breathing-gas hose, power cable with bare wires exposed, or excessively frayed safety line) will be cited under 29 CFR 1910.421(g).

   b. Compliance with the pre-dive inspection requirements usually can be determined only by observation (such as systems, equipment, processes and procedures), and questioning the employees. This standard makes no distinction between employer-provided equipment and employee-provided equipment with regard to the pre-dive inspection requirement. While an employee may make such inspections, it is the employer who is responsible for ensuring compliance with all equipment requirements of the standard.

8. 29 CFR 1910.421(h) *Warning signal*.

   a. The following paragraphs describe the two distinctions made in the requirements for displaying the warning signal for commercial diving operations:

      i. 29 CFR 1910.421(h) requires the warning signal to be displayed when diving from surfaces other than vessels such as wharves, piers, pilings, jetties, fixed caissons, levees, dikes, dams, breakwaters, and artificial islands (secured to the sea floor). Violations of this requirement shall be cited under this section.

      ii. The requirement for displaying the warning signal when the dive location is located on a vessel is covered by the U.S. Coast Guard Inland Navigation Rules. These requirements are not enforceable by OSHA. If the CSHO observes violations of the warning signal when the dive location is on a vessel, no citation shall be issued. However, the CSHO shall inform the employer of the violation(s) and recommend abatement (s). The CSHO also shall note the incident on the OSHA-1 Form and notify the nearest U.S. Coast Guard Marine Safety Office of the violation(s).

   b. The warning signal is a rigid replica of the international code Flag "A," and must be at least one meter in height (see Appendix F of this instruction).

F. **29 CFR 1910.422 *Procedures during dive***.

1. 29 CFR 1910.422(b) W*ater entry and exit*. A means capable of supporting the diver (such as an inwater stage or ladder) while entering or exiting the water is required. If it is a fixed structure, such as a ladder, it must extend below the water sufficiently to allow adequate diver access and support. The employer also must provide a means for assisting an injured diver from the water to the surface or into a diving bell (such as an inwater stage, stokes basket, or harness).

2. 29 CFR 1910.422(c) *Communications*. An operational two-way voice communication system is required for communications between each surface-supplied air diver or mixed-gas diver and a member of the dive team at the dive location or in the diving bell (if a diving bell is provided or required). Line-pull signals do not meet this requirement, except for the SCUBA-diving mode. A two-way voice communication system is required for communications between the diving bell and the dive location. Also, a two-way communication system (such as a cell phone, marine radio, or computer) must be available for obtaining emergency aid.

3. 29 CFR 1910.422(d) *Decompression tables*. This paragraph requires that decompression, repetitive, and no-decompression tables (as appropriate) be available at the dive location. These tables serve as guides for determining decompression and no-decompression profiles for the diving operation. The CSHO shall check that the decompression tables are available at the dive location (for standard air decompression tables refer to section V, paragraph H.3, of this instruction, U.S. Navy Diving Manual, Volume 2, "Air Decompression").

4. 29 CFR 1910.422(e) *Dive profiles*. A written record called a depth-time profile (including any breathing-gas changes, when appropriate) must be maintained for each diver during the dive, including decompression. This record aids the designated person-in-charge (or the dive-team member managing the decompression interval) in implementing the planned dive schedule and decompression interval, and making necessary adjustments in the decompression schedule if changes occur in planned bottom times or depths. The dive profile information may be recorded by whatever means and in whatever form the employer prefers, provided that the information is maintained accurately and completely.

5. 29 CFR 1910.422(f) *Hand-held power tools and equipment*.

    a. The standard does not require hand-held electric power tools used underwater to have a pressure-sensitive manual control switch. However, when electrically powered hand-held tools are used underwater, and the source of power is supplied from the dive location or a diving bell, the hand-held power tool shall not be supplied with power until requested by the diver. When the diver has finished work with the hand-held electric-power tool, the power to the tool will be de-energized from the dive location or the diving bell.

    b. In addition to the requirements of 29 CFR 1910.422(f)(1) and (f)(2), all hand-held electric power tools and equipment must comply with 29 CFR 1910.303(b) and 29 CFR 1910.399.

       Clarification of the term "approval" is given in 29 CFR 1910.303(a) as follows: "The conductors and equipment required or permitted by this subpart shall be acceptable only if approved."

       The term "acceptable" is defined under 29 CFR 1910.399 as follows: "An installation or equipment is acceptable to the Assistant Secretary of Labor, and approved within the meaning of [29 CFR Part 1910, Subpart S - Electrical]." An installation would be acceptable if it meets one of the following three conditions:
       - If it is accepted, or certified, or listed, or labeled, or otherwise determined to be safe by a nationally recognized testing laboratory [as defined by 29 CFR 1910.7].
       - With respect to an installation or equipment of a kind which no nationally recognized testing laboratory accepts, certifies, lists, labels, or determines to be safe, if it is inspected or tested by another federal agency, or by a State, municipal, or other local authority responsible for enforcing occupational safety provisions.
       - With respect to custom-made equipment or related installations which are designed, fabricated for, and intended for use by a particular customer, if determined to be safe for its intended use by the manufacturer on the basis of test data which the employer keeps and makes available for inspection to the Assistant Secretary and [his/her] authorized representatives.

6. 29 CFR 1910.422(g) *Welding and burning*.

    a. A current supply switch must be available to interrupt the current flow to the welding or burning electrode. The switch shall be tended by a dive-team member in voice communication with the diver performing the welding or burning (see 29 CFR 1910.422(g)(1)(i)). The disconnect switch must be in the open position unless the diver is actually welding or burning (see 29 CFR 1910.422(g)(1)(ii)). The CSHO shall determine that the welding machine's frame is properly grounded and that cables, electrode holders and connections are insulated to prevent overheating or breakdown (see 29 CFR 1910.422(g)(2) and (g)(3)). The employer must provide insulated gloves for the diver's protection (see 29 CFR 1910.422(g)(4)).

       NOTE: Personnel designated to operate electric cutting and welding equipment used in diving operations shall have experience or training in the safe use of this equipment (see 29 CFR 1910.410(a)(2)(i); welding and burning training violations will be cited under 29 CFR 1910.410).

    b. This standard does not place any restriction on the use of AC current or rectified AC current arc welding.

    c. 29 CFR 1910.422(g)(5). "Closed compartments" as used in this paragraph, means any space that is enclosed by

bulkheads and overheads (i.e., walls and ceilings), including large diameter pipes and other structures that, because of poor ventilation, could hold or contain a flammable gas or vapor. Prior to hot work, the employer must remove from closed compartments all flammable gases and vapors by ventilating, flooding, or purging with an inert-gas that will not support combustion. Venting alone is not sufficient unless it removes the flammable gases from the compartments. Closed compartments, structures, and pipes already under flow, as in hot tapping operations, meet the requirement for being flooded.

WARNING: A flooded compartment is not necessarily safe for cutting and welding. During the cutting and welding process, oxygen, hydrogen (electrolysis), and other gases may collect in a closed compartment, if it is not properly vented (made gas free). Should the diver cut or weld into the area where the gas collects, then a serious explosion can occur. By properly venting the space, gas will not collect and the space will remain flooded.

7. 29 CFR 1910.422(h) *Explosives*. Explosive charges are used to perform some types of underwater work, including demolition, sheet-pile cutting, cable cutting, and excavating. Explosives suitable for underwater work include primacord, various gelatins (gels), plastic blocks, and some liquids. Employers must comply with this provision, as well as the applicable requirements of 29 CFR 1910.109 and 29 CFR 1926.912, when handling, storing, and using explosives. This provision requires divers to be out of the water when detonating an explosive or testing the electrical continuity of the explosive circuits.

   NOTE: Only personnel who are properly trained or experienced shall handle explosives (see 29 CFR 1910.410(a)(1) and (a)(2)(i); explosive training violations will be cited under 29 CFR 1910.410).

8. 29 CFR 1910.422(i) *Termination of dive*. This paragraph applies to all diving modes. The designated person-in-charge is responsible for determining when a dive shall be terminated. "Termination" means ending the working interval of a dive. However, it may still be necessary to complete the decompression procedures. The working interval of a dive must be terminated when: the diver so requests; the diver fails to respond correctly to instructions from the dive team (indicating a possible disability of the diver or an equipment failure); communications with the diver are lost and cannot quickly be reestablished (either between the diver and the dive location or diving bell, or between the diver and the designated person-in-charge and the skipper of the support vessel for liveboating operations); or the diver begins to use the reserve breathing gas. Any of these situations requires termination of the dive. The decompression interval should not be omitted after termination of the dive if doing so would add to the diver's overall physical risk, unless the circumstances make inwater decompression impossible or present a greater physical risk to the diver.

G. **29 CFR 1910.423 *Post-dive procedures***.

1. 29 CFR 1910.423(b) *Precautions*. At the completion of a dive, the employer must: thoroughly check the physical condition of the diver; instruct the diver to report any physical problems or adverse physiological reactions (including decompression sickness symptoms); advise the diver of the location of the nearest decompression chamber; and alert the diver to the hazards of flying too soon after the dive (i.e., 12 hours for air diving; 24 hours for mixed-gas diving). Decompression sickness effects can occur for some time after the completion of the dive, and sleep can conceal the onset of decompression sickness. Consequently, after a dive deeper than 100 fsw, a dive that requires decompression, or after any dive using a mixed-gas breathing mixture, the employer is required to instruct the diver to remain awake and in the vicinity of the decompression chamber at the dive location for at least one hour after the dive, including one hour after any decompression or diving medical treatment (such as medical treatment for decompression sickness or arterial gas embolism).

2. 29 CFR 1910.423(c) *Recompression capability*. Decompression chambers provide the only effective therapy (i.e., recompression) for decompression sickness and arterial gas embolism. A decompression chamber also can reduce a diver's underwater exposure since chambers may be used to decompress the diver on the surface (i.e., procedures known as "surface decompression on air" and "surface decompression on oxygen").

   a. 29 CFR 1910.423(c)(1). This provision requires the use of a decompression chamber capable of recompressing the diver at the surface to a minimum of 165 fsw (6 ATA) at the dive location for: SCUBA dives deeper than 100 fsw; surface-supplied air dives deeper than 100 fsw but shallower than 220 fsw; mixed-gas dives shallower than 300 fsw; or diving outside the no-decompression limits shallower than 300 fsw.

   b. 29 CFR 1910.423(c)(2). A decompression chamber capable of recompressing the diver at the surface to the maximum depth of the dive must be available at the dive location for dives deeper than 300 fsw.

   c. 29 CFR 1910.423(c)(3). The decompression chamber must be dual-lock (i.e., having two compartments) so that supplies and personnel may be transferred into and out of the main compartment. The chamber also must be multi-place (i.e., the main compartment must be large enough for two persons), and must be located and ready for use within 5 minutes of the diver's exit from the water.

   d. 29 CFR 1910.423(c)(4). The decompression chamber must be equipped with: a pressure gauge for each inner lock and outer lock; a built-in breathing system with at least one mask for each chamber occupant; two-way voice communication between the chamber occupant(s) and a dive-team member at the dive location who is monitoring the decompression; a view port; and sufficient illumination to observe the chamber occupant(s).

   e. 29 CFR 1910.423(c)(5) and (c)(6). Treatment tables, oxygen or other appropriate treatment gas, and sufficient gas to pressurize the decompression chamber during the treatment period must be available at the dive site. In addition, a competent dive-team member must be available during the dive, and for one hour afterward, to tend and operate the chamber.

      NOTE: To be used as a recompression facility (i.e., in lieu of a chamber), a diving bell must meet all the criteria

listed in 29 CFR 1910.423(c)(1) and (c)(3). Chambers used for dives that are 300 fsw and deeper must have a pressure capability equal to or greater than the maximum depth of the dive (the CSHO shall check the dive plan and tables for the maximum depth of the dive).

3. 29 CFR 1910.423(d) *Record of dive*.

    a. 29 CFR 1910.423(d)(1) and (d)(2). The record maintained for each diving operation must include: the names of the dive-team members, including the designated person-in-charge; the date, time, and location of the dive; the diving mode(s) used; a general description of the work performed; the approximate underwater and surface conditions; and the maximum depth and bottom time for each diver. The following additional information is required for dives outside the no-decompression limits, deeper than 100 fsw, or using mixed-gas: depth-time and breathing-gas profiles; decompression tables (including any modifications); and, for repetitive diving, the elapsed time since the last pressure exposure (if less than 24 hours) or the repetitive dive designation for each diver.

    NOTE: These provisions do not require a standard form or that the dive records for each individual diver be kept on a separate sheet. When two or more divers are working simultaneously, the information required may be kept for the divers on one record. However, if the divers have different dive exposures or use different decompression tables, then separate entries must be made for each diver.

    b. 29 CFR 1910.423(d)(3). For each dive in which decompression sickness is suspected or symptoms are evident, the following additional information must be recorded and maintained: a description of decompression sickness symptoms (including depth and time of onset); and a description of treatment results. The information required also shall be recorded on the OSHA 300 Log ("Log of Work-Related Injuries and Illnesses"). Employers shall maintain a log of recordable work-related injuries and illnesses. The key word is "recordable." The purpose of this requirement is to document recordable illnesses, including incidents of decompression sickness, even when the initial symptoms include such manifestations as skin itch, slight joint cramps, and slight numbness of the extremities. Although seemingly innocuous, these symptoms are recognized and suspected as mild forms of decompression sickness. Symptoms and treatments must be recorded similarly to any other injury or illness (see Appendix G of this instruction for additional guidance).

4. 29 CFR 1910.423(e) *Decompression procedure assessment*. This paragraph requires the employer, within 45 days of occurrence, to investigate and evaluate each incident of decompression sickness, to take appropriate corrective action, and to prepare a written evaluation assessing the incident. The corrective action may include an adjustment of the dive procedures, reassessment of the decompression tables, or a reexamination of the particular dive involved. A check of the dive records should show whether an incident occurred that required an investigation, corrective action, and a written evaluation.

H. **29 CFR 1910.424 - 1910.427 *Specific Operations Procedures***. The requirements of 29 CFR 1910.424 through 1910.427 are in addition to any other applicable requirements in 29 CFR Part 1910, Subpart T.

I. **29 CFR 1910.424 *SCUBA diving***. Because a SCUBA diver has a limited breathing supply, does not usually have voice communication, and often is not monitored or controlled by surface-support personnel, the limits on this mode of diving are more stringent than for other diving modes.

1. 29 CFR 1910.424(b) *Limits*.

    a. 29 CFR 1910.424(b)(1) and (b)(2). The limits for SCUBA diving are more restrictive than for surface-supplied air diving or mixed-gas diving (see Appendix H). The maximum depth for SCUBA diving is 130 fsw (see 29 CFR 1910.424(b)(1)). A decompression chamber is required (i.e., available within 5 minutes from the dive location) when diving deeper than 100 fsw, or when diving outside of the no-decompression limits (see 29 CFR 1910.424 (b)(2)).

    b. 29 CFR 1910.424(b)(3). Each SCUBA diver must be line-tended when the current exceeds one knot. Three basic types of currents affect diving operations: river or major ocean currents; currents produced by the ebb and flow of the tides (which may add or subtract from any existing current); and underwater or rip currents caused by the rush of water returning from waves breaking along a shoreline. The CSHO shall determine that the employer has ascertained the strength of the local currents at the dive site from Tide and Current Tables, Coast and Geodetic Survey Charts, Coast Pilot Publications, or other sources. A SCUBA diver is seriously encumbered when swimming against a current exceeding one knot, and the standard prohibits such activity unless the diver is line-tended. A SCUBA diver may, however, swim downstream with a current when means are provided to pick the diver up (such as retrieval with a boat).

    NOTE: When two SCUBA divers are in the water, one tending line to the surface is sufficient when the two divers are connected by a "buddy line."

    c. 29 CFR 1910.424(b)(4). Each SCUBA diver must be line-tended when diving in an enclosed or physically confining space (i.e., any underwater location where the diver cannot ascend directly to the surface; commonly referred to as "free access to the surface").

    NOTE: For vessels without longitudinal (horizontal) stabilizers, "free access to the surface" means that the diver is diving above the turn of the bilge; for vessels with longitudinal stabilizers (usually found on military combat vessels), "free access to the surface" means that the diver is diving above the stabilizers.

2. 29 CFR 1910.424(c) *Procedures*.

a. 29 CFR 1910.424(c)(1). This paragraph requires that a standby diver be available for all SCUBA diving operations. An "available" standby diver means that the diving gear for the standby diver is at the dive location and ready for use (i.e., set up and fully checked out), with a qualified diver at the dive location available to be the standby diver. A second diver ("buddy diver") in the water does not satisfy the requirement for a standby diver. One employee can be both the standby diver and tender, provided that this employee is a qualified diver; for a three-person dive team, the designated person-in-charge (DPIC) would assume tending duties when the standby diver (tender) is in the water. A DPIC who is a qualified diver also can be the standby diver, provided that another dive-team member is at the dive location. This dive-team member must be trained and capable of performing the necessary functions of the DPIC, when the DPIC is in the water serving as the standby diver. This paragraph requires that the standby diver be line-tended from the surface when deployed in the water.

b. 29 CFR 1910.424(c)(2). This paragraph requires that a SCUBA diver be line-tended when in the water or that the SCUBA diver be accompanied by, and in continuous visual contact with, another diver during the diving operation.

NOTE: While line-tending the SCUBA diver from the dive location is considered preferable to "buddy diving," it is recognized that "buddy diving" is an accepted practice. The safety advantage of having two divers in the water tending each other ("buddy diving") is lost if they cannot maintain continuous visual contact; without visibility, divers cannot tend each other adequately.

c. 29 CFR 1910.424(c)(3). When diving is conducted in an enclosed or physically confining space, a diver shall be stationed at the underwater point of entry to assist in tending the diver in the space.

NOTE: The diver stationed at the underwater point of entry is required in addition to any standby diver at the dive location.

d. 29 CFR 1910.424(c)(4) and (c)(5). Each SCUBA diver is required to have: (1) a diver-carried reserve breathing-gas supply that consists of a manual reserve (J-valve), or (2) an independent reserve cylinder that has a separate regulator or that is connected to the underwater breathing apparatus (see 29 CFR 1910.424(c)(4)). The valve of the reserve breathing-gas supply must be in the closed position prior to the dive (see 29 CFR 1910.424(c)(5)) to ensure that the air reserve will not be depleted inadvertently during the dive.

NOTE: A Spare Air® bottle, or equivalent device, that is attached positively to the diver by a suitable line (so that the bottle is not lost if dropped) is sufficient as an independent reserve cylinder, provided that it meets the emergency air volume requirements for the dive profile. Spare Air® is the trade name for a small, high-pressure air bottle with an attached breathing regulator that is designed for use as an emergency-air source.

3. Commercial SCUBA air diving with one diver in the water requires a minimum of three dive-team members: a designated person-in-charge (DPIC) (see 29 CFR 1910.410(c)), a standby diver (see 29 CFR 1910.424(c)(1)), and a line-tended diver (see 29 CFR 1910.424(c)(2)). Commercial SCUBA diving with two divers in the water requires a minimum of four dive-team members: a DPIC (see 29 CFR 1910.410(c)), a standby diver (see 29 CFR 1910.424(c)(1)), and two divers (see 29 CFR 1910.424(c)(2)).

NOTE 1: Additional guidance regarding minimum dive-team requirements is provided in Appendix A, Questions #2 and #3, of this instruction.

NOTE 2: In establishing the number of dive-team members required for a dive, proper consideration must be given to 29 CFR 1910.421(d) *Planning and assessment*, 29 CFR 1910.421(e) *Hazardous activities*, and 29 CFR 1910.422(b)(3). This latter provision requires employers to provide a means to assist an injured diver from the water (such as an inwater stage, small boat, or stokes basket) or into a diving bell, that may necessitate additional dive-team members.

J. **29 CFR 1910.425 *Surface-supplied air diving***.

1. 29 CFR 1910.425(b) *Limits*.

a. 29 CFR 1910.425(b)(1). The maximum depth for surface-supplied air diving is 190 fsw, except that surface-supplied air dives with bottom times of less than 30 minutes may be conducted to a maximum depth of 220 fsw.

b. 29 CFR 1910.425(b)(2). A decompression chamber is required (available within 5 minutes from the dive location) for dives deeper than 100 fsw, or any dive that requires planned decompression.

NOTE: Decompression chambers and diving bells, when used as a recompression facility, shall meet the criteria specified by 29 CFR 1910.423(c) and 29 CFR 1910.430(f).

c. 29 CFR 1910.425(b)(3). A diving bell is required for dives with an inwater decompression time greater than 120 minutes, except when heavy gear is worn or diving is conducted in physically confining spaces.

2. 29 CFR 1910.425(c) *Procedures*.

a. 29 CFR 1910.425(c)(1). Each diver is required to be continuously tended while in the water.

NOTE: 29 CFR 1910.425(c)(1)(i) requires that a separate dive-team member tend each diver in the water when the dive exceeds 100 fsw or is outside the no-decompression limits. The increased hazards and complexity associated with deeper or longer dives may compromise diver safety if a tender is responsible for tending more than one diver.

b. 29 CFR 1910.425(c)(2). When diving is conducted in enclosed or physically confining spaces, another diver shall

be stationed at the underwater point of entry.

c. 29 CFR 1910.425(c)(3). This paragraph requires that each diving operation have a primary breathing-gas supply that is sufficient to support divers for the duration of the planned dive, including decompression.

d. 29 CFR 1910.425(c)(4)(i), (c)(4)(ii), and (c)(4)(iii). For dives deeper than 100 fsw or outside the no-decompression limits, each diver must: be tended by a separate dive-team member; have a standby diver available at the dive location while the diver is in the water; and have a diver-carried reserve breathing-gas supply, except when heavy gear is worn.

e. 29 CFR 1910.425(c)(4)(iv). A reserve breathing-gas supply is required at the dive location for dives deeper than 100 fsw or outside the no-decompression limits.

NOTE: The reserve breathing-gas supply required at the dive location must be on line and ready for use, and its source must be independent of the primary breathing-gas supply. The reserve breathing-gas supply must be of sufficient quantity and pressure to allow each diver to complete any planned decompression schedule.

f. 29 CFR 1910.425(c)(5)(i) and (c)(5)(ii). For surface-supplied air diving with heavy gear, deeper than 100 fsw, or outside the no-decompression limits, an extra breathing-gas hose must be available to the standby diver, and the hose must be capable of supplying breathing gas to the diver in an emergency. Also, an inwater stage must be provided for the diver(s) in the water.

g. 29 CFR 1910.425(c)(6). A diver-carried reserve breathing-gas supply must be provided to a diver in the water when the diver is prevented by the configuration of the dive area from ascending directly to the surface (i.e., when the diver does not have "free access to the surface"), except when the diver wears heavy gear or when the physical space does not permit the use of such a breathing-gas supply. The diver-carried reserve must be sufficient under operating conditions to allow the diver to reach the surface, or another source of breathing gas, or to be reached by a standby diver. Heavy-gear diving is exempted from these provisions because the gear carries its own reserve.

NOTE: For vessels without longitudinal (horizontal) stabilizers, "free access to the surface" means that the diver is diving above the turn of the bilge; for vessels with longitudinal stabilizers (usually found on military combat vessels), "free access to the surface" means that the diver is diving above the stabilizers.

3. Commercial surface-supplied air diving with one diver in the water requires a minimum of three dive-team members: a DPIC (see 29 CFR 1910.410(c)), and a diver "who shall be continuously tended [by a tender other than the DPIC] while in the water" (see 29 CFR 1910.425(c)(1)). For surface-supplied air diving that is 100 feet or less and does not involve planned decompression, a standby diver is not a specified requirement for every dive. However, based on the requirements of 29 CFR 1910.421(d) *Planning and assessment*, the hazard analysis and assessment of the dive will dictate the use of a standby diver when underwater conditions and hazards or potential hazards involve: proximity to an underwater suction, no free access to the surface, the possibility of diver entanglement or entrapment, or unknown bottom conditions. If a standby diver is required (such as when these conditions are present or for depths that exceed 100 fsw), these duties may be performed by the DPIC or the tender. A tender who is a qualified diver can be the standby diver; for a three person dive-team, the DPIC would assume tending duties when the standby diver (tender) is in the water. A DPIC who is a qualified diver also can be the standby diver, provided that another dive-team member is at the dive location. This dive-team member must be trained and capable of performing the necessary functions of the DPIC, when the DPIC is in the water as the standby diver.

NOTE: In establishing the number of dive-team members required for a dive, proper consideration must be given to 29 CFR 1910.421(d) *Planning and assessment*, 29 CFR 1910.421(e) *Hazardous activities*, and 29 CFR 1910.422(b)(3). This latter provision requires employers to provide a means to assist an injured diver from the water (such as an inwater stage, small boat, or stokes basket) or into a diving bell, that may necessitate additional dive-team members.

K. **29 CFR 1910.426 *Mixed-gas diving***.

1. 29 CFR 1910.426(b) *Limits.*

a. 29 CFR 1910.426(b)(1)(i). Mixed-gas diving requires a decompression chamber to be ready for use at the dive location for all dives (available within 5 minutes from the dive location). Decompression chambers and diving bells, when used as a recompression facility, must meet the criteria stated in 29 CFR 1910.423(c). 29 CFR 1910.430(f) sets forth additional requirements that apply only to decompression chambers. A diving bell (open diving bell or closed diving bell) is required for dives in the range of 220 - 300 fsw or involving inwater decompression lasting longer than 120 minutes, except when heavy gear is worn or when diving in physically confining spaces.

NOTE: See Appendix C of 29 CFR Part 1910, Subpart T, for exceptions to the decompression chamber requirement pertaining to recreational diving instructors and diving guides when other alternative requirements are met.

b. 29 CFR 1910.426(b)(ii). A closed diving bell is required for dives deeper than 300 fsw, except when diving is conducted in physically confining spaces.

2. 29 CFR 1910.426(c) *Procedures*.

a. 29 CFR 1910.426(c)(1) and (c)(2). A separate dive-team member is required to tend each mixed-gas diver in the water. A standby diver must be available while a diver(s) is in the water.

NOTE: A separate tender must be assigned to each mixed-gas diver at all times, and a standby diver must be available to assist the mixed-gas diver(s) in the water. Therefore, for mixed-gas diving, a tender cannot be a standby diver unless a qualified dive-team member is available to assume the tender's duties.

b. 29 CFR 1910.426(c)(3). When diving is conducted in enclosed or physically confining spaces, another diver must be stationed at the underwater point of entry to assist in tending the diver in the space.

c. 29 CFR 1910.426(c)(4). This paragraph requires a primary breathing-gas supply sufficient to support divers for the duration of any planned dive, including decompression.

d. 29 CFR 1910.426(c)(5). A reserve breathing-gas supply is required at the dive location for all mixed-gas dives.

NOTE: The reserve breathing-gas supply required at the dive location must be on line and ready for use, and its source must be independent of the primary breathing-gas supply. The reserve breathing-gas supply must be of sufficient quantity and pressure to allow each diver to complete any planned decompression schedule.

e. 29 CFR 1910.426(c)(6)(i) and (c)(6)(ii). When a mixed-gas diver wearing heavy gear is in the water, an extra breathing-gas hose must be available to the standby diver, and the hose must be capable of supplying breathing-gas to the diver in the water during an emergency. Also, an inwater stage must be provided for the divers in the water.

f. 29 CFR 1910.426(c)(7). An inwater stage is required for divers who do not have access to a diving bell for dives deeper than 100 fsw or dives outside the no-decompression limits.

g. 29 CFR 1910.426(c)(8). When a closed diving bell is used, a dive-team member must be available in the diving bell to tend the diver in the water.

h. 29 CFR 1910.426(c)(9). A diver-carried reserve breathing-gas supply is required when diving deeper than 100 fsw or outside the no-decompression limits, or when the diver is prevented by the configuration of the dive area from directly ascending to the surface (i.e., when the diver does not have "free access to the surface"), except when heavy gear is worn or when the physical space does not permit the use of such a breathing-gas supply.

NOTE 1: For vessels without longitudinal (horizontal) stabilizers, "free access to the surface" means that the diver is diving above the turn of the bilge; for vessels with longitudinal stabilizers (primarily found on military combat vessels), "free access to the surface" means that the diver is diving above the stabilizers.

NOTE 2: In establishing the number of dive-team members required for a dive, proper consideration must be given to 29 CFR 1910.421(d) *Planning and assessment*, 29 CFR 1910.421(e) *Hazardous activities*, and 29 CFR 1910.422(b)(3). This latter provision requires employers to provide a means to assist an injured diver from the water (such as an inwater stage, small boat, or stokes basket) or into a diving bell, that may necessitate additional dive-team members.

L. **29 CFR 1910.427 *Liveboating***. Supporting a surface-supplied air or mixed-gas diver from a vessel that is underway is known as liveboating. This operation is one of the most hazardous diving operations, and it is restricted to surface-supplied diving only (liveboating operations cannot be performed with SCUBA equipment).

1. 29 CFR 1910.427(b) *Limits*. Liveboating is not permitted for diving operations that: have an inwater decompression time of more than two hours; use surface-supplied air at depths greater than 190 fsw (except that surface-supplied air dives with a bottom time of less than 30 minutes may be conducted to depths of 220 fsw or less); use mixed-gas at depths deeper than 220 fsw; occur in rough seas that would impede the diver's mobility or ability to perform the assigned work; or take place during non-daylight hours.

2. 29 CFR 1910.427(c) *Procedures*.

a. 29 CFR 1910.427(c)(1). The propeller of the vessel must be stopped before the diver enters or exits the water.

b. 29 CFR 1910.427(c)(2). With a vessel underway, a diver's hose can become entangled in the vessel's propeller. Therefore, when inspecting a liveboating operation, the CSHO shall verify the availability and use of a device designed to minimize the possibility of the diver's hose becoming entangled in the vessel's propeller. Such a device may be a propeller shroud, a weighted fair lead system, or an air tugger with a heavy weight. The use of a tender to prevent hose entanglement without some mechanical support is not sufficient to satisfy this requirement. When a floating hose is used, the hose shall be checked carefully to ensure that the requirements for breathing-gas supply hoses are met (see 29 CFR 1910.430(c)).

c. 29 CFR 1910.427(c)(3). This paragraph requires the use of two-way voice communications between the designated person-in-charge and the person controlling the vessel while the diver is in the water.

d. 29 CFR 1910.427(c)(4). A standby diver is required for all liveboating operations.

e. 29 CFR 1910.427(c)(5). A diver-carried reserve breathing-gas supply shall be carried by each diver engaged in liveboating operations.

M. **29 CFR 1910.430 *Equipment***.

1. 29 CFR 1910.430(a) *General*. Every equipment modification, repair, test, calibration, or maintenance service must be recorded in a log or by means of a tagging system. The tag or log entry must include the date, the type of work

performed on the equipment, and the name or initials of the person who performed the work. The CSHO shall check to ensure that the employer has recorded the information required by this provision. This information is used to determine whether the equipment meets the requirements of 29 CFR 1910.430 or is in need of maintenance, testing, or replacement. These records (logs or tags) must be kept by the employer until replaced by a subsequent up-to-date record, or until the equipment is withdrawn from service.

2. 29 CFR 1910.430(b) *Air compressor system*.

    a. 29 CFR 1910.430(b)(1) and (b)(2). Air compressor systems used to supply air to the diver must be equipped with a volume tank (VT), a check valve on the inlet side of the VT (to prevent loss of air if the compressor fails), a VT pressure gauge, a VT relief valve (to prevent excessive pressure buildup), and a VT drain valve (to drain or "bleed" accumulated moisture from the VT). In addition, the air compressor intakes must be located away from any internal combustion engine exhaust or other contamination source to protect the diver's breathing air.

    b. 29 CFR 1910.430(b)(3) and (b)(4). The employer is responsible for checking the output of the air compressor system every 6 months to ensure that the diver's breathing air does not contain more than 20 ppm (parts per million) by volume of carbon monoxide, more than 1,000 ppm by volume of carbon dioxide, 5 milligrams per cubic meter of oil mist (except that non-oil-lubricated compressors need not be tested for oil mist), or a pronounced or noxious odor. The CSHO shall interview appropriate employees and examine the records indicating the results of such tests. The CSHO also shall check to ensure that the air sample was taken at the connection to the distribution system (manifold). If required, the CSHO or industrial hygienist should obtain a sample of the breathing air for later evaluation or, when possible, test for contaminants onsite.

        NOTE: Unlike compressors used with air respiratory systems that are not normally monitored, diving compressors are continually monitored by the dive team and are not required to have CO and high-temperature alarms.

3. 29 CFR 1910.430(c) *Breathing-gas supply hoses*.

    a. 29 CFR 1910.430(c)(1)(i), (c)(1)(ii), (c)(1)(iii), and (c)(1)(iv). Under paragraph (c)(1)(i), each breathing-gas hose must have a working pressure at least equal to the working pressure of the total breathing-gas system. Therefore, a hose connected to the low-pressure or downstream side of a regulating valve must meet the working pressure of that part of the system. For instance, the hose working pressure does not have to be equal to the pressure of the gas storage-bank cylinders, but must be equal to the working pressure downstream from the regulator. The working-pressure rating of the hose usually will be found on a decal or stencil with the manufacturer's name at regular intervals along the hose length.

        Paragraph (c)(1)(ii) requires that each breathing-gas supply hose have a rated bursting pressure at least four times the maximum working pressure (see the definition of "bursting pressure," section XV, paragraph B, of this instruction). Paragraphs (c)(1)(iii) and (c)(1)(iv) specify, respectively, that each breathing-gas supply hose must be tested annually to at least 1.5 times of its working pressure, and that the open ends of a hose must be taped, capped, or plugged when the hose is in storage or not in use to prevent foreign matter from contaminating the hose.

    b. 29 CFR 1910.430(c)(2)(i), (c)(2)(ii), and (c)(2)(iii). Connectors for diver's breathing-gas systems must be made of corrosion-resistant material and have a rated working pressure equal to the maximum working pressure of the hose to which they are connected. Connectors must be resistant to accidental disengagement.

        NOTE: Installation of cadmium-plated or other corrosion-resistant plated fittings is acceptable and meets the requirements of "corrosion-resistant" to the extent that the plating remains intact. However, when the plating becomes worn and the parent metal becomes pitted, the connector must be replaced.

    c. 29 CFR 1910.430(c)(3)(i), (c)(3)(ii), and (c)(3)(iii). Umbilicals must be marked in 10-foot increments from the diver to 100 feet, and in 50-foot increments thereafter. Hoses in umbilicals (i.e., breathing-gas hoses, hot water hoses, or other hoses that carry air or liquids) must be kink resistant. The breathing-gas hose in the umbilical also must meet other applicable hose requirements of 29 CFR 1910.430(c)(1) and (c)(2). The maximum allowable working pressure of the umbilical breathing-gas hose can be calculated by: subtracting the maximum depth (in psi) of the supply source (surface or diving bell) from the maximum depth (in psi) of the dive for which it will be used; and then adding 100 psi to this figure.

        NOTE: Additional guidance is available in the ADCI *Consensus Standards for Commercial Diving and Underwater Operations (Section 4)*.

4. 29 CFR 1910.430(d) *Buoyancy control*. The following equipment must have exhaust valves: helmets or masks connected directly to a dry suit or other buoyancy-changing equipment, and dry suits or other buoyancy-changing equipment not directly connected to the helmet or mask. A buoyancy compensator used for SCUBA diving must have an inflation source separate from the breathing-gas supply. SCUBA diving requires the use of a personal flotation device capable of maintaining the diver at the surface in a face-up position; this device also must be capable of oral inflation, have an exhaust valve, and have a manually activated inflation source independent of the breathing-gas supply.

5. 29 CFR 1910.430(e) *Compressed gas cylinders*. Employers must follow the OSHA standards for general industry that regulate the design, construction, and maintenance of compressed gas cylinders (see 29 CFR 1910.101 and 29 CFR 1910.169). In addition, the cylinders must be stored in a ventilated area away from excessive heat, and must be secured from falling. When the cylinders are in use, they must be equipped with a shut-off valve and a protective cap. The protective cap is not required when the cylinders: are designed with recessed shut-off valves, are connected to a

manifold, or used for SCUBA diving.

6. 29 CFR 1910.430(f) *Decompression chambers*. Each decompression chamber manufactured after October 20, 1977, must be built and maintained in accordance with ASME Code, or an equivalent standard (the meaning of the term "ASME or equivalent code" is covered under section XV, paragraph B, of this instruction). Decompression chambers manufactured on or prior to October 20, 1977, must be built and maintained in conformity with the code requirements to which they were built, or to an equivalent standard or code. Decompression chambers must have: a means of maintaining the atmosphere below 25 percent oxygen by volume; noise mufflers on the intake and exhaust lines (to facilitate communication and to protect against hearing loss) that are regularly inspected and maintained; suction guards on the exhaust line openings; and a means for extinguishing fire. Ignition sources and combustible material must be kept to a minimum inside the chamber.

   NOTE: Appropriate means to maintain the oxygen level below 25 percent may include a ventilation system or an overboard dump system. An overboard dump system exhausts the occupant's expired breathing gases from the built-in breathing system (BIBS)(used for breathing purposes inside a decompression chamber) to prevent a build up of oxygen inside the chamber above 25 percent by volume.

7. 29 CFR 1910.430(g) *Gauges and timekeeping devices*. To monitor a diver's depth-time profile, a gauge indicating diver depth that can be read at the dive location is required for all dives except SCUBA (SCUBA divers carry their own depth gauges). To maintain accuracy, each mechanical depth gauge must be dead-weight tested or calibrated against a master gauge every 6 months, and when a discrepancy larger than 2 percent of full scale occurs between any two equivalent gauges. A cylinder pressure gauge that the diver can monitor must be carried by each SCUBA diver. Also, a timekeeping device must be kept at the dive location for recording time intervals during each dive to maintain an accurate depth-time profile for each diver.

   NOTE: For depth and pressure gauges that are digital, employers must comply with the manufacturer's recommendations for verifying accuracy.

8. 29 CFR 1910.430(h) *Masks and helmets*. Surface-supplied air masks and helmets must have a non-return valve, that closes readily and positively, at the attachment point between helmet or mask and hose, as well as an exhaust valve. Surface-supplied air masks and helmets must have a minimum ventilation rate capability of 4.5 acfm for any depth at which they are used, or the capability of maintaining the diver's inspired carbon dioxide partial pressure below 0.02 ATA when the diver is producing carbon dioxide at a rate of 1.6 standard liters per minute.

   NOTE: The purpose of this helmet and mask provision is to ensure that air is supplied to the diver at a rate sufficient to meet the breathing requirements of the diver, and to dilute or flush expelled air from the diver's mask or helmet. This provision serves as a guide for the design and selection of masks and helmets, not as a basis for routine operational tests or field verification. Although this provision does not require employers to perform any test on helmets and masks, it does require employers to ensure that the appropriate ventilation rate is maintained during operational use. Citations shall be issued under this provision only after consulting with OSHA's National Office, Office of Maritime Enforcement.

9. 29 CFR 1910.430(i) *Oxygen safety.* Equipment used with oxygen or breathing-gas mixtures containing over 40 percent by volume oxygen must be designed for oxygen service. Components (except umbilicals) exposed to oxygen or breathing-gas mixtures containing over 40 percent by volume oxygen must be cleaned of flammable materials before use. Oxygen systems over 125 psig and compressed air systems over 500 psi must have slow-opening shut-off valves (such as a needle valve).

   NOTE: The purpose of this provision is to ensure that equipment exposed to oxygen is cleaned of flammable materials and hydrocarbon contaminates before placing that equipment into oxygen service. Similarly, before new or replacement components are placed into service in an oxygen-cleaned system, they also must be cleaned before being connected to the system.

10. 29 CFR 1910.430(j) *Weights and harnesses*. The requirements for weights and harnesses do not apply when a diver wears heavy gear (except as delineated in the NOTE below). In all other cases, each diver must be equipped with a weight belt or assembly that has a quick-release feature. Except for SCUBA diving and when the diver wears heavy gear, the diver must wear a safety harness with a positive buckling device, an attachment point for the umbilical (to prevent strain on the mask or helmet), and a lifting point (to distribute the pull force of the umbilical and harness over the diver's body).

    NOTE: When OSHA issued the commercial diving standard in 1977, harnesses were exempted from heavy gear since this gear was used with a harness-type weight belt that incorporated an attachment point for the umbilical. Advances in diving equipment and technology have led to heavy gear that uses an outer garment to carry necessary weights in pockets that are designed for that purpose (see NOTE to the definition of "heavy gear," section XV, paragraph B, of this instruction); such gear requires a harness with an attachment point for the umbilical, and a lifting point(s).

N. **29 CFR 1910.440 *Recordkeeping requirements***. The provisions of this standard specify the recordkeeping requirements for commercial diving operations.

1. 29 CFR 1910.440(a)(2). The employer must record any diving-related injury or illness that results in a dive-team member being hospitalized for a period of 24 hours or longer. The record must describe the circumstances of the incident and the extent of the injuries or illnesses.

   NOTE 1: These incidents do not have to be reported to OSHA (unless three or more hospitalizations are involved), but the record must be made available to a CSHO on request. Frequency of injuries and illnesses may be an indication of improper planning or dive procedures.

NOTE 2: Employers must report fatalities and multiple hospitalizations (three or more) by telephone or in person to the nearest OSHA Area Office, or by using OSHA's toll-free hotline at 1-800-321-OSHA. The caller making the accident report must talk directly to a person at OSHA (i.e., they cannot leave a message on the phone, send a fax, or send an e-mail). The maximum time allowed by 29 CFR 1904.39(a) for reporting fatality or hospitalization (three or more) cases is eight (8) hours; employers should report such cases as soon as possible after the occurrence (see Appendix G of this instruction for additional reporting guidance).

2. 29 CFR 1910.440(b)(1). This provision provides a CSHO with the authority to inspect and copy any record(s) required by this standard.

3. 29 CFR 1910.440(b)(2). This provision requires employers to retain, and to provide to their employees, their employees' designated representatives, and OSHA (usually during an inspection), exposure and medical records in accordance with paragraphs (a) - (e), and (g) - (i), of 29 CFR 1910.1020 *Access to employee exposure and medical records* (this standard was re-designated in 1996 from 29 CFR 1910.20 to 29 CFR 1910.1020). These records include: safe practices manual (see 29 CFR 1910.420); depth-time profiles (see 29 CFR 1910.422); decompression procedure-assessment evaluations (see 29 CFR 1910.423); and hospitalization records (see 29 CFR 1910.440). Additionally, this provision specifies that employers must retain and make available to their employees and their employees' designated representatives any equipment-inspection and equipment-testing records required under 29 CFR 1910.430 that pertain to these employees.

4. 29 CFR 1910.440(b)(3). This paragraph requires employers to maintain the following records and documents: a safe practices manual (current document); depth-time profile of each dive (until completion of the dive, or completion of the decompression-procedure assessment in the event of a decompression- sickness incident); the dive record (for 1 year, except 5 years for dives involving decompression-sickness incidents); decompression-procedure assessment evaluations (for 5 years); equipment-inspection and equipment-testing records (current entry or tag, or until the equipment is withdrawn from service); and hospitalization records (for 5 years).

5. 29 CFR 1910.440(b)(4). This paragraph specifies that employers are to send to the National Institute for Safety and Health (NIOSH) any record with an expired 5-year retention period. Sending the records to NIOSH makes them available for research purposes (such as assessing the medical effects of decompression procedures). In addition, employers and employees will have continuous access to the records if they need them to evaluate the safety of diving procedures, identify the causes of latent health effects, or for other reasons. However, employers may retain these expired records instead of sending them to NIOSH.

   NOTE: The NIOSH address for forwarding medical records is: Information Resources Branch; Education and Information Division; National Institute for Occupational Safety and Health; 4676 Columbia Parkway; Cincinnati, OH 45226. The NIOSH website is http://www.cdc.gov/niosh/homepage.html.

6. Additional guidance regarding injury and illness reporting and recordkeeping for commercial diving operations is provided in Appendix G of this instruction.

O. **29 CFR Part 1910, Subpart T, Appendix A - *Examples of Conditions Which May Restrict or Limit Exposure to Hyperbaric Conditions***.

This appendix lists disorders that may restrict or limit occupational exposure to hyperbaric conditions. The extent of the restriction depends on severity, presence of residual effects, response to therapy, number of occurrences, diving mode, and/or degree and duration of isolation.

P. **29 CFR Part 1910, Subpart T, Appendix B - *Guidelines for Scientific Diving***.

This appendix contains guidelines, that are used in conjunction with 29 CFR 1910.401(a)(2)(iv), to determine those scientific diving programs that are exempt from the requirements of 29 CFR Part 1910, Subpart T.

Q. **29 CFR Part 1910, Subpart T, Appendix C - *Alternative Conditions Under 29 CFR 1910.401(a)(3) for Recreational Diving Instructors and Diving Guides (Mandatory)***.

Appendix C of 29 CFR Part 1910, Subpart T, lists the conditions addressed by 29 CFR 1910.401(a)(3). This paragraph specifies that employers of recreational diving instructors and diving guides who comply with all of the conditions listed in this appendix, need not provide a decompression chamber for these divers as required under 29 CFR 1910.423(b)(2) or (c)(3), or 29 CFR 1910.426(b)(1).

R. **Other Commercial Diving Resources**.

While OSHA considers the industry standards set forth below to be a valuable resource for safe and healthful workplace practices in the commercial diving industry such standards are for information purposes only and employers accessing such information still must comply with the requirements of the Occupational Safety and Health (OSH) Act and standards promulgated pursuant to the OSH Act. Therefore, applying these recommendations or practices does not necessarily constitute compliance with the OSH Act and OSHA standards, including 29 CFR Part 1910, Subpart T. In addition, OSHA does not control the publication of information on the website listed in this section, and cannot guaranty the accuracy, reliability, or timeliness of the information contained in this website.

Association of Diving Contractors International (ADCI). The ADCI is an international association, with headquarters in Houston, Texas, that represents employers in the commercial diving industry. The ADCI *Consensus Standards for Commercial Diving and Underwater Operations* includes technical standards, and operational information, guidance and procedures in support of safe diving practices.

The following previously issued ADCI standards were incorporated into the ADCI *Consensus Standards for Commercial Diving and Underwater Operations (Fifth Edition)* in 2004:

- ADCI Standard 01-1994, In-Service Maintenance and Repairs of PVHOs
- ADCI Standard 02-1994, PVHO Window Cleaning, Inspection, Installation and Maintenance Instructions
- ADCI Standard 03-1995, Recommended Divers Supply Pressure
- ADCI Standard 04-1995, Duration of Bail-Out Cylinder
- ADCI Standard 05-1995, Recommended First Aid Kit Contents
- ADCI Standard 06-1995, Color Coding Guidance
- ADCI Standard 07-1996, Minimum Rest Hour Policy
- ADCI Standard 08-2000, High Pressure Water Blasting
- ADCI Standard 09-2000, Handling Systems Guidance on the Design, Installation and Testing for the Launch and Recovery of Divers
- ADCI Standard 10-1999, Commercial Diver Certification Card
- ADCI Standard 11-1998, Commercial Diving in Potable Water Facilities

ADCI also distributes the following safety videos:

- ADCI Video, Why a 3-Man Crew?
- ADCI Video, The Hazards of Diving in Delta-P (Differential-Pressure) Work Environments
- ADCI Video, The Hazards of Underwater Burning

Most ADCI products are available in Spanish (en Español). Additional information is available at the association's website, http://www.adc-int.org/wiadci.htm.

S. **Relationship to Other Federal Agencies and Transportation to Off-Shore Diving Sites**.

1. In general, OSHA Area Directors should coordinate inspection activities with local U.S. Coast Guard counterparts in a manner that minimizes the duplication of agency resources and maximizes the protection of affected employees.

2. Consistent with operational efficiency and the safety of agency personnel, transportation necessary to conduct off-shore inspections should be obtained in accordance with the following priorities:

   a. Appropriate federal agency, on an "as available" basis.

   b. Private contractor.

   c. Employer at the off-shore site.

3. Accident-investigation reports, statistical data, and other pertinent enforcement-related information may be freely exchanged with other agencies at the local level, consistent with existing rules and regulations.

APPENDIX A: Commercial Diving Operations Questions and Answers

This appendix consolidates OSHA interpretations related to commercial diving operations that have been issued and remain valid as of the date of this instruction. Previously issued interpretations were reviewed to determine their current validity and accuracy. Interpretations for which standard references have changed were updated to reflect the current standard reference.

OSHA requirements are set by statute, standards, and regulations. Our interpretations explain these requirements and how they apply to particular circumstances, but they cannot create additional employer obligations. These responses constitute OSHA's interpretations of the requirements discussed. Note that our enforcement guidance may be affected by changes to OSHA rules. Also, from time to time we update our guidance in response to new information. To keep apprised of such developments, you can consult OSHA's website at http://www.osha.gov.

Question #1: Are diving operations involving the underwater inspection of bridges considered to be "scientific diving" under 29 CFR 1910.401(a)(2)(iv), and if this diving is "scientific diving," what standards apply to these divers?

Answer: The underwater inspection of bridges by divers is governed by OSHA regulations for commercial diving, 29 CFR Part 1910, Subpart T - Commercial Diving Operations. The exemption from OSHA's commercial diving standard for scientific diving would not be applicable to underwater bridge inspection-diving activities.

Question #2: What are the minimum number of dive-team members required to support air dives using SCUBA equipment and surface-supplied diving equipment, with one diver in the water?

Answer: In establishing the number of dive-team members required for a dive, proper consideration must be given to 29 CFR 1910.421(d) *Planning and assessment*, 29 CFR 1910.421(e) *Hazardous activities*, and 29 CFR 1910.422(b)(3). This latter provision requires employers to provide a means to assist an injured diver from the water (such as an inwater stage, small boat, or stokes basket) or into a diving bell, that may necessitate additional dive-team members.

Commercial SCUBA air diving with one diver in the water requires a minimum of three dive-team members: a **designated person-in-charge** (DPIC)(see 29 CFR 1910.410(c)), a **standby diver** (see 29 CFR 1910.424(c)(1)), and a line-tended **diver** (see 29 CFR 1910.424(c)(2)). A tender who is a qualified diver can be the standby diver; for a three-person dive-team, the DPIC would assume tending duties when the standby diver (tender) is in the water. A DPIC who is a qualified diver also can be the standby diver, provided that another dive-team member is at the dive location.

This dive-team member must be trained and capable of performing the necessary functions of the DPIC, when the DPIC is in the water serving as the standby diver.

Commercial surface-supplied air diving with one diver in the water requires a minimum of three dive-team members: a **DPIC** (see 29 CFR 1910.410(c)), and a **diver** "who shall be continuously tended [by a **tender** other than the DPIC] while in the water" (see 29 CFR 1910.425(c)(1)). For surface-supplied air diving that is 100 feet or less and does not involve planned decompression, a standby diver is not a specified requirement for every dive. However, based on the requirements of 29 CFR 1910.421(d) *Planning and assessment*, the hazard analysis and assessment of the dive will dictate the use of a standby diver when underwater conditions and hazards or potential hazards involve: proximity to an underwater suction, no free access to the surface, the possibility of diver entanglement or entrapment, or unknown bottom conditions. If a standby diver is required (such as when these conditions are present or for depths that exceed 100 fsw), these duties may be performed by the DPIC or the tender. A tender who is a qualified diver can be the standby diver; for a three-person dive team, the DPIC would assume tending duties when the standby diver (tender) is in the water. A DPIC who is a qualified diver also can be the standby diver, provided that another dive-team member is at the dive location. This dive-team member must be trained and capable of performing the necessary functions of the DPIC, when the DPIC is in the water as the standby diver.

Question #3: What is the minimum number of dive-team members required to support SCUBA diving when two divers are in the water, and when are SCUBA divers required to be line-tended?

Answer: Commercial SCUBA air diving with two divers in the water requires a minimum of four dive-team members: a **designated person-in-charge** (DPIC)(see 29 CFR 1910.410(c)), a **standby diver** (see 29 CFR 1910.424(c)(1)), and **two divers** (see 29 CFR 1910.424(c)(2)). The two divers must be in continuous visual contact with each other or line-tended from the surface. The two divers require a tending line to the surface if they are required to work against a current exceeding one knot. When required or deemed necessary, one tending line to the surface is sufficient when the two divers are connected by a "buddy line." When the standby diver is deployed, he/she is required to be line-tended from the surface. A tender who is a qualified diver can be the standby diver; for a four-person dive team with two divers, the DPIC would assume tending duties when the tender is in the water serving as the standby diver. A DPIC who is a qualified diver also can be the standby diver, provided that another dive-team member is at the dive location. This dive-team member must be trained and capable of performing the necessary functions of the DPIC, when the DPIC is in the water serving as the standby diver.

Question #4: What commercial diving schools, national diver-training consensus standards, and commercial diving licenses or certifications does OSHA accept as meeting the requirements of 29 CFR 1910.410 *Qualifications of dive team*?

Answer: OSHA considers an employer to be in compliance with the requirements of 29 CFR 1910.410 when documentation shows that the diver completed training to the appropriate level (such as a surface-supplied air diver certificate, or a surface-supplied mixed-gas diver certificate) at a commercial (private), military, or other federal (such as the Army Corps of Engineers) diving school, or a school accredited by the Association of Commercial Diving Educators (ACDE). An employer also is in compliance when documented evidence shows that a diver's training meets the requirements specified by the national consensus standard published by the American National Standards Institute (ANSI) and the Association of Commercial Diving Educators (ACDE)(i.e., ANSI/ACDE-01-1998, *American National Standard for Divers - Commercial Diver Training - Minimum Standard*). No commercial diver-licensing programs exist in the United States; however, the Association of Diving Contractors International (ADCI) issues commercial diver certification cards in accordance with the ADCI *Consensus Standards for Commercial Diving and Underwater Operation (Section 3.0)*. OSHA considers an employer to be in compliance with the 29 CFR 1910.410 diver-training requirements when the employed divers have a valid ADCI commercial diver certification card indicating the appropriate training level.

Question #5: Do the *Consensus Standards for Commercial Diving and Underwater Operations* published by the Association of Diving Contractors International (ADCI) comply with OSHA and U.S. Coast Guard requirements for commercial diving operations? For diving operations that are not covered by OSHA or U. S. Coast Guard regulations, such as maintenance and repair of pressure vessels for human occupancy (PVHO) or handling systems for diving bells, what does OSHA recognize as the best industry practice?

Answer: OSHA recognizes the ADCI *Consensus Standards for Commercial Diving and Underwater Operations* as meeting the general requirements of 29 CFR 1910.420 for a safe practices manual. The contents of this document meet or exceed the requirements of 29 CFR Part 1910, Subpart T. For diving-related operational, maintenance, and testing matters that are not addressed by OSHA standards, OSHA recognizes ADCI standards as the best established industry practice.

OSHA's recognition of the ADCI standards is consistent with the position taken by the U.S. Coast Guard. In a letter from the U.S. Coast Guard, Chief, Office of Compliance, to the ADCI dated February 9, 2005, the U.S. Coast Guard stated, "Of significance, ADCI's *Consensus Standards for Commercial Diving and Underwater Operations* fully meet and exceed the Coast Guard's regulatory requirements for commercial diving operations found in 46 CFR 197. Now in its Fifth Edition, the ADCI *Consensus Standards* are considered commercial diving industry best practices and are recognized and used by the United States Coast Guard as our comprehensive guidance document."

Question #6: How is a determination made of a safe or minimum operating pressure for commercial diving surface-supplied equipment?

Answer: The minimum safe operating pressure for any surface-supplied diving system is dependent upon three principal factors: (1) the depth of the dive; (2) pressure loss through the diving air-supply hose; and (3) the pressure requirements for the diving helmet or mask. Equally important is the flow (volume) of air supplied to the diver. Employers must comply with the manufacturers' recommended operating pressures and flow requirements for

diving helmets and masks, and all diving systems must be analyzed by a competent person to ensure that the systems will support the diving operations adequately.

As required by 29 CFR 1910.430(h)(2), a surface-supplied air helmet or mask must have a minimum ventilation rate capability of 4.5 acfm at the depth of the dive, or the capability of maintaining the diver's inspired carbon-dioxide partial pressure below 0.02 ATA when the diver is producing carbon dioxide at a rate of 1.6 standard liters per minute. Diving system flow requirements must be analyzed as follows: (1) the flow volume of breathing gas needed by the diver (discussed above); and (2) the flow requirements of the piping, hoses, and associated fittings and components, that must collectively be capable of supporting instantaneous peak flow rates of 7.0 acfm when demand-breathing diving helmets and masks are used.

Diving helmets and masks that incorporate an oral-nasal cavity with a demand-breathing arrangement are mechanically simple, easy to operate, and require significantly less air volume per unit of time, than required by steady-flow ventilated helmets and masks. However, to instantaneously match flow rates to diver breathing patterns, these helmets and masks require driving pressures and piping flow capacities that are significantly higher than needed in steady-flow equipment used in comparable service. Also, since oral-nasal and demand-breathing masks have limited volume and no storage capability, OSHA recommends that divers use an emergency air bottle ("come-home bottle" or "bail-out bottle") when diving with such masks.

Too much air pressure to a helmet or mask can be just as dangerous as not having enough air pressure. For most demand-breathing regulators, the range between the minimum and maximum (free-flow) pressure is only about 75 psi, and the range between the optimum pressure and the maximum pressure is only about 50 psi. To avoid pressure-related hazards, the employer should consult the manufacturer of the diving helmet or mask to verify the minimum, optimum, and maximum pressure limits of the demand-breathing regulator.

When selecting a diving air compressor, it is important to determine the required **output pressure** (psig) and the **output volume** (scfm). These calculations are based on the pressure and flow available at the manifold (i.e., where the diver's umbilical connects topside to the air-supply system). Allowances must be made for pressure reduction caused by the piping system components between the volume tank and diver's manifold. For example, each filter can induce a 5 to 15 psi drop in system pressure.

Additional guidance is available in the ADCI *Consensus Standards for Commercial Diving and Underwater Operations (Section 4)*.

Question #7: Are "hookah rigs" (i.e., an air compressor supplying air through a hose directly to the second-stage of a SCUBA regulator) allowed by OSHA standards? Is it acceptable to use the second-stage regulator from a SCUBA regulator assembly approved by the U.S. Navy for a "hookah rig?"

Answer: Hookah rigs, as described in this question, are not in compliance with the OSHA commercial diving standard because such rigs prohibit diver-to-topside communications, which is a requirement for all surface-supplied diving operations (see 29 CFR 1910.422(c)(1)(i)). Further, assembling a hookah rig by using a second-stage regulator from a SCUBA regulator assembly can pose a severe hazard to divers. Second-stage SCUBA regulators are designed to function properly when supplied with pressure in a specified range (such as from 125 to 150 psi over the ambient water pressure). In a SCUBA regulator assembly, the first-stage SCUBA regulator has a mechanism that compensates for the ambient water pressure and maintains a constant pressure, in a specified range, to the second-stage regulator. Without the first-stage SCUBA regulator, as in the case with a hookah rig as described, the inlet air pressure to the second-stage regulator is not automatically compensated to maintain a constant over-bottom pressure (psi-ob); therefore, as the diver goes deeper, the air flow from the second-stage regulator decreases. Eventually, as the diver goes deeper, the diver will receive little or no air from the second-stage regulator, which can result in asphyxiation of the diver.

Regulators authorized by the U.S. Navy are for use only in the specified configuration. Consequently, the use of a second-stage SCUBA regulator independent of the first-stage SCUBA regulator is not approved by the Navy. Also, Navy approval is for Navy equipment used in Navy diving operations; this approval does not extend to the use of such equipment by commercial divers or other organizations.

Question #8: Are employers in compliance with OSHA standards when they rely on employees who own their own diving equipment to maintain this equipment?

Answer: OSHA supports and encourages employees to maintain, inspect, and ensure the safe operation of the equipment that they own and use in their employers' diving operations. However, these actions do not relieve employers of their responsibilities under OSHA standards to ensure the proper use, maintenance, testing, and other required actions regarding diving equipment used in the course of employment. Accordingly, OSHA makes no distinction between "employer-owned" equipment and "employee-owned" equipment. If the equipment is not in compliance with OSHA standards, and it is being used in the course of employment, then the employer is in violation of the standards.

Question #9: When a decompression chamber is not available at the dive location, can employers administer 100 percent oxygen to a diver who experiences decompression sickness or arterial gas embolism while the diver is being transported to a decompression chamber? Can an oxygen mask with a mouthpiece-held demand inhalator valve be used for unconscious patients?

Answer: OSHA standards require a multi-place recompression chamber at the dive location for any planned decompression dive, any dive deeper than 100 fsw, or any dive on a breathing medium other than standard air. However, divers who are not covered by these recompression chamber requirements (such as conducting no-decompression dives less than 100 fsw) can incur decompression sickness (i.e., "bends") or an arterial gas embolism. In these situations, when no recompression chamber is immediately available, the following guidelines apply. When transporting a breathing diving patient from the dive site to an available chamber for treatment, or when

transporting any other breathing diving patient from one treatment facility to another, a portable oxygen supply consisting of an E cylinder (approximately 669 liters of oxygen) and a transparent mask is recommended. When transporting a non-breathing diving patient from the dive site to an available chamber for treatment, a mechanical-bag resuscitator with a pure oxygen supply is recommended; the oxygen supply should be administered only by trained personnel. Under these circumstances, OSHA does not recommend the use of an emergency-oxygen kit having a replacement oxygen mask with a mouthpiece-held demand inhalator valve, because it is not suitable for an unconscious patient, and oxygen is incompatible with the rubber parts of the mouthpiece assembly.

Although the use of pure-oxygen treatment for a diving patient may be beneficial, it is not a substitute for recompression treatment. When a diver incurs any diving illness that requires recompression treatment (such as decompression sickness, or arterial gas embolism), the diver must be treated at a recompression facility. Oxygen treatment may be necessary or desired during transport to a recompression facility, but it must never be used as a replacement for recompression treatment when such treatment is required.

Question #10: Are detector-tube test kits suitable for compliance with 29 CFR 1910.430(b)(3) and (b)(4), which require that the output air from a diving compressor be tested every 6 months for carbon monoxide, carbon dioxide, and oil mist contaminants?

Answer: The use of detector tubes to perform the sampling required by 29 CFR 1910.430(b)(3) and (b)(4) is acceptable when the manufacturer's instructions and limitations are followed, and employers comply with the recordkeeping requirements of 29 CFR 1910.440(b)(2) and (b)(3)(vi). The OSHA Technical Manual, TED 01-00-015, January 20, 1999, Section II ("Sampling, Measurement Methods and Instruments"), provides additional guidance concerning the use and known limitations of detector tubes. When such limitations exist, detector tubes may not be used, and the specified alternative methods (such as laboratory-tested air samples) shall be used instead. OSHA encourages employers to send compressor air samples to laboratories periodically for analysis to validate the results of detector-tube testing, and to conduct diver's air sampling more frequently than semiannually.

Question #11: After the period for keeping records related to commercial diving operations under 29 CFR 1910.440 expires, may an employer destroy the records?

Answer: No. When the retention period expires for any records that an employer must keep (i.e., records with a five-year retention period), the employer must forward the records to the National Institute for Occupational Safety and Health (NIOSH), U.S. Department of Health and Human Services (DHHS). The NIOSH website address is http://www.cdc.gov/niosh/homepage.html. The current address for forwarding medical records to NIOSH is:

Information Resources Branch
Education and Information Division
National Institute for Occupational Safety and Health
4676 Columbia Parkway
Cincinnati, OH 45226

Question #12: What happens to the records required by 29 CFR 1910.440 if the employer goes out of business?

Answer: In this situation, the successor employer must receive and retain the records required by the standard. If the employer goes out of business without a successor employer, then the employer must forward the records to NIOSH. The NIOSH website address is http://www.cdc.gov/niosh/homepage.html. The current address for forwarding medical records to NIOSH is:

Information Resources Branch
Education and Information Division
National Institute for Occupational Safety and Health
4676 Columbia Parkway
Cincinnati, OH 45226

Question #13: How long must an employer retain records or documents required by 29 CFR 1910.440?

Answer: See chart below.

Retention Periods for Commercial Diving Records Required by 29 CFR 1910.440

Record or Document	Retention Period
Safe practices manual	Current document only
Depth-time profile	Until completion of the dive record; or if decompression sickness occurs during the dive, until completion of decompression-procedure assessment
Dive record	1 year; 5 years for records involving decompression sickness
Decompression procedure assessment evaluations	5 years

Equipment inspection and testing records	Current entry or tag, unless the equipment is withdrawn from service (i.e., then no retention requirement)
Hospitalization records	5 years

APPENDIX B: Summary of OSHA Authority

RESTRICTIONS AND LIMITATIONS ON OSHA's AUTHORITY

GEOGRAPHICAL RESTRICTIONS

Federal OSHA's authority is restricted to the following geographical limits:

- **State Territorial Waters** - Extends three (3) nautical miles (nm)(1 nm = 6,080 ft) from the general coastline at ordinary (mean) low water for all coastal areas, **except** Puerto Rico, Texas, and the Gulf Coast of Florida, which extend nine (9) nm from the general coastline at ordinary (mean) low water.

  NOTE: The State territorial waters for the East Coast of Florida extend three (3) nm and the Gulf Coast of Florida extend nine (9) nm.

- **International Boundary with Canada** - All waters in the Great Lakes and St. Lawrence Seaway within the United States boundary line with Canada are included (i.e., no three (3) nm or nine (9) nm restriction since the Great Lakes and St. Lawrence Seaway are part of U.S. Inland Waters).

- **Outer Continental Shelf (OCS) Lands** - Begins at the outer limit of the State territorial waters and extends to the edge of the U.S. continental shelf (NOTE: the continental shelf varies in distance). OSHA authority on the OCS only applies to the sea floor or any structure attached thereto (it does not include the water above the sea floor, nor does it include vessels operating on the OCS).

APPROPRIATIONS ACT LIMITATIONS

Current appropriations legislation exempts small employers in relatively low-hazard industries from programmed ("general schedule") OSHA inspections. For purposes of this appropriations exemption, a small employer is one that employs ten (10) or fewer employees. To qualify, the employer must be part of an industrial classification having a Days Away, Restricted or Transferred (DART) rate, as determined from the OSHA 300 Log, less than the national average rate for that industry most recently published by BLS. The exemption does NOT affect OSHA's authority to take action relating to occupational health hazards; employee complaints of unsafe or unhealthful working conditions; fatalities, catastrophes, or imminent dangers; or investigations of discrimination under section 11(c) of the OSH Act. OSHA Directive CPL 02-00-051 provides information on the current status of this Congressional exemption, while Appendix A to that instruction provides a list of industries with illness and injury rates currently below the national average.

OSHA AND U.S. COAST GUARD AUTHORITY

INSPECTED VESSELS

Under a 1983 Memorandum of Understanding between OSHA and the U.S. Coast Guard, the occupational safety and health of seamen on inspected vessels is the exclusive responsibility of the U.S. Coast Guard. The U.S. Coast Guard has safety and health authority over seamen working on an inspected vessel that is: (1) on the navigable waters of the U.S. (all U. S. Inland Waters and State territorial waters), and (2) owned in the U.S. and operated on the high seas (world-wide coverage).

OSHA has safety and health authority over working conditions of employees working on an inspected vessel, EXCEPT the working conditions of seamen and the working conditions of divers when the dive location is on an inspected vessel. Accordingly, the U.S. Coast Guard *Commercial Diving Standard* applies to diving operations when the dive location is on an inspected vessel (i.e., when diving operations are conducted from an inspected vessel). For inspected vessels, the OSHA standards most frequently involved are:

- Longshoring operations under 29 CFR Part 1918 - Covers all employees (other than seamen) who are engaged in longshoring operations or exposed to the hazards of such operations.

- Shipyard employment under 29 CFR Part 1915 - Covers all employees (other than seamen, and divers when the dive location is on an inspected vessel) who are engaged in shipbuilding, ship repair, or shipbreaking, or exposed to the hazards of such operations.

UNINSPECTED VESSELS

The U.S. Coast Guard has exercised limited authority and issued limited regulations over the safety and health of employees working on an uninspected vessel, i.e., vessels that are not inspected vessels or recreational vessels. All of the following areas for uninspected vessels fall under the authority of the U.S. Coast Guard: fire extinguishers; life preservers and other lifesaving devices; flame arresters (backfire traps) on internal gas-driven engines; and venting of

engine bilges and fuel tank compartment. Also, for commercial uninspected fishing industry vessels, the U.S. Coast Guard has issued various other requirements (46 CFR Part 28) dependent upon the type of vessel and the vessel's geographical area of operation (such as the vessel operates beyond the "boundary line").

OSHA has safety and health authority over an uninspected vessel for all occupational risks not covered by the U.S. Coast Guard. The OSHA standards most frequently involved for uninspected vessels include:

- Longshoring operations under 29 CFR Part 1918 - Covers all employees who are engaged in longshoring operations or exposed to the hazards of such operations.
- Shipyard employment under 29 CFR Part 1915 - Covers all employees who are engaged in shipbuilding, ship repair, or ship breaking, or exposed to the hazards of such operations.
- Commercial diving operations under 29 CFR Part 1910 - Covers all diving when the dive location is on an uninspected vessel. This includes diving from an uninspected vessel and doing work on an inspected vessel; such as hull scrubbing, propeller change, hull repair, etc.

  NOTE: When the dive location is on an inspected vessel, the U.S. Coast Guard *Commercial Diving Operations* standard applies.

UNINSPECTED COMMERCIAL FISHING INDUSTRY VESSELS

The U.S. Coast Guard exercises limited authority and has issued limited regulations (see 46 CFR Part 28) over the safety and health of employees working on an uninspected commercial fishing industry vessel (see CPL 02-01-020, *OSHA/U.S. Coast Guard Authority Over Vessels*). Per 46 CFR Part 28, the following limits are defined by the U.S. Coast Guard for uninspected commercial fishing industry vessels:

- Fish processors of 5,000 tons or less (only one vessel, the F/V Phoenix Enterprise, is currently known to exceed these limits; this vessel is an inspected vessel);
- Fish tenders of 500 tons or less; and
- Fishing vessels (all).

OSHA has safety and health authority over all employees, for all working conditions on an uninspected commercial fishing industry vessel that are not covered by the U.S. Coast Guard (see CPL 02-01-020, *OSHA/U.S. Coast Guard Authority Over Vessels*). For uninspected commercial fishing industry vessels, the areas of OSHA coverage most frequently involved are:

- Uninspected commercial fishing industry vessels (see CPL 02-01-020, *OSHA/U.S. Coast Guard Authority Over Vessels*) - Covers all employees who are engaged in work on uninspected commercial fishing industry vessels (fish processor vessels, fish tender vessels, and fishing vessels).
- Longshoring operations under 29 CFR Part 1918 - Covers all employees who are engaged in longshoring operations or exposed to the hazards of such operations.
- Shipyard employment under 29 CFR Part 1915 - Covers all employees who are engaged in shipbuilding, ship repair, or shipbreaking, or are exposed to the hazards of such operations.
- Commercial diving operations under 29 CFR Part 1910 - Covers all diving when the dive location is on an uninspected fishing industry vessel. This includes diving from an uninspected commercial fishing industry vessel when the divers are doing work on an inspected vessel (such as hull scrubbing, propeller change, hull repair).

  NOTE 1: When the dive location is on an inspected vessel, then the U.S. Coast Guard *Commercial Diving Operations* standard applies.

  NOTE 2: For commercial fish processor vessels over 5,000 tons (inspected vessels), the U.S. Coast Guard has authority over seaman engaged in any work activity.

COMMERCIAL DIVING

The U.S. Coast Guard regulations for commercial diving operations are specified in 46 CFR, Chapter I, Part 197, Subpart B. U.S. Coast Guard regulations state the following coverage:

- At Deepwater Ports or the safety zone (to 5 nautical miles) thereof per 33 CFR Part 150.
- From any artificial island, installation, or other device on the Outer Continental Shelf.
- From all vessels that have a valid certificate of inspection (inspected vessels).
- From any vessel engaged in activities related to Outer Continental Shelf **lands**.

OSHA covers commercial diving operations within OSHA's geographical authority when such operations are not covered by

the U.S. Coast Guard. As delineated in 29 CFR 1910.401(a)(2), OSHA exempts from coverage of the commercial diving operations standard: SCUBA instructors conducting SCUBA air dives within the no-decompression limits; diving performed for search, rescue, and public safety purposes; human research diving subjects; and scientific diving. To qualify for the scientific diving exemption, **all** of the requirements in 29 CFR 1910.401(a)(2)(iv) and Appendix B to 29 CFR Part 1910, Subpart T, must be met. More comprehensive guidance regarding exclusions and exemptions from the commercial diving operations standard is provided in Appendix C of this instruction.

FEDERAL AND STATE AUTHORITY

Federal OSHA's commercial diving standard covers private-sector employers in federal enforcement States, and employers who dive in association with maritime standards (i.e., shipyard employment, longshoring, and marine terminals) when these operations are not covered by a State with an OSHA-approved State-Plan State and local government employees are covered by the commercial diving standard only in States with State-Plans.

Twenty-one States and one Territory have OSHA-approved State-Plans covering both private and public sector employment: Alaska, Arizona, California, Hawaii, Indiana, Iowa, Kentucky, Maryland, Michigan, Minnesota, Oregon, Nevada, New Mexico, North Carolina, Puerto Rico, South Carolina, Tennessee, Utah, Vermont, Virginia, Washington and Wyoming.

Three States and one Territory (Connecticut, New Jersey, New York and the U.S. Virgin Islands) have approved plans covering State and local government employment only.

California, Michigan, Oregon, and Washington have promulgated State diving standards which differ from the federal standards. The other State-Plans have promulgated diving standards identical to the federal standards at 29 CFR Part 1910, Subpart T.

California, Minnesota, Vermont, and Washington cover certain private sector maritime operations (i.e., shore-based shipyard employment and marine terminals) under their State-Plans. State coverage is set out in the text of this directive and in the appropriate subparts of 29 CFR Part 1952, and is generally limited to shore-based activities not on the navigable waters (graving docks and marine railways are part of navigable waters). For specific guidance, see section XV, paragraph 9(c) of this directive. Also, Oregon covers commercial diving from all shore-side locations (for definition of dive location see section XV, paragraph B.11), even in maritime operations such as shipyard employment and marine terminals.

APPENDIX C: Exclusions and Exemptions from OSHA's Commercial Diving Standard

This appendix provides a summary review of the history, scope, and application of exclusions and exemptions to 29 CFR Part 1910, Subpart T - Commercial Diving Operations. Federal Register notices relevant to the development of the original OSHA diving standard and the subsequent amendment for the scientific diving exemption are cited in this summary; reference to these notices will provide for a more comprehensive understanding of the issues involved.

THE ORIGINAL COMMERCIAL DIVING STANDARD AND SCOPE OF OSHA's STATUTORY AUTHORITY

On July 22, 1977, the U.S. Department of Labor's Occupational Safety and Health Administration (OSHA) issued final public notice of the adoption of a permanent diving standard that became effective on October 20, 1977 (see Federal Register notice 42 FR 37650). This original diving standard, 29 CFR Part 1910, Subpart T - Commercial Diving Operations, established mandatory occupational safety and health requirements for commercial diving operations. The standard applies wherever OSHA has statutory authority. Consequently, the standard covers commercial diving in any natural or artificial inland body of water, as well as diving along the coasts (i.e., State territorial waters) of the United States and its possessions listed in Section 4(a) of the Occupational Safety and Health (OSH) Act (29 U.S.C. 655 *et al*.). For coastal States and Territories, the State territorial waters extend three (3) nautical miles seaward from the general coastline at ordinary (mean) low water, except for the Gulf Coast of Florida, Texas and Puerto Rico, where the State territorial waters extend for nine (9) nautical miles from the general coastline at ordinary (mean) low water. For States bordering the Great Lakes and St. Lawrence Seaway, all waters in the Great Lakes and associated rivers, up to the international boundary line with Canada, are U.S. navigable waters (U.S. Inland Waters).

ORIGINAL EXCLUSIONS FROM OSHA's COMMERCIAL DIVING STANDARD

The original OSHA diving standard provided three specific exclusions which remain in effect as follows:

1. **Instructional diving utilizing only open-circuit compressed air SCUBA within the no-decompression limits**. OSHA concluded that a valid distinction existed between SCUBA diving instructors and commercial divers which warranted an exclusion. The SCUBA diving instructor, who is an employee, is student oriented - not task oriented. The dive site is not determined by the location of a particular job as it is in commercial applications, where operations must of necessity be conducted under environmental conditions which are often adverse. The SCUBA diving instructor, by contrast, selects a location which is usually clear, shallow and warm. Indeed, a swimming pool is the dive site for most SCUBA diving instruction. Such dives are discontinued if the slightest difficulty occurs. SCUBA diving instructors do not utilize construction tools, handle explosives, or use welding or burning tools. As a result of these factors, SCUBA diving instructors are rarely exposed to adverse sea states, temperature extremes, great depths, poor visibility, or heavy workloads, some or all of which are common to the majority of commercial diving operations. However, OSHA took into consideration that some diving techniques and conditions pose greater potential hazards than others, regardless of the purpose of the dive. Thus, this exclusion for SCUBA diving instruction was limited to a restricted diving range, a particular diving mode, and specific equipment. The exclusion from the standard applies only to instructional diving

which uses open-circuit compressed air SCUBA and is conducted within the no-decompression limits. The standard defines no-decompression limits as the depth-time limits of the "no-decompression limits and repetitive dive group designation table for no-decompression air dives" of the U.S. Navy Diving Manual, or equivalent limits which the employer can demonstrate to be equally effective. No distinction *per se* is made between instructors of prospective recreational divers and instructors of prospective commercial divers. However, by its very nature, the training for commercial divers involves diving that is surface-supplied, uses mixed-gas as a breathing gas, requires decompression, often involves adverse environmental conditions, or involves the use of underwater tools and equipment; each of these factors potentially increases the hazards of the operation. It is emphasized that when recreational diving instruction exceeds the specified limits, the OSHA diving standard applies. It is noted that individuals engaged in recreational diving for their own personal enjoyment, and not otherwise related to their respective employments, are not within the authority of the OSH Act, and therefore are outside the scope of OSHA's diving standard. On the other hand, SCUBA diving for a commercial rather than instructional purpose is covered by the OSHA diving standard, regardless of equipment or depth-time range.

2. **Search, rescue, and related public-safety diving by or under the control of a governmental agency**. OSHA received a number of comments from persons engaged in diving incidental to police and public-safety functions, and the Agency concluded that an exclusion was appropriate for such applications. The purpose of the "by or under the control of a governmental agency" language is to make the exclusion applicable to all divers whose purpose is to provide search, rescue, or public-safety diving services under the direction and control of a governmental agency (such as local, State, or federal government) regardless of whether or not such divers are, strictly speaking, government employees. In excluding these search and rescue operations, OSHA determined that safety and health regulation of the police and related functions are best carried out by the individual States or their political subdivisions. It is pointed out that this exclusion does not apply when work other than search, rescue, and related public-safety diving is performed (such as divers repairing a pier). Diving contractors who occasionally perform emergency services, and who are not under the control of a governmental agency engaging their services, do not come under this exclusion. Such divers may, however, be covered by the provision concerning application of the standard in an emergency (see 29 CFR 1910.401(b)).

3. **Diving governed by the Protection of Human Subjects regulations of the Department of Health and Human Services (HHS)(previously known as the Department of Health, Education and Welfare (HEW)) or equally effective rules or regulations of another federal agency**. Diving operations which are governed by 45 CFR Part 46 are not within the scope of OSHA's commercial diving standard. Such operations involve research and development or related scientific activities requiring human subjects and receive HHS grants or contracts. Compliance with HHS regulations is mandatory for such employers or contractors, and the regulations are designed to promote safety and health. Similarly, any other federal agency which adopts rules or regulations that are equally effective (i.e., similar in design, purpose, and effect to those of HHS) are covered by this exclusion. The exclusion is supported in the record on the grounds that it would permit continued scientific research designed to extend the safe limits of diving physiology and technology. The long-term safety and health interests of divers are best served by this research, and such diving cannot reasonably be expected to comply in every respect with a standard that is designed to reflect current commercial diving operational practice.

EMERGENCY PROVISION OF OSHA's COMMERCIAL DIVING STANDARD

The original OSHA diving standard also included a provision for emergency situations (see 29 CFR 1910.401(b)), which remains in effect, when the overriding consideration is the preservation of life and the protection of the environment as follows:

The "emergency provision" permits deviations from the requirements of OSHA's diving standard in situations where death, serious physical harm, or major environmental damage is likely, but only to the extent that such action is immediately necessary to prevent or minimize the harm. No exemption is provided by the emergency provision for situations where purely economic or property damage is likely. Although temporarily exempt from substantive portions of the standard that are inappropriate in such emergency situations, employers are required to notify the nearest OSHA Area Office within 48 hours. Further, upon the request of the Area Director, employers must submit a record of the notification, with an indication and explanation of what deviations from the standard were taken as a result of the emergency. This reporting requirement enables OSHA to monitor the use of this exemption.

NOTE: The emergency provision is not a substitute for the variances specified under Section 6(d) of the OSH Act. These variances permit alternative means of compliance that are not exemptions from a standard, and that afford employees at least the same degree of protection that the standard provides; these variances typically address well-defined, non-emergency circumstances, and may be continuous. The emergency provision applies to unique, unplanned emergency circumstances for which diving services are sometimes needed on a temporary basis, thus making an OSHA variance unnecessary and inappropriate.

SCIENTIFIC DIVING EXEMPTION - BACKGROUND AND DEVELOPMENT

The original OSHA standard for commercial diving operations did not exempt diving performed solely for scientific research and development purposes. Subsequent to the publication of OSHA's original standard, the Agency received numerous requests from various individuals and organizations to reconsider the applicability of the standard to educational/scientific diving. Proponents for exempting educational/scientific diving noted that it was customary for the educational/scientific diving community to follow well-established, consensual standards of safe practice. They pointed out that the first set of consensual diving standards was developed by the Scripps Institution of Oceanography of the University of California in the early 1950s. Further, in 1973, diving safety boards and committees from ten major educational institutions involved in education/scientific diving met and accepted the University of California "*Guide for Diving Safety*" as a minimum standard for their individual programs. Therefore, it was contended that most diving programs at educational institutions were complying with this consensual standard, with limited

modifications for regional and operational variations in diving, before the publication of the original OSHA diving standard. The educational/scientific diving community pointed to their excellent safety record prior to OSHA's publication of a diving standard, and attributed their safety record to the effectiveness of self regulation by their community. Further, they noted that significant differences exist between educational/scientific diving and commercial diving. The educational/scientific diver is an observer and data gatherer who chooses the work area and diving conditions which will minimize environmental stresses, and maximize the safety and efficiency of gathering data. In contrast, it was noted that the commercial diver is an underwater construction worker, builder and trouble shooter whose work area and diving conditions are determined by the location and needs of the project.

Based on the concerns expressed by the educational/scientific diving community, on August 17, 1979, OSHA published an advance notice of proposed rulemaking (ANPR)(see Federal Register notice 44 FR 48274) to obtain additional information concerning which provisions of the OSHA diving standard were causing the most difficulty and what modifications to the standard should be considered. The responses to the ANPR, together with other information and data contained in OSHA's commercial diving record, convinced the Agency that there was a significant difference between educational/scientific diving and commercial diving; that the safety record of the educational/scientific diving community represented evidence of its successful self-regulation; and, as a result, an exemption for educational/scientific diving might be justified. Accordingly, on March 26, 1982, OSHA published a notice of proposed rulemaking (see Federal Register notice 47 FR 13005) to exempt diving "performed solely for marine scientific research and development purposes by educational institutions" from the OSHA diving standard. Although it was proposed to exempt only educational institutions which perform scientific diving, in the notice of proposed rulemaking OSHA requested responses to three specific questions in order to solicit data and information for determining if the exemption should include other segments of the scientific diving community. The original comment period for this notice of proposed rulemaking was May 10, 1982, however, on May 26, 1982, OSHA published a notice (see Federal Register notice 47 FR 22972) extending the comment period as requested by the American Academy of Underwater Sciences to June 18, 1982, and scheduled informal public hearings for June 29-30, 1982, in Washington, D. C., and July 7-9, 1982, in Los Angeles, California. Following completion of the public hearings, the submission of post-hearing comments, and receipt of arguments and briefs relating to the hearing issues, the Administrative Law Judge certified the record on September 3, 1982.

Based on the overwhelming support from comments and hearing testimony, as well as other information contained in the record, OSHA concluded that an exemption was justified for all scientific diving, not just solely scientific diving performed by educational institutions. Therefore, OSHA decided to broaden the exemption to include all segments of the scientific diving community. Based on the record, OSHA's exemption for scientific diving included specified conditions that scientific diving programs must meet before members of the scientific diving community may avail themselves of the exemption. On November 26, 1982, OSHA exempted scientific diving from coverage under 29 CFR Part 1910, Subpart T - Commercial Diving Operations, provided that the diving meets the Agency's definition of scientific diving **and** is under the direction and control of a diving program utilizing a safety manual and a diving control board meeting certain specified criteria (see Federal Register notice 47 FR 53357 and 29 CFR 1910.401(a)(2)(iv)).

The November 1982 scientific exemption was subsequently challenged by the United Brotherhood of Carpenters and Joiners (UBCJ) under Section 6(f) of the OSH Act. The union filed a petition for judicial review of the final rule regarding the scientific exemption, and on April 4, 1984, the Court of Appeals issued a memorandum and court order which required further action regarding this final rule. In compliance with the court's memorandum and order, OSHA published a notice on July 18, 1984 (see Federal Register notice 49 FR 29105), that reopened the record, and required a determination of the interpretive guidelines that OSHA proposed to use in determining which enterprises may avail themselves of the exemption for scientific diving. Final action regarding this court order was concluded and published by OSHA on January 9, 1985 (see Federal Register notice 50 FR 1046), *Commercial Diving Operations -Exemption for Scientific Diving - Final Guidelines*. This notice established the final guidelines that OSHA uses, in conjunction with the exemption criteria contained in the final rule (see Federal Register notice 47 FR 53357 and 29 CFR 1910.401(a)(2)(iv)), to determine whether a scientific diving program can avail itself of the exemption from the OSHA commercial diving standard. The absence of any factor specified in the guidelines (see Appendix B to 29 CFR Part 1910, Subpart T - Commercial Diving Operations), or the final rule (see 29 CFR 1910.401(a)(2)(iv)), renders a diving program ineligible for the exemption.

SCIENTIFIC DIVING EXEMPTION - DISCUSSION OF APPLICABLE FINAL RULE AND GUIDELINES

The final rule at 29 CFR 1910.401(a)(2)(iv), which became effective on November 26, 1982, exempts any diving operation which is defined as scientific diving that is under the direction and control of a diving program containing at least the following elements:

(A) Diving safety manual which includes at a minimum: Procedures covering all diving operations specific to the program; procedures for emergency care, including recompression and evacuation; and criteria for diver training and certification.

(B) Diving control (safety) board, with the majority of its members being active divers, which shall at a minimum have the authority to: approve and monitor diving projects; review and revise the diving safety manual; ensure compliance with the manual; certify the depths to which a diver has been trained; take disciplinary action for unsafe practices; and assure adherence to the buddy system (a diver is accompanied by and is in continuous contact with another diver in the water) for SCUBA diving.

In addition to the final rule, Appendix B to 29 CFR Part 1910, Subpart T - Commercial Diving Operations, titled "Guidelines for Scientific Diving," became effective on January 9, 1985. This appendix provides guidelines that are used in conjunction with the final rule to determine those scientific diving programs that are exempt from OSHA's diving standard. The guidelines are as follows:

1. "The Diving Control (safety) Board consists of a majority of active scientific divers and has autonomous and absolute authority over the scientific diving program's operations."

   The first guideline concerns organizational structure. OSHA concluded that the organizational structure of the scientific diving community's consensual standard program is not only vital to the integrity of scientific diving programs, but effectively serves to segregate scientific diving from commercial diving. The Diving Control Board required for scientific diving programs must contain several elements that distinguish the exempt scientific diving programs from commercial diving. These distinctive elements include absolute authority over diving operations, the autonomy inherent in the Diving Control Board's decision making powers and responsibilities, and peer review. OSHA's intent was for the Diving Control Board, primarily consisting of the divers themselves, to regulate the diving activities in a manner consistent with that described by the scientific diving community during the rulemaking process. Therefore, OSHA requires that Diving Control Boards have this autonomous and absolute authority over scientific diving operations. OSHA also concluded that the peer review system has successfully regulated scientific diving programs and, therefore, OSHA mandated that the majority of members of the Diving Control Board be active divers. OSHA's intent with respect to this "peer review" was that the active divers required to make up the Diving Control Board would be scientists who actively dive, since at issue was the control of a scientific program. Thus, OSHA will interpret the membership requirement as it was intended in the final rule. The "majority of active divers" on the Diving Control Board also must be scientists.

2. "The purpose of the project using scientific diving is the advancement of science; therefore, information and data resulting from the project are non-proprietary."

   The second guideline concerns the restricted purpose of the project. In part, the definition of scientific diving is "diving performed solely as a necessary part of a scientific, research, or educational activity" (see Federal Register notice 47 FR 53365 and 29 CFR 1910.402). The National Oceanic and Atmospheric Administration (NOAA) Diving Manual notes that "marine research using diving as a tool has been important in understanding the ocean, its organisms, and its dynamic processes." Such diving includes the study of fish behavior, ecological surveys and benthic surveys (the aggregate of organisms living on or at the bottom of a body of water). Scientific diving is an adjunct used in the advancement of underwater science. For example, representatives from the scientific diving community noted during public hearings and in written comments "Our objective is to promote the advancement of science and the use of underwater methods," that "Research and the furtherance of scientific knowledge are their (the divers) primary goals," results are "shared worldwide," and further that coverage of the scientific diving community by 29 CFR Part 1910, Subpart T - Commercial Diving Operations, may cause "irreparable damage to the underwater scientific effort of the United States." Because the exemplary safety record, which led OSHA to promulgate the scientific exemption to 29 CFR Part 1910, Subpart T, was created by diving with the restricted purpose of advancing science, OSHA limited the scope of the exemption to diving intended to advance science. OSHA recognizes that the advancement of science cannot occur unless such studies are made available to contribute to and enhance scientific knowledge. Therefore, OSHA's intent was to restrict the exemption to scientific research dives that result in non-proprietary information, data, knowledge, or other work product. The requirement that information be non-proprietary applies to scientific, research, and educational activities engaged in by scientific divers. Material available to the public for review is non-proprietary, whether or not it is published; material not available for review is proprietary.

3. "The tasks of a scientific diver are those of an observer and data gatherer. Construction and trouble-shooting tasks traditionally associated with commercial diving are not included within scientific diving."

   The third guideline concerns the tasks performed. The scientific diving definition in the standard states that such diving must be done by employees whose sole purpose for diving is to perform scientific research tasks. Also contained in the definition is a list of those tasks that are traditionally considered commercial, with emphasis on construction and the use of construction tools (such as heavy equipment, power tools, explosives, welding equipment, burning equipment). As OSHA discussed in the final rule (see Federal Register notice 47 FR 53357), a commercial diver is typically an underwater construction worker, builder, and troubleshooter; a scientific diver is an observer of natural phenomena or responses of natural systems, and a gatherer of data for scientific analysis. The tasks performed by the scientific diver usually are light and short in duration; if any hand tools are used, they are simple ones (such as a small hammer, collecting jars, special hand-held measuring devices, plastic core tubes, hand net, suction fish collector, camera, or slate pencil). As was indicated in a Federal Register notice (49 FR 29105), an example of task distinction might involve a scientific study of kelp. The construction of the kelp bed used in the project is not scientific diving since construction activities are commercial diving tasks; however, the consequent studies made of the kelp would be scientific diving tasks. Another example of task distinction was provided in the discussion of the final guidelines (see Federal Register notice 50 FR 1046). Lowering a large object into the water (such as the Project Aquarius habitat), even though a part of a scientific project, is not scientific diving. The special skills of an underwater scientist, including observation and data-collection skills, do not contribute to the placement of a large object underwater. OSHA avoided the possibility of the exemption applying to scientific divers who undertake such tasks while participating in a scientific research project by focusing the definition on the sole purpose of the dive (scientific research tasks), eliminating dives with mixed purposes, and further indicating typical examples of what OSHA considers to be commercial tasks. It is noted that the scientific diving community supported this limited definition (see the amicus brief in **United Brotherhood of Carpenters and Joiners v. Department of Labor**, No. 82-2509 (D.C. Cir. 1982)).

4. "Scientific divers, based on the nature of their activities, must use scientific expertise in studying the underwater environment and, therefore, are scientists or scientists in training."

   The fourth guideline concerns special qualifications. As was previously noted, a scientific diver is an observer and data gatherer involved in studying the underwater environment, its organisms and its dynamic processes, in order to promote underwater science. OSHA concluded, based on the nature of these activities, that these divers must be able to

use scientific expertise in studying and analyzing the underwater environment. Consequently, OSHA requires these divers to be scientists or scientists in training. For example, a project to map segments of the ocean floor might hire commercial divers to undertake certain mapping tasks. These commercial divers are neither scientists nor scientists in training as prescribed by this guideline and, therefore, would not be eligible for the exemption. If, however, scientific expertise was needed to effectively accomplish tasks associated with the mapping (such as specialized geological knowledge), and a geologist trained as a diver performed the special geological tasks associated with the mapping, then such diving tasks would meet this particular criterion. As stated previously, however, all program criteria and guidelines must be met in order for this diving scenario to qualify for the exemption. In promulgating the exemption, OSHA rejected using credentials to determine who is a scientist. However, the Agency accepted the limitation that divers covered by the exemption had to be scientists because this limitation reflects the scientific diving community's underwater activities, and it prevents obvious commercial diving from being construed as scientific diving.

APPENDIX D: No-Decompression Limits and Repetitive-Group Designation Table for No-Decompression Air Dives

The information in this appendix (including the table on page D-3) was adapted from the U.S. Navy Diving Manual (Revision 5), Volume 2, Chapter 9 ("Air Decompression"), Section 9-7 ("Unlimited/No-Decompression Limits and Repetitive Group Designation Table for Unlimited/No-Decompression Air Dives").

The table (Table 9-7) at the end of this appendix serves three purposes. First, it shows that dives to 20 fsw and shallower have unlimited (no-decompression) bottom times. Second, it summarizes all the depth and bottom-time combinations for which the no-decompression limits apply. Third, it provides the repetitive-group designation for each of these dives. Any dive to 25 fsw or deeper that has a bottom time greater than the no-decompression limits provided in this table is a decompression dive, and must comply with the appropriate air decompression table.

Even though decompression is not required when diving within the no-decompression limits listed in the table, some nitrogen remains in the diver's tissues for up to 12 hours following an air dive. Consideration must be give to this residual nitrogen in the divers tissues when calculating decompression for subsequent (i.e., repetitive) dives.

Each depth listed in the table has a corresponding no-decompression limit listed in minutes. This limit is the maximum bottom time that a diver can spend at that depth without requiring decompression. Use the columns to the right of the column marked "No-Decompression Limits (min)" to obtain the repetitive-group designation. A repetitive-group designation must be assigned to a diver after every dive. To find repetitive-group designations, follow these steps:

1. Enter the table at the depth equal to, or next greater than, the maximum depth of the dive.

   NOTE: 2 fsw is added to the recorded maximum depth of the dive.

2. Follow that row to the right to the bottom time equal to, or just greater than, the actual bottom time of the dive.

   NOTE: Seconds of time are rounded to the next greater minute of time.

3. Follow the column up to the repetitive-group designation.

   Example. The employer wants a diver to conduct a brief inspection of the work site, located at a depth of 152 fsw. Determine the maximum no-decompression limit (bottom time) and the repetitive-group designation for the diver.

1. Locate the dive depth in the column marked "Depth (feet/meters)." Since no entry is provided for 154 (152 +2) fsw, round the depth to the next deepest depth shown in the column (i.e., 160 fsw).

2. Move horizontally across the table to find the maximum no-decompression limit in the column marked "No-Decompression Limits (min)." The maximum no-decompression limit for this depth is 5 minutes. Therefore, to avoid decompression, the diver must descend to 152 fsw, make the inspection, and begin the ascent within 5 minutes of leaving the surface.

3. To find the repetitive-group designation for this dive, move horizontally to the right of the 160-fsw entry in the "Depth (feet/meters)" column to the figure "5" under the columns marked "Group Designation" ("5" represents the 5-minute bottom time for this dive). Then move upwards in this column to the letter ("D") at the top of the column. "D" is the repetitive-group designation for this dive.

   NOTE: This table, "Unlimited/No-Decompression Limits and Repetitive Group Designation Table for Unlimited/No-Decompression Air Dives" is based on an ascent rate of 60 feet per minute or 1 foot per second.

Table 9-7. Unlimited/No-Decompression Limits and Repetitive Group Designation Table for Unlimited/No-Decompression Air Dives.

Depth (feet)	Depth (meters)	No-Decompression Limits (min)	Group Designation A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
10	3.1	unlimited	60	120	210	300	797	*									
15	4.6	unlimited	35	70	110	160	225	350	452	*							
20	6.1	unlimited	25	50	75	100	135	180	240	325	390	917	*				
25	7.7	595	20	35	55	75	100	125	160	195	245	315	361	540	595		
30	9.2	405	15	30	45	60	75	95	120	145	170	205	250	310	344	405	
35	10.7	310	5	15	25	40	50	60	80	100	120	140	160	190	220	270	310
40	12.3	200	5	15	25	30	40	50	70	80	100	110	130	150	170	200	
50	15.3	100		10	15	25	30	40	50	60	70	80	90	100			
60	18.4	60		10	15	20	25	30	40	50	55	60					
70	21.5	50		5	10	15	20	30	35	40	45	50					
80	24.5	40		5	10	15	20	25	30	35	40						
90	27.6	30		5	10	12	15	20	25	30							
100	30.6	25		5	7	10	15	20	22	25							
110	33.7	20			5	10	13	15	20								
120	36.8	15			5	10	12	15									
130	39.8	10			5	8	10										
140	42.9	10			5	7	10										
150	46.0	5			5												
160	49.0	5				5											
170	52.1	5				5											
180	55.2	5				5											
190	58.2	5				5											

* Highest repetitive group that can be achieved at this depth regardless of bottom time.

This table is from the U.S. Navy Diving Manual (Revision 5).

APPENDIX E: Requirements and Duties of a Diver Tender

Requirements for Tending a Diver

The term "tending" a diver is addressed in 29 CFR Part 1910, Subpart T - Commercial Diving Operations, as follows:

- 29 CFR 1910.424(b)(3) requires SCUBA divers to be line-tended against currents exceeding one (1) knot.

  NOTE: This requirement applies even when one diver is accompanied by another diver. One surface-tending line (safety line) is sufficient provided that the two divers are connected via a "buddy-line."

- 29 CFR 1910.424(b)(4) and 1910.424(c)(3) require SCUBA divers to be line-tended when they are in an enclosed or physically confining space, and, a diver must be stationed at the underwater point of entry to the enclosed or

physically confining space.

- 29 CFR 1910.424(c)(2) requires SCUBA divers to be either line-tended from the surface, or accompanied by another diver in the water who is in continuous visual contact with the SCUBA diver during the diving operation.
- 29 CFR 1910.425(c)(1) requires that each diver be continuously tended during surface-supplied air dives of 100 fsw or less.
- 29 CFR 1910.425(c)(4) requires that a separate dive-team member tend each diver in the water during surface-supplied air dives deeper than 100 fsw or that exceed the no-decompression limits.
- 29 CFR 1910.426(c)(1) requires that a separate dive-team member shall tend each diver in the water for all mixed-gas diving.

Duties of a Diver Tender

The following discussion details the duties of a diver tender for a surface-supplied diving operation.

The duties of a tender are to: assist the diver with donning and checking equipment; continuously tend the diver's umbilical during water entry/exit; continuously tend the diver's umbilical and be aware of the diver's depth and location, at all times while the diver is in the water; assist the diver in undressing; and continually monitor the diver after completion of the dive as directed by the DPIC (i.e., designated person-in-charge; commonly referred to as the diving supervisor) (NOTE: the diver normally is monitored for a minimum period of ten minutes following a dive). The tender shall not be assigned any task other than tending the diver, unless specifically directed to do otherwise by the DPIC and properly relieved as tender by another dive-team member. Specifically, the diver tender:

- Assists the diver in donning diver-worn equipment. The following is a typical dressing procedure for surface-supplied diving operations:

  - Don diving dress (such as a wet suit, dry suit, hot-water suit, or chaffing garment).

  - Don diver's harness, secure, and adjust.

  - If weighted diving shoes or ankle weights are used, they are placed on the diver by the tender and secured.

  - Don neckring and secure if helmet is to be used.

  - Don and adjust weight belt.

  - Secure knife to belt, leg, or arm per diver's preference.

  - With the diver or a second dive-team member holding the mask or helmet, secure the emergency gas cylinder (when used).

  - Don mask or helmet and secure mask harness or helmet clamp.

  - Secure the umbilical assembly to harness.

  - After properly dressing the diver, ensure that all equipment is functioning properly, and inform the DPIC that the diver is ready.

- When the diver is ready to dive, the tender directs and assists the diver from the dressing area to the water-entry point (such as an inwater stage, ladder, or ramp). The tender always keeps one hand on the umbilical close to the diver, and the other hand on the diver's helmet or body harness, while assisting the diver during water entry (i.e., maintains positive control of the diver to check the diver should the diver slip or begin to fall).
- As the diver enters the water, the tender handles the umbilical. The tender must be careful to keep the diver's umbilical away from sharp edges, rotating machinery, and other hazards that could result in damage to or fouling of the umbilical. The umbilical must never be allowed to run free or be secured around a cleat, bitt, or other object. The tender must pay out the umbilical at a steady rate to permit the diver to enter the water smoothly and in a controlled manner (i.e., the tender must hold the umbilical tightly enough to check a fall or slip, but allow sufficient slack for the diver to move freely).
- When ready to leave the surface, the diver communicates by voice (such as "Leaving the surface") via the diver's intercom with the DPIC or the dive-team member assigned as the diver's phone-talker, and by using line-pull signals with the tender. The tender then notifies the DPIC that the diver has left the surface. The DPIC is responsible for maintaining the diving logs and records, and keeping track of the diver's bottom time for each dive conducted. When a descending line is used by the diver, the tender should handle the umbilical from a point at least ten feet from the descending line. When an inwater stage is being used, the tender must coordinate with the stage winch operator or line handlers to ensure a smooth descent for the diver.
- During the dive, the tender must be alert for, and immediately report to the DPIC, conditions or situations that may be hazardous or unsafe to the diving operations.
- During the dive, the tender must maintain continuous, positive control of the umbilical by having at least one hand on the umbilical at all times, and never allowing it to run free or be secured around a cleat, bitt, or other object. The tender also must control the diver's rate of descent by keeping excess slack out of the umbilical, and track the diver's relative position by continuously monitoring the tautness and location of the umbilical, direction and movement of surface bubbles, and the diver's depth (by using a pneumofathometer). Throughout the dive, the tender must keep slack

out of the umbilical while at the same time holding it taut, but not so taut as to interfere with the ability of the diver to work. Two or three feet of slack will permit the diver freedom of movement, while preventing the diver from being pulled off his/her feet by surging of the support craft or the force of any current acting on the umbilical. Occasionally, the tender should "fish" the diver by drawing in gently on the short slack until the tender senses the weight of the diver, and then pay out several feet of slack to the diver. This procedure ensures that movement by the diver has not resulted in excessive slack. Too much slack in the line will make signaling difficult, hinder the tender from catching a falling diver, and increase the possibility of fouling the umbilical. When the diver is underwater, umbilical line-pull signals are the only communications link with the diver if the intercom fails; therefore, the tender must always hold the diver's umbilical firmly with at least one hand to receive the line-pull signals.

- To detect a diver's line-pull signals during the dive, the tender must monitor the umbilical using at least one hand, and monitor by sight any descending line or marker buoy used by the diver. As directed by the DPIC, the tender communicates with the diver using the diver's intercom. Periodically, the tender should seek a "Diver okay" acknowledgement from the diver by voice communication or by using line-pull signals (such as sending the diver one line-pull signal and receiving one line-pull signal). Line-pull signals consist of a series of sharp, distinct pulls, strong enough for the diver or tender to detect, but not so strong as to pull the diver away from work. When communications are lost with the diver via the intercom (such as a bad connection or flooded mask), line-pull signals provide the only available communications with the diver; therefore, line-pull signals must be maintained continuously during the dive by keeping at least one hand on the umbilical. In the event that a diver does not respond to any voice or line-pull signal communications, it should be repeated. If the diver still does not respond to voice or line-pull signal communications, or responds incorrectly, the DPIC shall terminate the dive as required by 29 CFR 1910.422(i).
- Throughout the dive, the tender constantly monitors the diver's progress and keeps track of the diver's relative position by:

  - Watching and tracking the diver's exhaust bubbles. For example, bubbles surfacing in a single location indicate that the diver is working in place, while bubbles moving in a regular pattern indicate that the diver is searching the bottom. Bubbles moving rapidly in a straight line in one direction could mean that the diver has fallen.

  - Using the hands to monitor the line-pull signals on the umbilical (discussed above).

  - Watching the pneumofathometer pressure gauge to keep track of the operating depth. The gauge provides a direct reading (without the need to add air to the gauge) when the diver remains at a constant depth or ascends. However, when the diver descends, the pneumofathometer hose must be cleared by adding air before making a new reading.

  - Monitoring the gauges on powered equipment and other cues. For example, the ammeter on an electric-welding unit will indicate a power drain when the arc is in use, and the gas-pressure gauges for a gas torch will register fuel flow. Additionally, the "pop" made by a gas torch being lighted probably will be audible over the diver intercom, and bubbles from the torch will break on the surface, releasing small quantities of smoke.

  - Detecting vibrations in the air-powered lines of pneumatic tools.

- The tender must monitor the diver's activity continually. For example, the tender can frequently evaluate the diver's exertion by counting the number of breaths the diver takes per minute. In this regard, experienced tenders know the diver's normal breathing rate. A significant increase in the diver's breathing rate may indicate an over exertion situation. When necessary, the tender advises the DPIC to stop the diver's work, allow the diver to rest, and ventilate the diver's mask or helmet.
- When the diver leaves the bottom, he/she notifies topside by voice ("Leaving the bottom") via the diver's intercom with the DPIC or the dive-team member assigned as the diver's phone-talker, and by line-pull signals with the tender. The tender then notifies the DPIC that the diver has left the bottom. During surfacing, the tender closely monitors and controls the diver's rate of ascent as directed by the DPIC.
- When the dive is complete and the diver is ready to leave the water, the tender: assists the diver to the water-exit point (such as an inwater stage, ladder, ramp); keeps excess slack out of the umbilical while the diver is lifted by stage to the deck; maintains a taut-tension on the umbilical while the diver climbs the ladder; and provides assistance as requested by the diver when the diver exits by other means. When the diver returns to the dive location, the tender always keeps his/her hands on the umbilical close to the diver and on the diver's helmet or body harness (i.e., positive control of the diver) while assisting the diver to the derigging/undressing area.

Other duties that are assigned commonly to the diver tender during commercial diving operations include:

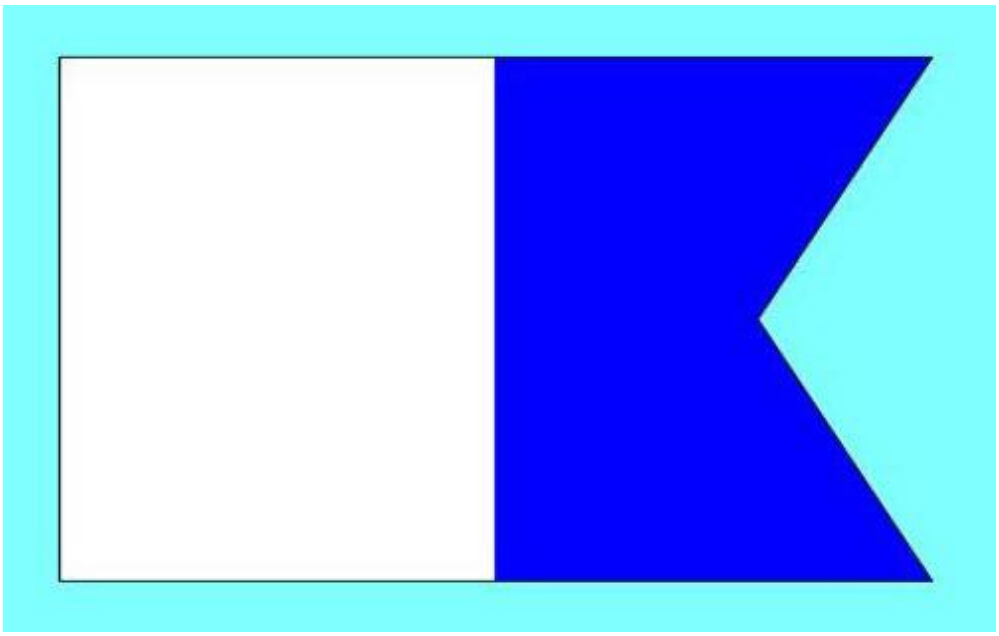
- As directed by the DPIC, assemble and test the diving equipment (such as an air-compressor, high-pressure cylinders, umbilical assembly, diver-worn equipment, communications equipment) and related support equipment (such as a welding generator and equipment, or cutting equipment).
- When no decompression chamber is at the diving station and the DPIC so directs, contact the nearest operational decompression-chamber facility to verify and confirm chamber availability.
- When a decompression chamber is available at the diving station and as directed by the DPIC, ensure that the decompression chamber is clean, properly outfitted, and ready for use.
- Assist in topside work as required, or as specifically directed by the DPIC, during the dive (such as lower or retrieve tools and equipment for the diver, bleed moisture from diver's air-supply volume tank).

NOTE: When directed by the DPIC to perform other specific tasks while the diver is underwater, the tender must be able to continuously tend the diver while performing the tasks. If not, the tender must be relieved properly as the tender by another dive-team member. The DPIC is allowed to relieve the tender and perform the tender's duties for short periods of time while the tender performs the assigned tasks.

- Perform routine maintenance and repair of diving equipment as directed by the DPIC.
- When qualified, and as directed by the DPIC, operate a decompression chamber for surface decompression or emergency treatment.

APPENDIX F: International Code Flag "A" ("Alpha" Flag)

29 CFR 1910.421(h) *Warning signal*. When diving from surfaces other than vessels in areas capable of supporting marine traffic, a rigid replica of the international code flag "A" at least one meter in height shall be displayed at the dive location in a manner which allows all-round visibility, and shall be illuminated during night diving operations.



Color: White and Blue (notched portion)
International Code Flag "A": Alfa;
Diver below (when stationary);
Keep clear.

APPENDIX G: OSHA Injury and Illness Reporting and Recordkeeping

REPORTING. Under 29 CFR 1904.39 *Reporting fatalities and multiple hospitalization incidents to OSHA*, employers are required to report any occupational fatality or incident involving inpatient hospitalization of three (3) or more employees within eight (8) hours of the incident. The report must include the following information: company name; location and time of the incident; number of fatalities or hospitalized employees; contact person for the company; phone number(s) for the company contact person; and, a brief description of the incident.

NOTE: States operating under OSHA-approved safety and health plans have injury and illness recordkeeping and reporting regulations comparable to those of Federal OSHA (for the names of these States, see the section titled *Federal and State Authority* in Appendix B of this instruction). State Plans may have different rules covering recordkeeping exemptions (see the section titled *Recordkeeping* below), procedures for reporting of fatalities and hospitalizations, record retention, and other procedural requirements. Employers conducting activities within a State-Plan State must comply with the requirements of that State Plan, and must report fatalities and multiple injuries to the appropriate State agency.

Reporting is required by employers who have employees aboard vessels (such as ships and barges), or on off-shore oil rigs and platforms when such vessels or rigs and platforms are located on or within navigable U.S. waterways and State territorial waters.

- State territorial waters extend three (3) nautical miles from the general coastline at ordinary (mean) low water for all States and U.S. Territories **except**: Texas, Puerto Rico, and the Gulf Coast of Florida, which extend nine (9) nautical miles from the general coastline at ordinary (mean) low water; and the Great Lakes and St. Lawrence Seaway States where the U.S. Inland "navigable waters" include all waters up to the international boundary line with Canada.
- Reporting to OSHA is required when the incident occurs within OSHA's authority, regardless of which federal agency regulates the working conditions.

- Determination of geographical authority shall be based on the location of the employee at the time of the incident.
- Exemptions from fatality and multiple-hospitalization reporting do not exist. Although exemptions apply for some illness and injury recordkeeping requirements (such as employers with 10 or less employees, and "low-hazard" industries), these exemptions do not apply to the requirement to report fatality and multi-hospitalization incidents to OSHA.
- Employers must report fatalities and multiple hospitalizations by telephone or in person to the nearest OSHA Area Office, or by using OSHA's toll-free hotline at 1-800-321-OSHA. The caller making the accident report must talk directly to a person at OSHA (i.e., they cannot leave a message on the phone, send a fax, or send an e-mail).

RECORDKEEPING. Employers, including employers covered by 29 CFR Part 1910, Subpart T, must establish and retain the employee illness and injury records required by 29 CFR Part 1904. As specified by 29 CFR 1904.31, employees include temporary employees (such as employees hired from temporary-employment agencies or leasing companies) who are not on an employer's payroll but whom the employer supervises on a day-to-day basis.

OSHA exempts the following employers from some of these illness and injury recordkeeping requirements: (1) employers who had no more than 10 employees (including temporary employees) at any time during the last calendar year (see 29 CFR 1904.1); or (2) employers classified in "low-hazard" industries specified by 29 CFR 1904.2. Nevertheless, even these exempted employers must comply with the following recordkeeping requirements:

- Under 29 CFR 1904.39, report any work-related fatality or the inpatient hospitalization of three (3) or more employees resulting from a single work-related incident; and
- Maintain a log of occupational injuries and illnesses under 29 CFR Part 1904, and make reports under 29 CFR 1904.41 and 1904.42 upon being notified in writing by OSHA or the U.S. Bureau of Labor Statistics of having been selected to participate in a survey of occupational injuries and illnesses.

DIVING INDUSTRY REPORTING AND RECORDKEEPING. The North American Industrial Classification System (NAICS) Code for "Diving Services on a Contract or Fee Basis" is 561990 (previously SIC 7389). This classification is part of NAICS Code 56199 "All Other Support Services," which is defined as a "low-hazard" industry. Therefore, a diving company with a primary NAICS Code 561990 is exempted from most OSHA recordkeeping requirements under 29 CFR (NOTE: Minnesota and Puerto Rico do not allow this "low-hazard" industry exemption). A company that performs diving, but has multiple NAICS Codes and is classified under a **primary NAICS Code other than 561990**, will be subject to all OSHA recordkeeping requirements if not covered by an exemption (such as employs 10 or fewer employees, or is a "low-hazard" industry). The primary NAICS Code is defined as the major work function or process performed by the establishment. OSHA may challenge the company's assignment of a primary NAICS Code if it appears that such an NAICS Code assignment was made erroneously or arbitrarily.

For diving companies under primary NAICS Code 561990, the following reporting and recordkeeping requirements apply:

- Must report to OSHA within eight (8) hours any work-related accident, occurring within OSHA's geographical authority, that results in a fatality or the hospitalization of three (3) or more employees.
- Must comply with the requirements of 29 CFR 1903.2 *Posting of notice; availability of the Act, regulations and applicable standards*.
- Must comply with the recordkeeping requirements of 29 CFR 1910.1020 *Access to employee exposure and medical records* (in 1996, 29 CFR 1910.20 was redesignated as 29 CFR 1910.1020).
- Must comply with any recordkeeping and reporting requirements specified by other OSHA occupational safety and health standards (such as the recordkeeping requirements specified by 29 CFR Part 1910, Subpart T, - Commercial Diving Operations).
- If notified by OSHA in writing, must participate in OSHA's Annual Occupational Injury and Illness Survey. Participation in this survey involves maintaining a log of occupational injuries and illnesses under 29 CFR 1904.4 (OSHA 300 Log) and making reports under 29 CFR 1904.41.
- If the employer receives a Survey of Occupational Injuries and Illnesses Form from the Bureau of Labor Statistics (BLS), or a BLS designee, the employer must promptly complete the form and return it following the instructions contained on the survey form and as specified by 29 CFR 1904.42.

For diving companies under primary NAICS Code 561990, the following reporting and recordkeeping requirements **do not** apply:

- Requirement per 29 CFR 1904.4 to maintain a log and summary of all recordable occupational injuries and illnesses at each of its establishments (OSHA 300 Log, or equivalent).
- Requirement per 29 CFR 1904.29 to complete a supplemental record for each occupational injury or illness that occurs at each of its establishments (OSHA 301 Incident Report, or equivalent).
- Requirement per 29 CFR 1904.29 to post an annual summary of occupational injuries and illnesses for each of its establishments.

APPENDIX H: Comparison of Requirements for the Primary Diving Modes

Symbols: Knot = 1 nautical mile per hour fsw = feet of sea water < = less thanNo-D = no-decompression limits DPIC = Designated Person In Charge > = greater than			
Requirements	SCUBA	Surface-supplied Air	Mixed-Gas
Limits	Maximum depth = 130 fsw; >1 knot then line-tended; enclosed space then line tended.	Maximum depth = 190 fsw; except for dives <30 minutes, may dive up to 220 fsw.	Not Applicable.
Tender	Either line-tended from surface or by another diver in continual visual contact.	&Continually tended at all depths; 1 tender per diver when >100 fsw or >no-D.	1 tender per diver. 1 diver in bell as tender.
Standby	Yes	>100 fsw or >no-D.	Yes
Diver-Carried Reserve	Yes (manual reserve or independent reserve cylinder).	>100 fsw or >no-D. No direct ascent (except heavy gear and no space).	>100 fsw or >no-D. No direct ascent (except heavy gear and no space).
Dive-Location Reserve	Not applicable.	>100 fsw or >no-D.	Yes
Inwater Stage	Not applicable.	Heavy gear.	Heavy gear >100 fsw or >no-D (if no bell).
Chamber	>100 fsw or >no-D.	>100 fsw or >no-D.	Yes
Bell	Not applicable.	Open or closed bell >120 minutes (except heavy gear and confined space).	Open or closed bell >220 fsw or >120 minutes (except heavy gear and confined space). Closed bell >300 fsw (except confined space).
Communications	Emergency assistance.	Emergency assistance. Between diver and dive location, diver and bell, bell and dive location.	Emergency assistance. Between diver and dive location, diver and bell, bell and dive location.
Miscellaneous	Diver at point of confined space entry. Require DPIC.	Diver at point of confined space entry. For heavy gear need extra hose at dive location. Require DPIC.	Diver at point of confined space entry. For heavy gear need extra hose at dive location. Require DPIC.

APPENDIX I: Checklist for Commercial Diving Operations

	1910.410 *QUALIFICATIONS OF DIVE TEAM.*	**Comments/Remarks/Notes**
	(a) *General.*	
	(1) Each dive-team member shall have the experience or training necessary to perform assigned tasks in a safe and healthful manner.	
	(2) Each dive-team member shall have experience or training in the following: (i) The use of tools, equipment and systems relevant to assigned tasks; (ii) Techniques of the assigned diving mode; and (iii) Diving operations and emergency procedures.	
	(3) All dive-team members shall be trained in cardiopulmonary resuscitation and first aid (American Red Cross standard course or equivalent).	

	(4) Dive-team members who are exposed to or control the exposure of others to hyperbaric conditions shall be trained in diving-related physics and physiology.	
	(b) *Assignments.*	
	(1) Each dive-team member shall be assigned tasks in accordance with the employee's experience or training, except that limited additional tasks may be assigned to an employee undergoing training provided that these tasks are performed under the direct supervision of an experienced dive-team member.	
	(2) The employer shall not require a dive-team member to be exposed to hyperbaric conditions against the employee's will, except when necessary to complete decompression or treatment procedures.	
	(3) The employer shall not permit a dive-team member to dive or be otherwise exposed to hyperbaric conditions for the duration of any temporary physical impairment or condition which is known to the employer and is likely to affect adversely the safety or health of a dive-team member.	
	(c) *Designated person-in-charge.*	
	(1) The employer or an employee designated by the employer shall be at the dive location in charge of all aspects of the diving operation affecting the safety and health of dive-team members.	
	(2) The designated person-in-charge shall have experience and training in the conduct of the assigned diving operation.	

	1910.420 *SAFE PRACTICES MANUAL.*	**Comments/Remarks/ Notes**
	(a) *General.* The employer shall develop and maintain a safe practices manual which shall be made available at the dive location to each dive-team member.	
	(1) The safe practices manual shall contain a copy of this standard and the employer's policies for implementing the requirements of this standard [29 CFR Part 1910, Subpart T].	
	(2) For each diving mode engaged in, the safe practices manual shall include: (i) Safety procedures and checklists for diving operations; (ii) Assignments and responsibilities of the dive-team members; (iii) Equipment procedures and checklists; and (iv) Emergency procedures for fire, equipment failure, adverse environmental conditions, and medical illness and injury.	

	1910.421 *PRE-DIVE PROCEDURES.*	**Comments/Remarks/ Notes**
	(a) *General.* The employer shall comply with the following requirements prior to each diving operation, unless otherwise specified.	
	(b) *Emergency aid.* A list shall be kept at the dive location of the telephone or call numbers of the following: (1) An operational decompression chamber (if not at the dive location); (2) Accessible hospitals; (3) Available physicians; (4) Available means of transportation; and (5) The nearest U.S. Coast Guard Rescue Coordination Center.	

	(c) *First aid supplies.*	
	(1) A first aid kit appropriate for the diving operation and approved by a physician shall be available at the dive location.	
	(2) When used in a decompression chamber or bell, the first aid kit shall be suitable for use under hyperbaric conditions.	
	(3) In addition to any other first aid supplies, an American Red Cross standard first aid handbook or equivalent, and a bag-type manual resuscitator with transparent mask and tubing shall be available at the dive location.	
	(d) *Planning and assessment.* Planning of a diving operation shall include an assessment of the safety and health aspects of the following: (1) Diving mode; (2) Surface and underwater conditions and hazards; (3) Breathing-gas supply (including reserves); (4) Thermal protection; (5) Diving equipment and systems; (6) Dive-team assignments and physical fitness of dive-team members (including any impairments known to the employer); (7) Repetitive dive designation or residual inert-gas status of dive-team members; (8) Decompression and treatment procedures (including altitude corrections); and (9) Emergency procedures.	
	(e) *Hazardous activities.* To minimize hazards to the dive-team, diving operations shall be coordinated with other activities in the vicinity which are likely to interfere with the diving operation.	
	(f) *Employee briefing.* (1) Dive-team members shall be briefed on: (i) The tasks to be undertaken; (ii) Safety procedures for the diving mode; (iii) Any unusual hazards or environmental conditions likely to affect the safety of the diving operation; and (iv) Any modifications to operating procedures necessitated by the specific diving operation.	
	(2) Prior to making individual dive-team member assignments, the employer shall inquire into the dive-team member's current state of physical fitness, and indicate to the dive-team member the procedure for reporting physical problems or adverse physiological effects during and after the dive.	
	(g) *Equipment inspection.* The breathing-gas supply system including reserve breathing-gas supplies, masks, helmets, thermal protection, and bell handling mechanism (when appropriate) shall be inspected prior to each dive.	
	(h) *Warning signal*. When diving from surfaces other than vessels in areas capable of supporting marine traffic, a rigid replica of the international code flag "A" at least one meter in height shall be displayed at the dive location in a manner which allows all-round visibility, and shall be illuminated during night diving operations.	

	1910.422 *PROCEDURES DURING DIVE.*	**Comments/Remarks/ Notes**

	(a) ***General***. The employer shall comply with the following requirements which are applicable to each diving operation unless otherwise specified.	
	(b) ***Water entry and exit.***	
	(1) A means capable of supporting the diver shall be provided for entering and exiting the water.	
	(2) The means provided for exiting the water shall extend below the water surface.	
	(3) A means shall be provided to assist an injured diver from the water or into a bell.	
	(c) ***Communications.*** (1) An operational two-way voice communication system shall be used between: (i) Each surface-supplied air or mixed-gas diver and a dive-team member at the dive location or bell (when provided or required); and (ii) The bell and the dive location.	
	(2) An operational, two-way communication system shall be available at the dive location to obtain emergency assistance.	
	(d) ***Decompression tables.*** Decompression, repetitive, and no-decompression tables (as appropriate) shall be at the dive location.	
	(e) ***Dive profiles.*** A depth-time profile, including when appropriate any breathing-gas changes, shall be maintained for each diver during the dive including decompression.	
	(f) ***Hand-held power tools and equipment.***	
	(1) Hand-held electrical tools and equipment shall be de-energized before being placed into or retrieved from the water.	
	(2) Hand-held power tools shall not be supplied with power from the dive location until requested by the diver.	
	(g) ***Welding and burning.***	
	(1) A current supply switch to interrupt the current flow to the welding or burning electrode shall be: (i) Tended by a dive-team member in voice communication with the diver performing the welding or burning. (ii) Kept in the open position except when the diver is welding or burning.	
	(2) The welding machine frame shall be grounded.	
	(3) Welding and burning cables, electrode holders, and connections shall be capable of carrying the maximum current required by the work, and shall be properly insulated.	
	(4) Insulated gloves shall be provided to divers performing welding and burning operations.	
	(5) Prior to welding or burning on closed compartments, structures or pipes, which contain a flammable vapor or in which a flammable vapor may be generated by the work, they shall be vented, flooded, or purged with a mixture of gases which will not support combustion.	
	(h) ***Explosives.***	
	(1) Employers shall transport, store, and use explosives in accordance with this section and the applicable provisions of 29 CFR 1910.109 and 29 CFR 1926.912.	
	(2) Electrical continuity of explosive circuits shall not be tested until the diver is out of the water.	

	(3) Explosives shall not be detonated while the diver is in the water.	
	(i) *Termination of dive.* The working interval of a dive shall be terminated when:	
	(1) A diver requests termination;	
	(2) A diver fails to respond correctly to communications or signals from a dive-team member;	
	(3) Communications are lost and cannot be quickly re-established between the diver and a dive-team member at the dive location, and between the designated person-in-charge and the person controlling the vessel in liveboating operations; or	
	(4) A diver begins to use diver-carried reserve breathing gas or the dive-location reserve breathing gas.	

	1910.423 *POST-DIVE PROCEDURES.*	**Comments/Remarks/ Notes**
	(a) *General.* The employer shall comply with the following requirements which are applicable after each diving operation, unless otherwise specified.	
	(b) *Precautions.*	
	(1) After the completion of any dive, the employer shall: (i) Check the physical condition of the diver; (ii) Instruct the diver to report any physical problems or adverse physiological effects including symptoms of decompression sickness; (iii) Advise the diver of the location of a decompression chamber which is ready for use; and (iv) Alert the diver to the potential hazards of flying after diving.	
	(2) For any dive outside the no-decompression limits, deeper than 100 fsw or using mixed-gas as a breathing mixture, the employer shall instruct the diver to remain awake and in the vicinity of the decompression chamber which is at the dive location for at least one hour after the dive (including decompression or treatment as appropriate).	
	(c) *Recompression capability.*	
	(1) A decompression chamber capable of recompressing the diver at the surface to a minimum of 165 fsw (6 ATA) shall be available at the dive location for: (i) Surface-supplied air diving to depths deeper than 100 fsw and shallower than 220 fsw; (ii) Mixed-gas diving shallower than 300 fsw; or (iii) Diving outside the no-decompression limits shallower than 300 fsw.	
	(2) A decompression chamber capable of recompressing the diver at the surface to the maximum depth of the dive shall be available at the dive location for dives deeper than 300 fsw.	
	(3) The decompression chamber shall be: (i) Dual-lock; (ii) Multi-place; and (iii) Located within 5 minutes of the dive location.	

	(4) The decompression chamber shall be equipped with: (i) A pressure gauge for each pressurized compartment designed for human occupancy; (ii) A built-in-breathing-system with a minimum of one mask per occupant; (iii) A two-way voice communication system between occupants and a dive-team member at the dive location; (iv) A viewport; and (v) Illumination capability to light the interior.	
	(5) Treatment tables, treatment gas appropriate to the diving mode, and sufficient gas to conduct treatment shall be available at the dive location.	
	(6) A dive-team member shall be available at the dive location during and for at least one hour after the dive to operate the decompression chamber (when required or provided).	
	(d) ***Record of dive.***	
	(1) The following information shall be recorded and maintained for each diving operation: (i) Names of dive-team members including the designated person-in-charge; (ii) Date, time, and location; (iii) Diving modes used; (iv) General nature of work performed; (v) Approximate underwater and surface conditions (visibility, water temperature and current); and (vi) Maximum depth and bottom time for each diver.	
	(2) For each dive outside the no-decompression limits, deeper than 100 fsw or using mixed-gas, the following additional information shall be recorded and maintained: (i) Depth-time and breathing-gas profiles; (ii) Decompression table designation (including modification); and (iii) Elapsed time since last pressure exposure if less than 24 hours or repetitive dive designation for each diver.	
	(3) For each dive in which decompression sickness is suspected or symptoms are evident, the following additional information shall be recorded and maintained: (i) Description of decompression sickness symptoms (including depth and time of onset); and (ii) Description and results of treatment.	
	(e) ***Decompression procedure assessment.*** The employer shall:	
	(1) Investigate and evaluate each incident of decompression sickness based on the recorded information, consideration of the past performance of the decompression table used, and individual susceptibility;	
	(2) Take appropriate corrective action to reduce the probability of recurrence of decompression sickness; and	
	(3) Prepare a written evaluation of the decompression procedure assessment, including any corrective action taken, within 45 days of the incident of decompression sickness.	

	1910.424 *SCUBA DIVING.*	**Comments/Remarks/ Notes**
	(a) *General.* Employers engaged in SCUBA diving shall comply with the following requirements, unless otherwise specified.	
	(b) *Limits.* SCUBA diving shall not be conducted:	
	(1) At depths deeper than 130 fsw;	
	(2) At depths deeper than 100 fsw or outside the no-decompression limits unless a decompression chamber is ready for use;	
	(3) Against currents exceeding one (1) knot unless line-tended; or	
	(4) In enclosed or physically confining spaces unless line-tended.	
	(c) *Procedures.*	
	(1) A standby diver shall be available while a diver is in the water.	
	(2) A diver shall be line-tended from the surface, or accompanied by another diver in the water in continuous visual contact during the diving operation.	
	(3) A diver shall be stationed at the underwater point of entry when diving is conducted in enclosed or physically confining spaces.	
	(4) A diver-carried reserve breathing-gas supply shall be provided for each diver consisting of: (i) A manual reserve (J-valve); or (ii) An independent reserve cylinder with a separate regulator or connected to the underwater breathing apparatus.	
	(5) The valve of the reserve breathing-gas supply shall be in the closed position prior to the dive. [For a J-valve, this is the up position.]	

	1910.425 *SURFACE-SUPPLIED AIR DIVING.*	**Comments/Remarks/ Notes**
	(a) *General.* Employers engaged in surface-supplied air diving shall comply with the following requirements, unless otherwise specified.	
	(b) *Limits.*	
	(1) Surface-supplied air diving shall not be conducted at depths deeper than 190 fsw, except that dives with bottom times of 30 minutes or less may be conducted to depths of 220 fsw.	
	(2) A decompression chamber shall be ready for use at the dive location for any dive outside the no-decompression limits or deeper than 100 fsw.	
	(3) A bell shall be used for dives with an inwater decompression time greater than 120 minutes, except when heavy gear is worn or diving is conducted in physically confining spaces.	
	(c) *Procedures.*	
	(1) Each diver shall be continuously tended while in the water.	
	(2) A diver shall be stationed at the underwater point of entry when diving is conducted in enclosed or physically confining spaces.	
	(3) Each diving operation shall have a primary breathing-gas supply sufficient to support divers for the duration of the planned dive including decompression.	

	(4) For dives deeper than 100 fsw or outside the no-decompression limits: (i) A separate dive-team member shall tend each diver in the water; (ii) A standby diver shall be available while a diver is in the water; (iii) A diver-carried reserve breathing-gas supply shall be provided for each diver except when heavy gear is worn; and (iv) A dive-location reserve breathing-gas supply shall be provided.	
	(5) For heavy gear diving deeper than 100 fsw or outside the no-decompression limits: (i) An extra breathing-gas hose capable of supplying breathing gas to the diver in the water shall be available to the standby diver. (ii) An inwater stage shall be provided to divers in the water.	
	(6) Except when heavy gear is worn or where physical space does not permit, a diver-carried reserve breathing-gas supply shall be provided whenever the diver is prevented by the configuration of the dive area from ascending directly to the surface.	

	1910.426 *MIXED-GAS DIVING.*	**Comments/Remarks/ Notes**
	(a) *General.* Employers engaged in mixed-gas diving shall comply with the following requirements, unless otherwise specified.	
	(b) *Limits.* Mixed-gas diving shall be conducted only when:	
	(1) A decompression chamber is ready for use at the dive location; and	
	(i) A bell is used at depths greater than 220 fsw or when the dive involves inwater decompression time of greater than 120 minutes, except when heavy gear is worn or when diving in physically confining spaces; or (ii) A closed bell is used at depths greater than 300 fsw, except when diving is conducted in physically confining spaces.	
	(c) *Procedures.*	
	(1) A separate dive-team member shall tend each diver in the water.	
	(2) A standby diver shall be available while a diver is in the water.	
	(3) A diver shall be stationed at the underwater point of entry when diving is conducted in enclosed or physically confining spaces.	
	(4) Each diving operation shall have a primary breathing-gas supply sufficient to support divers for the duration of the planned dive including decompression.	
	(5) Each diving operation shall have a dive-location reserve breathing-gas supply.	
	(6) When heavy gear is worn: (i) An extra breathing-gas hose capable of supplying breathing gas to the diver in the water shall be available to the standby diver; and (ii) An inwater stage shall be provided to divers in the water.	
	(7) An inwater stage shall be provided for divers without access to a bell for dives deeper than 100 fsw or outside the no-decompression limits.	

	(8) When a closed bell is used, one dive-team member in the bell shall be available and tend the diver in the water.	
	(9) Except when heavy gear is worn or where physical space does not permit, a diver-carried reserve breathing-gas supply shall be provided for each diver: (i) Diving deeper than 100 fsw or outside the no-decompression limits; or (ii) Prevented by the configuration of the dive area from directly ascending to the surface.	

	1910.427 *LIVEBOATING.*	**Comments/Remarks/ Notes**
	(a) *General.* Employers engaged in diving operations involving liveboating shall comply with the following requirements.	
	(b) *Limits.* Diving operations involving liveboating shall not be conducted:	
	(1) With an inwater decompression time of greater than 120 minutes;	
	(2) Using surface-supplied air at depths deeper than 190 fsw, except that dives with bottom times of 30 minutes or less may be conducted to depths of 220 fsw;	
	(3) Using mixed-gas at depths greater than 220 fsw;	
	(4) In rough seas which significantly impede diver mobility or work function; or	
	(5) In other than daylight hours.	
	(c) *Procedures.*	
	(1) The propeller of the vessel shall be stopped before the diver enters or exits the water.	
	(2) A device shall be used which minimizes the possibility of entanglement of the diver's hose in the propeller of the vessel.	
	(3) Two-way voice communication between the designated person-in-charge and the person controlling the vessel shall be available while the diver is in the water.	
	(4) A standby diver shall be available while a diver is in the water.	
	(5) A diver-carried reserve breathing-gas supply shall be carried by each diver engaged in liveboating operations.	

	1910.430 *EQUIPMENT.*	**Comments/Remarks/ Notes**
	(a) *General.*	
	(1) All employers shall comply with the following requirements, unless otherwise specified.	
	(2) Each equipment modification, repair, test, calibration or maintenance service shall be recorded by means of a tagging or logging system, and include the date and nature of work performed, and the name or initials of the person performing the work.	
	(b) *Air compressor system.*	
	(1) Compressors used to supply air to the diver shall be equipped with a volume tank with a check valve on the inlet side, a pressure gauge, a relief valve, and a drain valve.	
	(2) Air compressor intakes shall be located away from areas containing exhaust or other contaminants.	

	(3) Respirable air supplied to a diver shall not contain: (i) A level of carbon monoxide (CO) greater than 20 ppm; (ii) A level of carbon dioxide (CO_2) greater than 1,000 ppm; (iii) A level of oil mist greater than 5 milligrams per cubic meter; or (iv) A noxious or pronounced odor.	
	(4) The output of air compressor systems shall be tested for air purity every 6 months by means of samples taken at the connection to the distribution system, except that non-oil lubricated compressors need not be tested for oil mist.	
	(c) *Breathing-gas supply hoses.*	
	(1) Breathing-gas supply hoses shall: (i) Have a working pressure at least equal to the working pressure of the total breathing-gas system; (ii) Have a rated bursting pressure at least equal to 4 times the working pressure; (iii) Be tested at least annually to 1.5 times their working pressure; and (iv) Have their open ends taped, capped or plugged when not in use.	
	(2) Breathing-gas supply hose connectors shall: (i) Be made of corrosion-resistant materials; (ii) Have a working pressure at least equal to the working pressure of the hose to which they are attached; and (iii) Be resistant to accidental disengagement.	
	(3) Umbilicals shall: (i) Be marked in 10-foot increments to 100 feet beginning at the diver's end, and in 50-foot increments thereafter; (ii) Be made of kink-resistant materials; and (iii) Have a working pressure greater than the pressure equivalent to the maximum depth of the dive (relative to the supply source) plus 100 psi.	
	(d) *Buoyancy control.*	
	(1) Helmets or masks connected directly to the dry suit or other buoyancy-changing equipment shall be equipped with an exhaust valve.	
	(2) A dry suit or other buoyancy-changing equipment not directly connected to the helmet or mask shall be equipped with an exhaust valve.	
	(3) When used for SCUBA diving, a buoyancy compensator shall have an inflation source separate from the breathing-gas supply.	
	(4) An inflatable flotation device capable of maintaining the diver at the surface in a face-up position, having a manually activated inflation source independent of the breathing supply, an oral inflation device, and an exhaust valve shall be used for SCUBA diving.	
	(e) *Compressed gas cylinders.* Compressed gas cylinders shall:	
	(1) Be designed, constructed and maintained in accordance with the applicable provisions of 29 CFR 1910.101 and 1910.169 through 1910.171;	
	(2) Be stored in a ventilated area and protected from excessive heat;	
	(3) Be secured from falling; and	

	(4) Have shut-off valves recessed into the cylinder or protected by a cap, except when in use or manifolded, or when used for SCUBA diving.	
	(f) *Decompression chambers.*	
	(1) Each decompression chamber manufactured after the effective date of this standard, shall be built and maintained in accordance with the ASME Code or equivalent.	
	(2) Each decompression chamber manufactured prior to the effective date of this standard shall be maintained in conformity with the code requirements to which it was built, or equivalent.	
	(3) Each decompression chamber shall be equipped with: (i) Means to maintain the atmosphere below a level of 25 percent oxygen by volume; (ii) Mufflers on intake and exhaust lines, which shall be regularly inspected and maintained; (iii) Suction guards on exhaust line openings; and (iv) A means for extinguishing fire, and shall be maintained to minimize sources of ignition and combustible material.	
	(g) *Gauges and timekeeping devices.*	
	(1) Gauges indicating diver depth which can be read at the dive location shall be used for all dives except SCUBA.	
	(2) Each depth gauge shall be dead-weight tested or calibrated against a master reference gauge every 6 months, and when there is a discrepancy greater than two percent (2 percent) of full scale between any two equivalent gauges.	
	(3) A cylinder pressure gauge capable of being monitored by the diver during the dive shall be worn by each SCUBA diver.	
	(4) A timekeeping device shall be available at each dive location.	
	(h) *Masks and helmets.*	
	(1) Surface-supplied air and mixed-gas masks and helmets shall have:	
	(i) A non-return valve at the attachment point between helmet or mask and hose which shall close readily and positively; and (ii) An exhaust valve.	
	(2) Surface-supplied air masks and helmets shall have a minimum ventilation rate capability of 4.5 acfm at any depth at which they are operated or the capability of maintaining the diver's inspired carbon dioxide partial pressure below 0.02 ATA when the diver is producing carbon dioxide at the rate of 1.6 standard liters per minute.	
	(i) *Oxygen safety.*	
	(1) Equipment used with oxygen or mixtures containing over forty percent (40%) by volume oxygen shall be designed for oxygen service.	
	(2) Components (except umbilicals) exposed to oxygen or mixtures containing over forty percent (40%) by volume oxygen shall be cleaned of flammable materials before use.	
	(3) Oxygen systems over 125 psig and compressed air systems over 500 psig shall have slow-opening shut-off valves.	
	(j) *Weights and harnesses.*	
	(1) Except when heavy gear is worn, divers shall be equipped with a weight belt or assembly capable of quick release.	

	(2) Except when heavy gear is worn or in SCUBA diving, each diver shall wear a safety harness with: (i) A positive buckling device; (ii) An attachment point for the umbilical to prevent strain on the mask or helmet; and (iii) A lifting point to distribute the pull force of the line over the diver's body.	

	1910.440 *RECORDKEEPING REQUIREMENTS.*	**Comments/Remarks/ Notes**
	(a) *Recording diving-related injuries and illnesses.*	
	(1) [Reserved]	
	(2) The employer shall record the occurrence of any diving-related injury or illness which requires any dive-team member to be hospitalized for 24 hours or more, specifying the circumstances of the incident and the extent of any injuries or illnesses.	
	(b) *Availability of records.*	
	(1) Upon the request of the Assistant Secretary of Labor [for OSHA], or the Director, National Institute for Occupational Safety and Health, Department of Health and Human Services or their designees, the employer shall make available for inspection and copying any record or document required by this standard.	
	(2) Records and documents required by this standard shall be provided upon request to employees, designated representatives, and the Assistant Secretary in accordance with 29 CFR 1910.1020 (a)-(e) and (g)-(i) (in 1996, 29 CFR 1910.20 was re-designated as 29 CFR 1910.1020). Safe practices manuals (29 CFR 1910.420), depth-time profiles (29 CFR 1910.422), decompression procedure assessment evaluations (29 CFR 1910.423), and records of hospitalizations (29 CFR 1910.440) shall be provided in the same manner as employee exposure records or analyses using exposure or medical records. Equipment inspections and testing records which pertain to employees (29 CFR 1910.430) shall also be provided upon request to employees and their designated representatives.	
	(3) Records and documents required by this standard shall be retained by the employer for the following period: (i) Dive-team member medical records (physician's reports) (29 CFR 1910.411) - 5 years; [NOTE: No longer required since 29 CFR 1910.411 was deleted from the standard]; (ii) Safe practices manual (29 CFR 1910.420) - current document only; (iii) Depth-time profile (29 CFR 1910.422) - until completion of the recording of the dive, or until completion of decompression procedure assessment where there has been an incident of decompression sickness; (iv) Recording of dive (29 CFR 1910.423) - 1 year, except 5 years where there has been an incident of decompression sickness; (v) Decompression procedure assessment evaluations (29 CFR 1910.423) - 5 years; (vi) Equipment inspections and testing records (29 CFR 1910.430) - current entry or tag, or until equipment is withdrawn from service; (vii) Records of hospitalizations (29 CFR 1910.440) - 5 years.	

	(4) After the expiration of the retention period of any record required to be kept for five (5) years, the employer shall forward such records to the National Institute for Occupational Safety and Health, Department of Health and Human Services. The employer shall also comply with any additional requirements set forth at 29 CFR 1910.1020(h) (in 1996, 29 CFR 1910.20 was re-designated as 29 CFR 1910.1020).	
	(5) In the event the employer ceases to do business: (i) The successor employer shall receive and retain all dive and employee medical records required by this standard; or (ii) If there is no successor employer, dive and employee medical records shall be forwarded to the National Institute for Occupational Safety and Health, Department of Health and Human Services.	

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Occupational Safety & Health Administration
200 Constitution Avenue, NW
Washington, DC 20210

OREGON OCCUPATIONAL SAFETY AND HEALTH STANDARDS

Oregon Administrative Rules, Chapter 437

DIVISION 2 (29 CFR 1910)
GENERAL OCCUPATIONAL SAFETY & HEALTH RULES

SUBDIVISION T:

COMMERCIAL DIVING OPERATIONS (1910.401 - 1910.441)

Oregon Occupational Safety and Health Division (OR-OSHA)
Department of Consumer and Business Services
Salem, Oregon 97301-3882

AO 4-2006

The Oregon Department of Consumer and Business Services adopted these rules pursuant to ORS 654.025(2).

The Secretary of State Designated OAR Chapter 437 as the "Oregon Occupational Safety and Health Code." Six general subject areas within this code are designated as "Divisions."

- **Division 1** General Administrative Rules
- **Division 2** General Occupational Safety and Health Rules
- **Division 3** Construction
- **Division 4** Agriculture
- **Division 5** Maritime Activities
- **Division 7** Forest Activities
- **Oregon Revised Statutes (ORS)** 654 The Oregon Safe Employment Act (OSEAct)

Oregon-initiated rules in this division of the Oregon Occupational Safety and Health Code are numbered in a uniform system developed by the Secretary of State. This system does not number the rules in sequence (001, 002, 003, etc.). Omitted numbers may be assigned to new rules at the time of their adoption.

Oregon-initiated rules are arranged in the following Basic Codification Structure adopted by the Secretary of State for Oregon Administrative Rules (OAR):

Chapter	Division	Rule	Section	Subsection	Paragraphs
437	*002*	*0322*	*(1)*	*(a)*	*(A)(i)(I)*

The majority of Oregon OSHA codes are adopted by reference from the Code of Federal Regulations (CFR), and are arranged in the following basic federal numbering system:

Chapter	Division	Part	Subpart (Subdivision)	Section	Paragraphs
437	002	1910	S	.303	(a)

The terms "subdivision" and "subpart" are synonymous within OAR 437, Oregon Occupational Safety and Health Code.

To obtain an order form or copies of these codes, address:

Department of Consumer & Business Services
Oregon Occupational Safety & Health Division (OR-OSHA)
350 Winter St. NE, Room 430
Salem, OR 97301-3882

Or call the OR-OSHA Resource Library at 503-378-3272

The rules referenced in this division are available for viewing in the Office of the Secretary of State, Administrative Rules and Office Document Section, Oregon State Archives Building, Salem, Oregon 97310, or the Central Office, Oregon Occupational Safety and Health Division of the Department of Consumer and Business Services, Room 430, 350 Winter St. NE Salem, OR 97301-3882. Please visit our web site at: www.orosha.org

COMMERCIAL DIVING OPERATIONS

NOTE: The following federal standards in **Division 2/T, Commercial Diving**, (29 CFR 1910.401 through .441) were adopted by reference by OR-OSHA Admin. Order 5-1993, filed 5/3/93, **EFFEC-TIVE 6/1/93**.

OAR 437, Division 86, Commercial Diving, was superseded and replaced on 6/1/93.

NOTE: Oregon OSHA adopted by reference corrections and technical amendments issued by federal OSHA and published in the Federal Register. Federal OSHA made simple corrections, deleted redundant provisions, and clarified and reorganized various other provisions throughout the standards. OR-OSHA Admin. Order 4-1997, filed 4/2/97, effective 4/2/97.

NOTE: On February 17, 2004, February OSHA published in the Federal Register (69:7351-7366) final new rules for Commercial Diving, 1910.401(a)(3) and 1910.402.

Oregon OSHA adopts these rules in Division 2/T, Commercial Diving Operations (CDO). These changes allow employers of recreational diving instructors and diving guides to comply with an alternative set of requirements instead of the decompression-chamber requirements in the current CDO standards. The final rule applies only when these employees engage in recreational diving instruction and diving-guide duties; use an open-circuit, a semi-closed-circuit, or a closed-circuit self- contained underwater-breathing apparatus supplied with a breathing gas that has a high percentage of oxygen mixed with nitrogen; dive to a maximum depth of 130 feet of sea water; and remain within the no-decompression limits specified for the partial pressure of nitrogen in the breathing-gas mix- ture. These alternate requirements essentially are the same as the terms of a variance granted by Federal OSHA to Dixie Divers, Inc. in 1999.

OR-OSHA Admin. Order 2-2004, filed and effective May 20, 2004.

NOTE: Oregon OSHA adopted Federal OSHA changes as they appear in the April 3, 2006 Federal Register. These revisions include updating references and removing obsolete effective dates and startup dates from existing rules in General Industry, Construction, and Maritime Activities. Two changes Federal OSHA made that we do not include in this rulemaking are to remove effective dates in 1910.266 and 1926.1092, neither of which OR-OSHA had adopted before. OR-OSHA Admin. Order 4-2006, filed and effective 7/24/06.

OAR 437-002-0340 is the Oregon-initiated rule which adopted by reference the federal standards. Several Oregon-initiated rules have been retained and renumbered as OAR 437-002-0342 through 0355. These are printed ***in italics*** in proximity to related federal standards.

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OAR 437, DIVISION 2

GENERAL OCCUPATIONAL SAFETY AND HEALTH RULES

SUBDIVISION T – COMMERCIAL DIVING OPERATIONS

437-002-0340 Adoption by Reference. *In addition to, and not in lieu of, any other safety and health codes contained in OAR Chapter 437, the Department adopts by reference the following federal rules as printed in the Code of Federal Regulations, 29 CFR 1910, revised as of 7/1/03, and any subsequent amendments published in the Federal Register as listed below:*

(1) 29 CFR 1910.401 **Scope and application**, published 7/22/77, Federal Register, vol. 42, p. 37668; amended 11/26/82, FR vol. 47, p. 53365; amended 2/17/04, FR vol. 69, p. 7351.

(2) 29 CFR 1910.402 **Definitions**, published 7/22/77, Federal Register, vol. 42, p. 37668; amended 11/26/82, FR vol. 47, p. 53365; amended 2/17/04, FR vol. 69, p. 7351.

(3) 29 CFR 1910.410 **Qualification of dive team**, published 7/22/77, Federal Register, vol. 42, p. 37668.

(4) 29 CFR 1910.420 **Safe practices manual**, published 7/22/77, Federal Register, vol. 42, p. 37668; amended 4/30/84, FR vol. 49, p. 18295.

(5) 29 CFR 1910.421 **Pre-dive procedures**, published 7/22/77, Federal Register, vol. 42, p. 37668; amended 4/6/82, FR vol. 47, p. 14706; 6/7/89, FR vol. 54, p. 24334.

(6) 29 CFR 1910.422 **Procedures during dive**, published 7/22/77, Federal Register, vol. 42, p. 37668.

(7) 29 CFR 1910.423 **Post-dive procedures**, published 7/22/77, Federal Register, vol. 42, p. 37668; amended 4/30/84, FR vol. 49, p. 18295.

(8) 29 CFR 1910.424 **SCUBA diving**, published 7/22/77, Federal Register, vol. 42, p. 37668.

(9) 29 CFR 1910.425 **Surface-supplied air diving**, published 7/22/77, Federal Register, vol. 42, p. 37668.

(10) 29 CFR 1910.426 **Mixed-gas diving**, published 7/22/77, Federal Register, vol. 42, p. 37668.

(11) 29 CFR 1910.427 **Liveboating**, published 7/22/77, Federal Register, vol. 42, p. 37668.

(12) 29 CFR 1910.430 **Equipment**, published 6/27/74, Federal Register, vol. 39, p. 23502; amended 4/30/84, FR vol. 49, p. 18295; 9/18/88, FR, vol. 51, p. 33033.

(13) 29 CFR 1910.440 **Recordkeeping requirements**, published 7/22/77, Federal Register, vol. 42, p. 37688; amended 5/23/80, FR vol. 45, p. 35281; 4/6/82, FR, vol. 47, p. 14706; 9/29/86, FR, vol. 51, p. 34562; 3/7/96, FR vol. 61, no. 46, p. 9242; 4/3/06, FR vol. 71, no. 63, p. 16669.

(14) 29 CFR 1910, Appendix A to Subdivision T, **Examples of conditions which may restrict or limit exposures to hyperbaric conditions**, published 7/22/77, Federal Register, vol. 42, p. 37668.

(15) 29 CFR 1910, Appendix B to Subdivision T, **Guidelines for scientific diving**, published 1/9/85, Federal Register, vol. 50, p. 1050.

(16) 29 CFR 1910, Appendix C to Subdivision T, **Alternative Conditions under §1910.401(a)(3) for Recreational Diving Instructors and Diving Guides (Mandatory)**, published 2/17/04, Federal Register, vol. 69, p. 7351.

These rules are available at the Oregon Occupational Safety and Health Division, Oregon Department of Consumer and Business Services, and the United States Government Printing Office.

Stat. Auth.: ORS 654.025(2) and 656.726(4).
Stats. Implemented: ORS 654.001 through 654.295.
Hist: OR-OSHA Admin. Order 5-1993, f. 5/3/93, ef. 6/1/93. OR-OSHA Admin. Order 4-1997, f. 4/2/97, ef. 4/2/97. OR-OSHA Admin. Order 2-2004, f. 5/20/04, ef. 5/20/04. OR-OSHA Admin. Order 4-2006, f. 7/24/06, ef. 7/24/06.

SUBDIVISION T

COMMERCIAL DIVING OPERATIONS

SUBDIVISION T – COMMERCIAL DIVING OPERATIONS

Authority: Sections 4, 6, and 8 of the Occupational Safety and Health Act of 1970 (29 U.S.C. 653, 655, and 657); Section 107, Contract Work Hours and Safety Standards Act (the Construction Safety Act) (40 U.S.C. 333); Section 41, Longshore and Harbor Workers' Compensation Act (33 U.S.C. 941); Secretary of Labor's Order No. 8-76 (41 FR 25059), 9-83 (48 FR 35736), 1-90 (55 FR 9033), 3-2000 (65 FR 50017), or 5-2002 (67 FR 65008), as applicable; 29 CFR part 1911.

General

§1910.401 Scope and Application.

(a) Scope.

(1) This subdivision (standard) applies to every place of employment within the waters of the United States, or within any State, the District of Columbia, the Commonwealth of Puerto Rico, the Virgin Islands, American Samoa, Guam, the Trust Territory of the Pacific Islands, Wake Island, Johnston Island, the Canal Zone, or within the Outer Continental Shelf lands as defined in the Outer Continental Shelf Lands Act (67 Stat. 462, 43 U.S.C. 1331), where diving and related support operations are performed.

(2) This standard applies to diving and related support operations conducted in connection with all types of work and employments, including general industry, construction, ship repairing, shipbuilding, shipbreaking and longshoring. However, this standard does not apply to any diving operation:

(i) Performed solely for instructional purposes, using open-circuit, compressed-air SCUBA and conducted within the no-decompression limits;

(ii) Performed solely for search, rescue, or related public safety purposes by or under the control of a governmental agency; or

(iii) Governed by 45 CFR Part 46 (Protection of Human Subjects, U.S. Department of Health and Human Services) or equivalent rules or regulations established by another federal agency, which regulate research, development, or related purposes involving human subjects.

(iv) Defined as scientific diving and which is under the direction and control of a diving program containing at least the following elements:

(A) Diving safety manual which includes at a minimum: Procedures covering all diving operations specific to the program; procedures for emergency care, including recompression and evacuation; and criteria for diver training and certification.

(B) Diving control (safety) board, with the majority of its members being active divers, which shall at a minimum have the authority to: Approve and monitor diving projects; review and revise the diving safety manual; assure compliance with the manual; certify the depths to which a diver has been trained; take disciplinary action for unsafe practices; and, assure adherence to the buddy system (a diver is accompanied by and is in continuous contact with another diver in the water) for SCUBA diving.

(3) Alternative requirements for recreational diving instructors and diving guides. Employers of recreational diving instructors and diving guides are not required to comply with the decompression-chamber requirements specified by paragraphs (b)(2) and (c)(3)(iii) of Sec. 1910.423 and paragraph (b)(1) of Sec. 1910.426 when they meet all of the following conditions:

(i) The instructor or guide is engaging solely in recreational diving instruction or dive-guiding operations;

(ii) The instructor or guide is diving within the no-decompression limits in these operations;

(iii) The instructor or guide is using a nitrox breathing-gas mixture consisting of a high percentage of oxygen (more than 22% by volume) mixed with nitrogen;

(iv) The instructor or guide is using an open-circuit, semi-closed-circuit, or closed-circuit self-contained underwater breathing apparatus (SCUBA); and

(v) The employer of the instructor or guide is complying with all requirements of Appendix C of this subpart.

(b) Application in emergencies. An employer may deviate from the requirements of this standard to the extent necessary to prevent or minimize a situation which is likely to cause death, serious physical harm, or major environmental damage, provided that the employer:

(1) Notifies the Area Director, Occupational Safety and Health Administration within 48 hours of the onset of the emergency situation indicating the nature of the emergency and extent of the deviation from the prescribed regulations; and

(2) Upon request from the Area Director, submits such information in writing.

(c) Employer obligation. The employer shall be responsible for compliance with:

(1) All provisions of this standard of general applicability; and

(2) All requirements pertaining to specific diving modes to the extent diving operations in such modes are conducted.

[42 FR 37668, July 22, 1977, as amended at 47 FR 53365, Nov. 26, 1982; 58 FR 35310, June 30, 1993]

Stat. Auth.: ORS 654.025(2) and 656.726(4).
Stats. Implemented: ORS 654.001 through 654.295.
Hist: OR-OSHA Admin. Order 5-1993, f. 5/3/93, ef. 6/1/93. OR-OSHA Admin. Order 2-2004, f. 5/20/04, ef. 5/20/04.

§1910.402 Definitions.

As used in this standard, the listed terms are defined as follows:

"Acfm": Actual cubic feet per minute.

"ASME Code or equivalent": ASME (American Society of Mechanical Engineers) Boiler and Pressure Vessel Code, Section VIII, or an equivalent code which the employer can demonstrate to be equally effective.

"ATA": Atmosphere absolute.

"Bell": An enclosed compartment, pressurized (closed bell) or unpressurized (open bell), which allows the diver to be transported to and from the underwater work area and which may be used as a temporary refuge during diving operations.

"Bottom time": The total elapsed time measured in minutes from the time when the diver leaves the surface in descent to the time that the diver begins ascent.

"Bursting pressure": The pressure at which a pressure containment device would fail structurally.

"Cylinder": A pressure vessel for the storage of gases.

"Decompression chamber": A pressure vessel for human occupancy such as a surface decompression chamber, closed bell, or deep diving system used to decompress divers and to treat decompression sickness.

"Decompression sickness": A condition with a variety of symptoms which may result from gas or bubbles in the tissues of divers after pressure reduction.

"Decompression table": A profile or set of profiles of depth-time relationships for ascent rates and breathing mixtures to be followed after a specific depth-time exposure or exposures.

437-002-0342 Additional Oregon Definition.

Depth *– The actual depth of the dive measured in feet below the water's surface. For purposes of determining pressure equivalents, these measurements are assumed to be salt water at 0.445 pounds per square inch per foot of depth (0.445 psi/ft depth). Fresh water equals 0.432 psi/ft depth.*

Stat. Auth.: ORS 654.025(2) and 656.726(4).
Stats. Implemented: ORS 654.001 through 654.295.
Hist: OR-OSHA Admin. Order 5-1993, f. 5/3/93, ef. 6/1/93. OR-OSHA Admin. Order 2-2004, f. 5/20/04, ef. 5/20/04.

"Dive-guiding operations" means leading groups of sports divers, who use an open-circuit, semi-closed-circuit, or closed-circuit self-contained underwater breathing apparatus, to local undersea diving locations for recreational purposes.

"Dive location": A surface or vessel from which a diving operation is conducted.

"Dive-location reserve breathing gas": A supply system of air or mixed-gas (as appropriate) at the dive location which is independent of the primary supply system and sufficient to support divers during the planned decompression.

"Dive team": Divers and support employees involved in a diving operation, including the designated person-in-charge.

"Diver": An employee working in water using under water apparatus which supplies compressed breathing gas at the ambient pressure.

"Diver-carried reserve breathing gas": A diver-carried supply of air or mixed gas (as appropriate) sufficient under standard operating conditions to allow the diver to reach the surface, or another source of breathing gas, or to be reached by a standby diver.

"Diving mode": A type of diving requiring specific equipment, procedures and techniques (SCUBA, surface-supplied air, or mixed gas).

"Fsw": Feet of seawater (or equivalent static pressure head).

"Heavy gear": Diver-worn deep-sea dress including helmet, breastplate, dry suit, and weighted shoes.

"Hyperbaric conditions": Pressure conditions in excess of surface pressure.

"Inwater stage": A suspended underwater platform which supports a diver in the water.

"Liveboating": The practice of supporting a surfaced-supplied air or mixed gas diver from a vessel which is underway.

"Mixed-gas diving": A diving mode in which the diver is supplied in the water with a breathing gas other than air.

"No-decompression limits": The depth-time limits of the "no-decompression limits and repetitive dive group designation table for no-decompression air dives", U.S. Navy Diving Manual or equivalent limits which the employer can demonstrate to be equally effective.

"Psi(g)": Pounds per square inch (gauge).

"Recreational diving instruction" means training diving students in the use of recreational diving procedures and the safe operation of diving equipment, including an open-circuit, semi-closed-circuit, or closed-circuit self-contained underwater breathing apparatus, during dives.

"Scientific diving" means diving performed solely as a necessary part of a scientific, research, or educational activity by employees whose sole purpose for diving is to perform scientific research tasks. Scientific diving does not include performing any tasks usually associated with commercial diving such as: Placing or removing heavy objects underwater; inspection of pipelines and similar objects; construction; demolition; cutting or welding; or the use of explosives.

"SCUBA diving": A diving mode independent of surface supply in which the diver uses open circuit self-contained underwater breathing apparatus.

"Standby diver": A diver at the dive location available to assist a diver in the water.

"Surface-supplied air diving": A diving mode in which the diver in the water is supplied from the dive location with compressed air for breathing.

"Treatment table": A depth-time and breathing gas profile designed to treat decompression sickness.

"Umbilical": The composite hose bundle between a dive location and a diver or bell, or between a diver and a bell, which supplies the diver or bell with breathing gas, communications, power, or heat as appropriate to the diving mode or conditions, and includes a safety line between the diver and the dive location.

"Volume tank": A pressure vessel connected to the outlet of a compressor and used as an air reservoir.

"Working pressure": The maximum pressure to which a pressure containment device may be exposed under standard operating conditions.

[42 FR 37668, July 22, 1977, as amended at 47 FR 53365, Nov. 26, 1982]

Stat. Auth.: ORS 654.025(2) and 656.726(4).
Stats. Implemented: ORS 654.001 through 654.295.
Hist: OR-OSHA Admin. Order 5-1993, f. 5/3/93, ef. 6/1/93. OR-OSHA Admin. Order 2-2004, f. 5/20/04, ef. 5/20/04.

Personnel Requirements

§1910.410 Qualifications of Dive Team.

(a) General.

(1) Each dive team member shall have the experience or training necessary to perform assigned tasks in a safe and healthful manner.

(2) Each dive team member shall have experience or training in the following:

(i) The use of tools, equipment and systems relevant to assigned tasks;

(ii) Techniques of the assigned diving mode; and

(iii) Diving operations and emergency procedures.

(3) All dive team members shall be trained in cardiopulmonary resuscitation and first aid (American Red Cross standard course or equivalent).

(4) Dive team members who are exposed to or control the exposure of others to hyperbaric conditions shall be trained in diving-related physics and physiology.

(b) Assignments.

(1) Each dive team member shall be assigned tasks in accordance with the employee's experience or training, except that limited additional tasks may be assigned to an employee undergoing training provided that these tasks are performed under the direct supervision of an experienced dive team member.

(2) The employer shall not require a dive team member to be exposed to hyperbaric conditions against the employee's will, except when necessary to complete decompression or treatment procedures.

(3) The employer shall not permit a dive team member to dive or be otherwise exposed to hyperbaric conditions for the duration of any temporary physical impairment or condition which is known to the employer and is likely to affect adversely the safety or health of a dive team member.

(c) Designated person-in-charge.

(1) The employer or an employee designated by the employer shall be at the dive location in charge of all aspects of the diving operation affecting the safety and health of dive team members.

(2) The designated person-in-charge shall have experience and training in the conduct of the assigned diving operation.

Stat. Auth.: ORS 654.025(2) and 656.726(4).
Stats. Implemented: ORS 654.001 through 654.295.
Hist: OR-OSHA Admin. Order 5-1993, f. 5/3/93, ef. 6/1/93.

General Operations Procedures

§1910.420 Safe Practices Manual.

(a) General. The employer shall develop and maintain a safe practices manual which shall be made available at the dive location to each dive team member.

(b) Contents.

(1) The safe practices manual shall contain a copy of this standard and the employer's policies for implementing the requirements of this standard.

(2) For each diving mode engaged in, the safe practices manual shall include:

(i) Safety procedures and checklists for diving operations;

(ii) Assignments and responsibilities of the dive team members;

(iii) Equipment procedures and checklists; and

(iv) Emergency procedures for fire, equipment failure, adverse environmental conditions, and medical illness and injury.

(The information collection requirements contained in paragraph (b) were approved by the Office of Management and Budget under control number 1218-0069)

[42 FR 37668, July 22, 1977, as amended at 49 FR 18295, Apr. 30, 1984]

Stat. Auth.: ORS 654.025(2) and 656.726(4).
Stats. Implemented: ORS 654.001 through 654.295.
Hist: OR-OSHA Admin. Order 5-1993, f. 5/3/93, ef. 6/1/93.

§1910.421 Pre-Dive Procedures.

(a) General. The employer shall comply with the following requirements prior to each diving operation, unless otherwise specified.

(b) Emergency aid. A list shall be kept at the dive location of the telephone or call numbers of the following:

(1) An operational decompression chamber (if not at the dive location);

(2) Accessible hospitals;

(3) Available physicians;

(4) Available means of transportation; and

(5) The nearest U.S. Coast Guard Rescue Coordination Center.

437-002-0345 Inland Emergency Aid. *If conducting inland dive operation, the telephone or call numbers of the nearest local sheriff's office shall be included on the "Emergency Aid" list.*

Stat. Auth.: ORS 654.025(2) and 656.726(4).
Stats. Implemented: ORS 654.001 through 654.295.
Hist: WCD Admin. Order, Safety 3-1978, f. 5/30/78, ef. 7/15/78.
OR-OSHA Admin. Order 5-1993, f. 5/3/93, ef. 6/1/93.

(c) First aid supplies.

(1) A first aid kit appropriate for the diving operation and approved by a physician shall be available at the dive location.

(2) When used in a decompression chamber or bell, the first aid kit shall be suitable for use under hyperbaric conditions.

(3) In addition to any other first aid supplies, an American Red Cross standard first aid handbook or equivalent, and a bag-type manual resuscitator with transparent mask and tubing shall be available at the dive location.

(d) Planning and assessment. Planning of a diving operation shall include an assessment of the safety and health aspects of the following:

(1) Diving mode;

(2) Surface and underwater conditions and hazards;

(3) Breathing gas supply (including reserves);

(4) Thermal protection;

(5) Diving equipment and systems;

(6) Dive team assignments and physical fitness of dive team members (including any impairment known to the employer);

(7) Repetitive dive designation or residual inert gas status of dive team members;

(8) Decompression and treatment procedures (including altitude corrections); and

(9) Emergency procedures.

(e) Hazardous activities. To minimize hazards to the dive team, diving operations shall be coordinated with other activities in the vicinity which are likely to interfere with the diving operation.

(f) Employee briefing.

(1) Dive team members shall be briefed on:

(i) The tasks to be undertaken;

(ii) Safety procedures for the diving mode;

(iii) Any unusual hazards or environmental conditions likely to affect the safety of the diving operation; and

(iv) Any modifications to operating procedures necessitated by the specific diving operation.

(2) Prior to making individual dive team member assignments, the employer shall inquire into the dive team member's current state of physical fitness, and indicate to the dive team member the procedure for reporting physical problems or adverse physiological effects during and after the dive.

(g) Equipment inspection. The breathing gas supply system including reserve breathing gas supplies, masks, helmets, thermal protection, and bell handling mechanism (when appropriate) shall be inspected prior to each dive.

(h) Warning signal. When diving from surfaces other than vessels in areas capable of supporting marine traffic, a rigid replica of the international code flag "A" at least one meter in height shall be displayed at the dive location in a manner which allows all-round visibility, and shall be illuminated during night diving operations.

(The information collection requirements contained in paragraphs (b)(1) and (b)(5) were approved by the Office of Management and Budget under control number 1218-0058)

[42 FR 37668, July 22, 1977, as amended at 47 FR 14706, Apr. 6, 1982; 54 FR 24334, June 7, 1989]

Stat. Auth.: ORS 654.025(2) and 656.726(4).
Stats. Implemented: ORS 654.001 through 654.295.
Hist: OR-OSHA Admin. Order 5-1993, f. 5/3/93, ef. 6/1/93.

§1910.422 Procedures During Dive.

(a) General. The employer shall comply with the following requirements which are applicable to each diving operation unless otherwise specified.

(b) Water entry and exit.

(1) A means capable of supporting the diver shall be provided for entering and exiting the water.

(2) The means provided for exiting the water shall extend below the water surface.

(3) A means shall be provided to assist an injured diver from the water or into a bell.

(c) Communications.

(1) An operational two-way voice communication system shall be used between:

(i) Each surface-supplied air or mixed-gas diver and a dive team member at the dive location or bell (when provided or required); and

(ii) The bell and the dive location.

(2) An operational, two-way communication system shall be available at the dive location to obtain emergency assistance.

(d) Decompression tables. Decompression, repetitive, and no-decompression tables (as appropriate) shall be at the dive location.

(e) Dive profiles. A depth-time profile, including when appropriate any breathing gas changes, shall be maintained for each diver during the dive including decompression.

(f) Hand-held power tools and equipment.

(1) Hand-held electrical tools and equipment shall be de-energized before being placed into or retrieved from the water.

(2) Hand-held power tools shall not be supplied with power from the dive location until requested by the diver.

(g) Welding and burning.

(1) A current supply switch to interrupt the current flow to the welding or burning electrode shall be:

(i) Tended by a dive team member in voice communication with the diver performing the welding or burning; and

(ii) Kept in the open position except when the diver is welding or burning.

(2) The welding machine frame shall be grounded.

(3) Welding and burning cables, electrode holders, and connections shall be capable of carrying the maximum current required by the work, and shall be properly insulated.

(4) Insulated gloves shall be provided to divers performing welding and burning operations.

(5) Prior to welding or burning on closed compartments, structures or pipes, which contain a flammable vapor or in which a flammable vapor may be generated by the work, they shall be vented, flooded, or purged with a mixture of gases which will not support combustion.

(h) Explosives.

(1) Employers shall transport, store, and use explosives in accordance with this section and the applicable provisions of §1910.109 and §1926.912 of Title 29 of the Code of Federal Regulations.

(2) Electrical continuity of explosive circuits shall not be tested until the diver is out of the water.

(3) Explosives shall not be detonated while the diver is in the water.

(i) Termination of dive. The working interval of a dive shall be terminated when:

(1) A diver requests termination;

(2) A diver fails to respond correctly to communications or signals from a dive team member;

(3) Communications are lost and can not be quickly re-established between the diver and a dive team member at the dive location, and between the designated person-in-charge and the person controlling the vessel in liveboating operations; or

(4) A diver begins to use diver-carried reserve breathing gas or the dive-location reserve breathing gas.

Stat. Auth.: ORS 654.025(2) and 656.726(4).
Stats. Implemented: ORS 654.001 through 654.295.
Hist: OR-OSHA Admin. Order 5-1993, f. 5/3/93, ef. 6/1/93.

§1910.423 Post-Dive Procedures.

(a) General. The employer shall comply with the following requirements which are applicable after each diving operation, unless otherwise specified.

(b) Precautions.

(1) After the completion of any dive, the employer shall:

(i) Check the physical condition of the diver;

(ii) Instruct the diver to report any physical problems or adverse physiological effects including symptoms of decompression sickness;

(iii) Advise the diver of the location of a decompression chamber which is ready for use; and

(iv) Alert the diver to the potential hazards of flying after diving.

(2) For any dive outside the no-decompression limits, deeper than 100 fsw or using mixed gas as a breathing mixture, the employer shall instruct the diver to remain awake and in the vicinity of the decompression chamber which is at the dive location for at least one hour after the dive (including decompression or treatment as appropriate).

(c) Recompression capability.

(1) A decompression chamber capable of recompressing the diver at the surface to a minimum of 165 fsw (6 ATA) shall be available at the dive location for:

(i) Surface-supplied air diving to depths deeper than 100 fsw and shallower than 220 fsw;

(ii) Mixed gas diving shallower than 300 fsw; or

(iii) Diving outside the no-decompression limits shallower than 300 fsw.

(2) A decompression chamber capable of recompressing the diver at the surface to the maximum depth of the dive shall be available at the dive location for dives deeper than 300 fsw.

(3) The decompression chamber shall be:

(i) Dual-lock;

(ii) Multiplace; and

(iii) Located within 5 minutes of the dive location.

(4) The decompression chamber shall be equipped with:

(i) A pressure gauge for each pressurized compartment designed for human occupancy;

(ii) A built-in-breathing-system with a minimum of one mask per occupant;

(iii) A two-way voice communication system between occupants and a dive team member at the dive location;

(iv) A viewport; and

(v) Illumination capability to light the interior.

(5) Treatment tables, treatment gas appropriate to the diving mode, and sufficient gas to conduct treatment shall be available at the dive location.

(6) A dive team member shall be available at the dive location during and for at least one hour after the dive to operate the decompression chamber (when required or provided).

(d) Record of dive.

(1) The following information shall be recorded and maintained for each diving operation:

(i) Names of dive team members including designated person-in-charge;

(ii) Date, time, and location;

(iii) Diving modes used;

(iv) General nature of work performed;

(v) Approximate underwater and surface conditions (visibility, water temperature and current); and

(vi) Maximum depth and bottom time for each diver.

(2) For each dive outside the no-decompression limits, deeper than 100 fsw or using mixed gas, the following additional information shall be recorded and maintained:

(i) Depth-time and breathing gas profiles;

(ii) Decompression table designation (including modification); and

(iii) Elapsed time since last pressure exposure if less than 24 hours or repetitive dive designation for each diver.

(3) For each dive in which decompression sickness is suspected or symptoms are evident, the following additional information shall be recorded and maintained:

(i) Description of decompression sickness symptoms (including depth and time of onset); and

(ii) Description and results of treatment.

(e) Decompression procedure assessment. The employer shall:

(1) Investigate and evaluate each incident of decompression sickness based on the recorded information, consideration of the past performance of decompression table used, and individual susceptibility;

(2) Take appropriate corrective action to reduce the probability of recurrence of decompression sickness; and

(3) Prepare a written evaluation of the decompression procedure assessment, including any corrective action taken, within 45 days of the incident of decompression sickness.

(The information collection requirements contained in paragraphs (d) and (e) were approved by the Office of Management and Budget under control number 1218-0069)

[42 FR 37668, July 22, 1977, as amended at 49 FR 18295, Apr. 30, 1984]

Stat. Auth.: ORS 654.025(2) and 656.726(4).
Stats. Implemented: ORS 654.001 through 654.295.
Hist: OR-OSHA Admin. Order 5-1993, f. 5/3/93, ef. 6/1/93.

Specific Operations Procedures

§1910.424 Scuba Diving.

(a) General. Employers engaged in SCUBA diving shall comply with the following requirements, unless otherwise specified.

(b) Limits. SCUBA diving shall not be conducted:

(1) At depths deeper than 130 fsw;

(2) At depths deeper than 100 fsw or outside the no-decompression limits unless a decompression chamber is ready for use;

(3) Against currents exceeding one (1) knot unless line-tended; or

(4) In enclosed or physically confining spaces unless line-tended.

(c) Procedures.

(1) A standby diver shall be available while a diver is in the water.

(2) A diver shall be line-tended from the surface, or accompanied by another diver in the water in continuous visual contact during the diving operations.

(3) A diver shall be stationed at the underwater point of entry when diving is conducted in enclosed or physically confining spaces.

(4) A diver-carried reserve breathing gas supply shall be provided for each diver consisting of:

(i) A manual reserve (J valve); or

(ii) An independent reserve cylinder with a separate regulator or connected to the underwater breathing apparatus.

(5) The valve of the reserve breathing gas supply shall be in the closed position prior to the dive.

Stat. Auth.: ORS 654.025(2) and 656.726(4).
Stats. Implemented: ORS 654.001 through 654.295.
Hist: OR-OSHA Admin. Order 5-1993, f. 5/3/93, ef. 6/1/93.

§1910.425 Surface-Supplied Air Diving.

(a) General. Employers engaged in surface-supplied air diving shall comply with the following requirements, unless otherwise specified.

(b) Limits.

(1) Surface-supplied air diving shall not be conducted at depths deeper than 190 fsw, except that dives with bottom times of 30 minutes or less may be conducted to depths of 220 fsw.

(2) A decompression chamber shall be ready for use at the dive location for any dive outside the no-decompression limits or deeper than 100 fsw.

(3) A bell shall be used for dives with an inwater decompression time greater than 120 minutes, except when heavy gear is worn or diving is conducted in physically confining spaces.

(c) Procedures.

(1) Each diver shall be continuously tended while in the water.

(2) A diver shall be stationed at the underwater point of entry when diving is conducted in enclosed or physically confining spaces.

(3) Each diving operation shall have a primary breathing gas supply sufficient to support divers for the duration of the planned dive including decompression.

(4) For dives deeper than 100 fsw or outside the no-decompression limits:

(i) A separate dive team member shall tend each diver in the water;

(ii) A standby diver shall be available while a diver is in the water;

(iii) A diver-carried reserve breathing gas supply shall be provided for each diver except when heavy gear is worn; and

(iv) A dive-location reserve breathing gas supply shall be provided.

(5) For heavy-gear diving deeper than 100 fsw or outside the no-decompression limits:

(i) An extra breathing gas hose capable of supplying breathing gas to the diver in the water shall be available to the standby diver.

(ii) An in-water stage shall be provided to divers in the water.

(6) Except when heavy gear is worn or where physical space does not permit, a diver-carried reserve breathing gas supply shall be provided whenever the diver is prevented by the configuration of the dive area from ascending directly to the surface.

Stat. Auth.: ORS 654.025(2) and 656.726(4).
Stats. Implemented: ORS 654.001 through 654.295.
Hist: OR-OSHA Admin. Order 5-1993, f. 5/3/93, ef. 6/1/93.

§1910.426 Mixed-Gas Diving.

(a) General. Employers engaged in mixed-gas diving shall comply with the following requirements, unless otherwise specified.

(b) Limits. Mixed-gas diving shall be conducted only when:

(1) A decompression chamber is ready for use at the dive location; and

(i) A bell is used at depths greater than 220 fsw or when the dive involves inwater decompression time of greater than 120 minutes, except when heavy gear is worn or when diving in physically confining spaces; or

(ii) A closed bell is used at depths greater than 300 fsw, except when diving is conducted in physically confining spaces.

(c) Procedures.

(1) A separate dive team member shall tend each diver in the water.

(2) A standby diver shall be available while a diver is in the water.

(3) A diver shall be stationed at the underwater point of entry when diving is conducted in enclosed or physically confining spaces.

(4) Each diving operation shall have a primary breathing gas supply sufficient to support divers for the duration of the planned dive including decompression.

(5) Each diving operation shall have a dive-location reserve breathing gas supply.

(6) When heavy gear is worn:

(i) An extra breathing gas hose capable of supplying breathing gas to the diver in the water shall be available to the standby diver; and

(ii) An inwater stage shall be provided to divers in the water.

(7) An inwater stage shall be provided for divers without access to a bell for dives deeper than 100 fsw or outside the no-decompression limits.

(8) When a closed bell is used, one dive team member in the bell shall be available and tend the diver in the water.

(9) Except when heavy gear is worn or where physical space does not permit, a diver-carried reserve breathing gas supply shall be provided for each diver:

(i) Diving deeper than 100 fsw or outside the no-decompression limits; or

(ii) Prevented by the configuration of the dive area from directly ascending to the surface.

Stat. Auth.: ORS 654.025(2) and 656.726(4).
Stats. Implemented: ORS 654.001 through 654.295.
Hist: OR-OSHA Admin. Order 5-1993, f. 5/3/93, ef. 6/1/93.

§1910.427 Liveboating.

(a) General. Employers engaged in diving operations involving liveboating shall comply with the following requirements.

(b) Limits. Diving operations involving liveboating shall not be conducted:

(1) With an inwater decompression time of greater than 120 minutes;

(2) Using surface-supplied air at depths deeper than 190 fsw, except that dives with bottom times of 30 minutes or less may be conducted to depths of 220 fsw;

(3) Using mixed gas at depths greater than 220 fsw;

(4) In rough seas which significantly impede diver mobility or work function; or

(5) In other than daylight hours.

(c) Procedures.

(1) The propeller of the vessel shall be stopped before the diver enters or exits the water.

(2) A device shall be used which minimizes the possibility of entanglement of the diver's hose in the propeller of the vessel.

(3) Two-way voice communication between the designated person-in-charge and the person controlling the vessel shall be available while the diver is in the water.

(4) A standby diver shall be available while a diver is in the water.

(5) A diver-carried reserve breathing gas supply shall be carried by each diver engaged in liveboating operations.

Stat. Auth.: ORS 654.025(2) and 656.726(4).
Stats. Implemented: ORS 654.001 through 654.295.
Hist: OR-OSHA Admin. Order 5-1993, f. 5/3/93, ef. 6/1/93.

Equipment Procedures and Requirements

§1910.430 Equipment.

(a) General.

(1) All employers shall comply with the following requirements, unless otherwise specified.

(2) Each equipment modification, repair, test, calibration or maintenance service shall be recorded by means of a tagging or logging system, and include the date and nature of work performed, and the name or initials of the person performing the work.

437-002-0355 Air Supply Systems (Compressed Gases and Air).

(1) *For purposes of this standard, air supply systems shall include:*

(a) *Air supplied directly to a diver;*

(b) *Compressed systems used to fill air cylinders (tanks);*

(c) *Compressed air cylinders (tanks); and*

(d) *Compressed oxygen cylinder.*

(e) *For additional requirements for compressed gas cylinders, see OAR Division 2/H, 1910.101, Compressed Gases; Division 2/I, 1910.134(d), Respiratory Protection; and 30 CFR 11, Respiratory Protective Devices.*

(b) Air compressor system.

(1) Compressors used to supply air to the diver shall be equipped with a volume tank with a check valve on the inlet side, a pressure gauge, a relief valve, and a drain valve.

(2) Air compressor intakes shall be located away from areas containing exhaust or other contaminants.

(3) Respirable air supplied to a diver shall not contain:

(i) A level of carbon monoxide (CO) greater than 20 p/m;

(ii) A level of carbon dioxide (CO_2) greater than 1,000 p/m;

(iii) A level of oil mist greater than 5 milligrams per cubic meter; or

(iv) A noxious or pronounced odor.

(4) The output of air compressor systems shall be tested for air purity every 6 months by means of samples taken at the connection to the distribution system, except that non-oil lubricated compressors need not be tested for oil mist.

437-002-0355(2) *Tests for carbon monoxide shall be conducted on the air in air supply systems as follows:*

(a) *At least daily for air supplied directly to the diver; and*

(b) *At least once for each group or batch of cylinders filled or purchased.*

(c) Breathing gas supply hoses.

(1) Breathing gas supply hoses shall:

(i) Have a working pressure at least equal to the working pressure of the total breathing gas system;

(ii) Have a rated bursting pressure at least equal to 4 times the working pressure;

(iii) Be tested at least annually to 1.5 times their working pressure; and

(iv) Have their open ends taped, capped or plugged when not in use.

(2) Breathing gas supply hose connectors shall:

(i) Be made of corrosion-resistant materials;

(ii) Have a working pressure at least equal to the working pressure of the hose to which they are attached; and

(iii) Be resistant to accidental disengagement.

(3) Umbilicals shall:

(i) Be marked in 10-foot increments to 100 feet beginning at the diver's end, and in 50 foot increments thereafter;

(ii) Be made of kink-resistant materials; and

(iii) Have a working pressure greater than the pressure equivalent to the maximum depth of the dive (relative to the supply source) plus 100 psi.

437-002-0355(3) *The employer shall insure that the requirements of 1910.430(d) through 1910.430(i) are met, regardless of where compressed gas cylinder (tanks) are purchased or filled.*

Stat. Auth.: ORS 654.025(2) and 656.726(4).
Stats. Implemented: ORS 654.001 through 654.295.
Hist: WCD Admin. Order, Safety 3-1978, f. 5/30/78, ef. 7/15/78.
OR-OSHA Admin. Order 5-1993, f. 5/3/93, ef. 6/1/93.

(d) Buoyancy control.

(1) Helmets or masks connected directly to the dry suit or other buoyancy-changing equipment shall be equipped with an exhaust valve.

(2) A dry suit or other buoyancy-changing equipment not directly connected to the helmet or mask shall be equipped with an exhaust valve.

(3) When used for SCUBA diving, a buoyancy compensator shall have an inflation source separate from the breathing gas supply.

(4) An inflatable flotation device capable of maintaining the diver at the surface in a face-up position, having a manually activated inflation source independent of the breathing supply, an oral inflation device, and an exhaust valve shall be used for SCUBA diving.

(e) Compressed gas cylinders. Compressed gas cylinders shall:

(1) Be designed, constructed and maintained in accordance with the applicable provisions of 29 CFR 1910.101 and 1910.169 through 1910.171.

(2) Be stored in a ventilated area and protected from excessive heat;

(3) Be secured from falling; and

(4) Have shut-off valves recessed into the cylinder or protected by a cap, except when in use or manifolded, or when used for SCUBA diving.

(f) Decompression chambers.

(1) Each decompression chamber manufactured after the effective date of this standard, shall be built and maintained in accordance with the ASME Code or equivalent.

(2) Each decompression chamber manufactured prior to the effective date of this standard shall be maintained in conformity with the code requirements to which it was built, or equivalent.

(3) Each decompression chamber shall be equipped with:

(i) Means to maintain the atmosphere below a level of 25 percent oxygen by volume;

(ii) Mufflers on intake and exhaust lines, which shall be regularly inspected and maintained;

(iii) Suction guards on exhaust line openings; and

(iv) A means for extinguishing fire, and shall be maintained to minimize sources of ignition and combustible material.

(g) Gauges and timekeeping devices.

(1) Gauges indicating diver depth which can be read at the dive location shall be used for all dives except SCUBA.

(2) Each depth gauge shall be deadweight tested or calibrated against a master reference gauge every 6 months, and when there is a discrepancy greater than two percent (2 percent) of full scale between any two equivalent gauges.

(3) A cylinder pressure gauge capable of being monitored by the diver during the dive shall be worn by each SCUBA diver.

(4) A timekeeping device shall be available at each dive location.

(h) Masks and helmets.

(1) Surface-supplied air and mixed-gas masks and helmets shall have:

(i) A non-return valve at the attachment point between helmet or mask and hose which shall close readily and positively; and

(ii) An exhaust valve.

(2) Surface-supplied air masks and helmets shall have a minimum ventilation rate capability of 4.5 acfm at any depth at which they are operated or the capability of maintaining the diver's inspired carbon dioxide partial pressure below 0.02 ATA when the diver is producing carbon dioxide at the rate of 1.6 standard liters per minute.

(i) Oxygen safety.

(1) Equipment used with oxygen or mixtures containing over forty percent (40%) by volume oxygen shall be designed for oxygen service.

(2) Components (except umbilicals) exposed to oxygen or mixtures containing over forty percent (40%) by volume oxygen shall be cleaned of flammable materials before use.

(3) Oxygen systems over 125 psig and compressed air systems over 500 psig shall have slow-opening shut-off valves.

(j) Weights and harnesses.

(1) Except when heavy gear is worn, divers shall be equipped with a weight belt or assembly capable of quick release.

(2) Except when heavy gear is worn or in SCUBA diving, each diver shall wear a safety harness with:

(i) A positive buckling device;

(ii) An attachment point for the umbilical to prevent strain on the mask or helmet; and

(iii) A lifting point to distribute the pull force of the line over the diver's body.

(The information collection requirements contained in paragraph (a)(2) were approved by the Office of Management and Budget under control number 1218-0069)

[39 FR 23502, June 27, 1974, as amended at 49 FR 18295, Apr. 30, 1984; 51 FR 33033, Sept. 18, 1986]

Stat. Auth.: ORS 654.025(2) and 656.726(3).
Stats. Implemented: ORS 654.001 through 654.295.
Hist: OR-OSHA Admin. Order 5-1993, f. 5/3/93, ef. 6/1/93.

Recordkeeping

§1910.440 Recordkeeping Requirements.

(a)

(1) (Reserved)

(2) The employer shall record the occurrence of any diving-related injury or illness which requires any dive team member to be hospitalized for 24 hours or more, specifying the circumstances of the incident and the extent of any injuries or illnesses.

(b) Availability of records.

(1) Upon the request of the Assistant Secretary of Labor for Occupational Safety and Health, or the Director, National Institute for Occupational Safety and Health, Department of Health and Human Services of their designees, the employer shall make available for inspection and copying any record or document required by this standard.

(2) Records and documents required by this standard shall be provided upon request to employees, designated representatives, and the Assistant Secretary in accordance with 29 CFR 1910.1020(a) through (e) and (g) through (i). Safe practices manuals (§1910.420), depth-time profiles (§1910.422), recordings of dives (§1910.423), decompression procedure assessment evaluations (§1910.423), and records of hospitalizations (§1910.440) shall be provided in the same manner as employee exposure records or analyses using exposure or medical records. Equipment inspections and testing records which pertain to employees (§1910.430) shall also be provided upon request to employees and their designated representatives.

(3) Records and documents required by this standard shall be retained by the employer for the following period:

(i) Dive team member medical records (physician's reports) (§1910.411) – 5 years;

(ii) Safe practices manual (§1910.420) – current document only;

(iii) Depth-time profile (§1910.422) – until completion of the recording of dive, or until completion of decompression procedure assessment where there has been an incident of decompression sickness;

(iv) Recording of dive (§1910.423) – 1 year, except 5 years where there has been an incident of decompression sickness;

(v) Decompression procedure assessment evaluations (§1910.423) – 5 years;

(vi) Equipment inspections and testing records (§1910.430) – current entry or tag, or until equipment is withdrawn from service;

(vii) Records of hospitalizations (§1910.440) – 5 years.

(4) After the expiration of the retention period of any record required to be kept for five (5) years, the employer shall forward such records to the National Institute for Occupational Safety and Health, Department of Health and Human Services. The employer shall also comply with any additional requirements set forth at 29 CFR 1910.1020(h).

(5) In the event the employer ceases to do business:

(i) The successor employer shall receive and retain all dive and employee medical records required by this standard; or

(ii) If there is no successor employer, dive and employee medical records shall be forwarded to the National Institute for Occupational Safety and Health, Department of Health and Human Services.

(Approved by the Office of Management and Budget under control number 1218-0058)

[42 FR 37668, July 22, 1977, as amended at 45 FR 35281, May 23, 1980; 47 FR 14706, Apr. 6, 1982; 51 FR 34562, Sept. 29, 1986; 61 FR 9242, Mar. 7, 1996]

Stat. Auth.: ORS 654.025(2) and 656.726(4).
Stats. Implemented: ORS 654.001 through 654.295.
Hist: OR-OSHA Admin. Order 5-1993, f. 5/3/93, ef. 6/1/93. OR-OSHA Admin. Order 4-1997, f. 4/2/97, ef. 4/2/97. OR-OSHA Admin. Order 4-2006, f. 7/24/06, ef. 7/24/06.

Appendix A to Subdivision T – Examples of Conditions Which May Restrict or Limit Exposure to Hyperbaric Conditions

The following disorders may restrict or limit occupational exposure to hyperbaric conditions depending on severity, presence of residual effects, response to therapy, number of occurrences, diving mode, or degree and duration of isolation.

History of seizure disorder other than early febrile convulsions.

Malignancies (active) unless treated and without recurrence for 5 years.

Chronic inability to equalize sinus and/or middle ear pressure.

Cystic or cavitary disease of the lungs.

Impaired organ function caused by alcohol or drug use.

Conditions requiring continuous medication for control (e.g., antihistamines, steroids, barbiturates, mood-altering drugs, or insulin).

Meniere's disease.

Hemoglobinopathies.

Obstructive or restrictive lung disease.

Vestibular end organ destruction.

Pneumothorax.

Cardiac abnormalities (e.g., pathological heart block, valvular disease, intraventricular conduction defects other than isolated right bundle branch block, angina pectoris, arrhythmia, coronary artery disease).

Juxta-articular osteonecrosis.

Stat. Auth.: ORS 654.025(2) and 656.726(4).
Stats. Implemented: ORS 654.001 through 654.295.
Hist: OR-OSHA Admin. Order 5-1993, f. 5/3/93, ef. 6/1/93.

Appendix B to Subdivision T – Guidelines For Scientific Diving

This appendix contains guidelines that will be used in conjunction with §1910.401(a)(2)(iv) to determine those scientific diving programs which are exempt from the requirements for commercial diving. The guidelines are as follows:

1. The Diving Control Board consists of a majority of active scientific divers and has autonomous and absolute authority over the scientific diving program's operations.

2. The purpose of the project using scientific diving is the advancement of science; therefore, information and data resulting from the project are non-proprietary.

3. The tasks of a scientific diver are those of an observer and data gatherer. Construction and troubleshooting tasks traditionally associated with commercial diving are not included within scientific diving.

4. Scientific divers, based on the nature of their activities, must use scientific expertise in studying the underwater environment and, therefore, are scientists or scientists in training.

[50 FR 1050, Jan. 9, 1985]

Stat. Auth.: ORS 654.025(2) and 656.726(4).
Stats. Implemented: ORS 654.001 through 654.295.
Hist: OR-OSHA Admin. Order 5-1993, f. 5/3/93, ef. 6/1/93.

Appendix C to Subdivision T – Alternative Conditions Under §1910.401(a)(3) for Recreational Diving Instructors and Diving Guides (Mandatory)

Paragraph (a)(3) of §1910.401 specifies that an employer of recreational diving instructors and diving guides (hereafter, "divers" or "employees") who complies with all of the conditions of this appendix need not provide a decompression chamber for these divers as required under §§1910.423(b)(2) or (c)(3) or 1910.426(b)(1).

1. Equipment Requirements for Rebreathers.

(a) The employer must ensure that each employee operates the rebreather (i.e., semi-closed-circuit and closed-circuit self-contained underwater breathing apparatuses (hereafter, "SCUBAs")) according to the rebreather manufacturer's instructions.

(b) The employer must ensure that each rebreather has a counterlung that supplies a sufficient volume of breathing gas to their divers to sustain the divers' respiration rates, and contains a baffle system and/or other moisture separating system that keeps moisture from entering the scrubber.

(c) The employer must place a moisture trap in the breathing loop of the rebreather, and ensure that:

(i) The rebreather manufacturer approves both the moisture trap and its location in the breathing loop; and

(ii) Each employee uses the moisture trap according to the rebreather manufacturer's instructions.

(d) The employer must ensure that each rebreather has a continuously functioning moisture sensor, and that:

(i) The moisture sensor connects to a visual (e.g., digital, graphic, analog) or auditory (e.g., voice, pure tone) alarm that is readily detectable by the diver under the diving conditions in which the diver operates, and warns the diver of moisture in the breathing loop in sufficient time to terminate the dive and return safely to the surface; and

(ii) Each diver uses the moisture sensor according to the rebreather manufacturer's instructions.

(e) The employer must ensure that each rebreather contains a continuously functioning CO^2 sensor in the breathing loop, and that:

(i) The rebreather manufacturer approves the location of the CO^2 sensor in the breathing loop;

(ii) The CO^2 sensor is integrated with an alarm that operates in a visual (e.g., digital, graphic, analog) or auditory (e.g., voice, pure tone) mode that is readily detectable by each diver under the diving conditions in which the diver operates; and

(iii) The CO^2 alarm remains continuously activated when the inhaled CO^2 level reaches and exceeds 0.005 atmospheres absolute (ATA).

(f) Before each day's diving operations, and more often when necessary, the employer must calibrate the CO^2 sensor according to the sensor manufacturer's instructions, and ensure that:

(i) The equipment and procedures used to perform this calibration are accurate to within 10 percent of a CO^2 concentration of 0.005 ATA or less;

(ii) The equipment and procedures maintain this accuracy as required by the sensor manufacturer's instructions; and

(iii) The calibration of the CO^2 sensor is accurate to within 10 percent of a CO^2 concentration of 0.005 ATA or less.

(g) The employer must replace the CO^2 sensor when it fails to meet the accuracy requirements specified in paragraph 1(f)(iii) of this appendix, and ensure that the replacement CO^2 sensor meets the accuracy requirements specified in paragraph 1(f)(iii) of this appendix before placing the rebreather in operation.

(h) As an alternative to using a continuously functioning CO^2 sensor, the employer may use a schedule for replacing CO^2-sorbent material provided by the rebreather manufacturer. The employer may use such a schedule only when the rebreather manufacturer has developed it according to the canister-testing protocol specified below in Condition 11, and must use the canister within the temperature range for which the manufacturer conducted its scrubber canister tests following that protocol. Variations above or below the range are acceptable only after the manufacturer adds that lower or higher temperature to the protocol.

(i) When using CO^2-sorbent replacement schedules, the employer must ensure that each rebreather uses a manufactured (i.e., commercially pre-packed), disposable scrubber cartridge containing a CO^2-sorbent material that:

(i) Is approved by the rebreather manufacturer;

(ii) Removes CO^2 from the diver's exhaled gas; and

(iii) Maintains the CO^2 level in the breathable gas (i.e., the gas that a diver inhales directly from the regulator) below a partial pressure of 0.01 ATA.

(j) As an alternative to manufactured, disposable scrubber cartridges, the employer may fill CO^2 scrubber cartridges manually with CO^2-sorbent material when:

(i) The rebreather manufacturer permits manual filling of scrubber cartridges;

(ii) The employer fills the scrubber cartridges according to the rebreather manufacturer's instructions;

(iii) The employer replaces the CO^2-sorbent material using a replacement schedule developed under paragraph 1(h) of this appendix; and

(iv) The employer demonstrates that manual filling meets the requirements specified in paragraph 1(i) of this appendix.

(k) The employer must ensure that each rebreather has an information module that provides:

(i) A visual (e.g., digital, graphic, analog) or auditory (e.g., voice, pure tone) display that effectively warns the diver of solenoid failure (when the rebreather uses solenoids) and other electrical weaknesses or failures (e.g., low battery voltage);

(ii) For a semi-closed circuit rebreather, a visual display for the partial pressure of CO^2, or deviations above and below a preset CO^2 partial pressure of 0.005 ATA; and

(iii) For a closed-circuit rebreather, a visual display for: partial pressures of O^2 and CO^2, or deviations above and below a preset CO^2 partial pressure of 0.005 ATA and a preset O^2 partial pressure of 1.40 ATA or lower; gas temperature in the breathing loop; and water temperature.

(l) Before each day's diving operations, and more often when necessary, the employer must ensure that the electrical power supply and electrical and electronic circuits in each rebreather are operating as required by the rebreather manufacturer's instructions.

2. Special Requirements for Closed-Circuit Rebreathers.

(a) The employer must ensure that each closed-circuit rebreather uses supply-pressure sensors for the O^2 and diluent (i.e., air or nitrogen) gases and continuously functioning sensors for detecting temperature in the inhalation side of the gas-loop and the ambient water.

(b) The employer must ensure that:

(i) At least two O^2 sensors are located in the inhalation side of the breathing loop; and

(ii) The O^2 sensors are: functioning continuously; temperature compensated; and approved by the rebreather manufacturer.

(c) Before each day's diving operations, and more often when necessary, the employer must calibrate O^2 sensors as required by the sensor manufacturer's instructions. In doing so, the employer must:

(i) Ensure that the equipment and procedures used to perform the calibration are accurate to within 1 percent of the O^2 fraction by volume;

(ii) Maintain this accuracy as required by the manufacturer of the calibration equipment;

(iii) Ensure that the sensors are accurate to within 1 percent of the O^2 fraction by volume;

(iv) Replace O^2 sensors when they fail to meet the accuracy requirements specified in paragraph 2(c)(iii) of this appendix; and

(v) Ensure that the replacement O^2 sensors meet the accuracy requirements specified in paragraph 2(c)(iii) of this appendix before placing a rebreather in operation.

(d) The employer must ensure that each closed-circuit rebreather has:

(i) A gas-controller package with electrically operated solenoid O^2-supply valves;

(ii) A pressure-activated regulator with a second-stage diluent-gas addition valve;

(iii) A manually operated gas-supply bypass valve to add O^2 or diluent gas to the breathing loop; and

(iv) Separate O^2 and diluent-gas cylinders to supply the breathing-gas mixture.

3. O^2 Concentration in the Breathing Gas.

The employer must ensure that the fraction of O^2 in the nitrox breathing-gas mixture:

(a) Is greater than the fraction of O^2 in compressed air (i.e., exceeds 22 percent by volume);

(b) For open-circuit SCUBA, never exceeds a maximum fraction of breathable O^2 of 40 percent by volume or a maximum O^2 partial pressure of 1.40 ATA, whichever exposes divers to less O^2; and

(c) For a rebreather, never exceeds a maximum O^2 partial pressure of 1.40 ATA.

4. Regulating O^2 Exposures and Diving Depth.

(a) Regarding O^2 exposure, the employer must:

(i) Ensure that the exposure of each diver to partial pressures of O^2 between 0.60 and 1.40 ATA does not exceed the 24-hour single-exposure time limits specified either by the 2001 National Oceanic and Atmospheric Administration Diving Manual (the "2001 NOAA Diving Manual"), or by the report entitled "Enriched Air Operations and Resource Guide" published in 1995 by the Professional Association of Diving Instructors (known commonly as the "1995 DSAT Oxygen Exposure Table"); and

(ii) Determine a diver's O^2-exposure duration using the diver's maximum O^2 exposure (partial pressure of O^2) during the dive and the total dive time (i.e., from the time the diver leaves the surface until the diver returns to the surface).

(b) Regardless of the diving equipment used, the employer must ensure that no diver exceeds a depth of 130 feet of sea water ("fsw") or a maximum O^2 partial pressure of 1.40 ATA, whichever exposes the diver to less O^2.

5. Use of No-Decompression Limits.

(a) For diving conducted while using nitrox breathing-gas mixtures, the employer must ensure that each diver remains within the no-decompression limits specified for single and repetitive air diving and published in the 2001 NOAA Diving Manual or the report entitled "Development and Validation of No-Stop Decompression Procedures for Recrea- tional Diving: The DSAT Recreational Dive Planner," published in 1994 by Hamilton Research Ltd. (known commonly as the "1994 DSAT No-Decompression Tables").

(b) An employer may permit a diver to use a dive-decompression computer designed to regulate decompression when the dive-decompression computer uses the no-decompression limits specified in paragraph 5(a) of this appendix, and provides output that reliably represents those limits.

6. Mixing and Analyzing the Breathing Gas.

(a) The employer must ensure that:

(i) Properly trained personnel mix nitrox-breathing gases, and that nitrogen is the only inert gas used in the breathing-gas mixture; and

(ii) When mixing nitrox-breathing gases, they mix the appropriate breathing gas before delivering the mixture to the breathing-gas cylinders, using the continuous-flow or partial-pressure mixing techniques specified in the 2001 NOAA Diving Manual, or using a filter-membrane system.

(b) Before the start of each day's diving operations, the employer must determine the O^2 fraction of the breathing-gas mixture using an O^2 analyzer. In doing so, the employer must:

(i) Ensure that the O^2 analyzer is accurate to within 1 percent of the O^2 fraction by volume.

(ii) Maintain this accuracy as required by the manufacturer of the analyzer.

(c) When the breathing gas is a commercially supplied nitrox breathing-gas mixture, the employer must ensure that the O^2 meets the medical USP specifications (Type I, Quality Verification Level A) or aviator's breathing-oxygen specifications (Type I, Quality Verification Level E) of CGA G-4.3-2000 ("Commodity Specification for Oxygen"). In addition, the commercial supplier must:

(i) Determine the O^2 fraction in the breathing-gas mixture using an analytic method that is accurate to within 1 percent of the O^2 fraction by volume;

(ii) Make this determination when the mixture is in the charged tank and after disconnecting the charged tank from the charging apparatus;

(iii) Include documentation of the O^2-analysis procedures and the O^2 fraction when delivering the charged tanks to the employer.

(d) Before producing nitrox breathing-gas mixtures using a compressor in which the gas pressure in any system component exceeds 125 pounds per square inch (psi), the:

(i) Compressor manufacturer must provide the employer with documentation that the compressor is suitable for mixing high-pressure air with the highest O^2 fraction used in the nitrox breathing-gas mixture when operated according to the manufacturer's operating and maintenance specifications;

(ii) Employer must comply with paragraph 6(e) of this appendix, unless the compressor is rated for O^2 service and is oil-less or oil-free; and

(iii) Employer must ensure that the compressor meets the requirements specified in paragraphs (i)(1) and (i)(2) of §1910.430 whenever the highest O^2 fraction used in the mixing process exceeds 40 percent.

(e) Before producing nitrox breathing-gas mixtures using an oil-lubricated compressor to mix high-pressure air with O^2, and regardless of the gas pressure in any system component, the:

(i) Employer must use only uncontaminated air (i.e., air containing no hydrocarbon particulates) for the nitrox breathing-gas mixture;

(ii) Compressor manufacturer must provide the employer with documentation that the compressor is suitable for mixing the high-pressure air with the highest O^2 fraction used in the nitrox breathing-gas mixture when operated according to the manufac- turer's operating and maintenance specifications;

(iii) Employer must filter the high-pressure air to produce O^2-compatible air;

(iv) The filter-system manufacturer must provide the employer with documentation that the filter system used for this purpose is suitable for producing O^2-compatible air when operated according to the manufacturer's operating and maintenance specifi- cations; and

(v) Employer must continuously monitor the air downstream from the filter for hydrocarbon contamination.

(f) The employer must ensure that diving equipment using nitrox breathing-gas mixtures or pure O^2 under high pressure (i.e., exceeding 125 psi) conforms to the O^2-service requirements specified in paragraphs (i)(1) and (i)(2) of §1910.430.

7. Emergency Egress.

(a) Regardless of the type of diving equipment used by a diver (i.e., open-circuit SCUBA or rebreathers), the employer must ensure that the equipment contains (or incorporates) an open-circuit emergency-egress system (a "bail-out" system) in which the second stage of the regulator connects to a separate supply of emergency breathing gas, and the emergency breathing gas consists of air or the same nitrox breathing-gas mixture used during the dive.

(b) As an alternative to the "bail-out" system specified in paragraph 7(a) of this appendix, the employer may use:

(i) For open-circuit SCUBA, an emergency-egress system as specified in §1910.424(c)(4); or

(ii) For a semi-closed-circuit and closed-circuit rebreather, a system configured so that the second stage of the regulator connects to a reserve supply of emergency breathing gas.

(c) The employer must obtain from the rebreather manufacturer sufficient information to ensure that the bail-out system performs reliably and has sufficient capacity to enable the diver to terminate the dive and return safely to the surface.

8. Treating Diving-Related Medical Emergencies.

(a) Before each day's diving operations, the employer must:

(i) Verify that a hospital, qualified health-care professionals, and the nearest Coast Guard Coordination Center (or an equivalent rescue service operated by a state, county, or municipal agency) are available to treat diving-related medical emergencies;

(ii) Ensure that each dive site has a means to alert these treatment resources in a timely manner when a diving-related medical emergency occurs; and

(iii) Ensure that transportation to a suitable decompression chamber is readily available when no decompression chamber is at the dive site, and that this transportation can deliver the injured diver to the decompression chamber within four (4) hours travel time from the dive site.

(b) The employer must ensure that portable O^2 equipment is available at the dive site to treat injured divers. In doing so, the employer must ensure that:

(i) The equipment delivers medical-grade O^2 that meets the requirements for medical USP oxygen (Type I, Quality Verification Level A) of CGA G-4.3-2000 ("Commodity Specification for Oxygen");

(ii) The equipment delivers this O^2 to a transparent mask that covers the injured diver's nose and mouth; and

(iii) Sufficient O^2 is available for administration to the injured diver from the time the employer recognizes the symptoms of a diving-related medical emergency until the injured diver reaches a decompression chamber for treatment.

(c) Before each day's diving operations, the employer must:

(i) Ensure that at least two attendants, either employees or non-employees, qualified in first-aid and administering O^2 treatment, are available at the dive site to treat diving-related medical emergencies; and

(ii) Verify their qualifications for this task.

9. Diving Logs and No-Decompression Tables.

(a) Before starting each day's diving operations, the employer must:

(i) Designate an employee or a non-employee to make entries in a diving log; and

(ii) Verify that this designee understands the diving and medical terminology, and proper procedures, for making correct entries in the diving log.

(b) The employer must:

(i) Ensure that the diving log conforms to the requirements specified by paragraph (d) ("Record of dive") of §1910.423; and

(ii) Maintain a record of the dive according to §1910.440 ("Recordkeeping requirements").

(c) The employer must ensure that a hard-copy of the no-decompression tables used for the dives (as specified in paragraph 6(a) of this appendix) is readily available at the dive site, whether or not the divers use dive-decompression computers.

10. Diver Training.

The employer must ensure that each diver receives training that enables the diver to perform work safely and effectively while using open-circuit SCUBAs or rebreathers supplied with nitrox breathing-gas mixtures. Accordingly, each diver must be able to demonstrate the ability to perform critical tasks safely and effectively, including, but not limited to: recognizing the effects of breathing excessive CO^2 and O^2; taking appropriate action after detecting excessive levels of CO^2 and O^2; and properly evaluating, operating, and maintaining their diving equipment under the diving conditions they encounter.

11. Testing Protocol for Determining the CO^2 Limits of Rebreather Canisters.

(a) The employer must ensure that the rebreather manufacturer has used the following procedures for determining that the CO^2-sorbent material meets the specifications of the sorbent material's manufacturer:

(i) The North Atlantic Treating Organization CO^2 absorbent-activity test;

(ii) The RoTap shaker and nested-sieves test;

(iii) The Navy Experimental Diving Unit ("NEDU")-derived Schlegel test; and

(iv) The NEDU MeshFit software.

(b) The employer must ensure that the rebreather manufacturer has applied the following canister-testing materials, methods, procedures, and statistical analyses:

(i) Use of a nitrox breathing-gas mixture that has an O^2 fraction maintained at 0.28 (equivalent to 1.4 ATA of O^2 at 130 fsw, the maximum O^2 concentration permitted at this depth);

(i) While operating the rebreather at a maximum depth of 130 fsw, use of a breathing machine to continuously ventilate the rebreather with breathing gas that is at 100 percent humidity and warmed to a temperature of 98.6 degrees F (37 degrees C) in the heating-humidification chamber;

(ii) Measurement of the O^2 concentration of the inhalation breathing gas delivered to the mouthpiece;

(iii) Testing of the canisters using the three ventilation rates listed in Table I below (with the required breathing-machine tidal volumes and frequencies, and CO2-injection rates, provided for each ventilation rate):

Table I. – Canister Testing Parameters

Ventilation rates (Lpm, ATPS[1])	Breathing machine tidal volumes (L)	Breathing machine frequencies (breaths per min.)	CO2 injection rates (Lpm, STPD[2])
22.5	1.5	15	0.90
40.0	2.0	20	1.35
62.5	2.5	25	2.25

[1] ATPS means ambient temperature and pressure, saturated with water.
[2] STPD means standard temperature and pressure, dry; the standard temperature is 32 degrees F (0 degrees C).

(iv) When using a work rate (i.e., breathing-machine tidal volume and frequency) other than the work rates listed in the table above, addition of the appropriate combinations of ventilation rates and CO^2-injection rates;

(v) Performance of the CO^2 injection at a constant (steady) and continuous rate during each testing trial;

(vi) Determination of canister duration using a minimum of four (4) water temperatures, including 40, 50, 70, and 90 degrees F (4.4, 10.0, 21.1, and 32.2 degrees C, respectively);

(vii) Monitoring of the breathing-gas temperature at the rebreather mouthpiece (at the “chrome T” connector), and ensuring that this temperature conforms to the temperature of a diver’s exhaled breath at the water temperature and ventilation rate used during the testing trial;[1]

[1] NEDU can provide the manufacturer with information on the temperature of a diver’s exhaled breath at various water temperatures and ventilation rates, as well as techniques and procedures used to maintain these temperatures during the testing trials.

(viii) Implementation of at least eight (8) testing trials for each combination of tempera- ture and ventilation-CO^2-injection rates (for example, eight testing trials at 40 degrees F using a ventilation rate of 22.5 Lpm at a CO^2-injection rate of 0.90 Lpm);

(ix) Allowing the water temperature to vary no more than 2.0 degrees F (1.0 degree C) between each of the eight testing trials, and no more than 1.0 degree F (0.5 degree C) within each testing trial;

(x) Use of the average temperature for each set of eight testing trials in the statistical analysis of the testing-trial results, with the testing-trial results being the time taken for the inhaled breathing gas to reach 0.005 ATA of CO^2 (i.e., the canister-duration results);

(xi) Analysis of the canister-duration results using the repeated-measures statistics described in NEDU Report 2-99;

(xii) Specification of the replacement schedule for the CO^2-sorbent materials in terms of the lower prediction line (or limit) of the 95 percent confidence interval; and

(xiii) Derivation of replacement schedules only by interpolating among, but not by extrapolating beyond, the depth, water temperatures, and exercise levels used during canister testing.

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ADVANCED AMERICAN CONSTRUCTION, INC. SAFETY MANAGEMENT STANDARD

CONFINED SPACE ENTRY

1.0 Applicability

This procedure applies to Advanced American Construction, Inc. projects involving confined space entry operations.

2.0 Purpose and Scope

This procedure is intended to protect personnel from the hazards associated with confined space entry.

A confined space is:

1. Large enough for personnel entry, and
2. Has limited or restricted means for entry or exit, and
3. Is not designed for continuous occupancy.

A Non-Permit space is a confined space that does not present any potential hazards, nor will the work performed therein create a hazardous condition.

A Permit-Required space is a confined space that may present one or more potential hazards including hazardous atmospheres, fire/explosion, engulfment, entrapment, electrical, mechanical, or any other serious hazard.

Permit required confined space hazards include risks of asphyxiation, fire or explosion, chemical exposure, engulfment or drowning, electrocution, or dismemberment.

This procedure applies to all permit required confined space entry activities performed by Advanced American Construction, Inc. or any contractor and/or subcontractor.

Entry occurs whenever any body part crosses the plane of entry of the space when the intent is to enter.

3.0 Implementation

Field Operations - Implementation of this program is the responsibility of the Project Manager/Superintendent.

4.0 Requirements

A. Appoint an Entry Supervisor who:

1. Determines whether a space is a "permit required" or non-permit space.

2. Is responsible for onsite verification of acceptable entry conditions prior to entry.

3. Is responsible for assigning appropriately trained and medically qualified personnel to the project.

4. Has knowledge of required confined space entry equipment.

5. Has the ability to recognize and test hazardous atmospheres.

6. Is capable of performing a thorough hazard evaluation of the space and of the work that will be performed therein.

7. Understands how to execute a Confined Space Permit as well as any other required permit, such as a Hot Work permit.

8. Can and will coordinate with any other companies employees that must enter the confined space concurrently to ensure their qualifications and knowledge. Allowing them only to enter under the permit issued to or by AAC so that the operations of one employer do not endanger employees of another.

9. Has authority to stop work and take corrective actions when conditions change.

10. Has had formal, documented training as a confined space Entry Supervisor.

11. Entrants must:

    a) Know the hazards that may be faced during the entry such as potential exposure and their signs and symptoms.
    b) How the operate the equipment to be used including testing, ventilation, lighting, communication, PPE, access (ladders), rescue and any special equipment needed for the entry.
    c) Communicate with the attendant as necessary for the attendant to monitor progress of entrants or order evacuation.
    d) Keep the attendant informed of:

(i) any warning sign or symptom of exposure to a dangerous situation.
(ii) any prohibited situation detected

e) Exit the space whenever:
(i) An order to evacuate is given by the attendant or entry supervisor.
(ii) The entrant recognizes a sign or symptom of a dangerous situation, prohibited situation or condition or anytime an alarm is activated.

12. Attendants must:
    a) Be familiar with the hazards that may be faced including the signs or symptoms and consequences of exposure.
    b) Has knowledge of the behavioral effects of exposure.
    c) Maintain an accurate account of entrants in the permit space.
    d) Remain in place outside the space unless relieved by another attendant.
    e) Communicate with entrants to monitor status and be able to alert them in the need of evacuation.
    f) Monitor activities inside and outside the space and determine if it is safe for entrants to remain in the space.
    g) Order entrants to evacuate under the following conditions:
        (i) They detect any prohibited condition.
        (ii) They detect any behavioral effects of hazard exposure.
        (iii) They detect any situation outside the space that could endanger entrants
    h) Summon rescues immediately as soon as they determine the entrants need assistance.
    i) Prevent unauthorized persons for approaching or entering the confined space.
    j) Perform non-entry recue per plan

B. Permit System

1. Utilize the "Confined Space Entry Permit and Procedures" form, Attachment 1, for permit space entry evaluation and establishment of required entry parameters.

2. Require confined space entry permits to be issued at least each shift by the Entry Supervisor.

C. Planning for Confined Space Entry

1. The Entry Supervisor:

    a) Contacts the facility representative to gather information about the confined space and to determine if the facility has any entry requirements that must be followed.

b) Performs a Hazard Evaluation using the Confined Space Permit and Procedures for Entry Form, Attachment 1.
c) Determines whether the space is a "permit required confined space" or a non-permit required confined space.
d) Assesses whether those hazards that create the "permit required confined space" can be eliminated without employee entry into the space. By eliminating hazards that are immediately dangerous to life or health, administrative and rescue requirements are lessened and risk to workers is reduced.
e) Determines rescue requirements for the space - if so designated as a "permit required confined space".
f) Arranges for qualified Entrants and Attendants.
g) Obtains blank Confined Space Entry and Hot Work (if applicable) permit forms.
h) Identifies all equipment, including personal protective equipment, needed for the job including provisions for protection from pedestrian and vehicle traffic. This may require physical barriers, warning tape or signage to protect employees from external hazards.
i) Obtains all equipment and verifies that it is functional.
j) Coordinates confined space entry activities with other site employers on site that may be affected by the entry. Will provide contractors with a copy of this written program.
k) Reevaluate the permit space in the presence of any authorized entrant or that employee's authorized representative who requests that the employer conduct such reevaluation because the entrant or representative has reason to believe that the evaluation of that space may not have been adequate.

D. Site Confined Space Preparation

1. Space Isolation

a) Drain and clean the confined space as appropriate.
b) Isolate all forms of potential energy inside the confined space, including:

1) Electrical.
2) Mechanical.
3) Thermal.
4) Pneumatic.
5) Hydraulic.

c) Isolate all lines carrying fuels, liquids or gases into the space.
d) Develop alternate procedures for protection of entrants for lines that may not be controlled such as lines through stormwater or sewer vaults.

e) Open the entry point to the confined space.
f) Provide barricades and post the entrance of the space with a sign stating "Danger Confined Space Do Not Enter" or equivalent wording.
g) Designate and document entrants, attendants and entry supervisors on the permit.

2. Electrical Equipment

a) Provide electrical equipment that meets the electrical classification of the area. See SMS 8, "Electrical Safety".
b) Route all portable electrical equipment through ground fault circuit interruption (GFCI) devices.

3. Atmospheric Tests

a) Calibrate monitoring equipment and record information on the Daily Instrument Calibration Form.
b) Make initial atmospheric tests of the space.
c) Attach extension probes to the monitoring equipment, or lengths of silicone or similarly inert tubing material, to reach the bottom of the space. For horizontal spaces, the probe may need to be attached to a pole.
d) Take atmospheric measurements in several locations (bottom, middle, top, corners) allowing extra response time from the instrumentation to register, especially if a tubing extension is used.
e) Obtain reading for oxygen first, followed by %LEL, then for other contaminants of concern (if applicable).
f) Record all results on the permit and sign and initial where indicated.
g) Determine if acceptable entry conditions exist with respect to oxygen, %LEL, and other hazardous atmospheres.
h) If unacceptable entry conditions are indicated, correct the limiting condition.
i) If acceptable entry conditions exist, determine times that the monitoring will be repeated or if continuous monitoring will be needed.
j) Monitor continuously for oxygen and %LEL if hot work will be performed in the space.
k) Reevaluate the space in the presence of, and at the request of any authorized entrant upon their request.

4. Ventilation

a) Ventilation is required for **all** Permit entries.

b) Open as many openings as possible in the space to aid in cross ventilation.
c) Never ventilate confined spaces with oxygen.
d) Provide five (5) air changes per hour, or at least 10,000 cfm for large spaces.
e) When mechanical ventilation is used the air must be continuously monitored.
f) If a generator is used to provide power, be sure that the exhaust does not enter the space. Carbon monoxide monitoring may be required.
g) Place blower ductwork such that it does not create a hazard by impairing the line of vision of attendants to observe space entrants, or by blowing contaminants to other workers.
h) Provide at least 2,000 cfm of active exhaust ventilation for each welder or torch operating under a Hot Work Permit within the space.
i) Use fire/explosive proof ventilating equipment that is properly grounded when exhausting flammable gases, vapors and dusts from confined spaces.

5. Authorizing the Permit

a) The Entry Supervisor personally inspects the work area and signs the permit after confirming that all necessary precautions have been taken and all relevant information concerning the entry parameters are documented on the permit.
b) Conduct a briefing informing all entrants and attendants of space conditions.
c) Require entrant(s) and attendant(s) to each print their names and sign the permit.
d) Affix the permit to a location near the space entrance.

E. Entry Operations

1. Prohibit entry when oxygen deficient or flammable atmospheres are present in the space.

2. Limit entry to qualified entrants listed on the permit and only for the purpose stated on the permit.

3. Require entrants to follow all requirements listed on permit.

4. Attach body harness, if required, to a lifeline, and the other end of the life line is attached to a fixed point or to a mechanical lifting device outside the space at all times the entrant(s) are in the space.

5. Require that the attendant(s) remain at the entrance whenever an entrant is inside the confined space. The attendant may not be assigned other duties

that may distract him/her from maintaining uninterrupted contact with the entrant(s). The attendant may only attend to one confined space entry at any one time. Each space must have its own dedicated attendant.

6. Before an employee enters the space, the internal atmosphere shall be tested, with a calibrated direct-reading instrument, for oxygen content, for flammable gases and vapors, and for potential toxic air contaminants, in that order. Any employee who enters the space, or that employee's authorized representative, shall be provided an opportunity to observe and participate in the pre-entry testing required by this paragraph.

7. Air quality will be periodically tested, while continuous ventilation is applied.

F. Exiting the Confined Space

1. Attendant will order entrant(s) out of space whenever:

   a) A prohibited condition on the entry permit develops.
   b) The surrounding work area becomes unsafe.
   c) Any monitoring instrumentation, rescue equipment, ventilation, etc. becomes compromised.
   d) Possible symptoms of exposure are noted in the entrant(s).
   e) Entrant(s) express any type of concern regarding the safety of the entry.

G. Rescue (Entry Supervisor must ensure)

1. Require non-entry rescue procedures to be used for every entry.

2. Contract for qualified entry rescue services when non-entry rescue is not feasible in permit required confined spaces. Entry rescue must be staged on site adjacent to the space for the duration of the entry.

3. Advanced American Construction, Inc. will create per job site an emergency response plan with contact names and numbers posted in the job office. The plan will include summoning rescue and emergency services, for rescuing entrants from permit spaces, for providing necessary emergency services to rescued employees and for preventing unauthorized personnel from attempting a rescue

4. Advanced American Construction works in facilities when in house rescue services are trained and equipped to perform rescues. When this is the case the plan must be included on the entry permit for each case.

5. Advanced American Construction, Inc. will evaluate a prospective rescuer's ability to respond to a rescue summons in a timely manner, considering the hazard(s) identified; timely will vary according to the specific hazards involved in each entry.

6. Evaluate a prospective rescue service's ability, in terms of proficiency with rescue-related tasks and equipment, to function appropriately while rescuing entrants from the particular permit space or types of permit spaces identified.

7. Select a rescue team or service from those evaluated that:

    a. Has the capability to reach the victim(s) within a time frame that is appropriate for the permit space hazard(s) identified;
    b. Is equipped for and proficient in performing the needed rescue services;
    c. Inform each rescue team or service of the hazards they may confront when called on to perform rescue at the site; and
    d. Provide the rescue team or service selected with access to all permit spaces from which rescue may be necessary so that the rescue service can develop appropriate rescue plans and practice rescue operations or decline to provide the service.

8. Advanced American Construction, Inc. employees have been designated to provide permit space rescue and emergency services shall take the following measures;

    a. Provide affected employees with the personal protective equipment (PPE) needed to conduct permit space rescues safely and train affected employees so they are proficient in the use of that PPE, at no cost to those employees;
    b. Train affected employees to perform assigned rescue duties. Advanced American Construction, Inc. will ensure that such employees successfully complete the training required to establish proficiency as an authorized entrant
    c. Train affected employees in basic first-aid and cardiopulmonary resuscitation (CPR). Advanced American Construction will ensure that at least one member of the rescue team or service holding a current certification in first aid and CPR is available; and ensure that affected employees practice making permit space rescues at least once every 12 months, by means of simulated rescue operations in which they remove dummies, manikins, or actual persons from the actual permit spaces or from representative permit spaces. Representative permit spaces shall, with respect to opening size, configuration, and accessibility, simulate the types of permit spaces from which rescue is to be performed.

d. Advanced American Construction, Inc. will insure that outside services be given an opportunity to examine the entry site, practice rescue, and decline as appropriate. If there is reliance on the client Host rescue services for use, this MUST be stated and agreed to in contract language. Employees will have PPE at no cost, training and practice rescues at least every 12 months.

9. To facilitate non-entry rescue, retrieval systems or methods shall be used whenever an authorized entrant enters a permit space, unless the retrieval equipment would increase the overall risk of entry or would not contribute to the rescue of the entrant. Retrieval systems shall meet the following requirements.

   a. Each authorized entrant shall use a chest or full body harness, with a retrieval line attached at the center of the entrant's back near shoulder level, above the entrant's head, or at another point which the employer can establish presents a profile small enough for the successful removal of the entrant. Wristlets may be used in lieu of the chest or full body harness if the employer can demonstrate that the use of a chest or full body harness is infeasible or creates a greater hazard and that the use of wristlets is the safest and most effective alternative.

   b. The other end of the retrieval line shall be attached to a mechanical device or fixed point outside the permit space in such a manner that rescue can begin as soon as the rescuer becomes aware that rescue is necessary. A mechanical device shall be available to retrieve personnel from vertical type permit spaces more than 5 feet (1.52 m) deep

   c. If an injured entrant is exposed to a substance for which a Material Safety Data Sheet (MSDS) or other similar written information is required to be kept at the worksite, that MSDS or written information shall be made available to the medical facility treating the exposed entrant.

H. When the Entry Work is Complete

Cancel the permit by obtaining the signature of the entry supervisor and recording the time and date on the permit. This should be accomplished after the space is resealed and signs and barricades removed. If the space cannot be closed until a later time, provisions must be maintained (barricades, warning signs) to discourage persons from entering the space.

I. Training

1. Require Entry Supervisors, Entrants, and Attendants to be trained to adequately address all health and safety aspects associated with entry.

2. Training shall be provided to each affected employee as follows:

   a. Before the employee is first assigned duties;
   b. Before there is a change in assigned duties;
   c. Whenever there is a change in permit space operations that presents a hazard about which an employee has not previously been trained;
   d. Whenever the employer has reason to believe either that there are deviations from the permit space entry procedures required by paragraph (d)(3) of section 1910.146(g)(2)(iv) or that there are inadequacies in the employee's knowledge or use of these procedures.
   e. The training shall establish employee proficiency in the duties required by this section and shall introduce new or revised procedures, as necessary, for compliance with this section.
   f. Advanced American Construction, Inc. shall certify that the training required by paragraphs (g)(1) through (g)(3) of section 1910.146 has been accomplished. The certification shall contain each employee's name, the signatures or initials of the trainers, and the dates of training. The certification shall be available for inspection by employees and their authorized representative.

J. Medical Surveillance

All Entry Supervisors, Entrants, and Attendants will be medically qualified for confined space entry work.

K. Reviewing the Entry

   a) Immediate action will be taken to stop work and/or review any violation of the permit for unauthorized entry of a confined space, a hazard not covered by the permit, the occurrence of an injury or near miss, employee complaints etc.
   b) The review will initiate a correction process and planning for a new Confined Space Entry following all outlined precautions in the above sections.

L. Written Program Reviewing

The written program must be reviewed annually (unless no entries were made during the prior 12 month period) and revised as necessary to protect employees from confined space hazards. Canceled entry permits must be kept 1 year to facilitate the review problems encountered & should be noted and appropriate changes made during review.

5.0 Documentation Summary

Records required in the Project Safety File:

A. Entry supervisor, Entrant and Attendant qualifications.

B. Confined Space Entry Permits plus Hot Work Permits (if issued).

C. Monitoring equipment calibration logs.

D. Lock-out/Tag-out records (if used).

E. Daily worker briefing documentation.

F. Medical clearance documentation.

6.0 Resources

A. U.S. OSHA Standard - Permit Required Confined Spaces - 29 CFR 1910, Subpart J
(http://www.osha-slc.gov/OshStd_data/1910_0146.html)
B. U.S. OSHA Technical Links - Confined Spaces
(http://www.osha-slc.gov/SLTC/confinedspaces/index.html)
C. US Army Corp of Engineers EM 385-1-1, Section 06.I.
(http://www.usace.army.mil/inet/usace-docs/eng-manuals/em385-1-1/toc.htm)
D. U.S. OSHA Standards – 29 CFR Permit-required confined spaces 1910.146

CONFINED SPACE PERMIT & PROCEDURES FOR ENTRY

Confined Space Name:		**No.**
Confined Space Location:		**Date:**
Entry Authorized By:	**Time Issued:**	**Time expires:**

Reason(s) for Entry	Hazards

ISOLATION

Equipment to Lock/Tag/Test (including blocking, blanking, and/or disconnecting electrical, hydraulic, pneumatic, kinetic, thermal, steam, chemical, springs):

Equipment Name:	Isolated by:	Location:	Done

ENTRY REQUIREMENTS:	Required	Checked		Required	Checked
Eye Protection			Hot Work Permit		
- Safety Glasses			Communications		
- Goggles			Air Mover(s)		
- Face Shield			Rescue Hoist and Other Related Equipment		
Hearing Protection			Rescue Lanyard		
Fall Protection			GFCI Protected Electrical		
Respiratory Protection			Explosion Proof Lighting/Electrical		
- 1/2 Face Disposable			Non-sparking Tools		
- 1/2 Face Cartridge			Ladders		
- Full Face			Blocking/Blanking Equipment		
- Powered Air Purifying			Air Monitoring		
- Supplied Air			- Oxygen		
Gloves Type			- Combustibles		
Boots Type			- Carbon monoxide		
Clothing Type			- Hydrogen sulfide		
Hard Hat			- Dust		
Other			- Other		

Comments: _____

_____

_____

	Pre-Entry		Continuous		*Record readings every 30 minutes (minimum)*			
Atmospheric Testing	**Needed**	**Time: Results/Initials**	**Needed**	**Time: Results/Initials**	**Time: Results/Initials**	**Time: Results/Initials**	**Time: Results/Initials**	**Time: Results/Initials**
Oxygen (19.5-23.5%)								
Combustibles(<10%LEL)								
Carbon Monoxide (<35 ppm)								
Hydrogen Sulfide (<2 ppm)								
dust (visibility > 10')								
other								
other								

Note: Sign the permit and authorize entry only when the atmospheric conditions meet the permissible entry levels shown for a minimum period of 30 minutes prior to entry.

Name of Tester: Signature:

Testing Equipment Used	**Type**	**Model**	**I.D. Number**

Emergency Action Plan:

Authorization	**Signature**	**Time/Date**
Entry Supervisor: (print) I Certify that the requirement of this confined space entry permit have been met and I authorize entry into the confined space to which this permit applies.		
Relief Entry Supervisor: (print) I Certify that the requirement of this confined space entry permit have been met and I authorize entry into the confined space to which this permit applies.		
Entrants(s): (print)		
Attendant(s): (print)		

Permit Canceled by:_____ Date: _____Time: _____

Permit was cancelled because (check one): (i) Work has been completed ____ (ii) The permit has expired _____ (iii) Emergency (specify) _____

_____

_____

ADVANCED AMERICAN CONSTRUCTION, INC. SAFETY MANAGEMENT STANDARD

CRANE SUSPENDED PERSONNEL PLATFORMS (MANBASKETS)

1.0 Applicability

This procedure applies to Advanced American Construction, Inc. projects involving the use of manbaskets suspended from cranes.

2.0 Purpose and Scope

The purpose of this procedure is to establish safe work practices for the use of manbaskets, and to provide design, construction, and rigging requirements for manbaskets.

3.0 Implementation

Field Activities – Implementation of this procedure is the responsibility of the Project Manager/Superintendent.

4.0 Requirements

A. General

1. Use manbaskets **only when** no less hazardous means of access to elevations exist (e.g., ladders, aerial lifts, scaffolds, etc.)

2. Conduct and document (using Attachment 1) a pre-lift meeting to review the requirements and procedures to be followed. The crane operator, signal person(s), person(s) to be lifted, and the person responsible for the task must attend the meeting. A meeting must be conducted prior to the trial lift at each new work location, and repeated when any new employee is assigned to the operation.

B. Crane and Derrick Requirements

1. Require all cranes and derricks to be properly inspected in accordance with SMS 7, “Cranes”.

2. Hoist the personnel platform in a slow, controlled manner with no sudden movements.

3. Require that load lines are capable of supporting at least seven (7) times the maximum intended load. Rotation resistant lines must be capable of supporting at least ten (10) times the maximum intended load.
4. Engage all load and boom hoist drum brakes, swing brakes, and locking devices such as pawls or dogs when the occupied platform is in a stationary position.

5. Level the crane to within one percent (1%) of level grade, and fully extend outriggers (as applicable) in accordance with manufacturer's specifications.

6. Do not exceed fifty percent (50%) of the rated capacity for the crane's radius and configuration when hoisting loaded personnel baskets and associated rigging.

7. Prohibit the use of cranes or derricks with live booms.

8. Require that cranes with variable angle booms are equipped with a boom angle indicator that is readily visible to the operator.

9. Use only cranes which have been equipped with anti-two-blocking devices for personnel platform hoisting.

10. Determine the load radius to be used during the lift prior to hoisting personnel.

11. Always power down when lowering the basket. The use of the load hoist brake only and/or free falling is prohibited.

C. Personnel Platform Requirements

1. Use only platforms which have been designed by a qualified engineer specifically for personnel use, and which meet the requirements of U.S OSHA Requirements - Cranes and Derricks - 29 CFR 1926.550.

2. Do not load a personnel platform in excess of the rated load capacity.

3. Allow only the employees necessary to perform the work to occupy the platform, but never exceed 4 employees in the basket.

4. Use personnel platforms only for employees, their tools, and the materials necessary to do the work.

5. Do not use platforms for hoisting materials and tools when not hoisting personnel.

6. Evenly distribute and secure tools and materials within the platform.

D. Rigging Requirements

1. Use a master link or shackle to connect each bridle leg when using a wire rope bridle to connect the personnel platform to the load line.

2. Require that crane hooks can be closed and locked, eliminating the throat opening or use an alloy anchor type shackle with a bolt, nut, and retaining pin for attachment of the platform to the load line.

3. Use thimbles when fabricating eyes in wire rope slings.

4. Tag all bridles and associated rigging used for attaching the platform to the hoist line “For Personnel Use Only”, and do not use for any purpose other than hoisting personnel.

E. Trial Lift, Inspection, and Proof Testing by Designated Competent Person

1. Conduct a trial lift, with the unoccupied platform loaded at least to the anticipated lift weight, to each location at which the platform is to be hoisted and positioned immediately prior to placing personnel on the platform.

2. Repeat the trial lift whenever the crane is moved to a new location or when the lift route is changed.

3. Hoist and inspect the platform after the trial lift and before hoisting personnel. Correct any defects found during the inspection before hoisting personnel.

4. Proof test the platform at each jobsite to 125% of it’s rated capacity prior to hoisting employees and after any repair or modification by holding it in a suspended position for 5 minutes with the test load evenly distributed on the platform.

E. Safe Work Practices

1. Require employees, except the signal person, to keep all parts of the body inside of the platform during raising, lowering, and positioning.

2. Use tag lines unless their use creates an unsafe condition.

3. Secure platforms that are not landed to the structure before allowing employees to enter or exit.

4. Discontinue personnel hoisting operations upon indication of adverse weather conditions or other impending danger.

5. Require that employees being hoisted remain in sight of the operator or signal person. When this is not possible, radio communication may be used.

6. Do not make any lifts on another of the crane's load lines while personnel are suspended.

7. Direct the operator to remain at the controls at all times while the crane engine is running and the platform is occupied.

8. Require that all employees occupying the platform are using a body harness with the lanyard attached to the lower load block, or to a structural member within the platform capable of withstanding a fall impact.

9. For work over water, personal flotation devices are required and may be used in lieu of body harness and lanyard.

10. Do not hoist employees while the crane is traveling.

5.0 Documentation Summary

File the following documents in the Project Health and Safety file:

A. Pre-lift meeting documentation (Attachment 1).

B. Documentation as required by SMS 7, "Cranes".

6.0 Resources

A. U.S. OSHA Standard - Cranes and Derricks - 29 CFR 1926.550
(http://www.osha-slc.gov/OshStd_data/1926_0550.html)
B. ANSI B30.5-1968
(http://web.ansi.org/public/std_info.html)
C. U.S. OSHA Publication 3100 - Crane or Derrick Suspended Personnel Platforms
(http://www.osha-slc.gov/Publications/Osha3100.pdf)

Advanced American Construction, Inc. Health & Safety Program
PERSONNEL PLATFORM PRE-LIFT FORM

Date: _____ **Project #:** _____

1. Jobsite: _____
2. Job description (include estimated time required): _____
   _____
3. Basket needed: _____ 2-man: _____ Other (specify): _____
4. Location and Load
   A. Height from ground in feet: _____ (approximate)
   B. Crane needed: _____ ton; _____ Other
   C. Expected load in pounds:
      1) People at 250 pounds each _____
      2) Weight of tools and material _____
      3) Subtotal weight _____
      4) Weight of basket and rigging _____
      5) Total weight _____
5. Pre-lift Meeting (signatures):
   A. Crane Operator (Crane & manbasket inspected) _____
   B. Craftsmen, including tag line person
      _____
      _____
   C. Competent Person _____
6. Pre-lift:
   A. Test load in pounds _____ (1 1/2 times item 4.C.3 subtotal weight above)
   B. Crane operator to check boom angle and radius for capacity.
      1) Crane capacity in pounds _____
      2) Item "1)" divided by 2 _____
      3) Item 4.C.5 (total weight) _____
      4) If item "3)" is larger than item "2)", this crane may not be used.
   C. Full cycle test lift with test load (Item 6.A) completed.
      Competent Person Signature _____
7. If the crane must be relocated, then a new Personnel Platform Pre-lift Form is required.
8. The crane operator will not leave the cab while a manbasket is suspended, occupied or not occupied.

   Note: Retain one copy at each jobsite and send a copy to the Safety Manager.

9. Nightlift approval: _____ Superintendent _____ Signature
10. Approved: _____ Superintendent _____ Signature

ADVANCED AMERICAN CONSTRUCTION, INC. SAFETY MANAGEMENT STANDARD

CRANES

1.0 Applicability

This procedure applies to Advanced American Construction, Inc. projects/activities involving the use of cranes.

2.0 Purpose and Scope

The purpose of this procedure is to establish safe practices for the operation and maintenance of cranes in order to minimize the potential for personal injury and property damage.

3.0 Implementation

Shop Activities- Implementation of this procedure is the responsibility of the Shop Manager/Foreman.

Field Activities – Implementation of this procedure is the responsibility of the Project Manager/Superintendent.

4.0 Requirements

A. General

1. Allow only qualified, licensed operators to operate cranes.

2. Obtain annual inspection certification prior to use of any crane.

3. Designate a Competent Person to perform a Pre-Acceptance Inspection prior to accepting a crane from a vendor or owner. See Attachments 2, 3, 4.

4. Keep manufacturer's Operator's Manual in the cab of the crane.

5. Comply with manufacturer's specifications and limitations for the operation of all cranes.

6. Never modify a crane without the manufacturer's written approval.

7. Repair booms in accordance with manufacturer's specifications only.

8. Provide an easily accessible fire extinguisher with a minimum rating of 5 B:C in the cab of each crane.

9. Provide safety latches for all load hooks.

10. Require that rated load capacities, recommended operating speeds, and special hazard warnings are posted on the crane in a place visible to the operator while at the controls.

11. Down-rate load ratings by 2% for each degree of temperature below zero degrees Fahrenheit (-18 degrees C) until minus 30 degrees (-34 degrees C) is attained.

12. Do not make lifts when the temperature is minus 30 degrees (-34 degrees C) or below.

13. Determine the weight of the lift to within 5% prior to making the lift. When determining the weight, consider all handling devices, i.e. rigging, load block, and load line from the tip of the boom to the load, as part of the load.

14. Test the crane's brakes by raising the load a few inches (5 cm) and applying the brakes each time a load approaches the crane's rated capacity.

15. Consider wind loads when making lifts. (See Attachment 1)

16. Always barricade the swing radius of the superstructure.

17. Perform and record results of air monitoring for toxic gases and oxygen deficiency when using equipment in, or equipment exhausts into, enclosed spaces.

18. Restrict side loading to freely suspended loads.

19. Use taglines at all times unless impractical.

20. Require that all jibs are equipped with positive stops to prevent their movement of more than 5% above the straight line of the jib and boom.

21. Designate a competent person to provide hand signals to the operator, and post a hand signals chart at the jobsite. The crane operator must take signals only from the designated signalman. The hand signals to crane and derrick operator shall be those prescribed by the applicable ANSI Standard for the crane in use.

22. Never allow personnel under the load or swing a load over personnel.

23. Sound the horn when swinging loads.

24. Prohibit all personnel from riding the hook, ball, load block, or load.

25. Require that the house swing is locked when leaving the crane unattended, even if for only short periods of time.

26. Tie the main hook off to a secure anchor at the end of each shift.

27. Boom cranes down and rest on a suitable support when high winds are likely overnight.

28. Provide ground personnel to observe clearances when the operator's visibility is obscured or when traveling the crane.

29. Deenergize electrical power lines, as feasible, or provide insulating barriers when working proximate to power lines.

30. When working in proximity to energized power lines which have not been provided with insulating barriers, refer to SMS 31, "Utility Clearances".

31. Require that transmission towers are deenergized, or crane and load are properly grounded when working near transmitters where an electrical charge can be induced.

32. Advanced American Construction, Inc. will maintain written reports on rated load tests showing the test procedures and confirming the adequacy of any repairs or alterations.

    a) Test loads shall not exceed 110 percent of the rated load at any selected working radius.
    b) When rating is necessary: Crawler, truck and wheel-mounted cranes shall be tested in accordance with SAE Recommended Practice, Crane Load Stability Test Code J765 (April 1961)
    c) Locomotive cranes shall be tested in accordance with paragraph (c)(1)(i) and (ii) of this section
    d) Re-rating test report shall be readily available.
    e) No cranes shall be re-rated in excess of the original load ratings unless such rating changes are approved by the crane manufacturer or final assembler.

33. "Other Ropes"

    a) Heavy wear and/or broken wires may occur in sections in contact with equalizer sheaves or other sheaves where rope travel is limited, or with saddles. Particular care shall be taken to inspect ropes at these locations.
    b) All rope which has been idle for a period of a month or more due to shutdown or storage of a crane on which it is installed shall be given a

thorough inspection before it is used. This inspection shall be for all types of deterioration and shall be performed by an appointed or authorized person whose approval shall be required for further use of the rope. A certification record which includes the date of inspection, the signature of the person who performed the inspection, and an identifier for the rope which was inspected shall be prepared and kept readily available.

c) Particular care shall be taken in the inspection of non-rotating rope.

B. Truck Cranes

1. Never lift a load beyond the tipping point, which is the moment the wheels opposite the load leave their initial, unloaded position.

2. Require that the crane is level to within 1/8 inch (3 mm) in 24 inches (61 cm).

3. Fully extend all outriggers and lift carrier wheels until they just clear the ground.

4. Use timbers that are larger than the dimensions of the outrigger pads under the outrigger pads when ground conditions are less than ideal.

5. Never use the front bumper counterweight to increase lifting capacity unless it is indicated in the load capacity chart.

6. Do not lift a load over the front of a truck crane unless the crane's manufacturer approves such a lift.

7. Use nylon slings when handling tubular chord boom sections to avoid damage to the chords and lattice.

8. Assemble and disassemble pin-connected booms in accordance with SMS 26, "Rigging".

C. Crawler Cranes

1. Never lift a load beyond the tipping point, which is the moment the track rollers leave the roller path opposite the load.

2. Require that the crane is level to within 1/8 inch in 24 inches.

3. Make turns on hard, level ground only.

4. Use special care and a suitable safety holdback device when travelling up or down steep slopes.

5. Require that drive chains are always to the rear of the crane when travelling or lifting.

6. Use blocks against the sprocket or idler when lifting a load over the front or rear of the crane.

7. Use timber mats when ground conditions are less than ideal. Position mats crosswise to the tracks.

8. Install traction bars when the work area is covered with ice or snow.

9. Reduce rated loads by 20% when travelling with load over side of crawler or when travelling and swinging simultaneously.

10. Use nylon slings when handling tubular chord boom sections to avoid damage to the chords or lattice.

11. Assemble and disassemble pin-connected booms in accordance with SMS 26, “Rigging”.

D. Hydraulic Cranes

1. Never lift a load over the side unless all outriggers have been set.

2. Never lift a load over the front unless all outriggers have been set.

3. Engage the mechanical swing lock and reduce travel speed to creep speed when travelling with loads that approach the crane’s capacity (on rubber rating).

4. Tie all loads being carried to the front of the crane.

5. Extend all power telescoping boom sections equally.

6. Always use an anti two-blocking device.

7. Provide back-up alarms.

8. Inflate tires to recommended pressure before lifting on rubber.

9. Do not permit “on rubber” lifting with the boom extended.

E. Critical Lift Permits

Require a completed Critical Lift Permit (Attachment 9) prior to all lifts that meet any of the following conditions:

1. Lifts over live process lines, critical equipment, high voltage power lines, or other lifts that may jeopardize personnel and/or plant operations.

2. Multi-crane lifts.

3. Single crane lifts exceeding 75% of the crane's rated capacity, regardless of weight.

4. Manbasket lifts (Refer to SMS 6,"Crane Suspended Personnel Platforms").

F. Inspections

Designate a Competent Person to inspect all cranes in accordance with the following attachments:

1. Crawler Crane Pre-Acceptance Inspection (Attachment 2).

2. Truck Crane Pre-acceptance Inspection (Attachment 3).

3. Hydraulic Crane Pre-Acceptance Inspection (Attachment 4).

4. Daily Equipment Checklist – All Cranes (Attachment 5).

5. Monthly Crawler Crane Inspection (Attachment 6).

6. Monthly Hydraulic Crane Inspection (Attachment 7).

7. Wire Rope Inspection (Attachment 8).

8. Annual Inspection/Certification (3rd Party)

9. All crawler, truck, or locomotive cranes in use shall meet the applicable requirements for design, inspection, construction, testing, maintenance and operation as prescribed in the ANSI B30.5-1968, Safety Code for Crawler, Locomotive and Truck Cranes. However, the written, dated, and signed inspection reports and records of the monthly inspection of critical items prescribed in section 5-2.1.5 of the ANSI B30.5-1968 standard are not required. Instead, the employer shall prepare a certification record which includes the date the crane items were inspected; the signature of the person who inspected the crane items; and a serial number, or other identifier, for the crane inspected. The most recent certification record shall be maintained on file until a new one is prepared.

G. Qualifications.

1. Advanced American Construction, Inc. will only permit operators who have a valid certificate of competency (certificate) issued in accordance with this section by an Accredited Certifying Entity for the type of crane to be used to operate a crane covered by this section. Certificates shall be issued to operators who:

   a. Pass a physical examination conducted by a physician which at a minimum shall include the examination criteria specified in the American Society of Mechanical Engineers (ASME) B30.5-2000 standard, Chapter 5-3.1.2(a)(1-5, 7, 8) or the U.S. Department of Transportation (US DOT) Physical examination requirements contained in 49 CFR Sections 391.41 through 391.49.

   b. Pass a substance abuse test. The level of testing shall be consistent with the standard practice for the industry where the crane is in use and this test shall be conducted by a recognized laboratory service;

   c. Pass a written examination developed, validated, and administered in accordance with the Standards for Educational and Psychological Testing (Copyright 1999) published jointly by the Joint Committee of the American Educational Research Association, the American Psychological Association, and the National Council in Measurement in Education. The exam shall test knowledge and skills identified as necessary for safe crane operations and shall, at a minimum, include the following:

      1. Operational characteristics and controls, including characteristic and performance questions appropriate to the crane type for which qualification is sought.

      2. Emergency control skills, such as a response to fire, power line contact, loss of stability, or control malfunction;

      3. Demonstration of basic arithmetic skills necessary for crane operation and the ability to read and comprehend the crane manufacturer's operation and maintenance instruction materials, including load capacity information (load charts) for the crane for which certification is sought;

5.0 Documentation Summary

File these documents in the Project/Shop Safety and Health File:

9. Operator's qualifications and licenses.

10. Copies of all inspections required by Subsection E, "Inspections".

11. Air monitoring results, as applicable.

12. Critical Lift Permits.

6.0 Resources

G. U.S. OSHA Standard - Cranes, Derricks, Hoists, Elevators - 29 CFR 1926 Subpart N (http://www.osha-slc.gov/OshStd_toc/OSHA_Std_toc_1926_SUBPART_N.html)
H. U.S. OSHA Standard - Motor Vehicles, Mechanized Equipment - 29 CFR 1926 Subpart O (http://www.osha-slc.gov/OshStd_toc/OSHA_Std_toc_1926_SUBPART_O.html)
I. U.S. OSHA Standard - Power Transmission and Distribution - 29 CFR 1926.952,.955 (http://www.osha-slc.gov/OshStd_toc/OSHA_Std_toc_1926_SUBPART_V.html)
J. U.S. OSHA Technical Links - Crane, Derrick and Hoist Safety (http://www.osha-slc.gov/SLTC/cranehoistsafety/index.html)
K. "Mobile Craning Today" (http://www.oetio.com/05/05fr.htm)
L. ANSI/ASME B30.5 - 1982 (http://www.ansi.org/cat_top.html)
M. Osha.gov – Crawler Locomotive and Truck Cranes – 1910-180 (http://www.osha.gov.1910.180)
H. U.S. OSHA – Cranes and derricks. – 1926.550
I. Cal/OSHA T8 CCR 5006.1 mobile Crane & Tower Crane – Operator Qualifications and Certification.

Advanced American Construction, Inc. Health & Safety Program
WIND LOADS

The wind pressure (P) in pounds per square foot on a flat surface normal to the direction of the wind for any given velocity (V) in miles per hour is given quite accurately by the formula

$$P = 0.004\ V$$

The following table gives the pressure per square foot on a flat surface normal to the direction of the wind for different velocities, as calculated by the formula.

Velocity, miles per hour	**Pressure, lbs. per sq. ft.**
10	0.4
20	1.6
30	3.6

Use the formula above to calculate the pressure per square foot times the load area. Lifting is not permitted with wind velocity above 30mph, or if the force exceeds 2% of the crane's chart capacity.

Advanced American Construction, Inc. Health & Safety Program
PRE-ACCEPTANCE OR RELEASE
CRAWLER CRANE INSPECTION REPORT

Make	Model	Basic Capacity	Serial Number

Vendor	Inspection Location	Date	Order Number

Remarks:

		CONDITION			
		Good	Fair	Poor	NOTES
GENERAL					
1.	Appearance				
2.	Paint				
3.	Glass				
4.	Grease & oil leaks				
5.	Rating chart				
6.	Load indicator				
7.	Fire Extinguisher				
ENGINE (UPPER)					
8.	Oil level & condition				
9.	Starting equipment				
10.	Cooling system				
11.	Anti-freeze				
12.	Anti-icing equipment				
13.	Battery condition				
14.	Air system				

CRAWLER CRANE INSPECTION REPORT (Continued)

		CONDITION			
		Good	Fair	Poor	NOTES
15.	Hydraulic system				
16.	Engine instruments				
TORQUE CONVERTER					
17.	Instruments				
18.	Temperature				
19.	Pressure				
DRAW WORKS					
20.	Boom hoist				
21.	Clutch				
22.	Brake				
23.	Swing/friction				
24.	Swing/other				
25.	House lock				
26.	Travel				
27.	Turning dogs				
28.	Main hoist				
29.	Brake				
30.	Power down				
31.	Auxiliary hoist				
32.	Brake				
33.	Third drum				
34.	Brake				
LOWER WORKS					
35.	House rollers				
36.	Hook rollers				
37.	Roller path				
38.	Track pads				
39.	Track pins				
40.	Tumblers				
41.	Rollers				

CRAWLER CRANE INSPECTION REPORT (Continued)

		CONDITION			
		Good	Fair	Poor	NOTES
42.	Idlers				
43.	Sprockets				
44.	Chains				
45.	Track adjustment				
BOOM No. _____ Length _____					
46.	Point sheaves				
47.	Sheave guards				
48.	Load line dead end				
49.	Chords				
50.	Lattice				
51.	Boom connections				
52.	Boom stops				
53.	Boom cutout				
54.	Boom angle indicator				
JIB No. _____ Length _____					
55.	Point sheave				
56.	Sheave guards				
57.	Connections				
58.	Chords				
59.	Lattice				
60.	Stops				
61.	Strut				
MAST No. _____ Length _____					
62.	Point sheaves				
63.	Sheave guards				
64.	Connections				
65.	Chords				
66.	Lattice				
67.	Stops				
68.	Pendants/guy Lines				

CRAWLER CRANE INSPECTION REPORT (Continued)

		CONDITION			
		Good	Fair	Poor	NOTES
GANTRY					
69.	Sheaves				
70.	Pins				
EQUALIZER					
71.	Sheaves				
72.	Pins				
MAIN LOAD BLOCK					**Capacity:** _____
73.	Sheaves				
74.	Swivel				
75.	Hook/shackle				
76.	Safety latch				
AUXILIARY LOAD					
77.	Headache ball				
78.	Drop block				
79.	Swivel				
80.	Safety latch				
COUNTERWEIGHTS					**Specify Weight**
81.	Crane counterweight				
82.	Auxiliary counterweight				
83.	Car body counterweight				
84.	Locking devices				
WIRE ROPE					**Specify Type**
85.	Main load line				
86.	Auxiliary load line				
87.	Boom hoist line				
88.	Boom pendants				
89.	Jib pendants				
Does crane meet current inspection and certification requirements:					
Has boom and jib been N.D.T. tested?					Certify

CRAWLER CRANE INSPECTION REPORT (Continued)

	CONDITION			
	Good	Fair	Poor	NOTES
Have load hooks/shackles been N.D.T. tested?				Certify
Has boom or jib been repaired?				Specify

SUMMARY OF INSPECTION

I acknowledge this inspection report to show the condition of the above equipment. This report shall be used as reference to determine the repairs to be made during the rental period and at the termination of the rental period.

Inspector:

Approval:

Vendor's approval to inspection report:

Advanced American Construction, Inc. Health & Safety Program
PRE-ACCEPTANCE OR RELEASE
TRUCK CRANE INSPECTION REPORT

Make	Model	Basic Capacity	Serial Number

Vendor	Inspection Location	Date	Order Number

Remarks:

		CONDITION			
		Good	Fair	Poor	NOTES
GENERAL					
1.	Appearance				
2.	Paint				
3.	Glass				
4.	Grease & oil leaks				
5.	Rating chart				
6.	Load indicator				
7.	Fire Extinguisher				
ENGINE (UPPER)					
8.	Oil level & condition				
9.	Starting equipment				
10.	Cooling system				
11.	Anti-freeze				
12.	Anti-icing equipment				
13.	Battery condition				

TRUCK CRANE INSPECTION REPORT (Continued)

		CONDITION			
		Good	Fair	Poor	NOTES
14.	Air system				
15.	Hydraulic system				
16.	Engine instruments				
TORQUE CONVERTER					
17.	Instruments				
18.	Temperature				
19.	Pressure				
DRAW WORKS					
20.	Boom hoist				
21.	Clutch				
22.	Brake				
23.	Swing/friction				
24.	Swing/other				
25.	House lock				
26.	Main hoist				
27.	Brake				
28.	Power down				
29.	Auxiliary				
30.	Brake				
31.	Third drum				
32.	Brake				
CARRIER					
33.	Outrigger beams				
34.	Outrigger cylinders				
35.	Outrigger floats				
36.	Tires				
37.	Lights				
38.	Brakes				
39.	Steering				
40.	Sprockets				
41.	Chains				

TRUCK CRANE INSPECTION REPORT (Continued)

		CONDITION			
		Good	Fair	Poor	NOTES
42.	Track adjustment				
ENGINE (LOWER)					
43.	Starting equipment				
44.	Cooling system				
45.	Air system				
46.	Instruments				
BOOM No. _____ Length _____					
47.	Point sheaves				
48.	Sheave guards				
49.	Load line dead end				
50.	Chords				
51.	Lattice				
52.	Boom connections				
53.	Boom stops				
54.	Boom cutout				
55.	Boom angle indicator				
JIB No. _____ Length _____					
56.	Point Sheave				
57.	Sheave guards				
58.	Connections				
59.	Chords				
60.	Lattice				
61.	Stops				
62.	Strut				
MAST No. _____ Length _____					
63.	Point sheaves				
64.	Sheave guards				
65.	Connections				
66.	Chords				
67.	Lattice				

TRUCK CRANE INSPECTION REPORT (Continued)

		CONDITION			
		Good	Fair	Poor	NOTES
68.	Stops				
69.	Pendants/guy lines				
GANTRY					
70.	Sheaves				
71.	Pins				
EQUALIZER					
72.	Sheaves				
73.	Pins				
MAIN LOAD BLOCK					**Capacity:** _____
74.	Sheaves				
75.	Swivel				
76.	Hook/shackle				
77.	Safety latch				
AUXILIARY LOAD					
78.	Headache ball				
79.	Drop block				
80.	Swivel				
81.	Safety latch				
COUNTERWEIGHTS					**Specify Weight**
82.	Crane counterweight				
83.	Auxiliary counterweight				
84.	Car body counterweight				
85.	Locking devices				
WIRE ROPE					**Specify Type**
86.	Main load line				
87.	Auxiliary load line				
88.	Boom hoist line				
89.	Boom pendants				
90.	Jib pendants				

TRUCK CRANE INSPECTION REPORT (Continued)

	CONDITION			
	Good	Fair	Poor	NOTES
Does crane meet current inspection and certification requirements:				
Has boom and jib been N.D.T. tested?				Certify
Have load hooks/shackles been N.D.T. tested?				Certify
Has boom or jib been repaired?				Specify

SUMMARY OF INSPECTION

I acknowledge this inspection report to show the condition of the above equipment. This report shall be used as reference to determine the repairs to be made during the rental period and at the termination of the rental period.

Inspector:

Approval:

Vendor's approval to inspection report:

Advanced American Construction, Inc. Health & Safety Program
PRE-ACCEPTANCE OR RELEASE
HYDRAULIC CRANE INSPECTION REPORT

Make	Model	Basic Capacity	Serial Number

Vendor	Inspection Location	Date	Order Number

Remarks:

		CONDITION			
		Good	Fair	Poor	NOTES
GENERAL					
1.	Appearance				
2.	Paint				
3.	Glass				
4.	Glass wipers				
5.	Grease & oil leaks				
6.	Rating chart				
7.	Load indicator				
8.	Fire Extinguisher				
ENGINE					
9.	Oil level & condition				
10.	Starting equipment				
11.	Cooling system				
12.	Anti-freeze				
13.	Anti-icing equipment				

HYDRAULIC CRANE INSPECTION REPORT (Continued)

		CONDITION			
		Good	Fair	Poor	NOTES
14.	Battery condition				
15.	Air system				
16.	Hydraulic system				
17.	Engine instruments				
18.	Electrical system				
CARRIER					
19.	Steering assemblies				
20.	Brakes				
21.	Outriggers				
22.	Outrigger pads				
23.	Tires				
24.	Lights				
UPPER					
25.	Main swing assembly				
26.	Swing lock				
27.	Main hoist				
28.	Main hoist brake				
29.	Auxiliary hoist				
30.	Auxiliary hoist brake				
31.	Boom hoist				
BOOM No. _____ Length _____					
32.	Boom sections				
33.	Point sheaves				
34.	Anti two block device				
35.	Boom angle indicator				
JIB No. _____ Length _____					
36.	Point sheave				
37.	Stow lock				
38.	Connections				
MAIN LOAD BLOCK					

HYDRAULIC CRANE INSPECTION REPORT (Continued)

		CONDITION			
		Good	Fair	Poor	NOTES
39.	Sheaves				
40.	Swivel				
41.	Hook/shackle				
42.	Safety latch				
AUXILIARY LOAD					**Capacity** _____
43.	Ball				
44.	Swivel				
45.	Hook/swivel				
46.	Safety latch				
WIRE ROPE					**Specify type:** _____
47.	Main load line				
48.	Auxiliary load line				

Does crane meet current inspection and certification requirements:	
Has boom and jib been N.D.T. tested?	Certify
Have load hooks/shackles been N.D.T. tested?	Certify
Has boom or jib been repaired?	Specify

SUMMARY OF INSPECTION

I acknowledge this inspection report to show the condition of the above equipment. This report shall be used as reference to determine the repairs to be made during the rental period and at the termination of the rental period.

Inspector:

Approval:

Vendor's approval to inspection report:

Advanced American Construction, Inc. Health & Safety Program
EQUIPMENT CHECK LIST (DAILY)

MAKE	MODEL	UNIT NUMBER	WEEK ENDING

CHECK ITEM	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
Engine oil						
Lubrication						
Starting system						
Instruments						
Cooling system						
Air system						
Hydraulic system						
Operating controls						
Glass, mirrors						
Defroster, operating controls						
Brakes						
Steering system						
Tires						
Safety devices						
Lights and reflectors						
Horn						
Windshield wipers						
Fire extinguisher						

These items are to be checked each morning before operating this piece of equipment. Report ALL items in need of repair to Maintenance Shop at the time of inspection. Turn in check sheet to Equipment Supervisor at beginning of the week.

Operator _____ Badge Number _____

DATE REPORTED	REPAIRS	DATE REPAIRED

Advanced American Construction, Inc. Health & Safety Program
MONTHLY CRAWLER CRANE INSPECTION

Make	Model	Unit Number	Date

		CONDITION			
		Good	Fair	Poor	NOTES
GENERAL					
1.	Appearance				
2.	Paint				
3.	Glass				
4.	Grease & oil leaks				
5.	Rating chart				
6.	Load indicator				
7.	Fire Extinguisher				
ENGINE(S)					
8.	Starting system				
9.	Air system				
10.	Instruments				
TORQUE CONVERTER					
11.	Instruments				
DRAW WORKS					
12.	Boom hoist				
13.	Clutch				
14.	Brake				
15.	Swing/friction				
16.	Swing/other				
17.	House lock				

MONTHLY CRAWLER CRANE INSPECTION (Continued)

		CONDITION			
		Good	Fair	Poor	NOTES
18.	Travel				
19.	Turning dogs				
20.	Main hoist				
21.	Brake				
22.	Power down				
23.	Auxiliary hoist				
24.	Brake				
25.	Third drum				
26.	Brake				
LOWER WORKS					
27.	House rollers				
28.	Hook rollers				
29.	Roller path				
30.	Track pads				
31.	Track pins				
32.	Tumblers				
33.	Rollers				
34.	Idlers				
35.	Sprockets				
36.	Chains				
37.	Track adjustment				
BOOM					
38.	Point sheaves				
39.	Sheave guards				
40.	Load line dead end				
41.	Chords				
42.	Lattice				
43.	Boom connections				

MONTHLY CRAWLER CRANE INSPECTION (Continued)

		CONDITION			
		Good	Fair	Poor	NOTES
44.	Boom stops				
45.	Boom cutout				
46.	Boom angle indicator				
JIB					
47.	Point Sheave				
48.	Sheave guards				
49.	Connections				
50.	Chords				
51.	Lattice				
52.	Stops				
53.	Strut				
MAST					
54.	Point sheaves				
55.	Sheave guards				
56.	Connections				
57.	Chords				
58.	Lattice				
59.	Stops				
60.	Pendants/guy lines				
GANTRY					
61.	Sheaves				
62.	Pins				
EQUALIZER					
63.	Sheaves				
64.	Pins				
MAIN LOAD BLOCK					
65.	Sheaves				
66.	Swivel				

MONTHLY CRAWLER CRANE INSPECTION (Continued)

		CONDITION			
		Good	Fair	Poor	NOTES
67.	Hook/shackle				
68.	Safety latch				
AUXILIARY LOAD					
69.	Headache ball				
70.	Drop block				
71.	Swivel				
72.	Safety latch				
WIRE ROPE	**Wire Rope Inspection Report Attached**				

Inspected by: _____

Title: _____

Advanced American Construction, Inc. Health & Safety Program
MONTHLY HYDRAULIC CRANE INSPECTION

Make	Model	Unit Number	Date

		CONDITION			
		Good	Fair	Poor	NOTES
GENERAL					
1.	Appearance				
2.	Paint				
3.	Glass				
4.	Grease & oil leaks				
5.	Fire extinguisher				
ENGINE(S)					
6.	Starting equipment				
7.	Air system				
8.	Instruments				
CARRIER					
9.	Steering system				
10.	Brakes				
11.	Outriggers				
12.	Tires				
13.	Lights				
14.	Backup alarm				
UPPER					
15.	Swing assembly				
16.	Swing lock				
17.	Main hoist				

MONTHLY HYDRAULIC CRANE INSPECTION (Continued)

		CONDITION			
		Good	Fair	Poor	NOTES
18.	Main hoist brake				
19.	Auxiliary hoist				
20.	Auxiliary hoist brake				
21.	Boom Cylinder(s)				
BOOM					
22.	Boom sections				
23.	Point sheaves				
24.	Anti two block device				
25.	Boom angle indicator				
JIB					
26.	Point Sheave				
27.	Stow lock				
MAIN LOAD BLOCK					
28.	Sheaves				
29.	Swivel				
30.	Hook/shackle				
31.	Safety latch				
AUXILIARY LOAD					
32.	Ball				
33.	Swivel				
34.	Hook/swivel				
35.	Safety latch				
WIRE ROPE	**Use Wire Rope Inspection Report Attached**				

Inspected by: _____

Title: _____

Advanced American Construction, Inc. Health & Safety Program
WIRE ROPE INSPECTION REPORT

PROJECT	JOB NUMBER	MACHINE
UNIT NUMBER	**OWNER**	**OPERATOR**

SERVICE	CONSTRUCTION	INSP. DATE	COL. 1 ORIGINAL DIA.	CURRENT DIA.	COL. 2 LOSS OF DIA.	COL. 3 BROKEN WIRES IN ONE ROPE LAY	COL. 4 BREAKS IN 1 STRAND OF ONE LAY	NOTES
Main hoist								
Aux. hoist								
Boom hoist								
Boom pendants								
Jib pendants								
Main hoist								
Aux. hoist								
Boom hoist								
Boom pendants								
Jib pendants								
Main hoist								
Aux. hoist								
Boom hoist								
Boom pendants								
Jib pendants								

NOTE: ANSI STANDARDS - ROPE MUST BE REMOVED FROM SERVICE WHEN DIAMETER LOSS OR WIRE BREAKAGE OCCURS AS FOLLOWS:

DIAMETER LOSS - COL. 1 & 2

ALL EQUIPMENT EXCEPT FOR TOWER CRANES	
ORIGINAL DIAMETER (INCH)	LOSS (INCH)
3/4 (UP TO AND INCLUDING)	3/64
7/8 - 1 1/8	1/16
1 1/4 - 1 1/2	3/32

NUMBER OF WIRE BREAKS - COL 3 & 4

EQUIPMENT	COL. 3 IN ONE ROPE LAY	COL. 4 IN ONE STRAND IN ONE ROPE LAY
RUNNING ROPES CRANES AND DERRICKS	6	3
STANDING ROPES CRANES AND DERRICKS	1	1
• ALSO REMOVE ROPE IF ONE OR MORE BREAKS IN THE VALLEY ARE EVIDENT		

Advanced American Construction, Inc. Health & Safety Program
CRITICAL LIFT PERMIT

Project Name:_____ Project Number:_____

Lift Location:_____ Time:_____ Date:_____

Description of Load: _____

CRANE INFORMATION

Manufacturer:_____Model Number:_____

Boom/Jib Length: Main Boom:_____ft. Jib: _____ft. Total Boom:_____ft.

Maximum Radius During Lift: Pick:_____ Swing:_____ Set:_____

Direction and Degree of Swing: From: _____To:_____Degrees:_____

Lift Elevation (0= Crane Support Elevation): Maximum _____ft. Minimum:_____ft.

Boom Angles (In Degrees): Pick: _____ Swing: _____ Set: _____

Jib Stowed? Yes _____ No _____ Jib Erected? Yes _____ No _____

Manufacturer's Rated Capacity (per above configuration and radii): _____lbs.

LOAD INFORMATION

Weight of the Load: _____lbs. Effective Weight of Jib:_____lbs.

Effective Weight of Overhaul Ball (2X Ball Weight): _____lbs.

Weight of Load Block:_____lbs. Weight of Spreader_____lbs.

Weight of Slings: _____lbs. Weight of Shackles:_____lbs.

Weight of Other Rigging: _____lbs. TOTAL LIFT WEIGHT: _____lbs.

LOAD PERCENT OF CRANE CAPACITY PER LOAD CHART: _____%

_____ _____
Person Making Calculations Title Approved By Title

Advanced American Construction, Inc.
Post Office Box 83599 • Portland, Oregon 97283
Phone: (503) 445-9000 • Fax: (503) 546-3031
Website: www.callaac.com • CCB# 167886

Drug and Alcohol Awareness Program

The following Drug Awareness Program has been implemented at Advanced American Construction, Inc. for all employees:

Advanced American Construction, Inc. (AAC) is committed to operating an alcohol and drug-free work place. To ensure the highest standards of health and safety, all personnel employed by AAC, will be monitored for the use of drugs and abuse of alcohol under this program.

AAC has entered into the:

CONSTRUCTION INDUSTRY
DRUG-FREE WORKPLACE PROGRAM
(DFW PROGRAM)

Our plan document and compliance agreement are on file in our Personnel Department. We have designated two representatives from AAC, to work within the framework of the Administrative Rules. For reasons of confidentiality and privacy, these two individuals will handle all correspondence from Masonry Industry Trust Administration, Inc.

AAC Accounting Department will maintain personnel files in accordance to the contract agreement.

In addition to the above, all drivers who operate commercial motor vehicles in behalf of AAC will be required to comply with ADVANCED AMERICAN CONSTRUCTION, INC. DRUG AND ALCOHOL POLICY FOR USE WITH DOT REGULATED EMPLOYEES. This document is on file in the Accounting Department and available upon request.

AAC has also entered into agreement with A WorkSAFE Service FMCSA (DOT) Consortium. Attached is a Letter of Agreement copy with the document on file in the Accounting Department and again available upon request.

All drivers who operate commercial motor vehicles are substance abuse tested during the hiring process, plus a minimum of twice per year, immediately if involved in an accident and any time for cause.

All employee substance abuse testing is performed during a new hire process, random for all employees with a minimum of once per year but usually two times per year and immediately if involved in an accident or any time for cause.

Substance abuse test is a Specimen Collection: Split as per outside agreements.

ADVANCED AMERICAN CONSTRUCTION, INC. SAFETY MANAGEMENT STANDARD

ELECTRICAL SAFETY

1.0 Applicability

This program applies to Advanced American Construction, Inc. operations where electricity is used, electrical systems are installed or maintained, or where live electrical circuits are accessed. For work around overhead or underground utilities, see SMS 31, "Utility Clearances."

2.0 Purpose and Scope

This procedure describes requirements for working on electrical circuits with voltage greater than 50 volts. The primary hazards related to electricity are shock; burns; arc-blast; fire and explosions. This procedure is intended to reduce worker risk to electrical hazards.

3.0 Implementation

Office Locations - Implementation of this program is the responsibility of the Office Manager.

Shop Locations- Implementation of this procedure is the responsibility of the Shop Manager/Foreman.

Field Activities - Implementation of this program is the responsibility of the Project Manager.

4.1 Requirements

A. Any work performed on live electrical systems must be done by a licensed or journeyman electrician. Our employees are unqualified.

B. Follow established lockout/tagout procedures. Refer to SMS 20, “Lockout and Tagout Safety."

1. Consider all electrical systems as hot until verified de-energized and grounded.

2. Do not work on or in close proximity to electrical circuits unless the circuit is de-energized, grounded or guarded.

3. When an unqualified person is working in an elevated position near

overhead lines, the location shall be such that the person and the longest conductive object he or she may contact cannot come closer to any unguarded, energized overhead line than the following distances:

a. For voltages to ground over 50kV – 10 feet (305 CM) plus 4 inches (10 CM) for every 10kV over 50 kV.

b. For voltages to ground over 50kV – 10 feet (305 cm) plus 4 inches (10 cm) for every 10kV over 50 kV.

c. When an unqualified person is working on the ground in the vicinity of overhead lines, the person may not bring any conductive object closer to unguarded, energized overhead lines than the distances given in items a & b.

Note: For voltages normally encountered with overhead power line, objects which do not have an insulating rating for the voltage involved are considered to be conductive.

C. Hazardous Locations

Determine if electric equipment and wiring will be installed in locations that are classified depending on:

1. The properties of flammable vapors, liquids or gases, or combustible dusts or fibers that may be present; as well as the likelihood that a flammable or combustible concentration or quantity is present. (Refer to Attachment 1 for definitions of Hazardous Locations)

2. Consult resources A, B, E, and F for information on working in classified locations.

3. Vehicular and mechanical equipment. Any vehicle or mechanical equipment capable of having parts of its structure elevated near energized overhead lines shall be operated so that clearance of 10 ft. (305 CM) is maintained. If the voltage is higher than 50 kV, the clearance shall be increased 4 in. (10 CM) for every 10kV over that voltage. However, under any of the following conditions, the clearance may be reduced:

a. If the vehicle is in transit with its structure lowered, the clearance may be reduced to 4 ft. (122 CM). If the voltage is higher than 50 kV, the clearance shall be increased 4 in. (10 cm) for every 10 kV over that voltage.

b. If insulating barriers are installed to prevent contact with the lines, and if the barriers are rated for the voltage of the line being guarded and

are not a part of or an attachment to the vehicle or it's raised structure, the clearance may be reduced to a distance within the designed working dimensions of the insulating barrier.

c. If the equipment is an aerial lift insulted for the voltage involved, and if the work is performed by a qualified person, the clearance (between the un-insulated portion of the aerial lift and the power line) may be reduced to the distance given in table S-5.

d. Employees standing on the ground may not contact the vehicle or mechanical equipment or any of its attachments, unless:

    1. The employee is using protective equipment rated for the voltage; or

    2. The equipment is located so that no un-insulated part of its structure (that portion of the structure that provides a conductive path to employees on the ground) can come closer to the line than permitted in paragraph (c)(3)(iii) of this section.

    3. If any vehicle or mechanical equipment capable of having parts of its structure elevated near energized overhead lines is intentionally grounded, employees working on the ground near the point of grounding may not stand at the grounding location whenever there is a possibility of overhead line contact. Additional precautions, such as the use of barricades or insulation, shall be taken to protect employees from hazardous ground potentials, depending on earth resistivity and fault currents, which can develop within the first few feet or more outward from the grounding point.

    The person is insulated from all conductive objects at a potential different from from that of the energized part.

Table S-5 – APPROACH DISTANCES FOR QUALIFIED Employees – alternating current

Voltage range (phase to phase)	Minimum approach distance
300V and less	Avoid Contact
Over 300V, not over 750V	1 ft. 0 in. (30.5 cm).
Over 750V, not over 2kV	1 ft. 6 in. (46 CM).
Over 2kV, not over 15kV	2 ft. 0 in. (61 cm).
Over 15kV, not over 37kV	3 ft. 0 in. (91 cm).

Over 37kV, not over 87.5kV…… I 3 ft. 6 in. (107 cm).
Over 87.5kV, not over 121kV…. I 4 ft. 0 in. (122 cm).
Over 121kV, not over 140kV….. I 4 ft. 6 in. (137 cm).

e. Illumination

1. Employees may not enter spaces containing exposed energized parts, unless illumination is provided that enables the employees to perform the work safely.

2. "Confined or enclosed work spaces." When an employee works in a confined or enclosed space (such as a manhole or vault) that contains exposed energized parts, Advanced American Construction, Inc. shall provide, and the employee shall use, protective shields, protective barriers, or insulating materials as necessary to avoid inadvertent contact with these parts. Doors, hinged panels, and the like shall be secured to prevent their swinging into an employee and causing the employee to contact exposed energized parts.
3. "Conductive materials and equipment." Conductive materials and equipment that are in contact with any part of an employee's body shall be handled in a manner that will prevent them from contacting exposed energized conductors or circuit parts. If an employee must handle long dimensional conductive objects (such as duct and pipes) in areas with exposed live parts, the employer shall institute work practices (such as the use of insulation, guarding, and material handling techniques) which will minimize the hazard.

4. "Portable ladders." Portable ladders shall have nonconductive side rails if they are used where the employee or the ladder could contact exposed energized parts.

5. "Conductive apparel." Conductive articles of jewelry and clothing (such as watch bands, bracelets, rings, key chains, necklaces, metalized aprons, cloth with conductive thread, or metal headgear) may not be worn if they might contact exposed energized parts. However, such articles may be worn if they are rendered nonconductive by covering, wrapping, or other insulating means.

D. Ground Fault Circuit Interrupters and Grounding

1. Ground Fault Circuit Interrupters

a) Provide approved ground-fault circuit interrupters for all 120-volt, single phase, 15- and 20-ampere receptacle outlets on construction sites.
b) Provide ground-fault circuit interrupters for all 120-volt, single phase, 15-and 20-ampere receptacle outlets within garages, bathrooms, kitchens and shops.

2. Grounding/Earthing

Effectively ground all wiring, electrical circuits, and equipment, except portable tools & appliances protected by an UL-approved system of double insulation. Examples of equipment requiring grounding include:

a) Portable and vehicle or trailer mounted generators.
b) Electrically powered arc welders.
c) Switches.
d) Motor controller cases.
e) Fuse boxes.
f) Distribution cabinets.
g) Frames.
h) Non-current-carrying rails used for travel and motors of electrically operated cranes.
i) Electric elevators.
j) Metal frames of non-electric elevators to which electric conductors are attached.

E. Circuits

1. Require that there are no missing blanks in circuit or connector boxes.

2. Close doors to circuit and fuse boxes when not in use.

3. Label every circuit located on a circuit breaker/fuse box and/or motor control center (MCC).

F. Temporary Wiring, Electrical Tools and Extension Cords

1. Require that temporary wiring is installed and used in accordance with references. Specifically:

a) Guard, bury or isolate by elevation temporary wiring to prevent accidental contact by workers and equipment.

b) Require that vertical clearance above walkways is not less than 10 feet from circuits carrying 600 volts or less.
c) Support all exposed temporary wiring on insulators.
d) Protect temporary wiring from accidental damage.
e) Guard live parts of wiring.
f) Mark temporary power lines, switch boxes, receptacle boxes, metal cabinets and enclosures around equipment to indicate the maximum operating voltage.

2. Require that lighting strings are installed and used in accordance with references A and B. Specifically:

a) Use nonconductive lamp sockets and connections permanently molded to the conductor insulation.
b) Require that lighting strings have lamp guards.
c) Replace all broken or defective bulbs promptly.
d) Protect all lights used for illumination from accidental contact or breakage.
e) Ground metal-case sockets.

3. Require that extension cords are installed and used in accordance with references A and B. Specifically:

a) Use only 3-wire grounded type extension cords, designated for hard service or extra hard service and listed by Underwriters Laboratories, Inc.
b) Check cords for damage before use.
c) Do not exceed the rated load.
d) Do not use spliced cords.
e) Destroy and discard worn or frayed cords.
f) Do not fasten extension cords with staples, hang them by nails or suspend them by wire.
g) Do not wrap cords or cables around any conductive materials.

4. Require that portable electric tools brought onto the site are in good condition. Before use on any shift, visually inspect portable cord and plug-connected equipment for external defects and evidence of possible internal damage.

G. Report to supervision potential electrical hazards or unexpected occurrences while electrical renovation or construction occurs.

H. Keep accurate records of all pertinent work performed on a project.

1. Keep as built designs updated.

2. Share information on modifications with contractors on site.

I. Isolation of live electrical components

Isolate all live, unprotected electrical components through the use of barricades, fencing or other means to protect employees from contact.

J. Briefing

1. Brief workers on electrical hazards at the beginning of the job. Utilize Attachment 2 as a guide for proper PPE as applicable.

2. Brief new workers entering the site.

3. Brief workers when electrical conditions change or when hazards exist.

K. Inspection

Inspect the job site periodically using Attachment 3 to evaluate compliance with this standard.

L. **Grounding Conductor**

Advanced American Construction, Inc. Service, Inc. shall establish and implement an assured equipment grounding conductor program on construction sites covering all cord sets, receptacles which are not a part of the building or structure, and equipment connected by cord and plug which are available for use or used by employees.

1. A conductor used as a grounded conductor shall be identifiable and distinguishable from all other conductors. A conductor used as an equipment grounding conductor shall be identifiable and distinguishable from all other conductors.
2. No grounded conductor shall be attached to any terminal or lead so as to reverse designated polarity.
3. A grounding terminal or grounding-type device on a receptacle, cord connector, or attachment plug shall not be used for purposes other than grounding.
4. Consult resources A, B, C, D, E & F for procedures & guidelines to assure grounding conductors on sites are up to standard and available for use or used by employees.

a) Each cord set, attachment cap, plug and receptacle of cord sets, and any equipment connected by cord and plug, except cord sets and receptacles which are fixed and not exposed to damage, shall be visually inspected before each day's use for external defects, such as deformed or missing pins or insulation damage, and for indications of possible internal damage. Equipment found damaged or defective shall not be used until repaired or replaced.
b) Equipment, tools, electrical cords, etc. will be tagged as out of service and notice given to the Project Manager as early as possible.
c) The job site Project Manager is responsible for all inspection and determination to repair, replace and/or remove defective materials or equipment from operation. He will present to a qualified outside vendor or qualified internal employee to bring equipment back to required standard prior to allowing into service. A purchase order will be issued for an outside vendor tracking its repair or replacement cost. Or send it into our shop for repair or replacement and track the status through our J.J. Keller Maintenance Program until returned to the useable status. All equipment grounding conductors shall be tested for continuity & shall be electrically continuous.

    1. Each receptacle & attachment cap or plug shall be tested for correct attachment of the equipment grounding conductors. The equipment grounding conductor shall be connected to its proper terminal.

        a) Before each use.
        b) Before equipment is returned to service following any repairs.
        c) Before equipment is used such as when a cord has been run over.
        d) At intervals not to exceed 3 months, except that cord sets & receptacles which are fixed & not exposed to damage shall be tested at intervals not exceeding 6 months.

    2. Tests performed as required by this program shall be recorded as to the identity of each receptacle, cord set, & cord & plug connected equipment that passed the test and shall indicate the last date tested or interval for which it was tested. This record shall be kept by means of logs, color coding, or other effective means & shall be maintained until replaced by a more current record. These records shall be made available at the job site for inspection by the Project Manager.

    3. The following tests shall be performed on all cord sets, receptacles which are not a part of the permanent wiring of the

building or structure, and cord – and plug-connected equipment required to be grounded:

a) All equipment grounding conductors shall be tested for continuity and shall be electrically continuous.
b) Each receptacle and attachment cap or plug shall be tested for correct attachment of the equipment grounding conductor. The equipment grounding conductor shall be connected to its proper terminal.
c) This test record shall identify each receptacle, cord set, and cord- and plug-connected equipment that passed the test and shall indicate the last date it was tested or the interval for which it was tested. This record shall be kept by means of logs, color coding, or other effective means and shall be maintained until replaced by a more current record. The record shall be made available on the jobsite for inspection by the Project Manager and any affected employee.
d) Inspection and testing using Attachment 4 for maintenance requirement to this standard.

M. Training

1. Employees who face a risk of electric shock but who are not qualified persons shall be trained & familiar with electrically related safety practices.

2. Employees shall be trained in safety related work practices that pertain to their respective job assignments.

3. Clearance distances see SMS 31 page 2.

4. Additional requirements for unqualified persons. Employees who are not covered by paragraph (a) of this section but who are not qualified persons shall also be trained in and familiar with any electrically related safety practices not specifically addressed by 1910.331 through 1910.335 but which are necessary for their safety.

5. Additional requirements for qualified persons. Qualified persons (i.e. those permitted to work on or near exposed energized parts) shall, at a minimum be trained in and familiar with the skills and techniques necessary to distinguish exposed live parts from other parts of electric equipment.

5.1 Documentation Summary

Project Safety Files

1. Licensed/journeyman electrician for project (as necessary).

2. Attachment 3 Audits.

3. Documented communications between Advanced American Construction, Inc., contractors, licensed/journeyman electricians, or others.

6.1 Resources

A. U.S. OSHA Standard - General Industry Electrical Safety - 29 CFR 1910, Subpart S (http://www.osha-slc.gov/OshStd_toc/OSHA_Std_toc_1910_SUBPART_S.html)
B. U.S. OSHA Standard - Construction Electrical Safety - 29 CFR 1926, Subpart K (http://www.osha-slc.gov/OshStd_toc/OSHA_Std_toc_1926_SUBPART_K.html)
C. U.S. OSHA Standard - Design Safety Standards for Electrical Systems - General Industry - 29 CFR 1910, Subpart S (http://www.osha-slc.gov/OshStd_toc/OSHA_Std_toc_1910_SUBPART_S.html)
D. U.S. OSHA Standard - The Control of Hazardous Energy (lockout/tagout) - 29 CFR 1910.147 (http://www.osha-slc.gov/OshStd_data/1910_0147.html)
E. American National Standards Institute. ANSI C-2. 1996 National Electrical Safety Code (http://web.ansi.org/public/std_info.html)
F. National Fire Protection Association, National Electric Code, NFPA-70 (http://catalog.nfpa.org/)
G. U.S. Department of Labor – OSHA-GOV Standards – 29CFR Wiring Design and Protection. – 1926.404
H. U.S. Department of Labor – OSHA-GOV Standards – 29 CFR Training – 1910.332
I. U.S. Department of Labor – OSHA-GOV Standards – 29 CFR Selection and use of work practices 1910.333

Advanced American Construction, Inc. Health & Safety Program

HAZARDOUS LOCATIONS

"Class I Locations."

Class I locations are those in which flammable gases or vapors are or may be present in the air in quantities sufficient to produce explosive or ignitable mixtures. Class I locations include the following:

A. A Class I, Division 1 location is a location:

(1) In which ignitable concentrations of flammable gases or vapors may exist under normal operating conditions; or

(2) In which ignitable concentrations of such gases or vapors may exist frequently because of repair or maintenance operations or because of leakage; or

(3) In which breakdown or faulty operation of equipment or processes might release ignitable concentrations of flammable gases or vapors, and might also cause simultaneous failure of electric equipment.

B. A Class I, Division 2 location is a location:

(1) In which volatile flammable liquids or flammable gases are handled, processed, or used, but in which the hazardous liquids, vapors, or gases will normally be confined within closed containers or closed systems from which they can escape only in case of accidental rupture or breakdown of such containers or systems, or in case of abnormal operation of equipment; or

(2) In which ignitable concentrations of gases or vapors are normally prevented by positive mechanical ventilation, and which might become hazardous through failure or abnormal operations of the ventilating equipment; or

(3) That is adjacent to a Class I, Division 1 location, and to which ignitable concentrations of gases or vapors might occasionally be communicated unless such communication is prevented by adequate positive-pressure ventilation from a source of clean air, and effective safeguards against ventilation failure are provided.

"Class II Locations."

Class II locations are those that are hazardous because of the presence of combustible dust. Class II locations include the following:

A. A Class II, Division 1 location is a location:

(1) In which combustible dust is or may be in suspension in the air under normal operating conditions, in quantities sufficient to produce explosive or ignitable mixtures; or

(2) Where mechanical failure or abnormal operation of machinery or equipment might cause such explosive or ignitable mixtures to be produced, and might also provide a source of ignition through simultaneous failure of electric equipment, operation of protection devices, or from other causes, or

(3) In which combustible dusts of an electrically conductive nature may be present.

B. A Class II, Division 2 location is a location in which:

(1) Combustible dust will not normally be in suspension in the air in quantities sufficient to produce explosive or ignitable mixtures, and dust accumulations are normally insufficient to interfere with the normal operation of electrical equipment or other apparatus; or

(2) Dust may be in suspension in the air as a result of infrequent malfunctioning of handling or processing equipment, and dust accumulations resulting therefrom may be ignitable by abnormal operation or failure of electrical equipment or other apparatus.

"Class III Locations."

Class III locations are those that are hazardous because of the presence of easily ignitable fibers or flyings but in which such fibers or flyings are not likely to be in suspension in the air in quantities sufficient to produce ignitable mixtures. Class III locations include the following:

A. A Class III, Division 1 location is a location in which easily ignitable fibers or materials producing combustible flyings are handled, manufactured, or used.

C. A Class III, Division 2 location is a location in which easily ignitable fibers are stored or handled, except in process of manufacture.

Advanced American Construction, Inc. Health & Safety Program
Personal Protective Equipment & General Equipment
& Tools Needed During Electrical Work

If there is a danger of:	**Then use the following:**
- head injury from electric shock, or - burns due to contact with exposed energized parts	Nonconductive head protection - Class II nonconductive hard hat
Injury to the eyes or face from: - electric arcs or flashes, or - flying objects resulting from electrical explosion	Protective equipment for the eyes and face - face shield and safety glasses.
Shock to hands while handling energized wires	Lineman's rubber insulated gloves rated for the voltage exposed to; leather over gloves may be needed if exposure to abrasive surfaces is possible
- shock while working in areas where high voltage electrical systems or present, or - shock when performing electrical repairs	Non-conductive protective foot wear
Exposure to electric arcing or flash from: - opening or closing 2400 volt oil cutout switching devices; - removing or installing links in high voltage cable tap boxes; or - Removing or installing fuses in high voltage circuits.	Protective coveralls made of Nomex or other suitable flash-proof material.
IF	**THEN**
Energized parts are exposed	Use nonconductive ropes and hand lines near the exposed energized part.
Working near exposed energized conductors or circuit parts	Use insulated tools or handling equipment if the tools or handling equipment might make contact with such conducts or parts.
The insulating capability of insulated tools or handling equipment is subject to damage	Protect the insulating material.
Removing or installing fuses when the fuse terminals are energized	Use fuse-handling equipment, insulated for the circuit voltage.
Working near exposed energized parts that might be accidentally contacted or where dangerous electric heating or arcing might occur	Use protective shields, protective barriers, or insulating materials to protect from shock, burns, or other electrically related injuries.
Normally enclosed live parts are exposed for maintenance or repair	Guard the parts to protect unqualified persons from contact with the live parts.

Advanced American Construction, Inc. Health & Safety Program
ELECTRICAL HAZARD CHECK SHEET

Location Inspected:_____ Job No:_____

Date Inspected:_____ Name of Inspector: _____

		Yes	No	N/A
Electrical Equipment Markings				
1.	Disconnecting switches and circuit breakers are labeled to indicate their use or equipment served.			
2.	The necessary voltage, wattage, or current ratings are labeled.			
3.	Circuit breakers clearly indicate whether they are in the "on" or "off" position.			
Electrical Grounding				
4.	Extension cords used have a grounding conductor (third plug).			
5.	GFCI's are installed as required.			
6.	Portable electrical tools and equipment are of the double insulated type.			
7.	Ground fault circuit interrupters open the circuit on a ground current of 5 milliamperes or greater and are equipped with an integral push button test circuit.			
8.	Ground fault circuit interrupters are installed in accordance with the manufacturer's instructions.			
9.	Ground fault circuit interrupters are tested prior to initial use and periodically thereafter.			
10.	Grounding rods are at least 5/8-inch diameter steel or iron rods, 1/2-inch diameter copper clad steel, or 3/4-inch diameter galvanized pipe.			
11.	Grounding rods are in eight-foot lengths and driven to full depth.			
12.	The path from circuits, equipment, structures, and conduits or enclosures to ground are:			
13.	◆ Permanent and continuous.			
14.	◆ Have ample carrying capacity for the current likely to be imposed on it.			
15.	◆ Have resistance sufficiently low to permit current flow to operate circuit breakers and similar overcurrent devices on the circuit.			
16.	Driven ground rod electrodes have a resistance to ground not exceeding 25 ohms.			
17.	Upon installation of the driven ground rod electrode, the resistance was tested and recorded.			
18.	Conductors, used for bonding and grounding circuits, are of sufficient size to carry the anticipated current.			
19.	Grounds are not removed until all work is complete.			
Electrical Guarding				
20.	Switches, receptacles, etc. are provided with tight-fitting covers or plates.			
21.	All energized parts of electrical circuits and equipment are guarded against accidental contact by approved cabinets or enclosure			

Location Inspected:_____ **Job No:**_____

		Yes	No	N/A
22.	All unused openings (including conduit knockouts) in electrical enclosures and fittings are enclosed with appropriate covers, plugs or plates.			
23.	Ground-fault circuit interrupters are installed on each temporary 15 or 20 ampere, 120 volt AC circuit at locations where construction, demolition, modifications, alterations or excavations are being performed.			
24.	Electrical switches and breakers (rated 440 volts or greater) are provided with a means for locking them out in the OFF position.			
Electrical Systems				
25.	Circuit breakers accessible to personnel are protected from physical damage, and located away from ignitable material.			
26.	Weatherproof cabinets or enclosures are used when switches, circuit breakers, fuse panels and motor controllers are in a wet or outside location.			
27.	A readily accessible, manually operated switch is provided for each incoming service or supply circuit rated less than 5 kilovolts.			
28.	Electrical raceways and enclosures are securely fastened in place.			
29.	Overcurrent protection is provided for fuses or circuit breakers for each feeder and branch circuit.			
30.	Insulating fuse tongs or extractors are used when removing fuses from circuits rated 50-600 volts.			
31.	Fuse cabinets have close-fitting doors that can be locked.			
Extension Cords				
32.	Clamps or other securing means are provided on flexible cords or cables at plug receptacles, tools, equipment, etc. and the cord jacket is securely held in place.			
33.	Flexible cords and cables are free of splices and taps.			
34.	Only 3-wire grounded type extension cords, designated for hard or extra hard service are used.			
35.	Extension cords are listed by Underwriters Laboratories, Inc.			
36.	Extension cords are checked for damage before use.			
37.	The rated load on extension cords is not exceeded.			
38.	Extension cords are not fastened with staples, hung by nails or suspended by wire.			
Temporary Wiring				
39.	Temporary wiring is guarded, buried or isolated by elevation to prevent accidental contact by workers and equipment.			
40.	A vertical clearance above walkways for temporary wiring is not less than ten feet from circuits carrying 600 volts or less.			
41.	All exposed temporary wiring is supported on insulators.			
42.	Temporary wiring is protected from accidental damage.			

Location Inspected:_____ **Job No:**_____

		YES	NO	N/A
Lighting Strings				
43.	Nonconductive lamp sockets and connections are permanently molded to the conductor insulation on lighting strings.			
44.	Lighting strings have lamp guards.			
45.	Broken or defective bulbs are replaced promptly.			
46.	Lights are protected from accidental contact or breakage.			
47.	Wiring installed in conduit is equipped with bushings at outlets and terminals.			
48.	Receptacles are of the grounding type, and electrically connected to the equipment-grounding conductor.			
Worker Practices				
49.	Personnel performing electrical repairs are properly trained and "qualified".			
50.	Workers de-energize, ground or guard electric circuits before working in close proximity.			
51.	Workers consider all electrical systems as hot, until verified de-energized and grounded.			
52.	Proper lockout tag-out procedures are used for de-energizing electric circuits.			
Equipment				
53.	Only fiberglass or wood ladders are used when working near electrical hazards.			
54.	Insulation mats are placed on floors and on frames of equipment when working on energized equipment.			
Personal Protective Equipment				
55.	Rubber matting, blankets, insulated sleeves, and rubber gloves are inspected before use.			
56.	Workers use safety glasses and face shields during work activities where there is a reasonable probability of eye injury.			

REMARKS

ASSURED EQUIPMENT GROUNDING CONDUCTOR PROGRAM

It is the policy of Advanced American Construction, Inc. to establish and implement an assured equipment grounding conductor program on construction sites covering all cord sets, receptacles which are not a part of the permanent wiring of the building or structure, and equipment connected by cord and plug which are available for use or used by employees. This policy shall apply to all construction sites not equipped with ground fault circuit interrupters in accordance with OSHA standard 1926.400 (h)

Supervisors are designated to implement the assured equipment grounding conductor program: 1926.32 (f) defines competent person as one who is capable of identifying existing and predictable hazards in the surrounding area or working conditions which are unsanitary, hazardous or dangerous to employees, and who is authorized to take prompt corrective measures to eliminate them.

Supervisors will be responsible and accountable for the following:

Each cord set, attachment cap, plug and receptacle of cord set and any equipment connected by cord and plug, except cord sets and receptacles which are fixed and not exposed to damage, shall be visually inspected before each day's use for external defects, such as deformed or missing pins, or insulation damage, and for indication of possible internal damage. Equipment found damaged or defective may not be used until repaired.

Supervisors are responsible for tests on all cord sets, receptacles which are not a part of the permanent wiring of the building or structure, and cord and plug connected equipment required to be grounded. Tests shall be documented on the log for assured equipment grounding conductor program and shall be on the job site for inspection by OSHA officials and any affected employee. Equipment that does not meet prescribed test shall not be put into service. The following tests shall be performed:

- A. All equipment grounding conductors shall be tested for continuity and shall be electrically continuous.

- B. Each receptacle and attachment cap or plug shall be tested for correct attachment of the equipment grounding conductor. The equipment grounding shall be connected to its terminal.

In accordance with OSHA Construction Safety and health Standards 1926.21 Safety Training and Education, supervisors shall attend such training sessions as the company may deem necessary.

A copy of this policy shall be at the job site for inspection and copy by OSHA officials and any affected employee. Management retains the authority to designate that certain jobs comply with regulation 1926.400 (h) by use of ground fault circuit interrupters in lieu of the program established above. A copy of the completed forms will be kept on each applicable job site for inspection purposes.

WRITTEN DESCRIPTION
ASSURED EQUIPMENT GROUNDING CONDUCTOR PROGRAM

I. Scope

This procedure describes the requirements to assure the installation and maintenance of equipment grounding conductors for temporary wiring on construction sites in accordance with Safety and Health regulations for construction part 1926.404.

II.. Policy

Ground fault circuit interrupters (GFCI's) are not required for 120 volt, single phase, 15- and 20-ampere receptacles outlets where all of the requirements of this procedure are implemented at the construction site. Employees shall not use any equipment which has not met the requirements of this procedure.

III. Job site Information

A. Name or description of construction site:_____

B. Employer complying with this procedure is_____

C. Person designated to implement the procedure is _____

IV. Requirements

Equipment grounding conductors shall be installed and maintained in accordance with this procedure.

A Installation - Equipment grounding conductors shall be installed as follows:

1. All 120 volt, single phase, 15- and 20- ampere receptacles shall be of the grounding type and their contacts shall be grounded by connection to the equipment grounding conductor of the circuit supply/receptacle in accordance with the applicable requirements of the National Electrical Code.

2. All 120 volt cord sets (extension cords) shall have an equipment grounding conductor which shall be connected to the grounding contacts of the connector(s) on each end of the cord.

3. The exposed concurrent-carrying metal parts of the 120 volt cord and plug-connected tools and equipment that are likely to become energized shall be grounded in accordance with the applicable requirements of the National Electrical Code.

B. Visual Inspection

Employees shall be instructed to visually inspect receptacle, flexible cord sets (extension cords), except those that are fixed and not exposed to damage, and equipment connected by cord and plug before each day's use for external defects such as deformed or missing pins or insulation damage and for indication of possible internal damage. Where there is evidence of damage, the damaged item shall be taken out of service and tagged until tested and any required repairs have been made.

C. All 120 volt, single phase, 15 and 20- ampere receptacles which are not a part of the permanent wiring of the building or structure, 1220 volt flexible cord sets, and 120 volt cord and plug connected equipment required to be grounded shall be tested as follows:

1. All equipment grounding conductors shall be tested for continuity and shall be electrically continuous.

2. Each receptacle and attachment cap or plug shall be tested or correct attachment of the equipment grounding conductor. The equipment grounding conductor shall be connected to its proper terminal.

D. Testing Schedule

All required tests shall be performed:

1. Before first use
2. Before equipment is returned to service following any repairs.
3. Before equipment is used after any incident which can be reasonably suspected to have caused damage (for example, when a cord set is run over)
4. At intervals not to exceed 3 months, except that cord sets and receptacle which are fixed and not exposed to damage shall be tested at intervals not exceeding 6 months.

E. Test Records

Test verification shall be by means of numeric or color coded marking tape on the receptacle, cord set or equipment to identify that it has passed the test and to indicate the date (month or quarter) in accordance with section 5.0 Coding Scheme.

5. Color Scheme

Coding schemes for assured equipment grounding conductor test record.

MONTH OR QUARTER	*COLOR CODING SCHEME CODING*		*NUMERIC SCHEME*
	QUARTERLY	*MONTHLY*	*MONTHLY*
JANUARY	WHITE	WHITE	1
FEBRUARY		WHITE/YELLOW	2
MARCH		WHITE/BLUE	3
APRIL	GREEN	GREEN	4
MAY		GREEN/YELLOW	5
JUNE		GREEN/BLUE	6
JULY	RED	RED	7
AUGUST		RED/YELLOW	8
SEPTEMBER		RED/BLUE	9
OCTOBER	ORANGE	ORANGE	10
NOVEMBER		ORANGE/YELLOW	11
DECEMBER		ORANGE/BLUE	12
REPAIR OR INCIDENT	BROWN	BROWN	0

One of the methods listed by OSHA as part of acceptable record keeping is to establish a color code for marking cord sets and cord- and plug-connected equipment. The table below lists a color code that is in wide use by electricians and contractors. Colored plastic or vinyl electrical tape is placed on one or both ends of cords and cord- and plug-connected equipment to denote the month that the tests were performed.

Assured Equipment Grounding Conductor Program Color Code			
Month #	**Month Tested**	**Color of tape(s) to apply to cord**	
1	January	White	
2	February	White +	Yellow
3	March	White +	Blue
4	April	Green	
5	May	Green +	Yellow
6	June	Green +	Blue
7	July	Red	
8	August	Red +	Yellow
9	September	Red +	Blue
10	October	Orange	
11	November	Orange +	Yellow
12	December	Orange +	Blue

As an easy reminder of the color of the tape to place on the newly tested cord, remember the color for the start of each calendar quarter by the season:

White in January for Winter
Green in April for Spring
Red in July for Summer, or the 4th of July
Orange in October for Fall, or pumpkins.

Then add:
Yellow for the second month in each quarter,
Blue for the third month of each quarter.

ASSURED EQUIPMENT GROUNDING CONDUCTOR PROGRAM

COMPANY NAME:_____

SHOP ADDRESS:_____

JOB NAME OR NUMBER_____

ID OF EQUIP TESTED	DATE TESTED	ACTION, IF ANY	REASON- A-B-C-D	TESTED BY (SIGNATURE)

*REASON FOR TEST:

A. BEFORE FIRST USE.

B. BEFORE EQUIPMENT IS RETURNED TO SERVICE FOLLOWING ANY REPAIRS

C. BEFORE EQUIPMENT IS USED AFTER ANY INCIDENT WHICH CAN REASONABLY BE SUSPECTED TO HAVE CAUSED DAMAGE.

D. AT INTERVALS NOT TO EXCEED 3 MONTHS, EXCEPT THAT CORD SETS AND RECEPTACLES WHICH ARE FIXED AND NOT EXPOSED TO DAMAGE SHALL BE TESTED AT INTERVALS NOT EXCEEDING 6 MONTHS.

COMPANY AUTHORIZED SIGNATURE:_____

EFFECTS OF AMOUNT OF AC CURRENT AT 60 CYCLES PER SECOND

More than 3 mA - Painful shock which can cause indirect accidents.

More than 10 mA - Muscle contraction, "No-Let-Go" danger.

More than 30 mA - Lung paralysis, usually temporary.

More than 50 mA - Possible ventricular fibrillation (Heart dysfunction, usually fatal)

100 mA to 4 A- Certain ventricular fibrillation, fatal

Over 4 A - Heart paralysis, but may be temporary; severe burns. Usually caused by voltages above 600 Volts.

"mA" - Milli-amp **A = Ampere**

1 mA = 1/1000 Ampere = .001 Ampere

ADVANCED AMERICAN CONSTRUCTION, INC. SAFETY MANAGEMENT STANDARD

EMERGENCY ACTION PLANS

1.0 Applicability

This procedure applies to Advanced American Construction, Inc. office, shop and field operations.

2.0 Purpose and Scope

This procedure establishes policy, assigns responsibilities, and provides guidance to Advanced American Construction, Inc. offices/shops/field projects regarding emergency action. It includes general information on actions to be taken by Advanced American Construction, Inc. management and employees in the event of a fire or other emergency that may endanger life or property.

The objectives of this procedure are to:

A. Promote a fast, effective reaction in coping with emergencies.

B. Save lives and avoid injuries and panic.

C. Restore order and conditions back to normal levels with a minimum of confusion and as promptly as possible.

3.0 Implementation

Office Locations - Implementation of this program is the responsibility of the Office Manager.

Shop Locations- Implementation of this program is the responsibility is the responsibility of the Shop Manager/Foreman.

Field Activities - Implementation of this program is the responsibility of the Project Manager.

4.0 Requirements

A. Emergency Action Plan Development

1. Gather Information

Each Advanced American Construction, Inc. office/shop/project must

develop an emergency Action Plan tailored to its specific situation. Project EAPs must comply with client requirements and specifications and be written and available to all employees for review. Jobs with 10 or less employees may convey the plan orally. The plan must contain the following:

Reporting Fires and Other Emergencies

Describe the procedures that personnel should follow to report emergencies. List emergency telephone numbers for fire, paramedics and police. Include local prefixes on emergency numbers, if required, such as 9-911.

a) Alarm System

Describe the emergency alarm system for the building/site as applicable. Include the description and location of fire alarm pull boxes, and visual and audible alarms. If a public address (PA) system is used to notify occupants of emergencies, include the procedures to activate the PA system, such as calling the receptionist or building manager's office, and a description of the announcements that will be made. On construction sites the company radios are the best means of quick and widespread communication.

b) Evacuation Routes and Procedures

Develop a map or description of the evacuation routes and emergency exits to be use. A description of the building emergency lighting system and exit signs may also be included. Evacuation route maps may be posted in the offices. There should be a primary and alternate evacuation route and exit from each work area.

Describe procedures regarding the use of elevators, if applicable. In most cases elevator use is prohibited during an emergency. The building manager should be consulted for these procedures.

Include procedures to determine that no employees have been inadvertently left behind.

c) Critical Equipment/Operations Procedures

Designate personnel responsible for shutting down critical equipment only if absolutely necessary and the procedures for doing so, if applicable. Ensure that they are accounted for at the muster point by having an employee checklist available.

d) Assisting Disabled Personnel

Describe the provisions that have been made for notifying and assisting personnel with disabilities during an emergency. Such provisions are to accommodate personnel in wheelchairs or those who are temporarily disabled, such as personnel on crutches.

e) Personnel Accounting Procedures

Designate a primary and alternate assembly area for personnel who are evacuating. Require sufficient distance so that personnel will not be exposed to fire or debris hazards, or traffic, nor interfere with emergency responders.

Designate an individual and an alternate with the assigned responsibility for taking a headcount in the assembly area and reporting missing personnel to emergency responders.

Define the procedures on how employees will be informed that it is safe to re-enter the building or to leave for home.

B. Posting

1. Post the Emergency Action Plan where it is available to all employees.

2. Post evacuation maps at all exits and points of egress.
3. Post the entire plan on the employee bulletin board.
4. Have copies of emergency responder and company contacts in the event of an emergency posted in various places and muster points.

C. Training

1. Train all employees regarding the requirements of the Emergency Action Plan.
2. Training is required at hire, annually, when employees assigned duties change or when there is a change in the plan. Explain the route of escape, mustering points and how to contact emergency services. Lead employees must also be trained in assisting fellow employees that may need assistance.
3. Rehearse the plan in advance of an emergency.

5.0 Documentation Summary

Maintain in the Office/Shop/Project Safety Filing System:

1. Emergency Action Plan

2. Evacuation Maps

3. Training records

6.0 Resources

A. U.S. OSHA Standard - Emergency Action Plans - 29 CFR 1910.38
(http://www.osha-slc.gov/OshStd_data/1910_0038.html)
B. U.S. OSHA Fact Sheet - Responding to Workplace Emergencies
(http://www.osha-slc.gov/OshDoc/Fact_data/FSNO92-19.html)

ADVANCED AMERICAN CONSTRUCTION, INC. SAFETY MANAGEMENT STANDARD

EXCAVATION SAFETY

1.0 Applicability

This procedure applies to projects where Advanced American Construction, Inc. controls trenching and excavation activities, and/or where AAC employees are exposed to hazards associated with trenching and excavation activities.

2.0 Purpose and Scope

This procedure is intended to protect personnel from the hazards associated with excavation entry activities.

3.0 Implementation

Field Operations - Implementation of this program is the responsibility of the Project Manager/Superintendent.

4.0 Requirements

A. Competent Person

Appoint an Excavation Competent Person when Advanced American Construction, Inc. controls excavation activities. The Excavation Competent Person:

1. Is responsible for conducting daily inspections of excavation, adjacent areas, and protective systems prior to each shift.

2. Is responsible for inspection after every rainstorm or other hazard.

3. Must have knowledge of soils and soil classification.

4. Understands design and use of protective systems.

5. Has authority to stop work and take corrective actions when conditions change.

6. Has the ability to recognize and test hazardous atmospheres.

7. Has formal documentation of training as an Excavation Competent Person.

8. Is physically located at the excavation while work is in progress.

B. Soil Classification

Soil classifications must be conducted in accordance with Attachment 1. For the purposes of this standard all soils will be classified as type C unless otherwise designated in writing by a Registered Professional Engineer with experience in soils classification.

C. Protective Systems

Protect employees in excavations deeper than 4 feet by means of properly designed protective systems. All protective systems must comply with 29 CFR 1926 Subpart P Appendices B, D, and E.

1. Sloping and Benching

   See Attachment 2.

2. Timber Shoring for Trenches

   Timber shoring for trenches must be designed and stamped by a Registered Professional Engineer in accordance with 29CFR Subpart P, Appendix C.

3. Aluminum Hydraulic Shoring for Trenches

   Aluminum hydraulic shoring for trenches must be approved by a Registered Professional Engineer in accordance with 29CFR 1926 Subpart P, Appendix D.

4. Alternatives to Timber Shoring

   Trench shields and boxes must either be premanufactured with listed load ratings or designed, stamped and constructed under the direction of a Registered Professional Engineer.

5. Protective systems designed to protect employees in excavations deeper than 20 feet must be designed and stamped by a Registered Professional Engineer.

D. Permit System and Inspections

1. Establish a permit system utilizing Attachment 3 of this procedure that requires the following issues to be addressed:

a) Employee training/briefings.
b) Electrical safety.
c) Surface encumbrances.
d) Underground installations and utilities.
e) Protective systems.
f) Access and egress.
g) Exposure to vehicular traffic.
h) Exposure to falling loads.
i) Warning systems for mobile equipment.
j) Testing for hazardous atmospheres.
k) Emergency rescue equipment.
l) Protection from hazards associated with water accumulation.
    1. Employees shall not work in excavations in which there is accumulated water, or in excavations in which water is accumulating, unless adequate precautions have been taken to protect employees against the hazards posed by water accumulation. The precautions necessary to protect employees adequately vary with each situation, but could include special support or shield systems to protect from cave-ins, water removal to control the level of accumulating water, or use of a safety harness and lifeline.
m) Stability of adjacent structures.
n) Protection of employees from loose rock.
o) Inspections.
p) Fall protection. Walkways shall be provided where employees or equipment are required or permitted to cross over excavations. Guardrails which comply with 1926.502(b) shall be provided where walkways are 6 feet (1.8 m) or more above lower levels.

2. Require daily inspections of excavations to be conducted by Competent Person using Attachment 4.
3. The location of underground installations shall be determined before excavation. When utility companies or owners cannot respond to a request to locate underground utility installations within 24 hours, or cannot establish exact location of these installations, the employer may proceed, provided the employer does so with caution and provided detection equipment or other acceptable means to locate utility installations are used.

E. Structural ramps.

1. Structural ramps that are used solely by employees as a means of access or egress from excavations shall be designed by a competent person. Structural ramps used for access or egress of equipment shall be designed by a competent person qualified in structural design, and shall be constructed in accordance with the design.

2. Ramps and runways constructed of two or more structural members shall have the structural members connected together to prevent displacement.

3. Structural members used for ramps and runways shall be of uniform thickness.

4. Cleats or other appropriate means used to connect runway structural members shall be attached to the bottom of the runway or shall be attached in a manner to prevent tripping.

5. Structural ramps used in lieu of steps shall be provided with cleats or other surface treatments of the top surface to prevent slipping.

6. Means of egress from trench excavations. A stairway, ladder, ramp or other safe means of egress shall be located in trench excavations that are 4 feet (1.22 m) or more in depth so as to require no more than 25 feet (7.62 m) of lateral travel for employees.

7. Exposure to vehicular traffic. Employees exposed to public vehicular traffic shall be provided with, and shall wear, warning vests or other suitable garments marked with or made of reflectorized or high-visibility material.

8. Exposure to falling loads. No employee shall be permitted underneath loads handled by lifting or digging equipment. Employees shall be required to stand away from any vehicle being loaded or unloaded to avoid being struck by any spillage or falling materials. Operators may remain in the cabs of vehicles being loaded or unloaded when the vehicles are equipped, in accordance with 1926.601 (b)(6), to provide adequate protection for the operator during loading and unloading operations.

F. Hazardous atmospheres

1. Testing and controls. In addition to the requirements set forth in subparts D and E of this part (29 CFR 1926.50 – 1926.107) to prevent exposure to harmful levels of atmospheric contaminants and to assure acceptable atmospheric conditions, the following requirements shall apply.

2. Where oxygen deficiency (atmospheres containing less than 19.5 percent oxygen) or a hazardous atmosphere exists or could reasonably be expected to exist, such as in excavations in landfill areas or excavations in areas where hazardous substances are stored nearby, the atmospheres in the excavation shall be tested before employees enter excavations greater than 4 feet (1.22 m) in depth.

3. Adequate precaution shall be taken such as providing ventilation, to prevent employee exposure to an atmosphere containing a concentration of flammable gas in excess of 20 percent of the lower flammable limit of the

gas.

4. When controls are used that are intended to reduce the level of atmospheric contaminants to acceptable levels, testing shall be conducted as often as necessary to ensure that the atmosphere remains safe.

Training/Briefings

Conduct daily safety briefings for all employees associated with excavation activities and document on Attachment 3. Discuss excavation hazards, protective measures, and work practices that will be applicable to the day's activities.

5.0 Documentation Summary

Records required for the Project Safety File:

A. Competent person qualifications.

B. Excavation permits.

C. Daily Competent Person inspections.

D. Daily worker briefing documentation.

E. Daily inspection records

6.0 Resources

A. U.S. OSHA Standard - Excavations - 29 CFR 1926, Subpart P
(http://www.osha-slc.gov/OshStd_toc/OSHA_Std_toc_1926_SUBPART_P.html)
   1. Appendix B - Sloping and Benching
   (http://www.osha-slc.gov/OshStd_data/1926_SUBPART_P_APP_B.html)
   2. Appendix C - Timber Shoring
   (http://www.osha-slc.gov/OshStd_data/1926_SUBPART_P_APP_C.html)
   3. Appendix D - Aluminum Hydraulic Shoring
   (http://www.osha-slc.gov/OshStd_data/1926_SUBPART_P_APP_E.html)

B. U.S. OSHA Technical Links - Trenching and Excavation
(http://www.osha-slc.gov/SLTC/trenchingexcavation/index.html)

C. US Army Corp of Engineers EM 385-1-1, Section 23
(http://www.usace.army.mil/inet/usace-docs/eng-manuals/em385-1-1/toc.htm)

D. U.S. OSHA Standard – Specific Excavation Requirements. – 1926-651

Advanced American Construction, Inc. Health & Safety Program
Soils Classification

"Type A" soils

are cohesive soils with an unconfined, compressive strength of 1.5 ton per square foot (tsf) (144 kPa) or greater.

Examples of cohesive soils are: clay, silty clay, sandy clay, clay loam and, in some cases, silty clay loam and sandy clay loam. Cemented soils such as caliche and hardpan are also considered Type A.

However, no soil is Type A if:

(i) The soil is fissured; or
(ii) The soil is subject to vibration from heavy traffic, pile driving, or similar effects; or
(iii) The soil has been previously disturbed; or
(iv) The soil is part of a sloped, layered system where the layers dip into the excavation on a slope of four horizontal to one vertical (4H:1V)or greater; or
(v) The material is subject to other factors that would require it to be classified as a less stable material.

"Type B" soils are:

(i) Cohesive soil with an unconfined compressive strength greater than 0.5 tsf (48 kPa) but less than 1.5 tsf (144 kPa); or
(ii) Granular cohesionless soils including: angular gravel (similar to crushed rock), silt, silt loam, sandy loam and, in some cases, silty clay loam and sandy clay loam.
(iii) Previously disturbed soils except those which would otherwise be classed as Type C soil.
(iv) Soil that meets the unconfined compressive strength or cementation requirements for Type A, but is fissured or subject to vibration; or
(v) Dry rock that is not stable; or
(vi) Material that is part of a sloped, layered system where the layers dip into the excavation on a slope less steep than four horizontal to one vertical (4H:1V), but only if the material would otherwise be classified as Type B.

"Type C" soils are:

(i) Cohesive soil with an unconfined compressive strength of 0.5 tsf (48 kPa) or less; or
(ii) Granular soils including gravel, sand, and loamy sand; or
(iii) Submerged soil or soil from which water is freely seeping; or
(iv) Submerged rock that is not stable, or
(v) Material in a sloped, layered system where the layers dip into the excavation or a slope of four horizontal to one vertical (4H:1V) or steeper.

Advanced American Construction, Inc. Health & Safety Program

SIMPLE SLOPES

MAXIMUM ALLOWABLE SLOPES
SOIL OR ROCK TYPE
MAXIMUM ALLOWABLE SLOPES (H:V)[1]
FOR
EXCAVATIONS LESS THAN 20 FEET DEEP[3]

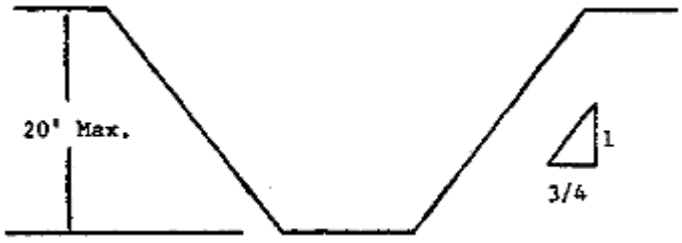
STABLE ROCK	VERTICAL (90 Deg.)
TYPE A[2]	3/4:1 (53 Deg.)
TYPE B	1:1 (45 Deg.)
TYPE C	1 1/2:1 (34 Deg.)

[1] *Numbers shown in parentheses next to maximum allowable slopes are angles expressed in degrees from the horizontal. Angles have been rounded off.*
[2] *A short-term maximum allowable slope of 1/2H:1V (63 degrees) is allowed in excavations in Type A soil that are 12 feet (3.67 m) or less in depth. Short-term maximum allowable slopes for excavations greater than12 feet (3.67 m) in depth shall be 3/4H:1V (53 degrees).*
[3] *Sloping or benching for excavations greater than 20 feet deep shall be designed by a registered professional engineer.*

Slope Configurations (All slopes stated below are in the horizontal to vertical ratio)

Excavations made in Type A soil.

All simple slope excavation 20 feet or less in depth shall have a maximum allowable slope of 3/4:1.

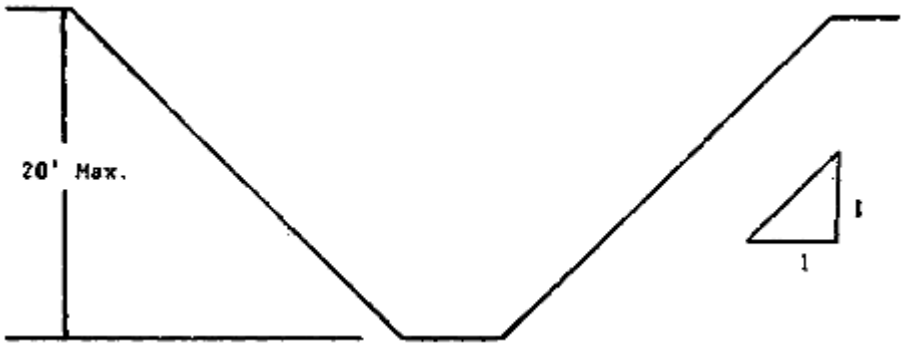


SIMPLE SLOPE - GENERAL

Exception: Simple slope excavations which are open 24 hours or less (short term) and which are 12 feet or less in depth shall have a maximum allowable slope of 1/2:1.

Excavations Made in Type B Soil

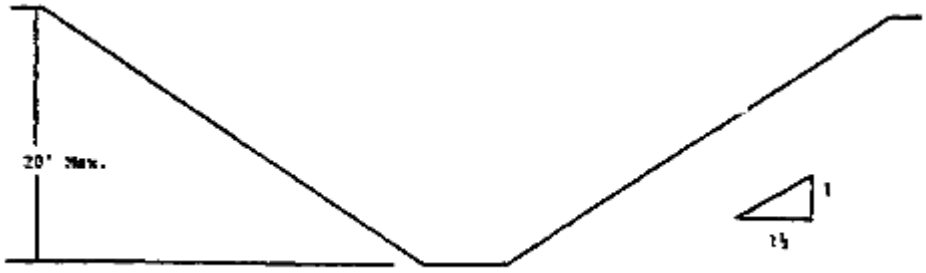
All simple slope excavations 20 feet or less in depth shall have a maximum allowable slope of 1:1.



SIMPLE SLOPE

Excavations Made in Type C Soil

All simple slope excavations 20 feet or less in depth shall have a maximum allowable slope of 1 1/2:1.



SIMPLE SLOPE

EXCAVATION/TRENCHING PERMIT

POST AT LOCATION

(GOOD FOR ONE WEEK ONLY)

Permit No. _____ Permit From _____ To _____

Competent Person: _____

Project Name: _____ Project Location: _____

Description or Job or Special procedures: _____

_____

_____

EMPLOYEE TRAINING AND PRE-EXCAVATION BRIEFING Circle Answer

1.	Safe Excavation and Rescue Training Conducted on: DATE:		
2.	Mandatory pre-excavation briefing conducted on: DATE:		
3.	Does this job require special training?	YES	NO

ELECTRICAL SAFETY

1.	Are all electrical devices grounded, double insulated, or GFCI protected?	YES	NO	N/A
2.	Have all power cords and tools been visually inspected?	YES	NO	N/A

SURFACE ENCUMBRANCES

1.	Have all surface encumbrances that are located so as to create a hazard to employees been removed or supported, as necessary, to safeguard employees?	YES	NO	N/A

UNDERGROUND INSTALLATIONS

1.	Have the estimated locations of all underground installation been determined prior to excavation?	YES	NO	N/A
2.	Have utility companies been contacted and advised of proposed work?	YES	NO	N/A
3.	Are underground installations protected, supported or removed while excavations are open?	YES	NO	N/A

PROTECTIVE SYSTEMS

1.	Excavation slopes comply with Type C Soil Classification?	YES	NO	N/A
2.	If no to question 1, has soil been examined and been determined to be other than Type C soil by a Registered Professional Engineer?	YES	NO	N/A
3.	If protective measures beyond sloping are required, do they meet OSHA Appendix standards?	YES	NO	N/A
4.	If no to question 3, has the protective system been designed and stamped by a Registered Professional Engineer?	YES	NO	N/A

MEANS OF EGRESS FOR TRENCHES DEEPER THAN 4 FEET

1.	Are stairways, ladders, or ramps provided every 25 feet?	YES	NO	N/A

ACCESS AND EGRESS

1.	Are structural ramps that are used solely by personnel as a means of access or egress from excavations designed by a competent person?	YES	NO	N/A
2.	Are ramps and runways constructed so structural members are connected to prevent displacement?	YES	NO	N/A
3.	Are structural ramps that are used for access and egress of equipment designed by a competent person qualified in structural design and constructed in accordance with the design?	YES	NO	N/A
4.	Are structural members used for ramps and runways of uniform thickness?	YES	NO	N/A
5.	Are cleats used in connecting runway structural members attached in a manner to prevent tripping?	YES	NO	N/A
6.	Are structural ramps used in lieu of steps provided with cleats or other surface treatment to prevent slipping?	YES	NO	N/A

EXPOSURE TO VEHICULAR TRAFFIC

1.	Are personnel exposed to public vehicular traffic wearing reflectorized or high visibility vests?	YES	NO	N/A

EXPOSURE TO FALLING LOADS

1.	Are employees prohibited from standing underneath loads handled by lifting or digging equipment?	YES	NO	N/A
2.	Are employees prohibited from standing next to vehicles being loaded or unloaded?	YES	NO	N/A

WARNING SYSTEMS FOR MOBILE EQUIPMENT

1.	Are warning systems such as barricades, hand or mechanical signals, or stop logs utilized when mobile equipment is operated adjacent to or at the edge of an excavation?	YES	NO	N/A

TESTING FOR HAZARDOUS ATMOSPHERES

1.	Are the atmospheric hazards that can be reasonably expected to exist in excavations greater than 4 feet deep tested and controlled?		YES	NO	N/A
		READING:		TIME:	INITIAL:
2.	Test for Oxygen Content:	_____ % 02 (19.5% Minimum)		_____	_____
3.	Test for Flammable Concentrations:	_____ % LEL (10% Maximum)		_____	_____
4.	Test for Toxic Concentration:	_____ PPM of _____		_____	_____
5.	Is testing conducted as often as necessary to ensure safety personnel?		YES	NO	N/A

EMERGENCY RESCUE EQUIPMENT

1.	Is emergency rescue equipment such as SCBA, safety harness and line, or basket stretcher readily available and attended when hazardous atmospheric conditions exist?	YES	NO	N/A
2.	Are employees who enter bell-bottom pier holes or other similar deep and confining excavations wearing a body harness with a life-line?	YES	NO	N/A

PROTECTION FROM HAZARDS ASSOCIATED WITH WATER ACCUMULATION

1.	Are employees prohibited from entering excavations that have accumulated water?	YES	NO	N/A
2.	Is water being controlled or prevented from accumulating in excavation by the use of water removal equipment?	YES	NO	N/A
3.	Is water control equipment operation being monitored by a competent person?	YES	NO	N/A
4.	Are diversion ditches, dikes, or other suitable means used to prevent surface water from entering excavation?	YES	NO	N/A
5.	Are excavations subjected to run-off from heavy rain immediately re-inspected by a competent person?	YES	NO	N/A

PROTECTION OF EMPLOYEES FROM LOOSE ROCK OR SOIL

1.	Is adequate protection provided to protect employees from loose rock or soil that could pose a hazard by falling or rolling from an excavation face?	YES	NO	N/A
2.	Are employees protected from excavated or other material and equipment by placing this material a minimum of two (2) feet from the edge of excavations or by the use of retraining devices?	YES	NO	N/A

STABILITY OF ADJACENT STRUCTURES

1.	Are support systems such as shoring, bracing, or underpinning provided to ensure stability of adjoining structures (i.e., buildings, walls) endangered by excavation activities?	YES	NO	N/A
2.	Has any excavation below the level of the base or footing of foundations or retaining walls been:			
	- Provided with a support system such as under pinning to ensure the safety of employees and stability of the structure?	YES	NO	N/A
	- Performed in stable rock?	YES	NO	N/A
	- Determined by a registered professional engineer that the structure is sufficiently removed from the excavation so as to be unaffected by the excavation activity?	YES	NO	N/A
	- Determined by a registered professional that the excavation work will not pose a hazard to employees?	YES	NO	N/A
3.	Is the undermining of sidewalks and pavement structures prohibited?	YES	NO	N/A

INSPECTIONS

1.	Are daily inspections of excavations where employee exposure can be reasonably anticipated being done by the competent person?	YES	NO	N/A
2.	Are inspections being performed by a competent person after every rainstorm or other hazard increasing occurrence?	YES	NO	N/A
3.	Are employees removed from the excavation if the competent person finds evidence at any time of a situation that could result in a possible cave-in, protective system failure, hazardous atmosphere or other hazardous condition?	YES	NO	N/A

FALL PROTECTION

1.	Are standard guardrails provided on walkways and bridges that cross over excavations?	YES	NO	N/A
2.	Are all remotely located excavations adequately barricaded or covered?	YES	NO	N/A
3.	Are temporary wells, pits, shafts and similar exploratory operations backfilled upon completion?	YES	NO	N/A

I have inspected the excavation described in this permit:

SIGNATURE OF COMPETENT PERSON _____ DATE _____

Advanced American Construction, Inc. Health & Safety Program
DAILY EXCAVATION/TRENCH INSPECTION REPORT

Competent Person: _____ Date: _____

Project Name: _____ Project Location: _____

Weather Conditions: _____Rainfall Amounts 24 hours Previous: _____

"I hereby attest that the following conditions existed and that the following items were checked or reviewed during this inspection".

Circle Y for YES; N for NO: N/A for NOT APPLICABLE. If comment is required, circle the number.

1.	Are barricades or covers in place and in good condition?	Y	N	N/A
2.	Have any tension cracks observed along top on any slopes?	Y	N	N/A
3.	Is surcharge located the proper distance from the toe of slopes?	Y	N	N/A
4.	Are slopes cut at design angle of repose?	Y	N	N/A
5.	Is any water seepage noted in trench walls or bottom?	Y	N	N/A
6.	Are pumps in place or available if needed?	Y	N	N/A
7.	Is bracing system installed in accordance with design?	Y	N	N/A
8.	Is there evidence of significant fracture planes in soil or rock?	Y	N	N/A
9.	Is there any evidence of caving or sloughing of soil since the last inspection?	Y	N	N/A
10.	Are there any zones of unusually weak soils or materials not anticipated?	Y	N	N/A
11.	Are there any noted dramatic dips or bedrock?	Y	N	N/A
12.	Are all short-term trench(s) covered within 24 hours?	Y	N	N/A
13.	Have non-compliance items been photographed?	Y	N	N/A
14.	Are hydraulic shores pumped to design pressure?	Y	N	N/A
15.	Is shoring being used secure?	Y	N	N/A
16.	Does plan include adequate safety factor for equipment being used?	Y	N	N/A
17.	Is traffic adequately away from trenching operation?	Y	N	N/A
18.	Are barricades up and secure?	Y	N	N/A
19.	Are there trees, boulders or other hazards in area?	Y	N	N/A
20.	Is vibration from equipment or traffic to close to trenching operation?	Y	N	N/A

Project Name: _____ Project Location: _____

21.	Are trench box(s) certified?	Y	N	N/A
22.	Are GFCI's used on ALL temporary electrical cords?	Y	N	N/A
23.	Is access and egress located every 25 feet?	Y	N	N/A
24.	Is hazardous testing done on a regular basis?	Y	N	N/A
25.	Is confined space permit renewed daily?	Y	N	N/A
26.	Has rescue procedure been established and is equipment immediately available?	Y	N	N/A

Comments: Place circled number in front of applicable comment.

ADVANCED AMERICAN CONSTRUCTION, INC. SAFETY MANAGEMENT STANDARD

FALL PROTECTION

1.0 Applicability

This procedure applies to Advanced American Construction, Inc. facilities and field operations where personnel could be exposed to fall hazards of 6 feet or greater.

2.0 Purpose and Scope

The purpose of this procedure is to provide criteria for the recognition and control of fall hazards.

3.0 Implementation

Facilities - Implementation of this procedure is the responsibility of the Location Manager.

Field Activities - Implementation of this procedure is the responsibility of the Project Manager/Superintendent.

4.0 Requirements

A. Training

1. Designate a competent person to provide training in fall hazard recognition to each employee who may be exposed to falls. The competent person must be qualified in the following areas:

    a) The nature of fall hazards in the work area.

    b) The correct procedures for erecting, maintaining, disassembling, and inspecting the fall protection systems to be used.

    c) The use and operation of guardrail, personal fall arrest, safety net, warning line, and safety monitoring systems, controlled access zones, and other protection to be used.

    d) The role of each employee in the safety monitoring system, when used.

e) The limitations on the use of mechanical equipment during the performance of roofing work on low-sloped roofs.
f) The correct procedures for the handling and storage of equipment and materials and the erection of overhead protection.

g) The role of employees in fall protection plans.

h) The standards contained in 29 CFR 1926 Subpart M.

2. Prepare a written certification record which includes the name of the employee trained, the date(s) of training, and the signature of the person who conducted the training.

3. Provide retraining when one of the following situations occur:

a) Changes in the workplace render previous training obsolete.

b) Changes in the types of fall protection systems or equipment to be used render previous training obsolete.

c) Inadequacies in affected employee's knowledge or use of fall protection systems or equipment indicate that the employee has not retained the requisite understanding or skill.

B. Fall Protection – General

Require that one or more of the fall protection/prevention systems outlined in this procedure is provided at **all** locations where fall hazards of 6 feet or greater exist. These locations include, but are not limited to, excavations, unprotected elevations, ladders, scaffolds, floor holes, wall openings, formwork, rebar tying, and all other locations and operations where potential fall hazards exist.

C. Guardrail Systems

1. Provide guardrail systems, when feasible, at all locations where a fall hazard of 6 feet or greater exists. Where guardrail systems are impractical, an alternative form of fall protection as outlined elsewhere in this procedure must be provided.

2. Require that guardrail systems meet the following criteria:

a) Toprails must be installed 42 inches above the walking/working surface and be capable of withstanding, without failure, a

minimum force of 200 pounds in any outward or downward direction with no more than 3 inches of deflection.

b) Midrails must be installed 21 inches above the walking/working surface and be capable of withstanding, without failure, a minimum force of 150 pounds in any outward or downward direction.

c) Posts must be spaced not more than 8 feet apart on centers.

3. Require that there are no openings more than 19 inches wide in any guardrail system.

4. Do not use plastic or steel banding as toprail or midrail.

5. Provide toprails and midrails of at least one-quarter inch nominal thickness or diameter, and smoothly surfaced to prevent cuts and punctures.

6. Flag the toprail with high-visibility material when using wire rope for toprails.

7. Erect guardrails on all sides when using guardrail systems around holes.

8. When guardrails are used around holes that are used for access, such as ladderways, provide a gate or offset the guardrail so that a person cannot walk directly into the hole.

9. When guardrails are used at hoisting areas, place a chain, gate, or removable guardrail section across the access point when hoisting operations are not taking place.

10. Provide guardrail systems at **all** locations above dangerous equipment, whether 6 feet or not.

11. Provide guardrails at all wall openings where the outside bottom edge of the opening is 6 feet or more above lower levels and the inside bottom edge of the wall opening is less than 39 inches above the walking/working surface.

12. Erect guardrail systems on all unprotected sides or edges of ramps and runways when such systems are used.

D. Personal Fall Arrest Systems

1. Provide and require the proper use of personal fall arrest systems on all unprotected elevations 6 feet or more above a lower level. Where these systems are impractical, an alternative form of fall protection as outlined elsewhere in this procedure must be provided.

2. All aspects of personal fall protections systems must be designed, installed, and used under the supervision of a qualified person.

3. Maintain a safety factor of at least 2 in all components of a personal fall protection system.

4. **Safety belts (body belts) are prohibited.**

5. Use only full body harnesses, shock-absorbing lanyards, lifelines, and anchorage points which meet the following criteria:

    a) Body harness design and construction must meet the specifications set forth in 29 CFR 1926.500-.503.

    b) All snaphooks must be of the locking type.

    c) Ropes and webbing used in lanyards, lifelines, and body harnesses must be made of synthetic fibers.

    d) The attachment point (dee-ring) of a body harness must be located in the center of the wearer's back near shoulder level, or above the wearer's head.

    e) Horizontal lifelines must be designed, installed, and used under the supervision of a qualified person; be capable of supporting at least 5,000 pounds per employee attached; and maintain a safety factor of at least 2.

    f) Lanyards and vertical lifelines must have a minimum breaking strength of 5,000 pounds.

    g) Self-retracting lifelines and lanyards which limit free fall to 2 feet or less must be capable of sustaining a minimum tensile load of 3000 pounds in the fully extended position.

    h) Self-retracting lifelines and lanyards which do not limit free fall to 2 feet or less, ripstitch, and other shock-absorbing lanyards must be capable of sustaining a minimum tensile load of 5,000 pounds in the fully extended position.

i) Anchorage points for personal fall protection systems must be independent of any anchorage point being used to support or suspend platforms and must be capable of supporting at least 5,000 pounds per employee attached.

6. Inspect all fall protection components for wear, damage, and deterioration prior to each use.

7. Require employees to be familiar with the fitting and donning of body harnesses; proper tie-off techniques, and suitable anchorage points.

8. Instruct employees to rig fall protection such that they can neither free fall more than 6 feet, nor contact any lower level.

9. Never tie off to guardrail systems or hoists.

10. Require employees to remain tied off 100% of the time at or above 6 feet by means of horizontal lifelines, vertical lifelines, a double lanyard system, or other suitable means.

11. Remove from service any component of a personal fall protection system that has been subjected to impact loading and do not use again until inspected by a competent person and determined to be undamaged and suitable for reuse.

12. Make provisions for the prompt rescue of personnel in the event of a fall, or require that employees are capable of self-rescue.

13. Provide separate vertical lifelines for each employee using a vertical lifeline. 5/8-inch nylon rope is recommended for lifeline use.

14. Protect lifelines against cuts and abrasions.

15. Use rope grabs to attach to vertical lifelines – never use knots.

E. Safety Net Systems

1. Provide safety net systems at locations where a fall hazard of 6 feet or greater exists, and other forms of fall protection are not feasible. Where safety net systems are impractical, an alternative form of fall protection as outlined elsewhere in this procedure must be provided.

2. Require that safety net systems meet the criteria set forth in 29 CFR 1926.500 -.503.

3. Install safety nets as close as possible under the walking/working

surface on which employees are working, but never more than 30 feet below this level.

4. Require that the potential fall area from the walking/working surface to the net is unobstructed.

5. Install safety nets with enough clearance under them to prevent contact with the surface or structures below when subjected to an impact force equal to the drop test specified below.

6. Extend the outer edge of the net 8 feet from the edge of the working surface when the vertical distance from the working level to the net is 5 feet or less.

7. Extend the outer edge of the net 10 feet from the edge of the working surface when the vertical distance from the working level to the net is 5 feet to 10 feet.

8. Extend the outer edge of the net 13 feet from the edge of the working surface when the vertical distance from the working level to the net is greater than 10 feet.

9. Conduct a drop test of the safety net after installation and before being used as a fall protection system; whenever relocated; after major repair; and at 6-month intervals if left in one place.

10. Conduct the drop test by dropping a 400 pound sandbag, 30 inches in diameter, into the net from at least 42 inches above the highest walking/working level at which employees are exposed to a fall.

11. Inspect safety nets at least once a week, and after any occurrence that could affect the integrity of the system, for wear, damage, and deterioration. Remove defective nets and components from service.

12. Remove all materials, scrap, equipment, and tools which have fallen into the net as soon as possible, but at least before the next work shift.

F. Hole Covers

1. Provide covers in roadways and vehicle aisles that are capable of supporting at least twice the maximum axle load of the largest vehicle expected to cross over the cover.

2. Provide walking/working surface hole covers that are capable of supporting at least twice the weight of employees, equipment, and materials that may be imposed on the cover at any one time.

3. Secure covers at the time of installation to prevent displacement by the wind, equipment, or employees.

4. Color code or mark all hole covers with the word “HOLE” or “COVER” to provide warning of the hazard.

G. Safety Monitoring Systems, Warning Line Systems, and Controlled Access Zones

Consult the Advanced American Construction, Inc. Safety Manager prior to performing any roofing, overhand bricklaying, leading edge, or other elevated work which may require the use of one or more of these systems.

H. Protection from Falling Objects

1. Install toeboards along the edge of the overhead walking/working surface.

2. Require that toeboards are a minimum of 3 ½ inches in height; that they are capable of withstanding at least 50 pounds of force applied in any downward or outward direction; and that there is no more than ¼ inch clearance between the toeboard and the walking/working surface.

3. Install paneling or screening from the top of the toeboard to the top rail or midrail when tools, equipment, or materials are piled higher than the top of the toeboard.

I. Controlled Access Zones

1. Inventory Fall Protection locations where conventional fall protection methods cannot be used. These locations shall be classified as controlled access zones.

   a) When used to control access to areas where leading edge and other operations are taking place the controlled access zone shall be defined by a control line or by any other means that restricts access.
   b) When control lines are used, they shall be erected not less than 6 feet (1.8m) nor more than 25 feet (7.7m) from the unprotected or leading edge, except when erecting precast concrete members.
   c) When erecting precast concrete members, the control line shall be erected not less than 6 feet (1.8m) nor more than 60 feet

(18m) or half the length of the member being erected, whichever is less, from the leading edge.

d) The control line shall extend along the entire length of the unprotected or leading edge and shall be approximately parallel to the unprotected or leading edge.
e) The control line shall be connected on each side to a guardrail system or wall.
f) When used to control access to areas where overhand bricklaying and related work are taking place:
g) The controlled access zone shall be defined by a control line erected not less than 10 feet (3.1m) nor more than 15 feet (4.5m) from the working edge.
h) The control line shall extend for a distance sufficient for the controlled access zone to enclose all employees performing overhand bricklaying and related work at the working edge and shall be approximately parallel to the working edge.
i) Additional control lines shall be erected at each end to enclose the controlled access zone.
j) Only employees engaged in overhand bricklaying or related work shall be permitted in the controlled access zone.
k) Control lines shall consist of ropes, wires, tapes, or equivalent materials, and supporting stanchions as follows:
l) Each line shall be flagged or otherwise clearly marked at not more than 6-foot (1l8m) intervals with high-visibility material.
m) Each line shall be rigged and supported in such a way that its lowest point (including sag) is not less than 39 inches (1m) from the walking/working surface and its highest point is not more than 45 inches (1.3m) [50 inches (1.3m) when overhand bricklaying operations are being performed] from the walking/working surface.
n) Each line shall have a minimum breaking strength of 200 pounds (.88kN).
o) On floors and roofs where guardrail systems are not in place prior to the beginning of overhand bricklaying operations, controlled access zones shall be enlarged, as necessary, to enclose all points of access, material handling areas, and storage areas.
p) On floors and roofs where guardrail systems are in place, but need to be removed to allow overhand bricklaying work or leading edge work to take place, only that portion of the guardrail necessary to accomplish that day's work shall be removed.

J. Safety Monitoring System

1. Where no other alternative measure has been implemented, the employer shall implement a safety monitoring system.

a) The employer shall designate a competent person to monitor the safety of other employees and the employer shall ensure that the safety monitor complies with the following requirements:
b) The safety monitor shall be competent to recognize fall hazards;
c) The safety monitor shall warn the employee when it appears that the employee is unaware of a fall hazard or is acting in an unsafe manner;
d) The safety monitor shall be on the same walking/working surface and within visual sighting distance of the employee being monitored;
e) The safety monitor shall be close enough to communicate orally with the employee; and
f) The safety monitor shall not have other responsibilities which could take the monitor's attention from the monitoring function.

K. Equipment

1. When purchasing equipment and raw materials for use in fall protection systems applicable ANSI & ASTM requirements must be met.

L. Rescue

1. Prompt rescue in the event of a fall is an essential part of any plan. Rescue must be a included in the JHA and plan document.
We have fall protection rescue boxes equipped with various types of rescue gear for the jobsites.

2. Do not plan on self rescue have a plan for each situation and equipment needed in advance.

L. Accident Investigation

1. In the event an employee falls, or some other related, serious incident occurs, (e.g., a near miss) Advanced American Construction, Inc. shall investigate the circumstances of the fall or other incident to determine if the fall protection plan needs to be changed (e.g. new practices, procedures, or training) and shall implement those changes to prevent similar types of falls or incidents.

5.0 Documentation Summary

Place in the Project Safety Files:

A. Competent Person Qualifications.

B. Employee Training Documents.

6.0 Resources

A. U.S. OSHA Standard - Fall Protection - 29 CFR 1926 Subpart M
(http://www.osha-slc.gov/OshStd_toc/OSHA_Std_toc_1926_SUBPART_M.html)
B. U.S. OSHA Technical Links - Fall Protection
(http://www.osha-slc.gov/SLTC/fallprotection/index.html)
C. (U.S. OSHA Sandard – Fall Protection – 1926.502 (g) (h)

ADVANCED AMERICAN CONSTRUCTION, INC. SAFETY MANAGEMENT STANDARD

FIRE PREVENTION AND PROTECTION

1.0 Applicability

This procedure applies to Advanced American Construction, Inc. office, shop and project locations.

2.0 Purpose and Scope

The purpose of this procedure is to reduce/eliminate potential fire hazards in the workplace and to provide for a rapid, effective response should a fire occur.

3.0 Implementation

Office/Shop Locations – Implementation of this procedure is the responsibility of the Office Manager.

Field Activities – Implementation of this procedure is the responsibility of the Project Manager/Superintendent.

4.0 Requirements

General

A. Develop an Emergency Action Plan as outlined in SMS 9, “Emergency Action Plan.”

B. Maintain good housekeeping to reduce fire hazards and to provide safe routes of egress should a fire occur.

C. Provide the appropriate number and types of fire extinguishers for the operations being performed. Refer to Attachment 1 for guidance.

D. Inspect fire extinguishers monthly and maintain an inspection log.

E. Advanced American Construction will assure that portable fire extinguishers are subjected to monthly vision check and an annual maintenance check. Stored pressure extinguishers do not require an internal examination. Advanced American Construction, Inc. will record the annual maintenance date and retain this record for one year after the

last entry or the life of the shell, whichever is less. The record will be available to the Assistant Secretary upon request.

F. Advanced American Construction, Inc. will inspect portable fire extinguishers periodically with a minimum of monthly and maintained in accordance with Maintenance and Use of Portable Fire Extinguishers, NFPA No. 10A-1970.

G. Conduct frequent periodic inspections to identify fire hazards such as:

1. Unnecessary accumulation of combustibles.

2. Unnecessary storage of flammables.

3. Sources of ignition (e.g., faulty wiring, sparks, open flame, etc.).

H. Remove all fire hazards promptly.

I. Prohibit smoking and other ignition sources in flammable storage and other fire hazard areas.

J. Post emergency numbers near telephones and evacuation maps in appropriate locations.

K. Conduct evacuation drills.

L. Train employees in:

1. Fire hazard recognition.

2. Fire hazard prevention.

3. Fire extinguisher use.

4. Emergency and evacuation procedures.

5. Where Advanced American Construction, Inc. has provided portable fire extinguishers for employee use in the workplace, AAC shall also provide an educational program to familiarize employees with the general principles of fire extinguisher use and the hazards involved with incipient stage fire fighting.

6. Advanced American Construction, Inc. shall provide the education required in item 5 of this section upon initial employment and at least annually thereafter.

5.0 Documentation Summary

File the following in the Office/Project Health and Safety File:

A. Emergency Action Plans.

B. Fire extinguisher inspection logs.

C. Employee training documentation.

D. Site audits.

E. Evacuation drills.

6.0 Resources

A. U.S. OSHA Standard - Means of Egress - 29 CFR 1910, Subpart E
(http://www.osha-slc.gov/OshStd_toc/OSHA_Std_toc_1910_SUBPART_E.html)
B. U.S. OSHA Standard - Employee Emergency Plans and Fire Prevention Plans - 29 CFR 1910.38
(http://www.osha-slc.gov/OshStd_data/1910_0038.html)
C. U.S. OSHA Standard - Fire Protection - 29 CFR 1910, Subpart L
(http://www.osha-slc.gov/OshStd_toc/OSHA_Std_toc_1910_SUBPART_L.html)
D. U.S. OSHA Technical Links - Fire Safety
(http://www.osha-slc.gov/SLTC/firesafety/index.html)
E. U.S. OSHA Construction Standard - Fire Protection and Prevention - 29 CFR 1926, Subpart F
(http://www.osha-slc.gov/OshStd_toc/OSHA_Std_toc_1926_SUBPART_F.html)
F. USACE EM 385-1-1 Section 9 - Fire Prevention and Protection
(http://www.usace.army.mil/inet/usace-docs/eng-manuals/em385-1-1/toc.htm)
G. U.S. OSHA Standard – Portable fire extinguishers. – 1910.157

Advanced American Construction, Inc. Health & Safety Program
FIRE EXTINGUISHER PLACEMENT GUIDELINES

1. Fire Extinguishers – General

The following are **minimum** requirements for fire extinguisher placement in office buildings, construction facilities, support buildings, and/or buildings under construction. In some cases, client requirements may be more stringent, in which case the client's requirements supercede the guidelines below.

a. A fire extinguisher, rated at a minimum of 2A, must be provided for each 3,000 square feet of the protected building area, or major fraction thereof. Travel distance from any point of the protected area to the nearest fire extinguisher shall not exceed 100 feet.

b. At least one fire extinguisher, rated at a minimum of 2A, must be provided on each floor. In multi-story buildings, at least one fire extinguisher must be located adjacent to the stairway.

c. Where more than 5 gallons of flammable or combustible liquids or 5 pounds of flammable gas are being used, a fire extinguisher, rated at least 10B, must be provided within 50 feet.

d. Portable fire extinguishing equipment, suitable for the fire hazard involved, must be provided at convenient, conspicuously accessible locations in Yard Storage areas. Portable fire extinguishers, rated at least 2A, shall be placed so that maximum travel distance to the nearest unit does not exceed 100 feet.

2. Flammable/Combustible Liquid Storage

The following are **minimum** requirements for fire extinguisher placement in flammable/combustible liquid and gas storage areas. In some cases, client requirements may be more stringent, in which case the client requirements supercede the guidelines below. Refer to SMS 15, "Flammable and Combustible Liquids and Gases, Attachment 2".

a. At least one portable fire extinguisher, rated at least 20B, must be located outside of, but not more than 10 feet from, the door opening into any room used for storage of more than 60 gallons of flammable or combustible liquids.

b. At least one portable fire extinguisher, rated at least 20B, must be located not less than 25 feet, nor more than 75 feet, from any flammable liquid storage area located outside.

c. At least one portable fire extinguisher, rated at least 20BC, must be provided on all tank trucks or other vehicles used for transporting and/or dispensing flammable/combustible liquids.

d. At least one fire extinguisher, rated at least 20BC, must be provided within 75 feet of each pump, dispenser, underground fill pipe opening, and lubrication/service areas.

e. At least one fire extinguisher, rated at least 20BC, must be provided at each LPG container storage area.

3. Hot Work

A minimum of one fire extinguisher, rated at least 20BC, must be provided for each hot work location. The extinguisher should be conspicuously positioned no more than 10 feet from the hot work. Refer to SMS 20, “Hot Work”.

ADVANCED AMERICAN CONSTRUCTION, INC. SAFETY MANAGEMENT STANDARD

FLAMMABLE AND COMBUSTIBLE LIQUIDS AND GASES

1.0 Applicability

This procedure applies to Advanced American Construction, Inc. shop and field operations where flammable and combustible liquids and gases are stored or used.

2.0 Purpose and Scope

The purpose of this procedure is to provide information regarding the proper storage, handling and work practices associated with flammable and combustible liquids and gases.

3.0 Implementation

Shop Locations - Implementation of this program is the responsibility of the Shop Manager.

Field Activities - Implementation of this program is the responsibility of the Project Manager/Superintendent.

4.0 Requirements

A. Appoint a Responsible Person who will:

1. Inspect storage areas periodically.

2. Monitor the quantity of flammable and combustible liquids and gases on the site.

3. Review work practices.

B. Control flammables, combustibles, and flammable gases entering the site.

1. Order only those materials and quantities that are needed to complete a job.

2. Check compliance with SMS 33, "Worker Right to Know".

C. Storage

1. Store flammable and combustible materials in appropriate tanks and containers. See Attachment 1.

2. Limit building storage outside of a flammable storage cabinet or storage room per Attachment 1.

3. Store oxidizers separately from flammables.

4. Segregate gas cylinders for storage based on their hazard (keep oxygen and acetylene cylinders stored separately).

D. Labeling and Signage

1. Post a "NO SMOKING OR OPEN FLAME" sign in all areas where flammable and combustible materials are stored, handled, and processed.

2. Require all containers and cylinders to be labeled with the contents and hazard-warning label.

E. Use of Materials on Site

1. Use flammable, combustible, and compressed gases in a manner that is consistent with the label and material safety data sheet for the product.

2. Use only those amounts of materials needed for the job. Transfer of flammables, combustibles, oxidizers to ready use containers is encouraged.

3. Use personal protective equipment stated on the product label and material safety data sheet.

F. Spill Control

1. Have a written spill response plan in place before materials are stored on site.

2. Clean up or respond to spills promptly.

G. Disposal

1. Keep solvent waste and flammable liquids in fire resistant, covered containers until they are removed from the worksite.

2. Do not place flammable or combustible waste in municipal garbage.

3. Dispose of flammable hazardous materials with a licensed hazardous material disposal company.

H. Inspection

1. Periodically inspect flammable and combustible storage and use areas; gas storage areas and oxidizer storage areas:

   a) Office settings inspect quarterly.
   b) Field related projects, inspect once a month.

2. Use the inspection sheet provided as Attachment 2 to inspect the storage areas.

I. Training

Require that Hazard Communication training includes specific hazard information for the flammables, combustibles and oxidizers used.

5.0 Documentation Summary

A. File these records in the Safety Filing System:

1. Location of the MSDS inventory.

2. Completed Flammable and Combustibles Inspection Checklist.

6.0 Resources

A. National Fire Protection Association Standard 58
(http://catalog.nfpa.org/)
B. Regulations of the U.S. Coast Guard
(http://www.uscg.mil/hq/g%2Dm/mse4/cfr.htm)
C. U.S. OSHA Standard - Flammable and Combustible Liquids - 29 CFR 1910.106
(http://www.osha-slc.gov/OshStd_data/1910_0106.html)

Advanced American Construction, Inc. Health & Safety Program
Flammable and Combustible Liquid Classifications

Flammable Liquid	Flash Point	Boiling Point
Class 1A	<73 ° F	<100 ° F
Class 1B	<73 °F	>100 ° F
Class 1C	>73 ° F<100 ° F	
Combustible liquid		
Class 2	>100 ° F<140 ° F	
Class 3	≥140 °F	

Maximum Allowable Size of Containers and Portable Tanks

	Flammable Liquids			Combustible Liquids	
Container Type	Class IA	Class IB	Class IC	Class II	Class III
Glass or approved plastic	1 pt	1 qt	1 gal	1 gal	1 gal
Metal (other than DOT drums)	1 gal	5 gal	5 gal	5 gal	5 gal
Safety cans	2 gal	5 gal	5 gal	5 gal	5 gal
Metal drums (DOT specifications)	60	60	60	60	60
Approved portable tanks	660 gal	660 gal	660 gal	660 gal	660 gal

Maximum Storage in Buildings Outside of Storage Cabinet or Storage Room

Type	Amount
Class 1A	25 gallons
Class 1B (containerized)	120 gallons
Class 1B (single portable tank)	660 gallons
Class 1C (containerized)	120 gallons
Class 1C (single portable tank)	660 gallons
Class 2 (containerized)	120 gallons

Advanced American Construction, Inc. Health & Safety Program
FLAMMABLE, COMBUSTIBLE, OXIDIZER &
COMPRESSED GAS INSPECTION CHECKSHEET

Location Inspected: _____ **Job No:** _____

Date Inspected: _____ **Name of Inspector:** _____

	Yes	No	Not Applicable
Storage Cabinets			
Flammable cabinets do not obstruct room exits.			
No more than 60 gallons of flammable or 120 gallons of combustible liquid is stored in a cabinet.			
No more than three cabinets are located in a storage area.			
Metal storage cabinets have self-closing doors.			
Cabinets are labeled "FLAMMABLE-KEEP FIRE AWAY"			
Safety Cans			
Safety cans are constructed of stainless steel, metal or tin.			
Safety cans have a flame arrestor and spring-loaded cap on both the filling and pouring spouts.			
Drum & Drum Storage Areas			
Drums are stored in a vertical position.			
Bungs are closed when liquid is not being transferred.			
Drums are shielded from the sun.			
Funnels with installed flash arrestor are used when transferring flammable liquids into drums.			
A minimum distance of 25 feet between a drum storage area and buildings is present.			
A "NO SMOKING" sign is posted in the area.			
An emergency spill kit is near the drum storage area.			
A 20 lb. dry-chemical fire extinguisher is no less than 10 feet or more than 50 feet from the storage area.			

Waste Cans	YES	NO	N/A
Combustible scrap, debris and waste materials (oily rags, etc.) are stored in covered metal cans.			
Waste cans are removed from the work area daily.			
Waste cans have spring-loaded self-closing lids.			
Storage Rooms Designed Specifically For Flammables			
Room construction meets NFPA fire-resistance requirements.			
Rooms with automatic extinguishing systems have the following:			
♦ noncombustible liquid-tight raised sills or ramps at least 4 inches in height.			
♦ flooring at least four inches below the surrounding floor, or an open grated trench that drains to a safe location.			
♦ openings with approved self-closing fire doors.			
♦ liquid-tight construction where the walls join the floors.			
♦ shelving, racks, dunnage floor overlay and other interiors with one inch wood.			
Rooms are ventilated by a gravity or mechanical exhaust system that:			
♦ commences not more than 12 inches above the floor.			
♦ is designed to provide for a complete change of air within the room at least six times per hour.			
♦ is controlled by a switch located outside the door, with ventilating equipment and any light fixtures operated from the same switch.			
Flammable & Combustible Storage Areas Within Buildings			
At least one portable fire extinguisher rated not less than 20-B is located outside of but not more than ten feet from the door opening into any room used for the storage of more than sixty gallons of flammable or combustible liquids.			
Buildings or rooms are locked when not occupied.			
Exits, stairways or passageways are not used for storing flammables and combustibles.			
No more than 25 gallons of Class IA or 60 gallons of Class IB; II or III liquids is located in a room outside of a flammable storage locker or flammable storeroom.			
An aisle at least three feet wide is maintained in storage areas.			
No more than those amounts needed for one day's use are stored in buildings under construction.			

Outside Storage of Flammable and Combustible Liquids	YES	NO	N/A
At least one portable fire extinguisher having a rating of not less than 20-B is located not less than twenty-five feet or more than 75 feet from any outside flammable liquid storage area.			
For containers not more than 60 gallons each, no more than 1,100 gallons in any one group are stored.			
Groups of containers are separated by five-foot clearances.			
Groups of containers are more than fifty feet from buildings.			
Portable tanks (not exceeding 660 gallons in capacity) are provided with emergency venting devices as specified by NFPA 30.			
Storage areas are free of accumulation of weeds, debris, and other combustible materials not necessary to the storage.			
Storage Tanks			
Tanks have relief vents.			
Tank vents are not close to open flames, stacks, heating apparatus, or any other source of ignition.			
A dike or curb or other suitable means to prevent the spread of leakage from tanks.			
Diked areas have a capacity equal in volume to at least that of the largest tank plus 10 % of all other tanks in the enclosure.			
Provisions to drain off accumulations of ground or rainwater or spills in diked areas.			
Dispensing of Flammable and Combustible Liquids			
Dispensing outlets for above ground tanks with nationally listed automatic-closing valve, without a latch-open device.			
Dispensing Systems are electrically bonded and grounded.			
Tanks, hoses and containers of five gallons or less in metallic contact while transferring flammable liquids.			
Electrically bonded systems are used for transferring flammable liquids in containers in excess of five gallons.			
Closed piping systems are used for drawing flammable liquids during transfer.			
Flammables and combustibles are drawn from a container or portable tank by use of gravity or through a pump using an approved self-closing valve.			

Liquefied Petroleum Gas - Refueling	YES	NO	N/A
Equipment is shut down during refueling operations.			
Leather gloves and safety glasses are worn during refueling operations.			
Smoking and hot work is prohibited during refueling.			
Refueling occurs at least 25 feet from buildings.			
Compressed Gases - Storage			
Cylinders must be capped when regulators are removed.			
Oxygen and fuel cylinders are stowed in designated well-ventilated areas.			
Storage areas have temperatures less than 130 degrees.			
Cylinders are stored upright and secured from falling over.			
Cylinders are in segregated groups by gas type and not intermingled with other cylinders.			
Oxygen cylinders are stored at least 20 feet away from flammables. (A fire resistive partition of at least 1-hour fire resistance rating of at least 5-foot height may also be used.)			
Flammable or combustible materials are kept at least 20 feet away from stored cylinders.			
Gas cylinder valves are protected from snow and ice during winter months.			
Oxygen cylinders are kept free from oil and grease.			
Welding cylinders are securely fastened to ready-use racks.			
Smoking or open flames are not permitted in areas where cylinders are stored.			
Cylinder storage areas are posted with the following sign: "DANGER - NO SMOKING OR OPEN FLAME"			
Cylinders are labeled with gas contents and warning statement.			
Empty cylinders are segregated from full cylinders.			
Oxidizers			
Oxidizers are stored separately from flammables.			
When oxidizers are shifted to a second container, the container is labeled with the appropriate warning labels.			
Secondary containers are compatible with oxidizers.			
Oxidizers are stored away from heat sources where the maximum temperature exceeds 100 degrees F.			
Chromic acid, nitric acid, perchloric acid, potassium permanganate (all oxidizers) are stored separately from other corrosives and flammables.			

ADVANCED AMERICAN CONSTRUCTION, INC. SAFETY MANAGEMENT STANDARD

Forklift Safety

1.0 Applicability

This procedure applies to Advanced American Construction, Inc. shop and field operations where forklifts and other powered industrial trucks or jacks are used for the purpose of material handling.

2.0 Purpose and Scope

During the movement of products and materials there are numerous opportunities for personal injury and property damage if proper procedures and caution are not used. This program applies to all powered industrial trucks, hoists & lifting gear used in material handling. The information in this program shall be used to train prospective industrial truck operators and provide the basis for initial and refresher training. OSHA reference for Powered Industrial Trucks is 1910.178.

3.0 Implementation

Shop Locations - Implementation of this procedure is the responsibility of the Office Manager.

Field Activities - Implementation of this procedure is the responsibility of the Project Manager/Superintendent.

4.0 Requirements

A. Prequalifications

1. Ensure that all candidates for Powered Industrial Truck operators meet the following basic requirements
   a) Must have no adverse vision problems that cannot be corrected by glasses or contacts;
   b) No adverse hearing loss that cannot be corrected with hearing aids
   c) No physical impairments that would impair safe operation of the PIT

d) No neurological disorders that affect balance or consciousness

e) Not taking any medication that affects perception, vision, or physical abilities

B. Training

1. Ensure that training of operators is conducted by an experienced operator that is familiar with the company training program.

2. Allow operators to operate without continual supervision only after they have successfully completed the training program and have received certification.

3. Supervise trainees closely and never allow trainees to operate independently.

4. Advanced American Construction, Inc. shall certify that each operator has been trained and evaluated as required. The certification shall include the name of the operator, the date of the training, the date of the evaluation, and the identity of the person(s) performing the training or evaluation.

5. Advanced American Construction, Inc. shall ensure the operators of powered industrial trucks are trained, as appropriate, by the dates shown in the following table.

If the employee was hired:	The initial training and evaluation of that must be completed:
Before December 1, 1999……..	By December 1, 1999.
After December 1, 1999…….	Before the employee is assigned to operate a powered industrial truck.

C. Safe Operating Procedures and Rules

1. Only authorized and trained personnel will operate PITs. Only authorized employees shall be allowed to operate mobile equipment. Authorization to operate mobile equipment will be issued to employees qualifying under appropriate training and proficiency testing.

2. The operator shall not use, or attempt to use any vehicle in any manner or for any purpose other than for which it is designated.

3. Ensure that all powered industrial trucks will be equipped with a headache rack, fire extinguisher, rotating beacon, back-up alarm and seat belts. Seat belts will be worn at all times by the Operator. Before starting the engine, the driver shall fasten seat belts and adjust them for a proper fit. The operator shall make sure the warning signal is operating when the equipment is backing up.

4. Require operators to perform daily pre- and post-trip inspections. At the beginning of each shift, the operator shall inspect and check the assigned equipment, reporting immediately to his/her supervisor any malfunction of the clutch or of the braking system, steering, lighting, or control system and locking/tagging out the equipment if necessary.

5. Report any safety defects (such as hydraulic fluid leaks; defective brakes, steering, lights, or horn; and/or missing fire extinguisher, lights, seat belt, or back-up alarm) for immediate repair or have the PIT taken "Out of Service".

6. Follow the proper recharging or refueling safety procedures. The operator of a gasoline or diesel vehicle shall shut off the engine before filling the fuel tank and shall ensure that the nozzle of the filling hose makes contact with the filling neck of the tank. No one shall be on the vehicle during fueling operations except as specifically required by design. There shall be no smoking or open flames in the immediate area during fueling operation.

7. Tilt loads back and carry no more than 6-8 inches from the ground. Loads that restrict the operator's vision will be transported backwards.

8. Travel no faster than 5 mph or faster than a normal walk.

9. Hard hats will be worn by PIT Operators in high lift areas.

10. No operator shall operate mobile equipment without the protection of an enclosed cab or approved eye protection.

11. Sound horn and use extreme caution when meeting pedestrians, making turns and cornering.

12. Prohibit passengers from riding on any portion of a PIT. Only the operator will ride PITs. "NO PASSENGERS" decals will be affixed on all PITs.

13. Unauthorized personnel shall not be permitted to ride on equipment unless it is equipped to accommodate passengers safely.

14. If PITs are used as a man lift, an appropriate man lift platform (cage with standard rails and toe-boards) will be used.

15. Aisles will be maintained free from obstructions, marked and wide enough (six foot minimum) for vehicle operation.

16. Lift capacity will be marked on all PITs. Operator will assure load does not exceed rated weight limits.

17. The operator shall not load the vehicle/equipment beyond its established load limit and shall not move loads which because of the length, width, or height that have not been centered and secured for safe transportation.

18. When un-attended, PITs will be turned off, forks lowered to the ground and parking brake applied.

19. All PITs (with exception of pallet jacks) will be equipped with a multi-purpose dry chemical fire extinguisher. (Minimum rating; 2A:10B:C)

20. Instruct operators to report all accidents, regardless of fault and severity, to Management. Management will conduct an accident investigation.

21. When loading rail cars and trailers, dock plates will be used. Operators will assure dock plates are in good condition and will store on edge when not in use.

22. Rail cars and trailers will be parked squarely to the loading area and have wheels chocked in place. Operators will follow established Docking/Un-Docking Procedures.

23. When lift trucks or other mechanically powered vehicles are being operated on open deck-type barges, the edges of the barges shall be guarded by railings, sideboards, timbers, or other means sufficient to prevent vehicles from rolling overboard. When such vehicles are operated on covered lighters where door openings other than those being used are left open, means shall be provided to prevent vehicles from rolling overboard through such openings.

D. Trucks

1. The flooring of trucks and trailers shall be checked for breaks and weakness before they are driven onto.

2. The brakes of highway trucks shall be set and wheel chocks placed under the rear wheels to prevent the trucks from rolling while they are boarded with powered industrial trucks.

3. Fixed jacks may be necessary to support a semitrailer and prevent upending during the loading or unloading when the trailer is not coupled to a tractor.

4. Positive protection shall be provided to prevent railroad cars from being moved while dockboards or bridge plates are in position.

E. Operations

1. If at any time a powered industrial truck is found to be in need of repair, defective, or in any way unsafe, the truck shall be taken out of service until it has been restored to safe operating condition.

2. Trucks shall not be driven up to anyone standing in front of a bench or other fixed object.

3. No person shall be allowed to stand or pass under the elevated portion of any truck, whether loaded or empty.

4. Unauthorized personnel shall not be permitted to ride on powered industrial trucks.

5. Arms or Legs shall not be placed between the uprights of the mast or outside the running lines of the truck.

6. When a powered industrial truck is left unattended, load engaging means shall be fully lowered, controls shall be neutralized, power shall be shut off, and brakes set. Wheels shall be blocked if the truck is parked on an incline.

7. A safe distance shall be maintained from the edge of ramps or platforms while on any elevated dock, or platform or freight car. Trucks shall not be used for opening or closing freight doors.

8. There shall be sufficient headroom under overhead installations, lights, pipes, sprinkler system, etc.

9. An overhead guard shall be used as protection against falling objects. It should be noted that an overhead guard is intended to offer protection from the impact of small packages, boxes, bagged material, etc., representative of the job application, but not to withstand the impact of a falling capacity load.

10. A load backrest extension shall be used whenever necessary to minimize the possibility of the load or part of it from falling rearward.

11. Trucks shall not be parked so as to block fire aisles, access to stairways, or fire equipment.

F. Traveling

1. All traffic regulations shall be observed, including authorized speed limits. A safe distance shall be maintained approximately three truck lengths from the truck ahead, and the truck shall be kept under control at all times.

2. Other trucks traveling in the same direction at intersections, blind spots, or other dangerous locations shall not be passed.

3. The driver shall be required to slow down and sound the horn at cross aisles and other locations where vision is obstructed. If the load being carried obstructs forward view, the driver shall be required to travel with the load trailing.

4. Railroad tracks shall be crossed diagonally wherever possible. Parking closer than 8 feet from the center of railroad tracks is prohibited.

5. The driver shall be required to look in the direction of, and keep a clear view of the path of travel.

6. Grades shall be ascended or descended slowly. When ascending or descending grades in excess of 10 percent, loaded trucks shall be driven with the load upgrade. On all grades the load and load engaging means shall be tilted back if applicable, and raised only as far as necessary to clear the road surface.

7. Under all travel conditions the truck shall be operated at a speed that will permit it to be brought to a stop in a safe manner.

8. Stunt driving and horseplay shall not be permitted.

9. The driver shall be required to slow down for wet and slippery floors.

10. Dockboard or bridgeplates, shall be properly secured before they are driven over. Dockboard or bridgeplates shall be driven over carefully and slowly and their rated capacity never exceeded.

11. Running over loose objects on the roadway surface shall be avoided.

12. While negotiating turns, speed shall be reduced to a safe level by means of turning the hand steering wheel in a smooth, sweeping motion. Except when maneuvering at a very low speed, the hand steering wheel shall be turned at a moderate, even rate.

G. Loading

1. Only stable or safely arranged loads shall be handled. Caution shall be exercised when handling off-center loads that cannot be centered.

2. Only loads within the rated capacity of the truck shall be handled.

3. The long or high (including multiple-tiered) loads that may affect capacity shall be adjusted.

4. Trucks equipped with attachments shall be operated as partially loaded trucks when not handling a load.

5. A load engaging means shall be placed under the load as far as possible; the mast shall be carefully tilted backward to stabilize the load.

6. Extreme care shall be used when tilting the load forward or backward, particularly when high tiering. Tilting forward with load engaging means elevated shall be prohibited except to pick up a load. An elevated load shall not be tilted forward except when the load is in a deposit position over a rack or stack. When stacking or tiering, only enough backward tilt to stabilize the load shall be used.

H. Fueling Safety

1. Fuel tanks shall not be filled while the engine is running. Spillage shall be avoided.

2. Spillage of oil or fuel shall be carefully washed away or completely evaporated and the fuel tank cap replaced before restarting engine.

3. No truck shall be operated with a leak in the fuel system until the leak has been corrected.

4. Open flames shall not be used for checking electrolyte level in storage batteries or gasoline level in fuel tanks.

I. Maintenance of Powered Industrial Trucks

1. Any power-operated industrial truck not in safe operating condition shall be removed from service. All repairs shall be made by authorized personnel.

2. Those repairs to the fuel and ignition systems of industrial trucks involving fire hazards shall be conducted only in locations designated for such repairs.

3. Trucks in need of repairs to the electrical system shall have the battery disconnected prior to such repairs.

4. All parts of any such industrial truck requiring replacement shall be replaced only by parts equivalent as to safety with those used in the original design.

5. Industrial trucks shall not be altered so that the relative positions of the various parts are different from what they were when originally received from the manufacturer, nor shall they be altered either by the addition of extra parts not provided by the manufacturer or by the elimination of any parts. Additional counter-weighting of fork trucks shall not be done unless approved by the truck manufacturer.

6. Industrial trucks shall be examined before being placed in service, and shall not be placed in service if the examination shows any condition adversely affecting the safety of the vehicle. Such examination shall be made at least daily. Where industrial trucks are used on a round-the-clock basis, they shall be examined prior to use each shift. Defects when found shall be immediately reported and corrected.

7. When the temperature of any part of any truck is found to be in excess of its normal operating temperature, thus creating a hazardous condition, the vehicle shall be removed from service and not returned to service until the cause for such overheating has been eliminated.

8. Industrial trucks shall be kept in a clean condition, free of lint, excess oil, and grease. Noncombustible agents should be used for cleaning trucks. Low flash point (below 100 deg. F.) solvents shall not be used. High flash point (at or above 100 deg. F.) solvents may be used.

J. Safe Operation Procedure for Charging or Changing LPG Tank

1. No Smoking.

2. Move LPG PIT outside for refueling.

3. Turn off PIT.

4. LPG tanks will be removed in the following order:

   a) shut off service valve

   b) disconnect tank from hose

   c) unbuckle and remove tank from bracket

   d) LPG tanks will be replaced in to following order:

   e) place tank in bracket and re-buckle

   f) reconnect hose to tank and tighten firmly

   g) open valve slowly and assure proper seal

NOTE: *Federal Law Prohibits dispensing an improper fuel type into any Vehicle or into a non-approved fuel container.*

K. In case of LPG Leaks or Tank Ruptures

1. DO NOT start or move the PIT.

2. If fuel hose is leaking, Close valve immediately and place PIT "Out of Service" until repaired.

3. If tank ruptures, warn other, immediately leave the area (at least 50 feet) and notify Management. Do not re-enter the area until cleared by Management.

L. Powered Industrial Trucks Pre-Use Checklist

1. Check the following items (as applicable) is to be conducted by the operator prior to use each shift:

   a) Lights

   b) Horn

   c) Brakes

   d) Leaks

   e) Warning Beacon

   f) Backup Warning Alarm

   g) Fire Extinguisher

2. Use the pre-shift inspection checklist (Attachment 1) prior to operation each day.

3. If any deficiencies are noted, the unit is to be placed OUT OF SERVICE until the problem has been corrected. Additionally, it is the operator's responsibility to notify the immediate supervisor and fill out a maintenance request.

5.0 Documentation Summary

A. File the following document in the Safety Filing System
   1. Operator certifications
   2. Inspection documents

6.0 Resources

A. OSHA Regulations (Standards - 29 CFR) Mechanically-powered vehicles used aboard vessels. - 1918.65
B. OSHA Regulations (Standards - 29 CFR) Powered industrial trucks. - 1910.178

Advanced American Construction, Inc.
Health & Safety Program

Forklift Training Program Content

Training Content

Training consists of a combination of formal instruction, practical training (demonstrations performed by the trainer and practical exercises performed by the trainee), and evaluation of the operator's performance in the workplace.

Initial Training: Powered industrial truck operators shall receive initial training in the following topics:

Truck-related training topics:

1. Operating instructions, warnings, and precautions for the types of truck the operator will be authorized to operate
2. Differences between the truck and the automobile
3. Truck controls and instrumentation: where they are located, what they do, and how they work
4. Engine or motor operation
5. Steering and maneuvering
6. Visibility (including restrictions due to loading)
7. Fork and attachment adaptation, operation, and use limitations
8. Vehicle capacity
9. Vehicle stability
10. Any vehicle inspection and maintenance that the operator will be required to perform
11. Refueling and/or charging and recharging of batteries
12. Operating limitations

13. Any other operating instructions, warnings, or precautions listed in the operator's manual for the types of vehicle that the employee is being trained to operate.

Workplace-related topics:

1. Surface conditions where the vehicle will be operated
2. Composition of loads to be carried and load stability
3. Load manipulation, stacking, and unstacking
4. Pedestrian traffic in areas where the vehicle will be operated
5. Narrow aisles and other restricted places where the vehicle will be operated
6. Hazardous (classified) locations where the vehicle will be operated
7. Ramps and other sloped surfaces that could affect the vehicle's stability
8. Closed environments and other areas where insufficient ventilation or poor vehicle maintenance could cause a buildup of carbon monoxide or diesel exhaust
9. Other unique or potentially hazardous environmental conditions in the workplace that could affect safe operation

Refresher training and evaluation. Refresher training, including an evaluation of the effectiveness of that training, shall be conducted to ensure that the operator has the knowledge and skills needed to operate the powered industrial truck safely. Refresher training in relevant topics shall be provided to the operator when:

1. The operator has been observed to operate the vehicle in an unsafe manner
2. The operator has been involved in an accident or near-miss incident

3. The operator has received an evaluation that reveals that the operator is not operating the truck safely
4. The operator is assigned to drive a different type of truck
5. A condition in the workplace changes in a manner that could affect safe operation of the truck
6. Once every 3 years an evaluation will be conducted of each powered industrial truck operator's performance.

Advanced American Construction, Inc.
Health & Safety Program

Forklift Operators Checklist

Truck #: _____ **Date:** _____
Operator: _____
Hour Meter Readings: _____
Hours Today: _____ **Total Hours:** _____

Visual Checks	***OK***	***Needs Repair***
Fluid Levels		
Leaks- Hydraulic, Battery		
Fuel Level		
Damage (Retaining Pins, Guards, Warnings)		
Tire Condition, Pressure		
Lights		
Hour Meter		
Other Gauges		
Battery Restraint System		
Seat Belt		
Other		
Operational Checks		
Horn, Warning Alarms		
Steering		
Service Brakes		
Parking Brake		
Hydraulic Controls		
Manuals, Capacity Plate		
Discharge Indicator		
Battery Load Test		

Comments: _____

_____

Inspected By: _____

ADVANCED AMERICAN CONSTRUCTION, INC. SAFETY MANAGEMENT STANDARD

Construction General Waste Management

1.0 Applicability

This written program documents the steps Advanced American Construction has taken to minimize General Refuse and Construction & Demolition debris resulting from various construction activities consistent with Civil Industrial operations present at our construction sites. Through the use of sound waste minimization practices utilizing a, reduce, reuse and recycle approach AAC will strive to reduce their volume of waste.

2.0 Purpose and Scope

AAC Management has overall responsibility for coordinating Safety, Health and Environmental programs in this company. Copies of the written program may be obtained at the job site or in the Corporate Office.

If, after reading this program, you find that improvements can be made, please contact AAC. We encourage all suggestions because we are committed to creating a safe workplace for all our employees and to the success of our Construction Waste Management Program. We strive for clear understanding, safe behavior, and involvement with the program from every level of the company.

Implementation

The Program Administrator: AAC Safety Manager
This person is responsible for:

- Issuing and administering this program and making sure that it satisfies all applicable federal, state and local requirements.
- Identifying waste minimization opportunities and prescribing appropriate solutions.
- Ensuring that all employees are made aware of the proper method to dispose of waste.

Project Managers, Superintendents and Foreman
These people are responsible for:

- Estimation of the waste that will be generated prior to work being performed so that the need for containers and waste removal, if necessary, can be determined.
- Coordinate with the project site or owner to ensure proper disposal of wastes or construction and demolition debris.
- Assign or ensure an AAC employee is given the responsibility to handle the task of proper disposal, reuse or recycling of wastes or C&D debris.
- Assuring that safe operations are maintained on the jobsite to prevent injuries to the eyes, face, head, hands and feet during handling of wastes.
- Enforcing the use of this program in the areas in which it’s required or necessary.

Employees

- Using PPE when required
- Properly store and maintain all General and C&D debris

Designated Recycling Coordinators

TBD

3.0 Definitions

General trash/refuse: includes domestic, office and warehouse wastes, paper and other nonhazardous refuse. Waste should be free of liquids and should not include any recyclable waste, used oil, hazardous wastes or universal wastes.

Clean construction or demolition debris: also known as "clean fill", is defined as uncontaminated broken concrete without protruding metal bars, bricks, rock, stone, reclaimed asphalt pavement, or dirt or sand generated from construction or demolition activities.

General construction or demolition debris: is defined as non-hazardous, uncontaminated materials resulting from the construction, remodeling, repair, and demolition of utilities, structures, and roads, limited to the following:

- soil * wall coverings * reclaimed asphalt pavement * rock * plaster * glass * non-hazardous painted wood * drywall * plastics * non-hazardous treated wood * electrical wiring * non-hazardous coated wood * non-asbestos insulation * bricks * wood products * roofing shingles * concrete * general roof coverings.

To the extent allowed by federal law, clean construction or demolition debris shall not be considered "waste" if it is:

Used as fill material outside of a setback zone if the fill is placed no higher than the highest point of elevation existing prior to the filling immediately adjacent to the fill area, and if covered by sufficient uncontaminated soil to support vegetation within 30 days of the completion of filling or if covered by a road or structure; or

separated or processed and returned to the economic mainstream in the form of raw materials or products, if it is not speculatively accumulated and, if used as a fill material, it is used in accordance with the first identical paragraph immediately above within 30 days of its generation; or

solely broken concrete without protruding metal bars used for erosion control; or

generated from the construction or demolition of a building, road, or other structure and used to construct, on the site where the construction or demolition has taken place, a manmade functional structure not to exceed 20 feet above the highest point of elevation of the property immediately adjacent to the new manmade functional structure as that

elevation existed prior to the creation of that new structure, provided that the structure shall be covered with sufficient soil materials to sustain vegetation or by a road or structure, and further provided that no such structure shall be constructed within a home rule municipality with a population over 500,000 without the consent of the municipality.

Program Activities

C&D versus General Trash or Refuse

Construction and demolition (C&D) debris is nonhazardous, uncontaminated material resulting from construction, remodeling, repair, or demolition of utilities, structures, and roads. These materials include the following:

- Bricks, concrete, and other masonry materials
- Soil
- Rock
- Wood, including nonhazardous painted, treated, and coated wood and wood products
- Wall coverings
- Plaster
- Drywall
- Plumbing fixtures
- Non-asbestos insulation
- Roofing shingles and other roof coverings
- Reclaimed asphalt pavement
- Glass
- Plastics that do not conceal waste
- Electrical wiring and components that do not contain hazardous substances
- Piping
- Metal materials incidental to any of the materials above

General trash includes domestic, office and warehouse wastes, paper and other nonhazardous refuse. Waste should be free of liquids and should not include any recyclable waste, used oil, hazardous wastes or universal wastes.

Accumulation and Storage

- Use appropriate PPE, such as rubber or neoprene gloves, boots and safety glasses, and a facemask or goggles.
- When handling trash, use caution to avoid splinters, cuts or other injuries.
- Trash can be accumulated in bags, drums, baskets, gondolas or dumpsters. Outdoor receptacles should be covered to prevent stormwater pollution.

Waste Management Locations

- Dumpsters should be kept within plain sight of the office if possible, to facilitate oversight of contractors or others who use it. C&D debris can be transported to a permitted facility by any hauler. The hauler is not required to have a special waste haulers permit. You should first call the disposal facility to determine if it accepts C&D debris.

- If you have lead-based paint that was removed from non-household waste (for example, paint that was removed from the substrate), the paint waste must be tested by a laboratory using the toxicity characteristic leachate procedure (TCLP) before landfilling. Currently this waste must be managed as a special waste.
- Well labeled trash barrels are to be located throughout the jobsite, covered and labeled; “General Trash”.

Recycling and Disposal

- All general refuse other than office waste is currently thrown in the dumpster and hauled to the landfill. Employees will be made aware of the proper disposal of waste at their jobsites (refer to Construction Waste Management Plan for details). However; every effort should be made to recycle or reuse certain types of general refuse
- C&D debris: Three recycling methods available to AAC include the following:

- **Mixed material collection** - Recyclable materials are transported from the job site, sorted at a designated facility, and sent to processors for recycling.
- **Source separation** - Similar materials are separated from other wastes at the job site by category (such as wood, metal, and concrete) and sent to processors for recycling.
- **On-site processing** - Recyclable materials are processed on site and made ready for reuse.

CONSTRUCTION WASTE MANAGEMENT PLAN

Company Name: **Contact Person:**
Telephone #:

Address:

Project Location:

Contractor:

Contact Person:

Telephone #:

Recycling Coordinators: Designated
Recycling Coordinators:

Project Description:

Waste Management Goals:

- This project will recycle or salvage for reuse a minimum of____**%** by weight of the waste generated on-site.
- Waste reduction will be achieved through building design, and reuse and recycling efforts will be maintained throughout the construction process.

- **Waste Prevention Planning:**
- Voluntary recycling requirements for AAC project recyclables include:
  - newspaper
  - corrugated cardboard
  - white and colored office paper
  - glass bottles and jars
  - metal cans
- Compliance with EPA and Oregon Landfill Bans, i.e. no disposal of tires, appliances, yard waste, mandatory recyclables, hazardous waste, batteries, fluorescent tubes, and large metal items.
- Project Construction Documents – Requirements for waste management which will be included in all work. The General Contractor will contractually require all subcontractors to comply with any client driven mandatory recycling requirements. A copy of this Construction Waste Management Plan will accompany all Subcontractor Agreements and require subcontractor participation.
- The Construction Waste Reduction Plan shall be implemented and executed as follows and as on the chart:

- Salvageable materials will be diverted from disposal where feasible.
- There will be a designated area on the construction site reserved for a row of dumpsters each specifically labeled for respective materials to be received.
- Before proceeding with any removal of construction materials from the construction site, Recycling Coordinators will inspect containers for compliance with local landfill requirements.
- Wood cutting will occur in centralized locations to maximize reuse and make collection easier.
- Hazardous waste will be managed by a licensed hazardous waste vendor.

Communication & Education Plan:

- AAC will conduct an on-site pre-construction meeting with subcontractors. Attendance will be required for the subcontractor's key field personnel. The purpose of the meeting is to reinforce to subcontractor's key field employees the commitments made by their companies with regard to the project goals and requirements.
- As each new subcontractor comes on site, the recycling coordinators will present him/her with a copy of the Waste Management Plan and provide a tour of the recycling areas.
- The subcontractor will be expected to make sure all their crews comply with the Waste Management Plan.
- All recycling containers will be clearly labeled. Containers shall be located in close proximity to the building(s) under construction in which recyclables/salvageable materials will be placed.
- Lists of acceptable/unacceptable materials will be posted throughout the site.
- All subcontractors will be informed in writing of the importance of non-contamination with other materials or trash.
- Recycling coordinators shall inspect the containers on a weekly basis to insure that no contamination is occurring and precautions shall also be taken to deter any contamination by the public.

Evaluation Plan:

- The General Contractor will develop, update, and post at the jobsite a graph indicating the progress to date for achieving the project's waste recycling goal of XX% by weight of the total project waste stream.

Expected Project Waste, Disposal, and Handling:

The following charts identify waste materials expected on this project, their disposal method, and handling procedures:

Material	Quantity	Disposal Method	Handling Procedure
Land Clearing Debris		Keep separate for reuse and or wood sale	Keep separated in designated areas on site.
Clean dimensional wood and palette wood		Keep separate for reuse by on-site construction or by site employees for either heating stoves or reuse in home projects. Recycle at:	Keep separated in designated areas on site. Place in “Clean Wood” container.
Plywood, OSB, particle board		Reuse, landfill	Keep separated in designated areas on site. Place in “Trash” container.
Painted or treated wood		Reuse, landfill	Keep separated in designated areas on site. Place in “Trash” container.
Concrete		Recycle	
Concrete Masonry Units		Keep separate for re-use by on-site construction or by site employees	Keep separated in designated areas on site
Metals		Recycle at:	Keep separated in designated areas on site. Place in “Metals” container.
Gypsum drywall (unpainted)		Recycle with supplier:	Keep scraps separate for recycling – stack on pallets in provided on site. All scrap drywall will be taken back by contractor to drywall supplier
Paint		Reuse, landfill	
Insulation		Reuse, landfill	
Flooring		Reuse, landfill	
Carpet and pad		Reuse or recycle with carpet manufacturer	
Glass		Glass Bottles: Recycle at:	Keep separated in designated areas on site. Place in “Glass/Plastic bottles/Metal Cans/Mixed Paper/ Cardboard” container
Plastics		Plastic Bottles: Recycle at: Plastic bags/scraps: Reuse, landfill	Keep separated in designated areas on site. Place in “Glass/Plastic bottles/Metal Cans/Mixed

			Paper/ Cardboard" container
Beverage		Recycle at:	Keep separated in designated areas on site. Place in "Glass/Plastic bottles/Metal Cans/Mixed Paper/ Cardboard" container
Cardboard		Recycle at:	Keep separated in designated areas on site. Place in "Glass/Plastic bottles/Metal Cans/Mixed Paper/ Cardboard" container
Paper and newsprint		Recycle at:	Keep separated in designated areas on site. Place in "Glass/Plastic bottles/Metal Cans/Mixed Paper/ Cardboard" container

Waste Disposal: Contractor:
Contact:

Name of landfill for disposal of non-recyclable waste:

- Transfer Stations:
- Landfills (ultimate disposal location):

Landfill tipping fee: $XX / ton

- **Estimate of waste for landfill disposal:**

Recycling Calculation:

If all construction waste was disposed in landfill:

XX lbs = XX tons x $XX/ton = **$XX**

With recycling: TOTAL = **$XX**

ADVANCED AMERICAN CONSTRUCTION, INC. SAFETY MANAGEMENT STANDARD

H2S – Hydrogen Sulfide

1.0 Applicability

This procedure applies to all operations.

2.0 Purpose and Scope

The purpose of this section is to ensure that the hazards of all chemicals produce or imported are evaluated, and that information concerning their hazards is transmitted to employers and employees. This transmittal of information is to be accomplished by means of comprehensive hazard communication programs, which are to include container labeling and other forms of warning, material safety data sheets and employee training.

This section requires chemical manufacturers or importers to assess the hazards of chemicals which they produce or import, and all employers to provide information to their employees about the hazardous chemicals to which they are exposed, by means of a hazard communication program, labels and other forms of warning, material safety data sheets, and information and training. In addition, this section requires distributors to transmit the required information to employers. **(Employers who do not produce or import chemicals need only focus on those parts of this rule that deal with establishing a workplace program and communicating information to their workers. Appendix E of this section is a general guide for such employers to help them determine their compliance obligations under the rule.)**

3.0 Implementation

Office Locations:	Implementation of this procedure is the responsibility of the Office Manager
Shop Locations:	Implementation of the program is the responsibility of the Shop Manager.
Field Activities:	Implementation of this program is the responsibility of the Project Manager/Superintendent.

4.0 Requirements

A. "Written hazard communication program." Reference SMS 33 Worker Right to Know (Hazard Communication)

1. Advanced American Construction, Inc. will develop, implement, and maintain at each workplace, a written hazard communication program which at least describes how the criteria specified in paragraphs (f), (g),

and (h) of 29 CFR – 1910.1200 for labels and other forms of warning, material safety data sheets, and employee information and training will be met, and which also includes the following:

a. A list of the hazardous chemicals known to be present using an identity that is referenced on the appropriate material safety data sheet (the list may be compiled for the workplace as a whole or for individual work areas); and

b. The methods the employer will use to inform employees of the hazards of non-routine tasks (for example, the cleaning of reactor vessels), and the hazards associated with chemicals contained in unlabeled pipes in their work areas.

2. "Multi-employer workplaces." Employers who produce, use, or store hazardous chemicals at a workplace in such a way that the employees of other employer(s) may be exposed (for example, employees of a construction contractor working on-site) shall additionally ensure that the hazard communication programs developed and implemented under this paragraph (e) include the following;

a. The methods the employer will use to provide the other employer(s) on-site access to material safety data sheets for each hazardous chemical the other employer(s)' employees may be exposed to while working;

b. The methods the employer will use to inform the other employer(s) of any precautionary measures that need to be taken to protect employees during the workplace's normal operating conditions and in foreseeable emergencies; and

c. The methods the employer will use to inform the other employer(s) of the labeling system used in the workplace.

d. The employer shall make the written hazard communication program available, upon request, to employees, their designated representatives, the Assistant Secretary and the Director, in accordance with the requirements of 29 CFR 1910.1020 (e).

e. Where employees must travel between workplaces during a work shift, i.e., their work is carried out at more than one geographical location, the written hazard communication program may be kept at the primary workplace facility.

3. Advanced American Construction, Inc. will use fixed or portable

monitors in detecting H2S that will alarm at the appropriate permissible exposure limits of 20 PPM for 1910 or 10 PPM for 1926.

4. Safety Precautions. When monitor alarm sounds even though employees are wearing appropriate PPE, vacate the area immediately until qualified person has made safety evaluation and taken corrective action to protect the health and well being off all assigned employees.

   A. Since all Field Maintenance work sites are unique a site specific contingency/emergency plan will be developed as appropriate. The guidelines for the plan will follow both this section and SMS 33 of this same Safety Manual. The plan generally will be generated in JSA software or may be hand written.

   B. All employees will be directed and aware of the site specific contingency/emergency plans both Advanced American Construction, Inc. and/or the owner of the facility of which we providing our field maintenance services.

5.0 H2S – Hydrogen Sulfide

1. Hydrogen Sulfide (H2S) is a colorless gas that smells like rotten eggs (from the sulphur). Often referred to as "sewer gas," (known by other names that include "sulfane", "sulfur hydride", "dihydrogen monosulfide", "sulfurated hydrogen", "sewer gas" and "stink damp"), hydrogen sulfide is highly poisonous. Usually, the poisoning caused by hydrogen sulfide is though inhalation and has a toxicity similar to cyanide. It is found in petroleum and natural gas and is sometimes present in ground water. Natural gas can contain up to 28% hydrogen sulfide gas and may be considered an air pollutant when found near a natural gas production area or refinery.

   Additional characteristics of hydrogen sulfide being toxic, colorless, with the odor of rotten eggs at low concentrations, is soluable in water and is flammable.

2. Low levels of H2S. The odor or hydrogen sulfide gas can be perceived at levels as low as 10 ppb (parts per billion). At levels of 50-100 ppm (parts per million), it may cause the human sense of smell to fail. Low levels can cause eye irritation, dizziness, coughing, and headache.

3. At high exposures (usually greater than 300 ppm), H2S has the amazing effect of causing the nose to stop perceiving its smell after a few inhalations, which may lead to the inhalation of a toxic or fatal dose (which can occur at 600 ppm). At high levels, hydrogen sulfide gas may paralyze the lungs, meaning that the victim may then be unable to escape from the toxic gas without assistance.

Deaths are not uncommon when people enter poorly ventilated spaces such as deep wells, underground tanks or sewer systems. Since H2S gas is heavier than air, its concentration is highest near the bottom of enclosed spaces.

4. Detection by Smell. Can be smelled a low levels, but with continuous low level exposure or at higher concentrations you lose your ability to smell the gas even though it is still present.

   At high concentrations – your ability to smell the can be lost instantly.

   Do not depend on your sense of smell for indicating the continuing presence of this gas or for warning of hazardous concentrations.

5. Health effects vary with how long, and at what level, you are exposed. Asthmatics may be at greater risk.

   Low concentrations – irritation of eyes, nose, throat, or respiratory system; effects can be delayed.

   Moderate concentrations – more severe eye and respiratory effects, headache, dizziness, nausea, coughing, vomiting and difficulty breathing.

   High concentrations – Shock, convulsions, unable to breathe, coma, death; effects can be extremely rapid (within a few breaths).

6. Before Entering Areas with Possible Hydrogen Sulfide.

   The air needs to be tested for the presence and concentration of hydrogen sulfide by a qualified person using fixed or portable monitor and will alarm at the appropriate permissible exposure limits of 20 PPM for 1910 or 10 PPM for 1926. This individual also determines if fire/explosion precautions are necessary.

   If gas is present, the space should be ventilated.

   If the gas cannot be removed, use appropriate respiratory protection and any other necessary personal protective equipment (PPE), rescue and communication equipment. Atmospheres containing high concentrations (greater than 100 ppm) are considered immediately dangerous to life and health (IDLH) and a self-contained breathing apparatus (SCBA) is required.

   Possible locations where our employees may be exposed to H2S during their job functions would be Pile Driving Operations, Recycled Drilling Mud, Pipeline & Refining Operations, Field Maintenance Operations.

6.0 Definitions

Article.

A manufactured item: (1) Which is formed to a specific shape or design during manufacture; (2) which has end use function(s) dependent in whole or in part upon it shape or design during end use; and (3) which does not release, or otherwise result in exposure to, a hazardous substance under normal conditions of use or in a reasonably foreseeable emergency resulting from workplace operations.

CAS number.

The unique identification number assigned by the Chemical Abstracts Service to specific chemical substances.

Chemical name.

The scientific designation of a chemical in accordance with the nomenclature system developed by the International Union of Pure and Applied Chemistry (IUPAC) or the Chemical Abstracts Service (CSA) rules of nomenclature, or a name which will clearly identify the substance for the purpose of conducting a hazard evaluation.

Chief.

The Chief of the Division of Occupational Safety and Health, P.O. Box 420603, San Francisco, Ca 94142, or designee.

Combustible liquid.

Any liquid having a flashpoint at or above 100o F (37.8o C), but below 200o F (93.3o C), except any mixture having components with flashpoints of 200o F (93.3o C), or higher, the total volume of which make up 99 percent or more of the total volume of the mixture

Common name.

Any designation or identification such as code name, code number, trade name, brand name or generic name used to identify a substance other than by its chemical name.

Compressed gas.

(A) A gas or mixture of gases having, in a container, an absolute pressure

exceeding 40 psi at 70o F (21.1o C); or

(B) A gas or mixture of gases having, in a container, an absolute pressure exceeding 104 psi at 130o F (54.4o C) regardless of the pressure at 70o F (21.1o C); or

(C) A liquid having a vapor pressure exceeding 40 psi at 100o F (37.8o C) a determined by ASTM D-323-72.

Container.

Any bag, barrel, bottle, box, can, cylinder, drum, reaction vessel, storage tank, tank truck, or the like that contains a hazardous substance. For purposes of this section, pipes or piping systems are not considered to be containers.

Department.

The Department of Industrial Relations, P.O. Box 420603, San Francisco, CA 94142, or designee.

Designated representative.

Any individual or organization to whom an employee gives written authorization to exercise such employee's rights under this section. A recognized or certified collective bargaining agent shall be treated automatically as a designated representative without regard to written employee authorization.

Director.

The Director of Industrial Relations, P.O. Box 420603, San Francisco, CA 94142, or designee.

Distributor.

A business, other than a manufacturer or importer, which supplies hazardous substances to other distributors or to employers.

Division.

The Division of Occupational Safety and Health (Cal/OSHA), California Department of Industrial Relations, or designee.

Emergency.

Any potential occurrence such as, but not limited to, equipment failure, rupture of containers, or failure of control equipment, which may or does result in a release

of a hazardous substance into the workplace.

Employee.

Every person who is required or directed by any employer, to engage in any employment, or to go to work or be at any time in any place of employment.

Employer.

(A) The State and every State agency.

(B) Each county, city district, and all public and quasi-public corporations and public agencies therein.

(C) Every person including any public service corporation, which has any natural person in service.

(D) The legal representative of any deceased employer.

Explosive.

A substance that causes a sudden, almost instantaneous release of pressure, gas, and heat when subjected to sudden shock, pressure, or high temperature.

Exposure or Exposed.

Any situation arising from work operation where any employee may ingest, inhale, absorb through the skin or eyes, or otherwise come into contact with a hazardous substance.

Flammable.

A substance that falls into one of the following categories:

(A) Aerosol, flammable. An aerosol that, when tested by the method described in 16 CFR 1500.45, yields a flame projection exceeding 18 inches at full valve opening, or a flashback (a flame extending back to the valve) at any degree of valve opening;

(B) Gas, flammable:

1. A gas that, at ambient temperature and pressure, forms a flammable mixture with air at a concentration of thirteen (13) percent of volume or less; or

2. A gas that, at ambient temperature and pressure, forms a range of flammable mixtures with air wider than twelve (12) percent by volume, regardless of the

lower limit;

(C) Liquid, flammable. Any liquid having a flashpoint below 100o F (37.8o C), except any mixture having components with flashpoints of 100o F (37.8o C) or higher, the total of which make up 99 percent or more of the total volume of the mixture.

(D) solid, flammable. A solid, other than a blasting agent or explosive as defined in section 5237(a), that is liable to cause fire through friction, absorption of moisture, spontaneous chemical change, or retained heat from manufacturing or processing, or which can be ignited readily and when ignited burns so vigorously and persistently as to create a serious hazard. A chemical shall be considered to be a flammable solid if, when tested by the method described in 16 CFR 1500.44, it ignites and burns with a self-sustained flame at a rate greater than one-tenth of an inch per second along its major axis.

Flashpoint.

The minimum temperature at which a liquid gives off a vapor in sufficient concentration to ignite when tested as follows:

(A) Tagliabue Closed Tester (see American National Standard Method of Test for Flash Point by Tag Closed Tester, Z11.24-1979 (ASTM D 93-79) for liquid with a viscosity of less than 45 Saybolt Universal Seconds (SUS at 100o F (37.8o C), that do not have a tendency to form a surface film under test; or

(B) Pensky-Martens Closed Tester (see American National Standard Method of Test Flash Point Pensky-Martens Closed Tester, Z11.7-1979) for liquids with a viscosity equal to or greater than 45 SUS at 100o F (37.8o C), or that have a tendency to form a surface film under test; or

(C) Setaflash Closed Tester (see American National Standard Method of Test Flash Point by Setaflash Closed Tester (ASTM D 3278-78).

Organic peroxides, which undergo autoaccelerating thermal decomposition, are excluded from any of the flashpoint determination methods specified above.

Hazard warning.

Any words, pictures, symbols, or combination thereof appearing on a label or other appropriate form of warning which convey the health hazards and physical hazards of the substance(s) in the container(s).

Hazardous substance.

Any substance which is a physical hazard or a health hazard or is included in the

List of Hazardous Substances prepared by the Director pursuant to Labor Code section 6382.

Health hazard.

A substance for which there is statistically significant evidence based on a least one study conducted in accordance with established scientific principles that acute or chronic health effects may occur in exposed employees. The term "health hazard: includes substances which are carcinogens, toxic or highly toxic agents, reproductive toxins, irritants, corrosives, sensitizers, hepatotoxins, nephrotoxins, neurotoxins, agents which act on the hematopoientic system, and agents which damage the lungs, skin, eyes, or mucous membranes. Appendix A provides further definitions and explanations of the scope of health hazards covered by this section, and Appendix B describes the criteria to be used to determine whether or not a substance is to be considered hazardous for purposes of this standard.

Identity.

Any chemical or common name which is indicated on the material safety data sheet (MSDS) for the substance. The identity used shall permit crossreferences to be made among the required list of hazardous substances, the label and the MSDS.

Immediate use.

The hazardous substance will be under the control of and used only by the person who transfers it from a labeled container and only within the work shift in which it is transferred.

Importer.

The first business with employees within the Customs Territory of the United States which receives hazardous substances produced in other countries for the purpose of supplying them to distributors or purchasers within the United States.

Label.

Any written, printed, or graphic material displayed on or affixed to containers of hazardous substances.

Manufacturer.

A person who produces, synthesizes, extracts, or otherwise makes a hazardous substance.

Material safety data sheet (MSDS).

Written or printed material concerning a hazardous substance which is prepared in accordance with section 5194(g).

Mixture.

Any solution or intimate admixture of two or more substances, at least one of which is present as a hazardous substance, which do not react chemically with each other.

NIOSH.

The National Institute for Occupational Safety and Health, U.S. Department of Health and Human Services.

Organic peroxide.

An organic compound that contains the bivalent -0-0- structure and which may be considered to be a structural derivative of hydrogen peroxide where one or both of the hydrogen atoms has be replaced by an organic radical.

Oxidizer.

A substance other than a blasting agent or explosive as defined in section 5237(a), that initiates or promotes combustion in other materials, thereby causing fire either of itself or through the release of oxygen or other gases.

Physical hazard.

A substance for which there is scientifically valid evidence that it is a combustible liquid, a compressed gas, explosive, flammable, an organic peroxide, an oxidizer, pyrophoric, unstable (reactive) or water-reactive.

Produce.

To manufacture, process, formulate, repackage, or relabel.

Pyrophoric.

A substance that will ignite spontaneously in air at a temperature of 130o F (54.4o C) or below.

Responsible party.

Someone who can provide additional information on the hazardous substance and appropriate emergency procedures, if necessary.

Specific chemical identity.

The chemical name, Chemical Abstracts Service (CAS) Registry Number, or any other information that reveals the precise chemical designation of the substance.

Substance.

Any element, chemical compound or mixture of elements and/or compounds.

Trade secret.

Any confidential formula, pattern, process, device, information, or compilation of information which gives its user an opportunity to obtain a business advantage over competitors who do not know or us it. A trade secret shall not include chemical identity information which is readily discoverable through qualitative analysis. Appendix D sets out the criteria to be used in evaluating trade secrets.

Unstable (reactive).

A substance which in the pure state, or as produced or transported, will vigorously polymerize, decompose, condense, or will become self-reactive under conditions of shocks, pressure or temperature.

Use.

To package, handle, react, or transfer.

Water-reactive.

A substance that reacts with water to release a gas that is either flammable or presents a health hazard.

Work area.

A room or defined space in a workplace where hazardous substances are produced or used, and where employees are present.

Workplace.

Any place, and the premises appurtenant thereto, where employment is carried on, except a place the health and safety jurisdiction over which is vested by law in, and actively exercised by, any state or federal agency other than the Division.

7.0 Employee Information & Training

1. Advanced American Construction, Inc. will provide employees with effective information and training on hazardous substances in their work area at the time of their initial assignment, and whenever a new hazard is introduced into their work area. Information and training may relate to general classes of hazardous substances to the extent appropriate and related to reasonably foreseeable exposures of the job.

2. Information and training will consist of at least the following topics:

   a. Employees will be informed of the requirements of this section.

   b. Employees will be informed of any operations in their work area where hazardous substances are present.

   c. Employees will be informed of the location and availability of the written hazard communication program, including the list(s) of hazardous substances and material safety data sheets required by this section.

   d. Employees will be trained in the methods and observations that may be used to detect the presence or release of a hazardous substance in the work area (such as monitoring conducted by the employer, continuous monitoring devices, visual appearance or odor of hazardous substances when being released, etc.).

   e. Employees will be trained in the physical and health hazards of the substances in the work area, and the measures they can take to protect themselves from these hazards, including specific procedures the employer has implemented to protect employees from exposure to hazardous substances, such as appropriate work practices, emergency procedures, and personal protective equipment to be used.

   f. Employees shall be trained in the details of the hazard communication program developed by the employer, including an explanation of the labeling system and the material safety data sheet, and how employees can obtain and use the appropriate hazard information.

   g. Advanced American Construction, Inc. will inform employees of the right:

      1. To personally receive information regarding hazardous substances to which they may be exposed, according to the provisions of this section.

      2. For their physician or collective bargaining agent to receive information regarding hazardous substances to which the employee may be exposed according to provisions of this section;
      3. Against discharge or other discrimination due to the employee's exercise of the rights afforded pursuant to the provisions of the

Hazardous Substances Information and Training Act.

4. Whenever Advanced American Construction, Inc. receives a new or revised material safety data sheet, such information shall be provided to employees on a timely basis not to exceed 30 days after receipt, if the new information indicates significantly increased risks to, or measures necessary to protect, employee health as compared to those stated on a material safety data sheet previously provided.

8.0 Resources

A. U.S. OSHA Standards – Hazard Communication. – 1910.1200
B. U.S Department of Labor OSHA Quick Card – Hydrogen Sulfide (H2S)
C. H2S Safety: Manning Safety Services, Inc.
D. Cal/OSHA T8 CCR 5194. Hazard Communication Subchapter 7. General Industry Safety Orders

ADVANCED AMERICAN CONSTRUCTION, INC. SAFETY MANAGEMENT STANDARD

HAND TOOLS AND PORTABLE EQUIPMENT

1.0 Applicability

This procedure applies to Advanced American Construction, Inc. operations involving the use of hand tools and/or power equipment, including chain saws, brush cutters, powder-actuated tools, and similar high-hazard implements.

2.0 Purpose and Scope

The purpose of this standard is to provide guidelines for the safe use and handling of hand tools and power equipment.

3.0 Implementation

Shop Locations - Implementation of this program is the responsibility of the Shop Manager.

Field Locations – Implementation of this program is the responsibility of the Project Manager/Superintendent.

4.0 Requirements

A. General

1. Keep hand and power tools in good repair and used only for the task for which they were designed.

2. Remove damaged or defective tools from service.

3. Keep surfaces and handles clean and free of excess oil to prevent slipping.

4. Do not carry sharp tools in pockets.

5. Clean tools and return to the toolbox or storage area upon completion of a job.

6. Wrenches must have a good bite before pressure is applied.

    a) Brace yourself by placing your body in the proper position so that in case the tool slips you will not fall.

b) Make sure hands and fingers have sufficient clearance in the event the tool slips.

c) Always pull on a wrench, never push.

7. When working with tools overhead, place tools in a holding receptacle or secure when not in use.

8. Do not throw tools from place to place, from person to person, or drop from heights.

9. Use non-sparking tools in atmospheres with fire or explosive characteristics.

10. Inspect all tools prior to start-up or use to identify any defects.

11. Powered hand tools should not be capable of being locked in the on position.

12. Require that all power fastening devices be equipped with a safety interlock capable of activation only when in contact with the work surface.

13. Do not allow loose clothing, long hair, loose jewelry, rings and chains to be worn while working with power tools.

14. Do not use cheater pipes.

15. Make provisions to prevent machines from automatically restarting upon restoration of power.

16. Whether furnished by the employer or the employee, the tools shall be maintained in a safe condition.

17. Guards shall be in place and operable at all times while the tool is in use. The guard may not be manipulated in such a way that will comprise its integrity or compromise the protection in which intended. Guarding shall meet the requirements set forth in ANSI B15.1

18. Any tool which is not in compliance with any applicable requirements of this part is prohibited. Such tool shall either be identified as unsafe by tagging or locking the controls to render them inoperable or shall be physically removed from its place of operation.

B. Grinding Tools

1. Inspect work rests and tongue guards for grinders.

a) Work rest gaps should not exceed 1/8 inch (3 mm).
b) Tongue guards gap should not exceed 1/4 inch (6 mm).

2. Do not adjust work or tool rests while the grinding wheel is moving.

3. Inspect the grinding wheel for cracks, chips or defects. Remove from service if any defects are found.

4. Wear goggles when grinding. A clear full-face shield may be worn with the goggles.

5. Do not use the side of a grinding wheel unless the wheel is designed for side grinding.

6. Always stand to the side of the blade, never directly behind it.

7. Use grinding wheels only at their rated speed.

8. Grinding aluminum is prohibited.

C. Power Saws

1. Require that circular saws are fitted with blade guards.

2. Remove damaged, bent or cracked saw blades from service immediately.

3. Require that table saws are fitted with blade guards and a splitter to prevent the work from squeezing the blade and kicking back on the operator.

4. Require guards that cover the blade to the depth of the teeth on hand held circular saws. The guard should freely return to the fully closed position when withdrawn from the work surface.

D. Wood Working Machinery

1. Do not use compressed air to remove dust, chips and from wood working machinery.

2. Locate the on-off switch to prevent accidental start up. The operator must be able to shut off the machine without leaving the work station.

3. Guard planers and joiners to prevent contact with the blades.

4. Use a push stick when:

a) The cutting operation requires the hands of the operator to come close to the blade.
b) Small pieces are being machined.

5. Adjust saw blades so they only clear the top of the cut.

6. Automatic feed devices should be used whenever feasible.

E. Pneumatic Tools and Equipment

1. Require that pneumatic tools have:

a) Tool retainers to prevent the tool from being ejected from the barrel during use.
b) Safety clip or tie wire to secure connections between tool/hose/compressor if they are of the quick connection (Chicago fittings) type.

2. Do not lay hose in walkways, on ladder or in any manner that presents a tripping hazard.

3. Never use compressed air to blow dirt from hands, face or clothing.

4. Compressed air exhausted through a chip guarded nozzle shall be reduced to less than 30 psi. Proper respiratory, hand, eye and ear protection must be worn.

5. Never raise or lower a tool by the air hose.

F. Powder Actuated Fastener Tools

1. Use powder actuated tools that comply with the requirements of the American National Standards Institute (ANSI) standard A 10.3 - 1970.

2. Use only individuals that have been trained by a manufacturer's representative and possess the proper license to operate, repair, service and handle powder actuated tools.

3. Never use a powder actuated tool in a flammable or explosive atmosphere.

4. Require the use of goggles or a full face shield as well as safety glasses during operation of powder actuated tools.

5. Powder actuated tool must not be able to be fired unless the tool is pressed against the work surface.

6. The tool must not be able to fire if the tool is dropped when loaded.

7. Firing the tool should require two separate operations, with the firing movement being separate from the motion of bringing the tool to the firing position.

8. Never fire into soft substrate where there is potential for the fastener to penetrate and pass through, creating a flying projectile hazard.

9. Do not use powder actuated tools in reinforced concrete if there is the possibility of striking the re-bar.

10. Do not use on cast iron, glazed tile, surface hardened steel, glass block, live rock or face brick.

11. Never load and leave a powder actuated tool unattended. It should only be loaded prior to intended firing.

12. Test tools each day prior to loading by testing safety devices according to manufacturer's recommended procedure.

G. Chain Saws

1. Inspect the saw prior to each use and periodically during daily use.

2. Operate the chain saw with both hands at all times.

3. Never cut above chest height.

4. Require that the idle is correctly adjusted on the chain saw. The chain should not move when the saw is in the idle mode.

5. Start cutting only after a clear escape path has been made.

6. Shut the saw off when carrying through brush or on slippery surfaces. The saw may be carried no more than 50 feet (15 metres) while idling.

7. Require applicable protective gear. This may include, but is not limited to

   a) Loggers safety hat.
   b) Safety glasses.
   c) Steel-toed boots.
   d) Protective leggings.

e) Hearing protection.

8. Inspect saws to require that they are fitted with an inertia break and hand guard.

9. *Never* operate a chain saw when fatigued.

10. Do not allow others in the area when chain saws are operated.

11. Make sure there are no nails, wire or other imbedded material that can cause flying particles.

12. Do not operate a chain saw that is damaged, improperly adjusted, or is not completely and securely assembled. Always keep the teeth sharp and the chain tight. Worn chains should immediately be replaced.

13. Keep all parts of your body away from the saw chain when engine is running.

H. Hand Operated Pressure Equipment

1. Pressure equipment such as grease guns, paint and garden sprayers shall be directed away from the body and other personnel in the area. The person operating any equipment such as this, which has a potential for eye injury, must wear protective goggles.

2. The noise produced when using certain types of pressure equipment may require the use of hearing protection.

3. Never allow the nozzle of a pressurized tool to come in contact with any body parts while operating. There is potential for injection of a chemical directly into the user's body, resulting in severe injury or death.

I. Gasoline Powered Tools

1. Never pour gasoline on hot surfaces.

2. Never fuel around open flame or while smoking.

3. Shut down the engine before fueling.

4. Provide adequate ventilation when using in enclosed spaces.

5. Use only OSHA approved safety cans to transport flammable liquids.

J. Inspection

Inspect all hand tools on a regular basis. Defective tools shall be immediately removed from service, tagged or destroyed to prevent further use.

K. Personal protective equipment. Employees using hand and power tools and exposed to the hazard of falling, flying, abrasive, and splashing objects, or exposed to harmful dusts, fumes, mists, vapors, or gases shall be provided with the particular person protective equipment necessary to protect them from the hazard. All personal protective equipment shall meet the requirements and be maintained according to Subparts D and E of this part.

5.0 Documentation Summary

Place in the Project Safety File:

A. Site briefings regarding tool use.

B. Records of tools removed from service.

C. Copies of powder actuated tool licenses (as applicable).

D. Tool inspection documentation.

6.0 Resources

A. U.S. OSHA Standard - Hand and Portable Power Tools - 29 CFR 1910, Subpart P (http://www.osha-slc.gov/OshStd_toc/OSHA_Std_toc_1910_SUBPART_P.html)
B. U.S. OSHA Standard - Construction Tools - Hand and Power - 29 CFR 1926, Subpart I (http://www.osha-slc.gov/OshStd_toc/OSHA_Std_toc_1926_SUBPART_I.html)
C. ANSI A10.3 – 1970 (http://web.ansi.org/public/std_info.html)
D. U.S. OSHA Standard – 29 CFR 1226.300 Tools – Hand and Power

ADVANCED AMERICAN CONSTRUCTION, INC. SAFETY MANAGEMENT STANDARD

HEAT RELATED ILLNESS SAFETY PROGRAM

1.0 Applicability

This procedure applies to Advanced American Construction, Inc. projects/activities, employees who perform work in an outdoor environment. Advanced American Construction, Inc. will evaluate and reduce hazards if employees are exposed to temperature extremes, radiant heat, humidity, or limited air movement while working in an outdoor environment.

2.0 Purpose and Scope

It is the purpose that all affected employees are required to comply with this Heat Related Illness program and are encouraged to actively participate in identifying ways to reduce the risk of experiencing heat related illness in the workplace.

It is also the purpose of Advanced American Construction, Inc. to check the workplace for unsafe conditions, monitor the health and safety of employees, and take prompt action in response to any identified heat related illness hazards.

3.0 Implementation

Shop Activities – Implementation of this procedure is the responsibility of the Shop Manager/Foreman

Field Activities – Implementation of this procedure is the responsibility of the Project Manager/Superintendent

4.0 Requirements

A. Hazard Evaluation

1. Advanced American Construction, Inc. has evaluated the workplace and identified the following heat related illness hazards:

    a. Heat and humidity during the months of May, June, July, August and September
    b. Reflected heat from pavement
    c. Radiated heat from equipment, tar, torches
    d. Heavy clothing and PPE's
    e. Specific job duties like rigging, flagging, digging, etc.

Table 1

To determine the temperature trigger, select the type of clothing or PPE the employee is wearing and whether the work is being performed in the direct sun or the shade.

	Work in direct sun	Work in shade
Work clothes	89°F	96°F
Double-layer woven clothes (e.g., cotton coveralls on top of summer clothes)	77°F	87°F
Vapor barrier (e.g., encapsulating suit or turn out gear)	52°F	62°F

Note: The trigger temperatures in Table 1 are based on a dew point of 50°F and were developed for use by the state of Washington

B. Prevention, Controls, and Correction of Hazards

1. Advanced American Construction, Inc. has evaluated the workplace and identified the following heat related illness hazards:
2. When heat related illness hazards are present the following actions will be taken:

   a. Additional rest breaks will be provided during peak temperature times such as sitting in a shaded area or inside our job site office trailer
   b. Water will be provided and made readily accessible in sufficient quantity to provide one quart per employee per hour
   c. *Employees will be encouraged to frequently drink small quantities of water since 1 quart or more over the course of an hour may be necessary when the work environment is hot and employees may be sweating more than usual during the performance of work*
   d. *New employees or employees off the job for two weeks or more will limit time of moderate to heavy work to 50% on the first day and increase work by 10% each day until acclimatized.*
   e. *Cooling vests, bandanas, neck covers will be provided to employees if needed*
   f. *This could be a work/rest regimen, starting jobs earlier and ending earlier to avoid the hot times of the day, provisions for gaining access to shade, etc.*
   g. *Shaded areas will be available for breaks*
   h. *Employees working in remote locations will be contacted periodically*

C. First Aid awareness and actions in the event of a heat related illness:

1. The following chart helps employees recognize the main types of heat related illnesses, signs, symptoms, and the appropriate treatment to reduce the effects of the heat related illness. This chart will be posted in the Project Office Trailer and or near the water supply and or break area

	Signs and Symptoms	First Aid and Treatment
Sunburn	• red, hot skin • may blister	• move to shade, loosen clothing • apply cool compresses or water
Heat Rash	• red, itchy skin • bumpy skin • skin infection	• apply cool water or compresses • keep affected area dry • control itching and infection with prescribed medication
Heat cramps	• muscle spasms in legs or abdomen • grasping the affected area • abnormal body position	• move person to a cooler location • stretch or massage muscles for cramps • get medical evaluation if cramps persist • give cool water or electrolyte-containing fluid to drink
Heat exhaustion	• headaches • clumsiness • dizziness/lightheadedness/fainting • weakness/exhaustion/fatigue • heavy sweating/clammy/moist skin • irritability/confusion • nausea/vomiting • paleness • high pulse rate	• move person to a cooler place (do not leave alone) • loosen and remove heavy clothing that restricts evaporative cooling • if conscious, provide small amounts of cool water to drink • fan person, spray with cool water, or apply a wet cloth to skin to increase evaporative cooling • lay flat and elevate feet • evaluate mental status (ask who, where, when questions) • call 911 if not feeling better within a few minutes
Heat stroke	• any of the above, but more severe • sweating may or may not be present	• **call 911** • move person to a cooler place (do not leave alone)

	• red or flushed, hot dry skin • bizarre behavior • mental confusion or losing consciousness • panting/rapid breathing • rapid, weak pulse • seizures or fits • can be fatal	• cool worker rapidly • if conscious, provide small amounts of water to drink • loosen and remove heavy clothing that restricts evaporative cooling • fan person, spray with cool water, or apply a wet cloth to skin to increase evaporative cooling • lay flat and elevate feet • monitor airway and breathing, administer CPR if needed

2. In the event that medical treatment is needed beyond first aid and 911 must be called our Project Manager or crew member will call 911 to solicit adequate medical attention.

3. Directions to the worksite will be posted in the Job Site Trailer and or break area near a first aid kit.

D. Training:

1. All training will be provided prior to outdoor work assignments presenting heat related illness hazards during the months of May, June, July, august, and September, and at least annually thereafter. Training will be documented and kept on file. Temperature exposure records are not required to be kept.

E. **Employee training:**

1. Training in the following topics will be provided to all employees who may be exposed to a heat-related illness hazard:

   a. The environmental factors that contribute to the risk of heat-related illness;
   b. Awareness of personal factors that may increase susceptibility to heat illness;
   c. Advanced American Construction, Inc. procedures for identifying, evaluating, and controlling exposure;
   d. The importance of removing personal protective equipment during all breaks;
   e. The importance of frequent consumption of small quantities of water, 1 quart or more over the course of an hour may be necessary when the work

environment is hot and employees may be sweating more than usual in the performance of their duties;

f. The importance of acclimatization;
g. The different types of heat-related illness and the common signs and symptoms of heat-related illness;
h. The importance of immediately reporting to Advanced American Construction, Inc, directly or through the employee's supervisor, symptoms or signs of heat illness in themselves, or in coworkers;
i. Advanced American Construction, Inc., procedures for responding to symptoms of possible heat-related illness, including how emergency medical services will be provided should they become necessary;
j. The purpose and requirements of this standard; and
k. The worker's right to receive the protections provided by this standard.

F. Supervisor training:

1. Prior to assignment, supervisors must have training on the following topics:

   a. The information required to be provided in employee training above.
   b. The procedures the supervisor is to follow to implement the applicable provisions in this section;
   c. The procedures the supervisor is to follow when an employee exhibits signs or symptoms consistent with possible heat-related illness, including emergency response procedures;
   d. Procedures for moving employees to a place where they can be reached by an emergency medical service provider, if necessary; and
   e. How to provide clear and precise directions to the emergency medical provider who needs to find the work site.

G. Definitions

1. "Acclimatization" – means the body's temporary adaptation to work in the heat that occurs gradually as a person is exposed to it.

2. "Drinking water" – means water satisfying the Department of Health's requirements as potable water suitable for drinking by the public. Water packaged as a consumer product is an acceptable source of drinking water.

3. "Environmental risk factors for heat related illness" - means working conditions that increase the susceptibility for heat related illness including air temperature, relative

humidity, radiant heat from the sun and other sources, conductive heat sources such as the ground, air movement, workload severity and duration, clothing and personal protective equipment worn by employees.

4. "Heat Related Illness" (HRI) - means a serious medical condition resulting from the body's inability to cope with a particular heat load, and includes, but not limited to, heat cramps, heat rash, heat exhaustion, heat syncope (fainting), and heat stroke.

5. "Outdoor environment" – means an environment where work activities are conducted outside of a building shell (generally referring to a ceiling and at least three sides). Environments such as vehicle cabs, sheds, and tents, or other non-permanent structures may be considered an outdoor environment when the environmental factors are not controlled.

6. "Personal risk factors for heat related illness" - means factors including, but not limited to, an individual's age, degree of acclimatization, health, medical condition, water consumption, alcohol consumption, caffeine consumption, nicotine consumption, and use of prescription and non-prescription medications that affect the body's water retention or other physiological responses to heat.

5.0 Documentation Summary

File these records in the Project Safety File:

1. Emergency Action Plans.
2. Training records.

6.0 Resources

A. U.S OSHA Technical Manual (OTM). OSHA Directive TED 01-00-015 [TED 1-0.15A], (1999, January 20). Several portions of the OTM include heat stress as part of the evaluation process:

B. Protecting yourself in the Sun. OSHA Publication 3154, (2003), 355 KB PDF, 2 Pages

ADVANCED AMERICAN CONSTRUCTION, INC. SAFETY MANAGEMENT STANDARD

HEAVY EQUIPMENT OPERATIONS

1.0 Applicability

This procedure applies to Advanced American Construction, Inc. field projects where heavy equipment is in operation.

2.0 Purpose and Scope

The purpose of this procedure is to require that heavy equipment is operated in a safe manner, that the equipment is properly maintained and that ground personnel are protected.

3.0 Implementation

Field Activities - Implementation of this procedure is the responsibility of the Project Manager/Superintendent.

4.0 Requirements

A. Authorized Operators

1. Evaluate operators through documentable experience (resume, etc.) and a practical evaluation of skills.

2. Allow only qualified operators to operate equipment.

3. Prohibit equipment from being operated by any personnel who have not been specifically authorized to operate it.

4. Maintain a list of operators for the project and the specific equipment that they are authorized to operate.

5. Require operators to use seat belts at all times in all equipment and trucks.

6. Brief operators on the following rules of operation:

    a) Operators are in control of their work area.

    b) Equipment will be operated in a safe manner and within the constraints of the manufacturer's Operation Manual.

c) Operators will stop work whenever unauthorized ground personnel or equipment enter their work area and only resume work when the area has been cleared.

B. Ground Personnel

1. Require that ground personnel on the site have received training and comply with the following rules of engagement:

a) All ground personnel must wear orange protective vests when in work areas with any operating equipment.

b) Ground personnel will stay outside of the swing zone or work area of any operating equipment.

c) Ground personnel may only enter the swing or work area of any operating equipment when:

(1) They have attracted the operator's attention and made eye contact.
(2) The operator has idled the equipment down and grounded all extensions.
(3) The operator gives the ground personnel permission to approach.

d) Ground personnel shall never walk or position themselves between any fixed object and running equipment or between two running pieces of equipment.

C. Equipment

1. Maintain operations manuals at the site for each piece of equipment that is present on the site and in use.

2. Require that operators are familiar with the manual for the equipment and operate the equipment within the parameters of the manual.

3. Require that all equipment is provided with roll-over protection systems (ROPS). Tracked excavators are exempt from ROPS requirements but must have a cab that provides protection from overhead hazards.

4. Verify that seatbelts are present and functional in all equipment.

5. Prohibit the use of equipment which has cab glass that is cracked, broken or missing.

6. Require that backup alarms are functional on all trucks and equipment. Tracked excavators must have bidirectional alarms or the operator must be provided with a spotter whenever tracking in either direction.

7. Require all extensions such as buckets, blades, forks, etc. to be grounded when not in use.

8. Require brakes to be set and wheels chocked (when applicable) when not in use.

D. Inspection and Maintenance

1. Require daily inspections of equipment by operators using Attachment 1.

2. Prohibit use of equipment deemed to be unsafe as a result of daily inspection until required repairs or maintenance occur.

3. Conduct maintenance as prescribed by the manufacturer in the Operations Manuals for each piece of equipment.

4. During maintenance/repair, require that:

a) Motors are turned off.
b) All extensions are grounded or securely blocked.
c) Controls are in a neutral position.
d) Brakes are set.

5.0 Documentation Summary

File the following documents in the Project Health and Safety File.

1. List of authorized operators.

2. Operator qualifications.

3. Daily Equipment Inspection Logs.

4. Site Briefing documentation for operator rules and ground personnel “rules of engagement”.

6.0 Resources

A. U.S. OSHA Standard - Motorized Vehicles and Mechanized Equipment - 29 CFR 1926, Subpart O.
(http://www.osha-slc.gov/OshStd_toc/OSHA_Std_toc_1926_SUBPART_O.html)

DAILY HEAVY EQUIPMENT SAFETY INSPECTION CHECKLIST

EQUIPMENT ID NO.: _____ DATE: _____

EQUIPMENT NAME: _____ INSPECTOR'S NAME: _____

BEG HOURS: _____ END HOURS: _____ EMPLOYEE NO.: _____

ITEM INSPECTED	4IF SATISFACTORY	COMMENTS
Falling Object Protective Structure (FOP)		
Roll-Over Protection Structure (ROP)		
Seat Belts		
Operator Seat Bar(s)		
Side Shields, Screens or Cab		
Lift Arm Device		
Grab Handles		
Back-up Alarm - Working		
Lights		
Guards		
Horn		
Anti-Skid Tread Clear of Mud		
Safety Signs; i.e., counterbalance swing area		
Fire Extinguisher		
General Condition		
Fuel Connection		
Oil (full and no leaks)		
Clear of Extra Materials		
Controls Function Properly		
Damaged Parts		
Hydraulic System (full and no leaks)		
Parking Brake		
Lift Arm and Bucket		
Tires/Tracks		
Steering		
Breathing Air System		
Blast Shields		
Operator Signature:		
Gallons of Fuel Added		
Quarts of Oil Added		

INSTRUCTIONS: Each shift inspect all applicable items indicated. If an unsatisfactory condition is observed, suspend operation of the equipment and report the unsatisfactory condition to the site supervisor immediately.

ADVANCED AMERICAN CONSTRUCTION, INC. SAFETY MANAGEMENT STANDARD

HOT WORK

1.0 Applicability

This procedure applies to Advanced American Construction, Inc. projects involving welding, torch cutting, grinding, and other spark or heat producing operations.

2.0 Purpose and Scope

The purpose of this procedure is to establish safe hot work practices to reduce/eliminate personal injury and potential fire and explosion hazards.

3.0 Implementation

Field Activities – Implementation of this procedure is the responsibility of the Project Manager/Superintendent.

Shop- Implementation of this procedure is the responsibility of the Shop Manager.

4.0 Requirements

A. General

1. Verify that planned hot work operations conform to client hot work procedures and permit requirements.

2. Issue Hot Work Permit for all hot work operations where client permits are not provided. See Attachment 1.

3. Perform housekeeping in hot work areas to remove or cover all combustible or flammable materials.

4. Cover all wood planking, scaffolds, wooden forms, and other combustible material that cannot be removed with fire blankets or other suitable material.

5. Provide a fire watch when performing hot work in areas where fires might develop. Continue the watch for 30 minutes after completion of hot work.

6. Contain slag and sparks with fire blanket or sheet metal.

7. Require that at least one 10 pound BC fire extinguisher is available at each hot work location.

8. Position weld screens or shields to protect workers and passers-by from welding arc rays.

9. Provide metal buckets or containers for disposal of electrode stubs.

10. Check for explosive vapors and, if necessary, purge before welding or cutting closed containers or pipelines.

11. Refer to SMS 5,"Confined Space Entry" for ventilation and other requirements for hot work in confined spaces.

12. Restrictions. If the requirements stated in paragraphs (a)(1)(i) and (a)(1)(ii) of General requirements standards – 29 CFR – 1910.252 cannot be followed then welding and cutting shall not be performed.

13. Fire watch.

    a. Fire watchers shall be required whenever welding or cutting is performed in locations where other than a minor fire might develop, or any of the following conditions exist:

    b. Appreciable combustible material, in building construction or contents, closer than 35 feet (10.7 m) to the point of operation.

    c. Appreciable combustibles are more than 35 feet (10.7 m) away but are easily ignited by sparks.

    d. Wall or floor openings within a 35-foot (10.7 m) radius expose combustible material in adjacent areas including concealed spaces in walls or floors.

    e. Combustible materials are adjacent to the opposite side of metal partitions, walls, ceilings, or roofs and are likely to be ignited by conduction or radiation.

14. Personnel. Workmen in charge of the oxygen or fuel-gas equipment, including generators, and oxygen or fuel-gas distribution piping systems shall be instructed and judged competent by their employers for this important work before being left in charge. Rules and instructions covering the operation and maintenance of oxygen or fuel-gas supply equipment including generators, and oxygen or fuel-gas distribution piping systems shall be readily available.

15. Fire watchers shall have fire extinguishing equipment readily available and be trained in its use. They shall be familiar with facilities for sounding an alarm in the event of a fire. They shall watch for fires in all exposed areas, try to extinguish them only when obviously within the capacity of the equipment available, or otherwise wound the alarm. A fire watch shall be maintained for at least a half hour after completion of welding or cutting operations to detect and extinguish possible smoldering fires.

16. First aid supplies/kits and equipment are readily available on all job sites at all times. First aid kits will be inspected and kept current at all times in compliance with OSHA standard 1926.50 (d)(2). First aid kits will meet ANSI standard Z308.1-1998 or better.

B. Personal Protective Equipment

Require the provision and use of the following personal protective equipment for hot work operations:

12. Proper eye protection, e.g. welding hood with proper shade lens; cutting or burning goggles for torch cutting; full faceshields for grinding. See SMS 22, “Personal Protective Equipment” for proper lens shades.

13. Safety glasses must be worn under hoods and faceshields.

14. Appropriate gloves for task being performed.

15. Fire resistant welding jackets or leathers.

16. High top boots.

17. Clothing free of oil and grease, and preferably non-synthetic fiber.

B. Torch Cutting Operations

1. Inspect torches and hoses at the beginning of each shift for leaking shutoff valves, damaged hose and couplings, and tip connections.

2. Tag defective torches and remove from service until properly repaired.

3. Require that oxygen and fuel gas regulators and valves are in proper working order.

4. Light torches with strikers or other approved means, never with matches or lighters.

5. Keep oxygen cylinders and fittings free of oil and grease.

6. Require that oxygen and fuel gas hoses are easily distinguishable from each other and are not interchangeable. Do not use a single hose having more than one gas passage.

7. Provide flashback arrestors/check valves on all oxygen and fuel gas torches.

8. Remove hose that shows evidence of flashback or damage from service and repair or discard.

9. Do not cover more than 4 inches out of 12 inches (10 cm out of 30 cm) of hose with tape when taping parallel lengths of hose to prevent tangling.

10. Use only hose couplings that cannot be unlocked or disconnected by means of a straight pull.

11. Require that the boxes used to store hose are ventilated.

12. String hoses overhead using non-metallic hangers or otherwise position them to keep clear of walkways, ladders, and stairways.

13. Provide proper ventilation and respiratory equipment when cutting zinc coated, cadmium coated, chromium bearing, mercury bearing, or other toxic material containing metals. See SMS 25, “Respiratory Protection” and SMS 19 “Lead in Construction.”

14. Shut off cylinder valves and bleed regulators and hoses when leaving cutting rigs unattended and at the end of each shift.

C. Cylinder Handling

1. Secure cylinders in an upright position at all times.

2. Replace and secure valve safety caps when cylinders are not in use.

3. Close valves, remove regulators, and replace valve safety caps before moving cylinders.

4. Move cylinders by tilting and rolling them on their bottom edges; by use of a bottle cart; or with motorized equipment. Never lay cylinders on their sides and roll them.

5. Do not use magnets, chokers, or slings to hoist cylinders. Use a cradle or bottle rack designed and constructed for hoisting purposes.

6. Use only warm, not boiling, water to thaw cylinders and valves.

7. Provide bottle carts, chains, or other steadying devices to keep cylinders from being knocked over while in use.

8. Stencil, stamp, or label cylinders with either the chemical or trade name of the contents.

D. Cylinder Usage and Storage

1. Never use cylinders as rollers or supports, whether empty or full.

2. Do not attempt to refill or mix gases in a cylinder.

3. Require all cylinders to be equipped with a handle or wrench so that they can be turned off immediately if necessary.

4. Stand to the side of the outlet and open valve slightly and close immediately prior to connecting a regulator to a cylinder. Never crack a valve near ignition sources.

5. Position cylinders where they will not be struck by sparks, slag, or flame, and where they cannot become part of an electrical circuit.

6. Never take gas cylinders into confined spaces.

7. Do not strike an electrode against a cylinder to strike an arc.

8. Do not use hammers or wrenches to open cylinders having fixed hand wheels.

9. Do not use acetylene at a pressure in excess of 15 psi gauge pressure, or 30 psi absolute.

10. Store cylinders in a location where they will not be subjected to sources of artificial heat.

11. Separate oxygen cylinders in storage from fuel gas cylinders and combustible materials by at least 20 feet, or by a noncombustible barrier at least 5 feet high having a fire resistance rating of at least one-half hour.

12. Provide proper signs at storage areas, such as “DANGER – FLAMMABLE No Smoking or Open Flames”.

13. Keep storage areas free of vegetation, trash, and other combustible materials.

14. Remove regulators and replace valve safety caps when storing cylinders or when cylinders will be left unattended.

E. Welding Operations

1. Use only electrode holders that are specifically designed for arc cutting and welding and are of a sufficient capacity to safely handle the maximum rated current required by the electrodes.

2. Require that electrode holders are properly insulated.

3. Remove electrodes from the holders and place holders so they cannot make contact with people or conducting objects when leaving holders unattended.

4. Require that the welding machine frame is properly grounded.

5. Shut off the welding machine at the end of each shift or when the machine is to be moved.

6. Require that the welding/cutting/ground cables meet the following requirements:

   a) Cables must be completely insulated, flexible, and capable of handling the maximum current requirements of the work in progress.
   b) Cables must be free from repair or splices for a minimum distance of 10 feet from the electrode holder, except when standard insulated connectors or splices with insulating value equal to the cable are used.
   c) Insulated connectors of a capacity at least equal to that of the cable should be used for splices. If connecting lugs are used, they must be completely and substantially insulated.
   d) A ground cable must have a safe current carrying capacity at least equal to the maximum output capacity of the unit or units that it services.
   e) Never attach a ground cable to a pipeline containing gases or flammable liquids.
   f) String all cables overhead with non-metallic hangers or otherwise position to keep clear of walkways, ladders, and stairways.
   g) Immediately remove all damaged and worn cable from service until properly repaired.

7. Workers assigned to operate or maintain arc welding equipment shall be acquainted with the requirements of this section 1010.254 and with 1910.252 (a), (b), and (c) of this part

8. The operator should report any equipment defect or safety hazard to his supervisor and the use of the equipment shall be discontinued until its safety has been assured. Repairs shall be made only by qualified personnel.

G. Training

1. Insist that cutters or welders and their supervisors are suitably trained in the safe operation of their equipment and the safe use of the process.

Documentation Summary

File these documents in the Project Safety and Health file:

Hot Work Permits

5.0 Resources

A. U.S. OSHA Construction Standard - Welding and Cutting - 29 CFR 1926, Subpart J (http://www.osha-slc.gov/OshStd_toc/OSHA_Std_toc_1926_SUBPART_J.html)
B. U.S. OSHA Standard - Welding, Cutting and Brazing - 29 CFR 1910 Subpart Q (http://www.osha-slc.gov/OshStd_toc/OSHA_Std_toc_1910_SUBPART_Q.html)
C. ANSI Z49.1-1983, "Safety in Welding and Cutting" (http://web.ansi.org/public/std_info.html)
D. U.S. OSHA Standard – Welding, Cutting, and Brazing, General Requirements 29 CFR 1910.252
E. U.S. OSHA Standard – Oxygen-Fuel gas welding and cutting. 29 CFR – 1910.253
F. U.S. OSHA Standard – Arc welding and cutting. 29 CFR – 1910.254

CUTTING – WELDING – HOT WORK

PERMIT

IMPORTANT: Precautions on reverse side must be followed without fail.

Date:____/____/____

Building:_____

Floor/Dept./Area:_____

Time Started:_____Completed:_____

Work to be done:_____

_____

_____

Work will be performed by:_____

_____

_____

Items 1, 2, 3, and 4 of the required precautions listed on the reverse side have been completed. Arrangements have been made for Item 5. Permission is therefore granted for this work.

This permit expires_____ or end of shift, whichever is first.

If fire occurs, phone _____ or use alarm box located at

_____

Signed_____Title_____

File in Project Safety and Health File. **See Reverse Side**

DANGER

Do not cut, weld, or use other open flame or spark producing equipment until the following precautions have been taken.

Check each item:

_____ 1. The location where work is to be done has been personally inspected.

____ A. Sprinklers, where provided, are in commission.

____ B. There is no flammable dust, vapors, or liquids, or unpurged tanks or equipment previously containing such materials in the area.

____ C. This work will be confined to the area or equipment specified in the permit.

____ 2. The following safeguards have been provided:

____ A. Floors and surroundings have been swept clean and wet down.

____ B. Ample portable extinguishing equipment has been provided.

____ 3. If the work involves cutting, welding, or other spark producing equipment, the following additional safeguards have been provided:

____ A. All combustibles have been located 30 feet from the operation and the remainder protected with fire blanket, metal guards, or flameproofed covers (not ordinary tarps).

____ B. All floor and wall openings within 40 feet of the operations have been tightly covered.

____ C. Firewatches have been assigned to watch for dangerous sparks in area, as well as floors above and below.

____ 4. Flame or spark producing equipment to be used has been inspected and found in good repair.

____ 5. Arrangements have been made for a patrol of the area, including floors above and below, during any lunch or rest period and for at least one half hour after work has been completed.

ADVANCED AMERICAN CONSTRUCTION, INC. SAFETY MANAGEMENT STANDARD

HOUSEKEEPING

1.0 Applicability

This procedure applies to Advanced American Construction, Inc. facilities and field operations.

2.0 Purpose and Scope

Proper housekeeping in office locations, on construction sites, and fixed work facilities is essential to prevent fires as well as injuries resulting from slips, trips and falls.

3.0 Implementation

Office/Shop Locations - Implementation of this program is the responsibility of the Office Manager.

Field Activities - Implementation of this program is the responsibility of the Project Manager.

4.0 Requirements

A. Maintain the cleanliness of the site.

1. Require tools and equipment to be stowed at the end of the day.
2. Store supplies in locations away from walkways and in a manner that will not trip workers.
3. Keep weeds and vegetation away from stockpiled materials and walkways.
4. Maintain flooring and walkways in a clean, dry, smooth condition.
5. Dispose of construction debris in a timely manner.

B. Regularly inspect the work area for slip and trip hazards.

1. Office/shop locations inspect work areas at least semi-annually. Utilize the check-sheet provided as Attachment 1.

2. Construction sites inspect sites at least monthly. Utilize the check sheet provided as Attachment 1.

C. Thoroughly investigate all injuries resulting from slips, trips and falls on site. Correct conditions contributing to injuries.

5.0 Documentation Summary

A. Office/Sop

File Completed Housekeeping Inspection Sheets (Attachment 1), in the Office/Shop Safety Filing System.

B. Field

File Completed Housekeeping Inspection Sheets (Attachment 1), in the Project Safety File.

6.0 Resources

A. U.S. OSHA Standard - Sanitation - 29 CFR 1910.141(a)(3)
(http://www.osha-slc.gov/OshStd_data/1910_0141.html)
B. U.S. OSHA Standard - Aisles and Passageways - 29 CFR 1910.22(b)
(http://www.osha-slc.gov/OshStd_data/1910_0022.html)

Advanced American Construction, Inc. Health & Safety Program
HOUSEKEEPING INSPECTION SHEET

Building or Location: _____

Date : _____ **Inspection Conducted by:** _____

		Yes	No must be corrected	N/A
General Site Housekeeping				
1.	No blocking of exits or emergency equipment.			
2.	Equipment or materials are not left lying on the ground.			
3.	Storage areas are free from the accumulation of materials that constitute trip hazards.			
4.	Work area is kept free of scrap material and other debris.			
5.	Combustible scrap and debris is removed by safe means at regular intervals.			
6.	Oily rags are stored in metal cans with tight fitting lids. Oily rags are removed at the end of the day.			
Visibility				
7.	Halls, stairways and walkways are well lit.			
8.	Well designed light switches are present in areas where walkways are not always lighted.			
9.	Dust, smoke or steam does not create poor visibility.			
10.	Glare from floodlights or windows does not create poor visibility in work areas.			
Stairs				
11.	Handrails are tight and at the proper level.			
12.	Handrails extend past the top and bottom step.			
13.	White or yellow strips are painted on the first and last step for better visibility. (Not an OSHA requirement - recommendation only.)			
14.	Steps are not rough or defective.			
15.	Stair treads are wide enough and risers consistently spaced.			
16.	Stairs are free of obstructions.			
Floor Conditions				
17.	Floors of every workroom are clean, and so far as possible, in a dry condition.			

		YES	NO	N/A
18.	Floors are not oily or overly waxed or polished.			
19.	Where wet floors or processes are present, proper drainage is provided and false floors, mats, or other dry standing places are provided.			
20.	Floor surfaces are finished with non-slip coatings where spills are likely.			
21.	Floors and passageways are free from protruding nails, splinters, holes, or loose boards.			
22.	Floors are free of holes and depressions.			
23.	Aisles or pathways are wide enough for easy passage and for carrying objects (48 inches is recommended).			
24.	Ramps are covered with non-slip surfaces or matting.			
25.	Carpets or rugs do not have loose or frayed edges that may catch boots or shoes.			
26.	Walkways are free from extension cords, air hoses and cables.			
27.	Boxes, containers, machine parts or other tripping hazards do not lie in pathways.			
Ground Conditions				
28.	Trip hazards are not present.			
29.	Fall hazards are not present.			
30.	Holes or changes in ground elevation are either filled or guarded.			
31.	Muddy walkways are filled with gravel to reduce slipping.			
32.	All employees who work in wet or greasy conditions wear slip resistant footwear.			
Equipment				
33.	Vehicle steps are of adequate size, surface placement for safe dismounting.			
34.	Hand grips or ladders are adequate for getting in and out of equipment.			
35.	Ladders have been checked for damage and removed from service if found unsafe.			

I certify that the above inspection was performed to the best of my knowledge and ability, based on the conditions present on _____.

_____

Signature

ADVANCED AMERICAN CONSTRUCTION, INC. SAFETY MANAGEMENT STANDARD

LEAD IN CONSTRUCTION

1.0 Applicability

This procedure applies to Advanced American Construction, Inc. projects where lead-containing materials are disturbed and occupational exposures may occur.

2.0 Purpose and Scope

The purpose of this program is to protect personnel from occupational exposures to lead.

3.0 Implementation

Field Activities - Implementation of this procedure is the responsibility of the Project Manager/Superintendent.

4.0 Requirements

A. Determine whether any surface to be disturbed or altered contains lead or has a surface coating that contains lead.

B. All employees potentially exposed to lead must:

1. Be in the Medical Surveillance Program for Lead.

2. Have received training as outlined in Attachment 1.

3. Advanced American Construction, Inc. will provide training for and assure the participation of all employees who are subject to exposure to lead at or above the action level or for whom the possibility of skin or eye irritation exists.

4. Advanced American Construction, Inc. will provide training by 180 days from the effective date for those employees covered by paragraph (l)(1)(ii) on the standard's effective date and prior to the time of initial job assignment for those employees subsequently covered by this paragraph.

5. The training will be repeated at least annually for each employee.

C. Interim Protection Measures

Until the initial exposure assessment can be conducted the following protective measures must be implemented:

1. Provide respiratory protection as outlined in Attachment 2.

2. Provide coveralls or other similar full body covering.

3. Provide gloves, hats, shoes or disposable shoe coverings.

4. Provide faceshields, goggles or other appropriate protective equipment.

5. Provide change areas and handwashing facilities.

D. Initial Exposure Assessment

1. Contact the Advanced American Construction, Inc. Safety Manager to determine whether historical air monitoring data is available that accurately represents exposure conditions for the Initial Determination for the project.

2. In the absence of representative historical data conduct air monitoring to assess personnel exposure to lead.

E. Negative Initial Determination

1. Exposures to lead below an 8-hour time-weighted average of 30 ug/m^3 requires a written record which includes:

   a) Date of determination.
   b) Location within the worksite.
   c) Name of each employee monitored.
   d) Monitoring results.
   e) Type of activity conducting during monitoring.

2. No further action regarding lead required.

F. Exposures to lead above an 8-hour time-weighted average of 30 ug/m^3 and below 50 ug/m^3

All employees potentially exposed to lead must:

1. Be in the Medical Surveillance Program for Lead.

2. Have received training as outlined in Attachment 1.

3. Utilize appropriate PPE and personal hygiene procedures as outlined in the project-specific safety plan.

G. Exposures above the 8-hour time-weighted average Permissible Exposure Limit of 50 ug/m^3

1. Develop a Lead Compliance Plan

a) The compliance plan must include the following topics:

(1) Description of work activities that expose personnel to lead.
(2) Equipment to be used and procedures to be followed during lead exposure activities.
(3) Employee job responsibility and crew size during lead exposure activities.
(4) Maintenance practices to be followed for servicing and cleaning equipment and disposing of waste.
(5) Specific instructions on how to set up engineering controls (ventilation; containment; etc.).
(6) Air monitoring data from initial assessment.
(7) A detailed work schedule for implementation.
(8) A description of arrangements made among contractors on multi-contractor sites with respect to informing affected employees of potential exposure to lead.
(9) The name of the competent person for the site.

b) Appoint a Competent Person who will be responsible for performing regular inspections of the job site, materials, and equipment during the job.

2. Order the PPE specified in the Lead Compliance Plan.

3. Provide for the cleaning, laundering, and disposal of protective clothing and equipment.

H. Require that Engineering Controls are on site and installed correctly before work begins. Implement the engineering controls specified in the Lead Compliance Plan for the site.

I. Protective work clothing and equipment

1. Provision and use. If an employee is exposed to lead above the PEL, without regard to the use of respirators or where the possibility of skin or eye irritation exists, Advanced American Construction, Inc. will provide at no cost to the

employee and assure that the employee uses appropriate protective work clothing and equipment such as, but not limited to:

a. Coveralls or similar full-body work clothing;

b. Gloves, hats, and shoes or disposable shoe coverlets, face shields, vented goggles, or other appropriate protective equipment which complies with 1910.133 of this part.

c. Advanced American Construction, Inc. will provide the protective clothing in a clean and dry condition at least weekly, and daily to employees whose exposure levels without regard to a respirator are over 200 up/m(3) of lead as an 8-hour TWA.

d. Advanced American Construction, Inc. will provide for the cleaning, laundering, repair or replacement or disposal of protective clothing and equipment as required by paragraph (g)(1) of lead – 1910.1025

J. Provide hygiene facilities which include:

1. A clean change room equipped with separate lockers for the storage of street clothes and work clothes.

2. A shower and handwashing facilities.

3. A lunch area free from lead contamination.

K. Establish rules that will maintain proper housekeeping in the lead abatement area, specifically:

1. Prohibit contaminated clothing and equipment outside of lead work area.

2. Require lead workers to shower at the end of the shift and wash up before eating and drinking outside the lead area.

3. Segregate dirty or contaminated equipment from clean work areas.

4. HEPA vacuum all lead-contaminated surfaces.

L. Label lead hazardous areas and equipment.

1. Mark lead hazardous areas with boundary tape and signs stating:

WARNING
LEAD WORK AREA

POISON
NO SMOKING OR EATING

2. Mark lead contaminated equipment and debris with labels warning of the lead hazard.

M. Notify contractors and subcontractors before work begins.

Require contractors to know the location of lead in the job site. Even if contract workers are not directly exposed they may need to still perform training required under the hazard communication standard.

N. Maintain requirements of the Lead Compliance Plan throughout the job.

1. Direct the appointed "competent person" to inspect the job site at least daily for those days when lead operations are performed.

2. Advanced American Construction, Inc. shall collect full shift (for at least 7 continuous hours) personal samples including at least one sample for each shift for each job classification in each work areas.

3. Full shift personal samples shall be representative of the monitored employee's regular, daily exposure to lead.

O. Blood Sampling, Monitoring and Employee Notification

1. The blood sampling & monitoring should be conducted every 6 months until two consecutive blood samples & analysis are acceptable.
2. The sampling & monitoring should be performed at least monthly during the removal period.
3. Any employee with elevated blood levels should be temporarily removed.
4. Employees should be notified in writing within five days after the receipt of biological monitoring results, the employer shall notify in writing each employee whose blood lead level exceeds 40 ug/100 g
5. Of that employee's blood lead level and (B) that the standard requires temporary medical removal with Medical Removal Protection benefits when an employee's blood lead level exceeds the numerical criterion for medical removal under paragraph (k)(1)(i) of section 1910.1025(j)(2)(iv)

5.0 Documentation Summary

File these records in the Project Safety File:

1. Physician's medical clearance for lead workers.

2. Proof of blood lead testing for personnel.

3. Pre-Job Lead Hazard Initial Assessment.

4. Air monitoring results.

5. Completed Lead Job Inspection forms.

6. Lead Compliance Plan for the job (as necessary).

6.0 Resources

A. U.S. OSHA Standard - Lead - 29 CFR 1926.62
(http://www.osha-slc.gov/OshStd_data/1926_0062.html)
B. U.S. OSHA Expert System - Lead in Construction Advisor
(http://www.osha.gov/oshasoft/LeadxWb.html)
C. U.S. OSHA Technical Links - Lead
(http://www.osha-slc.gov/SLTC/lead/index.html)
D. U.S. OSHA Standard – Lead – 1910.1025
E. U.S. OSHA Standard – Lead – 1910.1025(j)(2)(i)(C)(iv)
F. U.S. OSHA Standard – Lead – 1910.1025(d)(1)(iii)

Advanced American Construction, Inc. Health & Safety Program
TRAINING REQUIREMENTS FOR LEAD WORKERS

Assure each employee is trained in the following:

a) The content of lead in construction standard, (29 CFR 1926.62 for U.S. operations).

b) The specific nature of the operations that could result in exposure to lead above the action level.

c) The purpose, proper selection, fitting, use, and limitations of respirators.

d) The purpose and description of the medical surveillance program and the medical removal protection program including information concerning the adverse health effects associated with excessive exposure to lead.

e) The engineering controls and work practices associated with the employee's job assignment including training of employees to follow relevant good work practices.

f) The content of any lead compliance plan and the location of regulated areas in effect.

g) Instructions to employees that chelating agents should not be routinely used.

h) The employee's right of access to records.

Advanced American Construction, Inc. Health & Safety Program
INTERIM RESPIRATORY PROTECTION MEASURES

During the interim work period while air monitoring is being performed and exposure levels are being determined, the following guidance must be followed regarding respiratory protection for employees:

1. Provide half face respirators with HEPA cartridges where lead coatings or paint is present and any of the following activities will occur:

   a) Manual demolition of structures.
   b) Manual scraping.
   c) Manual sanding.
   d) Heat gun applications.
   e) Power tool cleaning with dust collection applications.
   f) Spray painting with lead paint.

2. Provide Loose fitting hood or helmet powered air purifying respirator with high efficiency filters, or hood or helmet supplied air respirator operated in a continuous-flow mode when performing tasks involving:

   a) Lead containing mortar.
   b) Lead burning.
   c) Rivet busting.
   d) Power tool cleaning without dust collection systems.
   e) Cleanup activities where dry expendable abrasives are used.
   f) Abrasive blasting enclosure movement and removal.

3. Provide full facepiece supplied air respirator operated in pressure demand or other positive-pressure when performing tasks involving:

   a) Abrasive blasting.
   b) Welding.
   c) Cutting.
   d) Torch burning.

ADVANCED AMERICAN CONSTRUCTION, INC., SAFETY MANAGEMENT STANDARD

LOCKOUT AND TAGOUT SAFETY

1.0 Applicability

This procedure applies to Advanced American Construction, Inc. facilities and projects involving exposure to uncontrolled sources of energy.

2.0 Purpose and Scope

This procedure outlines the requirements that must be followed to prevent injuries, either direct or indirect, when work is performed near or on an energy source that is unexpectedly operated.

Some energy sources that should be protected against include:

A. Electrical circuits.

B. Fluid systems (water and liquid product).

C. Pneumatic systems.

D. Flammable systems (including liquid and gaseous fuels).

E. Thermal systems (steam).

F. Gravity systems.

G. Hazardous material systems.

3.0 Implementation

Shop Locations - Implementation of this procedure is the responsibility of the Shop Manager

Field Operations - Implementation of this procedure is the responsibility of the Project Manager/Superintendent.

4.0 Requirements

A. General

1. "Authorized employee" means a person who locks/tags out machines or equipment in order to perform servicing or maintenance on that machine or equipment, and who has received the training described in Section C, below.

2. "Affected employee" means an employee whose job requires him/her to operate or use a machine or equipment on which servicing or maintenance is being performed under lockout and tagout, or whose job requires him/her to work in an area in which such servicing or maintenance is being performed.

3. "Qualified person" means person who is familiar with the construction and operation of the equipment and the hazards involved, and who:

   a) Requests de-energizing of an energy source.
   b) Inspects de-energizing with the authorized employee.
   c) Assures that authorized employee has locked and tagged the source.
   d) Requires that all applicable authorized employees affix lock/tags at the same locations(s).
   e) Operates the equipment controls or otherwise verifies that the equipment cannot be restarted after being locked out.
   f) Coordinates the continuation of lock/tagout protection through shift or personnel changes.
   g) Controls accountability of locks and tags.
   h) Makes appropriate log entries on Attachment 1.
   i) Conducts tests and visual inspections prior to reenergizing to check that circuits and equipment can be safely energized.
   j) If an energy isolating device is not capable of being locked out, Advanced American Construction, Inc. energy control program shall utilize a tag out system.
   k) If an energy isolating device is capable of being locked out, the employer's energy control program shall utilize lockout, unless the employer can demonstrate that the utilization of a tag out system will provide full employee protection as set forth in this section.
   l) After January 2, 1990, whenever replacement or major repair, renovation or modification of a machine or equipment is performed, and whenever new machines or equipment are installed, energy isolating devices for such machine or equipment shall be designed to accept a lockout device.
   m) If an energy source can be locked out this method shall be utilized. LOCKOUT DEVICE: A device that utilizes a lock, either key or combination to hold an energy isolating device in a safe position. If an energy source cannot be locked out a tag out system shall be utilized. TAG OUT DEVICE: A warning tag (weather or chemical resistant) standardized in size, color, with working warning of hazardous energy

(Do Not Start) (Do Not Open) (Do Not Close) Do Not Energize) (Do Not Operate).

4. Employees shall not work on or in equipment, vessels, etc., which are **not** in a "zero energy state".

5. Coordinate all lockout and energy control activities with client, owner, contractor, and subcontractor practices and programs.

6. Require that all locks are keyed differently and that only one key exists for each lock and remains in the possession of the authorized employee to whom it has been assigned.

7. Testing or positioning of machines, equipment or components thereof. In situations in which lockout or tagout devices must be temporarily removed from the energy isolating device and the machine or equipment energized to test or position the machine, equipment or component thereof, the following sequence of actions shall be followed:

   a. Clear the machine or equipment of tools and materials.

   b. Remove employees from the machine or equipment.

   c. Remove the lockout tagout devices.

   d. Energize and proceed with testing or positioning;

   e. Deenergize all systems and reapply energy control measures.

   f. Document the procedure to include who performs & verifies.

8. Group lockout or tagout. When servicing and/or maintenance is performed by a crew, craft, department or other group, they shall utilize a procedure which affords the employees a level of protection equivalent to that provided by the implementation of a personal lockout or tagout device.

9. Primary responsibility is vested in an authorized employee for a set number of employees working under the protection of a group lockout or tagout device (suck as an operations lock);

10. Provision for the authorized employee to ascertain the exposure status of individual group members with regard to the lockout or tagout of the machine or equipment and when more than one crew, craft, department, etc. is involved, assignment of overall job-associated lockout or tagout control responsibility to an authorized employee designated to coordinate

affected work forces and ensure continuity of protection; and each authorized employee shall affix a personal lockout or tagout device to the group lockout device, group lockbox, or comparable mechanism when he or she begins work, and shall remove those devices when he or she stops working on the machine or equipment being serviced or maintained.

11. Shift or personnel changes. Specific procedures shall be utilized during shift or personnel changes to ensure the continuity of lockout or tagout protection, including provision for the orderly transfer of lockout or tagout device protection between off-going and oncoming employees, to minimize exposure to hazards from the unexpected energization or start-up of the machine or equipment, or the release of stored energy.

B. Procedure

Follow this lock and tagout procedure whenever the unexpected operation of equipment, switch, or valve or other energy sources could injure someone. Only authorized employees may perform jobs requiring lockout procedures.

1. **Step 1** - Achieving Zero Energy

a) Identify and locate all sources of energy that could affect individuals involved.
b) Notify all affected personnel that equipment is going to be de-energized and accessed. This can be done verbally, visually, or by hanging a warning tag on the control panel.
c) Disconnect the main sources of power by breaking the primary power circuit, valve, pipe, etc. Locking out a low voltage control circuit is not considered breaking a main power source.
d) Disconnect each separate power source of multiple power systems, e.g., air over hydraulic, electric over hydraulic, etc.
e) Release all residual energy remaining behind the power source, e.g., hydraulic or air pressure, etc.
f) Secure all power sources in the de-energized position with a lockout device. Use multiple lock devices when more than one lock is required. Each person who is protected by the lockout:

(1) Places a signed lock and tag on source location(s) to include name of individual placing device.
(2) Keeps the key to his/her own lock.
(3) Removes own lock (only exception: person not on site and person is contacted).
(4) Works ***only*** on protected source(s).
(5) Removes lock at completion for work shift or transfer.

g) Block or blank any machinery, device, or piping system that can move on its own or deliver energy with or without the power source.
h) Test equipment, prior to working on it, to insure that all sources of energy have been isolated and that it is "safe".
i) Lockout or tagout devixes shall be affixed to each energy isolating device by authorized employees.
j) Lockout devices, where used, shall be affixed in a manner that will hold the energy isolating devices in a safe or off position.
k) Tagout devices, where used, shall be affixed in such a manner as will clearly indicate that the operation or movement of energy isolating devices from the safe or off position.
l) Where tagout devices are used with energy isolating devices designed with the capability of being locked, the tag attachment shall be fastened at the same point at which the lock would have been attached.
m) Where a tag cannot be affixed directly to the energy isolating device, the tag shall be located as close as safely as possible to the device in a position that will be immediately obvious to anyone attempting to operate the device.
n) Following the application of lockout or tagout devices to energy isolating devices, all potentially hazardous stored or residual energy shall be relieved, disconnected, restrained & a possibility of reaccumulation of stored energy level, verification of isolation shall be continued until the servicing or maintenance is completed, or until the possibility of such accumulation no longer exists.

2. **Step 2** - Preparing to Re-Energize

a) Once the task has been completed, tools picked up, safety chains, guards, guard rails, warning signs, etc. are replaced, notify affected personnel that the lockout device is going to be removed.
b) Remove locks and tags.
c) Once all lockout devices have been removed, the equipment or process may be restarted.

3. Temporary operation of locked out source

a) Make sure everyone is clear of the system.
b) Make sure tools are clear.
c) Remove lock(s).
d) Energize the system and conduct check.
e) Immediately de-energize the system and replace locks.

4. Unauthorized removal of lock and tag is prohibited. Use the following procedure for Supervisor or Qualified Person to remove lock/tag when employee is not available:

a) Verify authorized employee is not on site and available to remove own tag.
b) Check that employees are not exposed to hazards.
c) Verify equipment is safe to operate, tools have been removed and guards have been replaced.
d) Remain with affected equipment so that no one returns while equipment or process is being restarted.
e) Remove lock/tag and energize equipment.
f) Require that affected employee knows the lockout device(s) has been removed before he/she resumes work.

C. Training

1. Authorized employees must receive training prior to conducting lockout/tagout activities.

2. Training must include:

a) Purpose of lockout procedure.
b) Hazards associated with different energy sources.
c) Recognition of when to lockout.
d) Electrical lockout procedures.
e) Valve lockout procedures.
f) Compliance with lockout procedures.
g) Discussion of specific procedures.
h) Advanced American Construction, Inc. shall provide training to ensure that the purpose and function of the energy control program are understood by employees and that the knowledge and skills required for the safe application, usage, and removal of the energy controls are acquired by employees.
i) Each authorized employee shall receive training in the recognition of applicable hazardous energy sources, the type and magnitude of the energy available in the workplace, and the methods and means necessary for energy isolation and control.
j) Each affected employee shall be instructed in the purpose and use of the energy control procedure.
k) All other employees whose work operations are or may be in an area where energy control procedures may be utilized, shall be instructed about the procedure, and about the prohibition relating to attempts to restart or reenergize machines or equipment which are locked out or tagged out.
l) When tag out systems are used, employees shall also be trained in the following limitations of tags:

a. Tags are essentially warning devices affixed to energy isolating

devices, and do not provide the physical restraint on those devices that is provided by a lock.

b. When a tag is attached to an energy isolating means, it is not to be removed without authorization of the authorized person responsible for it, and it is never to be bypassed, ignored, or otherwise defeated.

c. Tags must be legible and understandable by all authorized employees, affected employees, and all other employees whose work operations are or may be in the area, in order to be effective.

d. Tags and their means of attachment must be made of materials which will withstand the environmental conditions encountered in the workplace.

e. Tags may evoke a false sense of security, and their meaning needs to be understood as part of the overall energy program.

f. Tags must be securely attached to energy isolating devices so that they cannot be inadvertently or accidentally detached during use.

3. Employee Retraining

1. Retraining shall be provided for all authorized and affected employees whenever there is a change in their job assignments, a change in machines, equipment or processes that present a new hazard, or when there is a change in the energy control procedures.

2. Additional retraining shall also be conducted whenever a periodic inspection under paragraph 1 of this section reveals, or whenever Advanced American Construction, Inc. has reason to believe that there are deviations from or inadequacies in the employee's knowledge or use of the energy control procedures.

3. The retraining shall reestablish employee proficiency and introduce new or revised control methods and procedures, as necessary.

4. Advanced American Construction, Inc. shall certify that employee training has been accomplished and is being kept up to date. The certification shall contain each employee's name and dates of training.

D. Periodic Inspection

1. Advanced American Construction, Inc. shall conduct a periodic inspection of the energy control procedure at least annually to ensure that the procedure and the requirements of this standard are being followed.

2. The periodic inspection shall be performed by an authorized employee other than the one(s) utilizing the energy control procedure being inspected.

3. The periodic inspection shall be conducted to correct any deviations or inadequacies identified.

4. Where lockout is used for energy control, the periodic inspection shall include a review, between the inspector and each authorized employee, of the employee's responsibilities under the energy control procedure being inspected.

5. Where tag out is used for energy control, the periodic inspection shall include a review, between the inspector and each authorized and affected employee, of the employee's responsibilities under the energy control procedure being inspected, and the elements set forth in this section.

6. Advanced American Construction, Inc. shall certify that the periodic inspections have been performed. The certification shall identify the machine or equipment on which the energy control procedure was being utilized, the date of the inspection, the employees included in the inspection, and the person performing the inspection.

5.0 Documentation Summary

File these records in the Project Safety File:

A. Training records for authorized employees

B. Lockout Log

6.0 Resources

A. ANSI 235.2
(http://www.ansi.org)
B. U.S. OSHA Standard - Accident Prevention Tags and Signs - 29 CFR 1926.200
(http://www.osha-slc.gov/OshStd_data/1926_0200.html)
C. U.S. OSHA Standard - Locking and Tagging of Circuits - 29 CFR 1926.417
(http://www.osha-slc.gov/OshStd_data/1926_0417.html)
D. U.S. OSHA Technical Links - Lockout/Tagout
(http://www.osha-slc.gov/SLTC/controlhazardousenergy/index.html)
E. U.S. OSHA Standard The control of hazardous energy (lock out/tag out) -1920-147

Advanced American Construction, Inc. Health and Safety Program

LOCK AND TAG LOG

Job Name: _____ Job Location _____

Name of Tagging Authority: _____Date: _____

Date	Lockout Location	Authorized Employee	Activity Initiated	Activity Completed

ADVANCED AMERICAN CONSTRUCTION, INC. SAFETY MANAGEMENT STANDARD

MEDICAL SERVICES & FIRST AID

1.0 Applicability

This procedure applies to Advanced American Construction, Inc. office, shop and field operations.

2.0 Purpose and Scope

This procedure establishes policy, assigns responsibilities, and provides guidance to Advanced American Construction, Inc. offices/shops/field projects regarding First Aid and Medical Services.

3.0 Implementation

Field Activities - Implementation of this procedure is the responsibility of the Project Manager/Superintendent.

A. All job sites & main shop have posted Emergency Action Plans where it is available to all employees.

B. An Excel spread sheet is established on the computer network to keep track of all employee training certificates and renewal dates

4.0 Requirements

A. Advanced American Construction, Inc. Service, Inc. provides First Aid & CPR Certified personnel on all job sites and main shop. The certifications are provided through the American Red Cross or equivalent training that can be verified by documentary evidence.

B. Advanced American Construction, Inc. provides Emergency Action Plans to include emergency contact information for quick reference and response to medical emergencies.

C. First aid supplies/kits are readily available on all job sites.

D. First aid kits will be inspected and kept current at all times in compliance with OSHA standard 1926.50 (d)(2)

First Aid Kit will meet ANSI standard Z308.1-1998 or better.

The contents of the first aid kit shall be placed in a weatherproof container with individual sealed packages for each type of item, and shall be checked by the employer before being sent out on each job and at least weekly on each job to ensure that the expended items are replaced.

Kit contains:

- (100) 1" x 3" Adhesive Strips
- (1) 40" Triangular Bandage
- (5) 4" x 4" Gauze Pads
- (1) 4" Gauze Bandage
- (1) 5" x 9" Large Wound Dressing
- (30) Antiseptic Wipes
- (6) .9 gm First Aid & Burn Cream packets
- (1) Cold Pack
- (1) Scissors
- (1) Forceps
- (4) Exam Gloves
- (1) First Aid Instructions

E. Emergency transportation will always be available on the job site. Company owned vehicles to emergency response vehicles as needed.

F. Advanced American Construction, Inc. will provide OSHA approved eye flushing and body drenching capability on all shop and/or job sites. Personnel will have training through their CPR or First Aid training in the use of this equipment.

5.0 Resources

A. U.S. OSHA Standard – Medical services and first aid – 29CFR 1925.50
www.osha.gov/pls/oshaweb/owadisp.show
B. ANSI Standard – Z308.1-1998

ADVANCED AMERICAN CONSTRUCTION, INC. SAFETY MANAGEMENT STANDARD

NOISE AND HEARING CONSERVATION

1.0 Applicability

This procedure applies to Advanced American Construction, Inc. facilities and field operations where AAC personnel may encounter noise exposures that may exceed 85 dBA.

2.0 Purpose and Scope

The purpose of this procedure is to protect employees from hazardous noise exposures and to prevent hearing loss.

3.0 Implementation

Shop Locations: Implementation of this program is the responsibility of the Shop Manager/Foreman.

Field Activities: Implementation of this program is the responsibility of the Project Manager/Superintendent.

4.0 Requirements

A. General

Require the use of hearing protectors in any location where powered or motorized equipment or any other noise source could reasonably be expected to exceed 85 dBA. Use of hearing protectors may only be discontinued when noise levels are verified to be less than 85 dBA through a properly conducted noise survey.

B. Hearing Protectors

1. Require that at least two (2) types of hearing protectors are available to employees, preferably a plug and muff type.

2. Minimum Noise Reduction Ratings(NRR)

Hearing protectors issued to or used by Advanced American Construction, Inc. personnel must have the following minimum NRR:

Ear Plugs	Muffs

29 dB 27 dB

3. Require that hearing protectors are used properly and thus effectively protect hearing.

4. Hearing protection shall be replaced as necessary. Advanced American Construction, Inc. will ensure that hearing protectors are worn. Employees shall be properly trained in the use, care & fitting of protectors.

5. Hearing protectors are available to all employees exposed to an 8-hour time-weighted average of 85 decibels at no cost to the employee.

C. Noise Surveys

1. Noise surveys must be conducted in a manner that reasonably reflects the exposure of the affected employees. Surveys must be conducted under supervision of the Advanced American Construction, Inc. Safety Manager.

2. Sound level meters and audio dosimeters used to determine employee exposure to noise sources must be Type II (accurate to within +/- 2dB), operated in “slow” response, on the “A” scale, and be calibrated to factory guidelines (including periodic factory recalibration).

D. Noise Controls

Eliminate noise sources to the extent possible. Examples of controls that must be considered follow:

1. Addition or replacement of mufflers on motorized equipment.

2. Addition of mufflers to air exhausts on pneumatic equipment.

3. Following equipment maintenance procedures to lubricate dry bearings.

4. Isolation of loud equipment such as compressors and generators from employee work areas.

5. Replacement of older noisy equipment with newer and quieter models.

E. Audiometric Exams

Verify that permanent employees and project employees who are required to wear hearing protection for at least six months have had audiometric tests (annually).

1. When information indicates that employee exposure may equal/exceed

the 8 hour time-weighted average of 85 decibels, the employer shall implement a monitoring program to identify employees to be included in the hearing conservation program.

F. Training

Verify that each employee who must work in a noisy environment is current on the required Hearing Conservation Training. The training shall be repeated annually for each employee. The training shall be updated consistent to changes in PPE and work processes. The training is for all employees who are exposed to noise at or above an 8-hour time-weighted average of 85 decibels, and shall ensure employee participation. Training must include the following topics:

1. The effects of noise on hearing.

2. The purpose of hearing protectors.

3. The advantages and disadvantages of various types of hearing protectors.

4. The attenuation of various types of hearing protection.

5. The selection, fitting, care and use of hearing protectors.

6. The purpose of audiometric testing.

7. An explanation of the audiometric testing procedure.

8. Advanced American Construction, Inc. will make available to affected employees or their representatives copies of this standard and shall also post a copy in the workplace.

9. Advanced American Construction, Inc. will provide to affected employees any informational materials pertaining to the standard that are supplied to the employer by the Assistant Secretary.

G. Baseline Audiogram

1. Within 6 months of an employee's first exposure at or above the action level, Advanced American Construction, Inc. Service will establish a valid baseline audiogram against which subsequent audiograms can be compared.

2. "Mobile test van exception." Where mobile test vans are used to meet the audiometric testing obligation, the employer shall obtain a valid baseline audiogram within 1 year of an employee's first exposure at or above the

action level. Where baseline audiograms are obtained more than 6 months after the employee's first exposure at or above the action level, employees shall wearing hearing protectors for any period exceeding six months after first exposure until the baseline audiogram is obtained.

3. Testing to establish a baseline audiogram shall be preceded by at least 14 hours without exposure to workplace noise. Hearing protectors may be used as a substitute for the requirement that baseline audiograms be preceded by 14 hours without exposure to workplace noise.

4. Advanced American Construction, Inc. shall notify employees of the need to avoid high levels of non-occupational noise exposure during the 14-hour period immediately preceding the audiometric examination.

5. When a standard threshold shift occurs: The use of hearing protection shall be re-evaluated and/or refitted and if necessary a medical evaluation may be required.

6. At least annually after obtaining the baseline audiogram, the employer shall obtain a new audiogram for each employee exposed at or above an 8-hour time-weighted average of 85 decibels.

7. Each employee's annual audiogram shall be compared to that employee's baseline audiogram to determine if the audiogram is valid and if a standard threshold shift has occurred. If a comparison of the annual audiogram to the baseline audiogram indicates a standard threshold shift, the employee shall be informed of this fact in writing, within 21 days of the determination.

H. Hearing Protector Attenuation

1. Advanced American Construction, Inc. shall evaluate hearing protector attenuation for the specific noise environments in which the protector will be used. The Advanced American Construction, Inc. shall use one of the evaluation methods for estimating the Adequacy of Hearing Protection Attenuation.

2. Hearing protectors must attenuate employee exposure at least to an 8-hour time-weighted average of 90 decibels.

3. For employees who have experienced a standard threshold shift, hearing protectors must attenuate employee exposure to an 8-hour time-weighted average of 85 decibels or below.

4. The adequacy of hearing protector attenuation shall be re-evaluated whenever employee noise exposures increase to the extent that the hearing protectors provided may no longer provide adequate attenuation.

Advanced American Construction, Inc. shall provide more effective hearing protectors where necessary.

5.0 Documentation Summary

A. File these records in the Shop Safety Filing System:

1. Types of hearing protectors and associated NRRs
2. Noise surveys, when applicable
3. Hearing Conservation Program Medical Clearances
4. Training records

B. File these records in the Project Safety File.

1. Types of hearing protectors and associated NRRs
2. Noise surveys, when applicable
3. Hearing Conservation Program Medical Clearances
4. Training records

6.0 Resources

A. U.S. OSHA Standard - Occupational noise exposure - 29 CFR 1910.95 (http://www.osha-slc.gov/OshStd_data/1910_0095.html)

B. U.S. OSHA Construction Standard - Occupational noise exposure - 29 CFR 1926.52 (http://www.osha-slc.gov/OshStd_data/1926_0052.html)

C. U.S. OSHA Technical Links - Noise and Hearing Conservation (http://www.osha-slc.gov/SLTC/noisehearingconservation/index.html)

D. American Industrial Hygiene Association: The Occupational Environment - Its Evaluation and Control, Chapter 20. Fairfax, VA: 1997

E. National Hearing Conservation Association web site (http://www.hearingconservation.org/)

ADVANCED AMERICAN CONSTRUCTION, INC. SAFETY MANAGEMENT STANDARD

PERSONAL PROTECTIVE EQUIPMENT

1.0 Applicability

This program applies to Advanced American Construction, Inc. shop and field operations where the use of Personal Protective Equipment (PPE) is warranted. Refer to SMS 25, “Respiratory Protection", for respiratory hazards. Hearing Protection issues are additionally addressed in SMS 21, "Noise and Hearing Conservation."

2.0 Purpose and Scope

This procedure provides information on recognizing and identifying those conditions that require control of the risks or use of personal protective equipment as well as selecting personal protective equipment for hazardous activities.

3.0 Implementation

Shop Locations - Implementation of this program is the responsibility of the Shop Manager.

Field Activities - Implementation of this program is the responsibility of the Project Manager/Superintendent with active involvement from all employees and subcontractors onsite.

4.0 Requirements

A. Perform risk / hazard assessments for those work activities that present hazards and / or are likely to require the use of PPE.

   1. Use Attachment 1 to perform the assessment.

   2. Reevaluate completed risk / hazard assessments when the job changes.

B. Eliminate the hazards identified in Attachment 1, if possible, through engineering or administrative controls.

C. Select PPE that will protect employees if hazards cannot be eliminated.

   1. See Attachment 1 for recommended PPE.

2. Review Material Safety Data Sheets for chemicals used for PPE recommendations.
3. If needed, consult with Health and Safety Manager for assistance in selecting PPE.

D. Provide selected PPE to employees, assuring that it fits properly and giving them a choice if more than one type is available.

E. Conduct and document employee training.

1. Train all employees to recognize hazards and evaluate risks who are required to wear PPE.

2. Require that training includes:

a) Hazard identification and classification of risks by severity and probability. (see attachment 5)
b) When PPE is necessary to be worn.
c) What PPE is necessary.
d) How to properly don, doff, adjust and wear PPE.
e) Limitations of PPE.
f) Proper care, maintenance, useful life and disposal of PPE.

3. Training must be conducted before PPE is assigned.

4. Refresher training is needed when:

a) New types of PPE are assigned to the worker.
b) Worker cannot demonstrate competency in PPE use.

5. Keep written records of the employees trained and type of training provided, including date of training.

F. Post those areas on the work site that require all employees to use personal protective equipment.

G. Maintain Protective Equipment.

1. Check personal protective equipment for damage, cracks, and wear prior to each use. Replace or repair equipment not found in good condition.

2. Wash off contaminated protective equipment with water and mild soap, if necessary, to prevent degradation of the equipment.

H. Periodically inspect worksites where employees are using personal protective equipment, using Attachment 2.

1. Field Activities - inspect work sites at least monthly.

2. Shop Locations - inspect work sites semi-annually.

I. Employee-Owned Equipment

When employee-owned equipment is permitted, Advanced American Construction, Inc. will be responsible for the assurances of its adequacy, maintenance & sanitation, to the same standard as company owned equipment.

5. **Documentation Summary**

A. Records required in the Project Safety File:

1. Completed Hazard Assessment Certification Forms (Attachment 1).

2. Completed Personal Protective Equipment Inspection Sheet (Attachment 2).

3. Documentation of employee training.

B. Records required in the Laboratory Safety Filing System:

1. Completed Hazard Assessment Certification Forms (Attachment 1).

2. Completed Personal Protective Equipment Inspection Sheet (Attachment 2).

3. Documentation of employee training.

C. **Resources**

a. U.S. OSHA Standards - Personal Protective Equipment - 29 CFR 1910 Subpart I
(http://www.osha-slc.gov/OshStd_toc/OSHA_Std_toc_1910_SUBPART_I.html)

b. U.S. OSHA Construction Standard - Personal Protective Equipment - 29 CFR 1926 Subpart E
(http://www.osha-slc.gov/OshStd_toc/OSHA_Std_toc_1926_SUBPART_E.html)

c. U.S. OSHA Technical Links - Personal Protective Equipment
(http://www.osha-slc.gov/SLTC/personalprotectiveequipment/index.html)

d. American National Standards Institute, ANSI Z89.1-1986, Protective Headwear
(http://www.ansi.org/cat_top.html)

e. American National Standards Institute, ANSI Z87.1 - 1989, Eye and Face Protection
(http://www.ansi.org/cat_top.html)
f. American National Standards Institute, ANSI Z41.1 - 1991, Foot Protection
(http://www.ansi.org/cat_top.html)
g. SMS - Fall Protection

Attachment 1

Advanced American Construction, Inc. Health and Safety Program
Table 1
Welding Lens Selection

Operations	Electrode Size 1/32 inch	Arc Current	Minimum Protective Shade
Shielded metal arc welding (SMAW)	Less than 3	Less than 60	7
SMAW	3 - 5	60-160	8
SMAW	5-8	160-250	10
SMAW	More than 8	250-550	11
Gas metal arc welding and flux cored arc welding		Less than 60	7
Gas metal arc welding and flux cored arc welding		60-160	10
Gas metal arc welding and flux cored arc welding		160-250	10
Gas metal arc welding and flux cored arc welding		250-500	10
Gas tungsten arc welding		Less than 50	8
Gas tungsten arc welding		50-150	8
Gas tungsten arc welding		150-500	10
Air carbon arc cutting	(light)	Less than 500	10
Air carbon arc cutting	(heavy)	500-1000	11
Gas tungsten arc welding		Less than 20	6
Gas tungsten arc welding		20-100	8
Gas tungsten arc welding		100-400	10
Gas tungsten arc welding		400-800	11
Plasma arc cutting	(light)	Less than 300	8
Plasma arc cutting	(medium)	300-400	9
Plasma arc cutting	(heavy)	400-800	10
Torch brazing			3
Torch soldering			2
Carbon arc welding			14
Gas welding			5-6
Oxygen cutting			3-5

Advanced American Construction, Inc. Health & Safety Program
HAZARD ASSESSMENT CERTIFICATION FORM

Location: _____ **Job No:** _____

Date: _____ **Assessment Conducted by:** _____

Specific tasks performed at this location: _____

_____

Are any of the following present during the task?		No	Yes (Hazard Present)	Eliminate Hazard or Use Following PPE
Overhead Hazards				
1.	Suspended loads that could fall			Hard hat, ANSI Class A, B
2.	Overhead beams or load that could strike head			Hard hat, ANSI Class A, B
3.	Energized wires or equipment that could strike head			Hard hat, ANSI Class B
4.	Employees working above at an elevated site who could drop objects on others below			Hard hat, ANSI Class A, B
5.	Sharp objects or corners at head level			Hard hat, ANSI Class A, B or C
Eye Hazards				
6.	Chemical splashes or irritating mists			Chemical protective goggles See Attachment 3
7.	Excessive dust			Safety glasses or impact goggles
8.	Smoke & fumes			Chemical protective goggles
9.	Welding operations			See Table 1 and Attachment 3
10.	Lasers/optical radiation			See Attachment 3 and Reference F
11.	Projectiles			See Attachment 3
12.	Sawing, cutting, chipping, grinding			See Attachment 3
Face Hazards				
13.	Chemical splashes or irritating mists			Face shield if chemical is irritating to the skin or is corrosive. See Attachment 3
14.	Welding operations			See Attachment 3 and Table 1
15.	Projectiles			See Attachment 3 and face shield

		No	Yes (Hazard Present)	Eliminate Hazard or Use Following PPE
Hand Hazards				
16.	Chemical exposure			Use resistant gloves as recommended by manufacturer - See Best Chemrest Guide
17.	Sharp edges, splinters, etc.			Leather gloves
18.	Temperature extremes - heat			Leather gloves; hot mill gloves; Kevlar gloves, welders' gloves
19.	Temperature extremes - cold			Leather gloves; insulated gloves
20.	Blood, fungus			Nitrile gloves
21.	Exposure to live electrical current			Electrical gloves - See Reference H
22.	Sharp tools, machine parts, etc.			Leather gloves, kevlar gloves
23.	Material handling			Leather gloves
Foot Hazards				
24.	Heavy materials (greater than 50 pounds) handled by employees			Safety shoes or boots
25.	Potential to crush whole foot			Safety shoes or boots with metatarsal guard
26.	Sharp edges or points - puncture risk			Safety shoes or boots
27.	Exposure to electrical wires			Safety shoes or boots with electrical protection
28.	Unusually slippery conditions			Rubber soled boots or grips
29.	Chemical contamination			Rubber, nitrile boots or boot covers
30.	Wet conditions			Rubber boots or boot covers
31.	Construction/demolition			Safety shoes or boots with metatarsal guard if who foot crushing hazard exists.
Fall Hazards				
32.	Elevations above 6 feet without guardrails			Full body harness, ANSI A-10.14 - 1991 - See Reference G
33.	Suspended scaffolds, boatswain's chairs, float scaffolds, suspended staging.			ANSI Type II - full body harness - See Reference G
34.	Working in trees			ANSI Type I full body harness - See Reference G
35.	Working in vehicle mounted, elevating work platforms (bucket trucks, pin-on platforms, etc.)			ANSI Type II full body harness - see Reference G

		No	Yes (Hazard Present)	Eliminate Hazard or Use Following PPE
Water Hazards				
36.	Working on or above water where drowning hazards exist			U.S. Coast Guard approved personal flotation device, Type I, II, or III PFD
Excessive Heat or Flame				
37.	Full body chemical protective clothing in temperatures greater than 80 degrees			Cooling vest
38.	Work around molten metal or flame			Nomex or kevlar clothing
39.	Welding activities			Welding leathers for those areas that are exposed to flame, spark or molten metal
Respiratory Hazards				
40.	See SMS 42 for RESPIRATORY PROTECTION for selection guidance			
Excessive Noise				
41.	Exposure to noise			Ear plugs or muffs
Body and Leg Protection				
42.	Chemical exposure			Have H&S representative assist you in proper selection
43.	Using chainsaw, cutting brush			Chainsaw chaps

I certify that the above inspection was performed to the best of my knowledge and ability, based on the hazards present on _____.

_____

Signature

Attachment 3

Advanced American Construction, Inc. Health & Safety Program
PERSONAL PROTECTIVE EQUIPMENT INSPECTION SHEET

Date Inspected: _____ **Name of Inspector:** _____

		True	False (= Hazard - Needs to be fixed)
Hard Hats			
1.	The brim or shell does not show signs of exposure and excessive wear, loss of surface gloss, chalking or flaking.		
2.	Suspension system in hard hat does not show signs of deterioration including cracking, tearing or fraying.		
3.	The brim or shell is not cracked, perforated or deformed.		
4.	Employees us hard hats in marked areas.		
5.	Hard hat areas are marked.		
Safety Shoes			
6.	Safety shoes used by employees do not show signs of excessive wear.		
7.	Safety shoe required areas are marked.		
Work Gloves			
8.	Gloves are worn when needed.		
9.	Gloves do not show signs of excessive wear such as cracks, scrapes or lacerations, thinning or discoloration or break through to the skin.		
Protective Clothing			
10.	Protective clothing is worn by employees when required.		
Hearing Protection			
11.	Noise hazardous areas are marked.		
12.	Employees are using earplugs or muffs when using noise hazardous equipment or working in noise hazardous areas.		
Safety Glasses			
13.	Eye hazardous areas are marked or posted.		
14.	Employees use safety glasses when working in eye hazardous areas or working with eye hazardous equipment.		

REMARKS

_____

_____

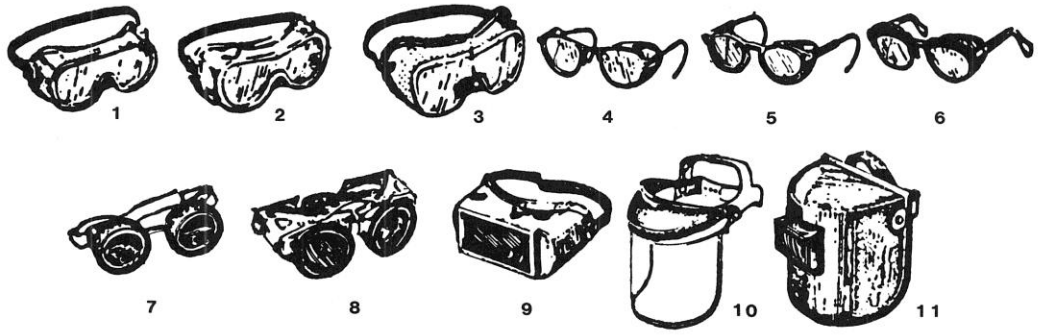
_____

_____

_____

Advanced American Construction, Inc. Health & Safety Program

EYE AND FACE PROTECTOR SELECTION GUIDE



1. **GOGGLES,** Flexible Fitting, Regular Ventilation
2. **GOGGLES,** Flexible Fitting, Hooded Ventilation
3. **GOGGLES,** Cushioned Fitting, Rigid Body
*4. **SPECTACLES,** Metal Frame, with Sideshields
*5. **SPECTACLES,** Plastic Frame, with Sideshields
*6. **SPECTACLES ,** Metal-Plastic Frame, with Sideshields
*7. **WELDING GOGGLES,** Eyecup Type, Tinted Lenses (Illustrated)

7A. **CHIPPING GOGGLES,** Eyecup Type, Clear Safety Lenses (Not Illustrated)

*8. **WELDING GOGGLES,** Coverspec Type, Tinted Lenses (Illustrated)

8A. **CHIPPING GOGGLES,** Coverspec Type, Clear Safety Lenses (Not Illustrated)

*9. **WELDING GOGGLES,** Coverspec Type, Tinted plate Plate Lens

10. **FACE SHIELD,** (Available with Plastic or Mesh Window)

11. **WELDING HELMETS**

APPLICATIONS		
OPERATION	HAZARDS	RECOMMENDED PROTECTORS Bold Type Numbers Slightly Preferred Protection
ACETYLENE-BURNING ACETYLENE-CUTTING ACETYLENE-WELDING	SPARKS, HARMFUL RAYS MOLTEN METAL, FLYING PARTICLES	**7,8,9**
CHEMICAL HANDLING	SPLASH, ACID BURNS, FUMES	**2,10** (For severe exposure add 10 over 2)
CHIPPING	FLYING PARTICLES	**1,3,4,5,6,7A,8A**
ELECTRIC (ARC) WELDING	SPARKS, INTENSE RAYS, MOLTEN METAL	**9,11** (11 in combination with 4,5,6 in tinted lenses, advisable)
FURNACE OPERATIONS	GLARE, HEAT, MOLTEN METAL	**7,8,9** (For severe exposure add 10)
GRINDING-LIGHT	FLYING PARTICLES	**1,3,4,5,6,10**
GRINDING -HEAVY	FLYING PAPTICLES	**1,3,7A,8A** (For severe exposure add 10)
LABORATORY	CHEMICAL SPLASH, GLASS BREAKAGE	**2** (10 when in combination with 4,5,6)
MACHINING	FLYING PARTICLES	**1,3,4,5,6,10**
MOLTEN METALS	HEAT, GLARE, SPARKS, SPLASH	**7,8** (10 in combination with 4,5,6 in tinted lenses)
SPOT WELDING	FLYING PARTICLES, SPARKS	**1,3,4,5,6,10**

*Non-side shield spectacles are available for limited hazard use requiring only frontal protection.

Attachment 5

Ranking Risk by Probability and Severity

Probability and severity must be evaluated for all risks. A low probability and low severity risk is considered acceptable and all other type risks should be controlled and reduced to this level if at all possible. High probability and high severity risk tasks should not be undertaken without further controls.

- Probability is the likeliness of an event occurring and ranges from rare to almost certain.
- Severity is the level seriousness of the event and ranges from insignificant to severe.

Use of engineering or administrative controls can reduce both probability and severity. PPE can also be effective but should be used only when engineering and administrative options are exhausted.
During the development of the JHA and its' review with those involved, both probability and severity must be discussed. Employees and subcontractors should be actively involved in both the identification and elimination of hazards. The more individuals involved, the better the chance of identifying and controlling all hazards.

Use the matrix below to assess risks. Extreme and high risks are unacceptable. Medium risks should be reduced.

Likelihood	Consequences				
	Insignificant	Minor	Moderate	Major	Severe
Almost certain	M	H	H	E	E
Likely	M	M	H	H	E
Possible	L	M	M	H	E
Unlikely	L	M	M	M	H
Rare	L	L	M	M	H

Attachment 5

ADVANCED AMERICAN CONSTRUCTION, INC. SAFETY MANAGEMENT STANDARD

PORTABLE LADDERS

1.0 Applicability

This procedure applies to Advanced American Construction, Inc. shop and field locations where portable ladders are used.

2.0 Purpose and Scope

The purpose of this procedure is to require the safe use and proper construction, inspection, and maintenance of ladders at Advanced American Construction, Inc. fixed site and project locations.

3.0 Implementation

Field Activities - Implementation of this procedure is the responsibility of the Project Manager/Superintendent.

Shop Locations - Implementation of this procedure is the responsibility of the Shop Manager.

4.0 Requirements

A. General

1. Provide ladders for safe access to all elevations where permanent or temporary stairways or suitable ramps or runways are not provided.

2. Never use ladders with broken or missing rungs or steps, broken or split side rails, or other faulty or defective construction. When ladders with such defects are discovered, they shall immediately be withdrawn from service.

3. Place ladder feet on a substantial base and keep the area around the top and bottom of the ladder clear.

4. Do not place ladders in passageways, doorways, driveways, or any location where they may be displaced by activities being conducted in any other work, unless protected by barricades or guards.

5. Tie, block, or otherwise secure ladders while in use to prevent their being displaced.

6. Never use metal ladders for electrical work or where they or the user may contact electrical conductors.

7. Require that ladders are equipped with non-skid safety feet.

8. Use only Type I Industrial wooden, fiberglass, or metal ladders.

9. Ladders shall not be loaded beyond the maximum intended load for which they were built, nor beyond their manufacturer's rated capacity.

10. Ladders shall be used only for the purpose for which they were designed.

11. Ladder rungs, cleats, and steps shall be parallel, level, and uniformly spaced when the ladder is in position for use or that they meet OSHA specifications.

B. Straight and Extension Ladders

1. Position straight and extension ladders at such a pitch that the horizontal distance from the top support to the foot of the ladder is about one-quarter of the working length of the ladder (one foot out for every four feet up).

2. Do not use ladders in a horizontal position as platforms, runways, or scaffolds.

3. Extend the side rails at least 36 inches above the landing. When this is not practical, install grab rails which provide a secure grip.

4. When using two section extension ladders, the two sections must have a minimum overlap of 3 feet for working lengths up to 33 feet, and 4 feet for working lengths up to 44 feet. Extension ladders must not exceed 44 feet in length when extended in accordance with this lap schedule.

5. Do not permit anyone to stand on the top three rungs of a straight or extension ladder.

C. Stepladders

1. Always fully open and lock side braces when using stepladders.

2. Use straight or extension ladders for access. Stepladders are meant to be used as temporary elevated working platforms only.

3. Do not place planks on the top steps of stepladders.

4. Never stand on the top two steps of a stepladder.

5. Require that all four feet of the ladder have an even, solid footing.

D. Training

Train each employee in the safe, proper use of ladders, including the following:

1. Do not carry materials up or down - use a hand line.
2. Face the ladder when ascending or descending.
3. Position the ladder at the proper pitch.
4. Secure the top and bottom of the ladder to prevent displacement.
5. Require proper extension above landing.
6. Never overreach - work only within an arm's length of the ladder.
7. Allow only one person on a ladder at a time.

E. Inspections

1. Conduct thorough periodic inspections of all ladders to identify cracks, broken rungs, and deterioration. Ladders found to be in an unsafe condition must be removed from the workplace immediately. When immediate removal is not possible, the ladder shall be conspicuously tagged "DANGER - DO NOT USE" until such time as removal is possible.
2. Inspect each ladder for unsafe conditions before each use.

5.0 Documentation Summary

Place in the Project Safety File:

A. Site safety briefings regarding ladder use and inspection.

B. Records of ladders taken out of service and/or removed from site.

6.0 Resources

A. U.S. OSHA Construction Standard - Stairways and Ladders - 29 CFR 1926 Subpart X
(http://www.osha-slc.gov/OshStd_toc/OSHA_Std_toc_1926_SUBPART_X.html)
B. U.S. OSHA Standard - Portable Ladders - 29 CFR 1910. 25 - 26
(http://www.osha-slc.gov/OshStd_toc/OSHA_Std_toc_1910_SUBPART_D.html)
C. ANSI A.14.1 1982, Ladders

(http://www.ansi.org/cat_top.html)

D. ANSI A.14.2 1982, Ladders
(http://www.ansi.org/cat_top.html)

E. U.S. OSHA Standard – Ladders – 29 CFR 1926.1053

ADVANCED AMERICAN CONSTRUCTION, INC. SAFETY MANAGEMENT STANDARD

PSM / Contractor Responsibilities

1.0 Applicability

This section applies to the following: A process which involves a chemical at or above the specified threshold quantities listed in Appendix A of this section;

A process which involves a flammable liquid or gas (as defined in 1910.1200© of this part) on site in one location, in a quantity of 10,000 pounds (4535.9 kg) or more except for:

Hydrocarbon fuels used solely for workplace consumption as a fuel (e.g., propane used for comfort heating, gasoline for vehicle refueling), if such fuels are not a part of a process containing another highly hazardous chemical covered by this standard;

Flammable liquids stored in atmospheric tanks or transferred which are kept below their normal boiling point without benefit of chilling or refrigeration.

2.0 Purpose and Scope

This section contains requirements for preventing or minimizing the consequences of catastrophic releases of toxic, reactive, flammable, or explosive chemicals. These releases may result in toxic, fire or explosion hazards.

3.0 Implementation

A. Field Activities – Implementation of this procedure is the responsibility of the Project Manager/Superintendent.

4.0 Requirements

A. Advanced American Construction, Inc. shall develop and implement safe work practices to control the entrance, presence and exit of contract employers and contract employees in covered process areas.

1. Advanced American Construction, Inc. will periodically evaluate the performance of contract employers in fulfilling their obligations.

2. Maintain a contract employee injury and illness log related to the contractor's work in process areas.

3. The contract employer shall assure that each contract employee is trained in the work practices necessary to safely perform his/her job.

4. The contract employer shall assure that each contract employee is instructed in the known potential fire, explosion, or toxic release hazards related to his/her job and the process, and the applicable provisions of the emergency action plan.

5. The contract employer shall document that each contract employee has received and understood the training required by this paragraph. The contract employer shall prepare a record which contains the identity of the contract employee, the date of training, and the means used to verify that the employee understood the training.

6. Advanced American Construction, Inc. will assure that each contract employee follows the safety rules of the facility including the safe work practices required by paragraph (f)(4) of Standard 29 – CFR 1010.119

7. The contract employer shall advise the employer of any unique hazards presented by the contract employer's work, or of any hazards found by the contract employer's work.

8. This section does not apply to: Oil or gas well drilling or servicing operation; or, normally unoccupied remote facilities.

9. Contractor employees shall abide by employers safety work practices during operations such as lockout/tagout, confined space entry, opening process equipment or piping and controls over entrance to facility.

5.0 Definitions.

1. "Atmospheric tank" means a storage tank which has been designed to operate at pressures from atmospheric through 0.5 p.s.i.g. (pounds per square inch gauge, 3.45 Kpa).

2. "Boiling point" means the boiling point of a liquid at a pressure of 14.7 pounds per square inch absolute (p.s.i.a.) (760 mm.). For the purposes of this section, where an accurate boiling point is unavailable for the material in question, or for mixtures which do not have a constant boiling point, the 10 percent point of a distillation performed in accordance with the Standard Method of Test for Distillation of Petroleum Products, ASTM D-86-62, which is incorporated by reference as specified in Sec. 1910.6, may be used as the boiling point of the liquid.

3. "Catastrophic release" means a major uncontrolled emission, fire, or explosion, involving one or more highly hazardous chemicals, that presents serious danger to employees in the workplace.

4. "Facility" means the buildings, containers or equipment which contain a process.

5. "Highly hazardous chemical" means a substance possessing toxic, reactive, flammable, or explosive properties and specified by paragraph (a)(1) of this section.

6. "Hot work" means work involving electric or gas welding, cutting, brazing, or similar flame or spark-producing operations.

7. "Normally unoccupied remote facility" means a facility which is operated, maintained or serviced by employees who visit the facility only periodically to check its operation and to perform necessary operating or maintenance tasks. No employees are permanently stationed at the facility. Facilities meeting this definition are not contiguous with, and must be geographically remote from all other buildings, processes or persons.

8. "Process" means any activity involving a highly hazardous chemical including any use, storage, manufacturing, handling, or the on-site movement of such chemicals, or combination of these activities. For purposes of this definition, any group of vessels which are interconnected and separate vessels which are located such that a highly hazardous chemical could be involved in a potential release shall be considered a single process.

9. "Replacement in kind" means a replacement which satisfies the design specification.

10. "Trade secret" means any confidential formula, pattern, process, device, information or compilation of information that is used in an employer's business, and that gives the employer an opportunity to obtain an advantage over competitors who do not know or use it. Appendix D contained in 1910.1200 sets out the criteria to be used in evaluating trade secrets.

6.0 Process safety information. In accordance with the schedule set forth in paragraph (e)(1) of this section, Advanced American Construction, Inc. will complete a compilation of written process safety information before conducting any process hazard analysis required by the standard. The compilation of written process safety information is to enable the employer and the employees involved in operating the process to identify and understand the hazards posed by those processes involving highly hazardous chemicals. This process safety information shall include information pertaining to the hazards of the highly hazardous chemicals used or produced by the process, information pertaining to the technology of the process, and information pertaining to the equipment in the process.

Information pertaining to the hazards of the highly hazardous chemicals in the process. This information shall consist of at least the following:

1. Toxicity information;
2. Permissible exposure limits;
3. Physical data;
4. Reactivity data;
5. Corrosivity data;
6. Thermal and chemical stability data;
7. Hazardous effects of inadvertent mixing of different materials that could foreseeably occur

   Note: Material Safety Data Sheets meeting the requirements of 29 CFR 1910.1200(g) may be used to comply with this requirement to the extent they contain the information required.
8. Information pertaining to the technology of the process.
9. Information concerning the technology of the process shall include at least the following:

   a. A block flow diagram or simplified process flow diagram
   b. Process chemistry;
   c. Maximum intended inventory;
   d. Safe upper and lower limits for such items as temperatures, pressures, flows or composition; and
   e. An evaluation of the consequences of deviations, including those affecting the safety and health of employees.
   f. Where the original technical information no longer exists, such information may be developed in conjunction with the process hazard analysis in sufficient detail to support the analysis.
10. Information pertaining to the equipment in the process shall include:

    a. Materials of construction;
    b. Piping and instrument diagrams P&ID's
    c. Electrical classification;
    d. Relief system design and design basis;
    e. Ventilation system design;
    f. Design codes and standards employed;
    g. Material and energy balances for processes built after May 26, 1992; and
    h. Safety systems (e.g. interlocks, detection or suppression systems).
    i. Advanced American Construction, Inc. shall document that equipment complies with recognized and generally accepted good engineering practices.
    j. For existing equipment designed and constructed in accordance with codes, standards, or practices that are no longer in general use, the employer shall determine and document that the equipment is designed,

maintained, inspected, tested, and operating in a safe manner.

7.0 Employee participation.

1. Advanced American Construction will develop a written plan of action regarding the implementation of the employee participation.

2. Advanced American Construction will consult with employees and their representatives on the conduct and development of process hazards analyses and on the development of the other elements of process safety management.

3. Advanced American Construction will provide to employees and their representatives access to process hazard analyses and to all other information required to be developed.

8.0 Hot work permit

1. Advanced American Construction, Inc. will issue a hot work permit for hot work operations conducted on or near a covered process. Reference SMS 17 Hot Work for guide lines.

2. The permit shall document that the fire prevention and protection requirements in 29 CFR 1910.252(a) have been implemented prior to beginning the hot work operations; it shall indicate the date(s) authorized for hot work; and identify the object on which hot work is to be performed. The permit shall be kept on file until completion of the hot work operations.

9.0 Process hazard analysis

1. Advanced American Construction, Inc. shall perform an initial process hazard analysis (hazard evaluation) on processes covered by this standard. The process hazard analysis shall be appropriate to the complexity of the process and shall identify, evaluate, and control the hazards involved in the process. Employers shall determine and document the priority order for conducting process hazard analyses based on a rationale which includes such considerations as extent of the process hazards, number of potentially affected employees, age of the process, and operating history of the process. The process hazard analysis shall be conducted as soon as possible, but not later than the following schedule:

   a. No less than 25 percent of the initial process hazards analyses shall be

completed by May 26, 1994;

b. No less than 50 percent of the initial process hazards analyses shall be completed by May 26, 1995;
c. No less than 75 percent of the initial process hazards analyses shall be completed by May 26, 1996;
d. All initial process hazards analyses shall be completed by May 26, 1997.
e. Process hazards analyses completed after May 26, 1987 which meet the requirements of this paragraph are acceptable as initial process hazards analyses. These process hazard analyses shall be updated and revalidated, based on their completion date, in accordance with paragraph (e)(6) of this standard.

2. Advanced American Construction, Inc. shall use one or more of the following methodologies that are appropriate to determine and evaluate the hazards of the process being analyzed.

a. What-if;
b. Checklist;
c. What-If/Checklist;
d. Hazard and Operability Study (HAZOP);
e. Failure Mode and Effects Analysis (FMEA);
f. Fault Tree Analysis; or
g. An appropriate equivalent methodology.

3. The process hazard analysis shall address:

a. The hazards of the process;
b. The identification of any previous incident which had a likely potential for catastrophic consequences in the workplace;
c. Engineering and administrative controls applicable to the hazards and their interrelationships such as appropriate application of detection methodologies to provide early warning of releases. (Acceptable detection methods might include process monitoring and control instrumentation with alarms, and detection hardware such as hydrocarbon sensors.);
d. Consequences of failure of engineering and administrative controls;
e. Facility siting;
f. Human factors; and
g. A qualitative evaluation of a range of the possible safety and health effects of failure of controls on employees in the workplace.

10.0 Incident investigation.

1. Advanced American Construction, Inc. will investigate each incident

which resulted in, or could reasonably have resulted in a catastrophic release of highly hazardous chemical in the workplace.

2, An incident investigation shall be initiated as promptly as possible, but not later than 48 hours following the incident.

3. An incident investigation team shall be established and consist of at least one person knowledgeable in the process involved, including a contract employee if the incident involved work of the contractor, and other persons with appropriate knowledge and experience to thoroughly investigate and analyze the incident.

4. A report shall be prepared at the conclusion of the investigation which includes at a minimum:

   a. Date of incident
   b. Date investigation began
   c. A description of the incident
   d. The factors that contributed to the incident
   e. Any recommendations resulting from the investigation

5. Advanced American Construction, Inc. shall establish a system to promptly address and resolve the incident report findings and recommendations. Resolutions and corrective actions shall be documented.

6. The report shall be reviewed with all affected personnel whose job tasks are relevant to the incident findings including contract employees where applicable.

7. Incident investigation reports shall be retained for five years.

8. Employees must immediately report all accidents, injuries and near misses. An incident investigation must be initiated within 48 hours. Resolutions and corrective actions must be documented and maintained 5 years.

11.0 Trade secrets

1. Advanced American Construction, Inc. will make all information necessary to comply with the section available to those persons responsible for compiling the process safety information (required by paragraph (d) of section 1910.119), those assisting in the development of the process hazard analysis, those responsible for developing the operating procedures and those involved in incident investigations, emergency planning and response and compliance audits without regard

to possible trade secret status of such information.

2. Nothing in this paragraph shall preclude the employer from requiring the persons to whom the information is made available under paragraph (p)(1) of this section to enter into confidentiality agreements not to disclose the information as set forth in 29 CFR 1910.1200.

3. Subject to the rules and procedures set forth in 29 CFR 1010.1200 (i)(1) through 1910.1200(i)(12), employees and their designated representatives shall have access to trade secret information contained within the process hazard analysis and other documents required to be developed by this standard.

12.0 Training

1. Each employee presently involved in operating a process, and each employee before being involved in operating a newly assigned process, shall be trained in an overview of the process and in the operating procedures as specified in paragraph (f) 29 CFR 1910-119. The training shall include emphasis on the specific safety and health hazards, emergency operations including shutdown, and safe work practices applicable to the employee's job tasks.

2. In lieu of initial training for those employees already involved in operating a process on May 26, 1992, an employer may certify in writing that the employee has the required knowledge, skills, and abilities to safely carry out the duties and responsibilities as specified in the operating procedures.

3. Refresher training. Refresher training shall be provided at least every three years, and more often if necessary, to each employee involved in operating a process to assure that the employee understands and adheres to the current operating procedures of the process. Advanced American Construction, Inc., in consultation with the employees involved in operating the process, will determine the appropriate frequency of refresher training.

5. Training documentation. Advanced American Construction will ascertain that each employee involved in operating a process has received and understood the training required. Advanced American Construction, Inc. will prepare a record which contains the identity of the employee, the date of training, and the means used to verify that the employee understood the training.

13.0 Resources

A. Federal OSHA Standards – 29 CFR - Process safety Management of highly

hazardous chemicals 1910.119

B. Cal/OSHA T8 CCR 5189

C. Federal OSHA Standards – 29 CFR – Flammable liquid or gas – 1910.1200(c)

ADVANCED AMERICAN CONSTRUCTION, INC. SAFETY MANAGEMENT STANDARD

REGULATORY INSPECTIONS

1.0 Applicability

This program applies to all Advanced American Construction, Inc. office and field operations.

2.0 Purpose and Scope

Representatives of regulatory agencies may have statutory authority to evaluate Advanced American Construction, Inc. operations for compliance with health and safety regulations. Advanced American Construction, Inc. personnel are to cooperate with all such inspections. This procedure provides guidelines for responding to the inspector and for documenting inspection activities.

3.0 Implementation

Shop Locations - Implementation of this procedure is the responsibility of the Shop Manager.

Field Activities - Implementation of this procedure is the responsibility of the Project Manager/Superintendent.

4.0 Requirements

A. Obtaining Positive Identification

Request formal identification (photo identification card) from any regulatory agency representative. Call the agency if there is any question regarding the identity of the individual (independently obtain the agency's number; don't use a number provided by the representative). Obtain a business card from the inspector for Advanced American Construction, Inc. records.

B. Warrants

Do not require an inspector to obtain a warrant prior to conducting an inspection.

C. Health and Safety Notification

Contact Health and Safety Manager immediately upon confirming the identification of the representative.

D. Opening Conference

1. Request an opening conference if one is not initiated by the inspector.

2. Use the opening conference to determine why the inspector is conducting the inspection.

3. Take good notes during the conference.

E. Inspection Activities

1. Escort the inspector at all times, taking him/her directly to the area of interest.

2. Answer all questions honestly, but do not volunteer information.

3. Do not argue with or attempt to mislead the inspector.

4. Resolve violative conditions immediately, while the representative is on site, if possible.

5. Make sure the inspector has appropriate qualifications to enter high hazard areas.

6. Take good notes during the inspection and take pictures where the inspector takes pictures.

7. Inspectors generally have the right to interview employees if they do not interrupt operations.

F. Closing Conference

1. Request a closing conference if one is not initiated by the inspector.

2. Use the closing conference to determine what regulatory violations the representative found, if any.

3. Do not try to negotiate during the closing conference.

4. Take good notes during the conference.

G. Post-Inspection Activities

1. Immediately contact the Health and Safety Manager and communicate the results of the inspection. The Health and Safety Manager will provide additional instructions regarding the inspection.

2. Debrief any employees who were contacted by the representative; all discussions should be reduced to notes.

3. All follow-on activities associated with the inspection will be coordinated by the Health and Safety Manager and appropriate legal counsel.

5.0 Documentation Summary

Provide the following documents to the Health and Safety Manager

A. Inspector's business card

B. All materials provided by the inspector

C. All notes relating to the inspection, opening conference, closing conference, and debriefings

D. All photos from the inspection, with explanatory notes

6.0 Resources

A. U.S. OSHA - Field Inspection Reference Manual
(http://www.osha-slc.gov/Firm_osha_toc/Firm_toc_by_sect.html)

ADVANCED AMERICAN CONSTRUCTION, INC. SAFETY MANAGEMENT STANDARD

RESPIRATORY PROTECTION

1.0 Applicability

This program defines responsibilities and procedures and is applicable to operations that may require the use of respiratory protection including Immediately Dangerous to Life and Health (IDLH) and emergency conditions. This program also addresses the voluntary use of respirators.

2.0 Purpose and Scope

The purpose of this procedure is to protect those employees performing operations for which exposures can not be controlled by use of conventional engineering or administrative controls and prior to establishing a negative air exposure assessment, and to require that respiratory protective equipment is selected, used, maintained, and stored in accordance with acceptable practices.

3.0 Implementation

Shop Locations - Implementation of this program is the responsibility of the Shop Manager.

Field Activities - Implementation of this program is the responsibility of the Project Manager/Superintendent.

Program Administration- **Jeff Harper** serves as the Program Administrator and is responsible to ensure that the program is reviewed annually.

4.0 Requirements

A. Determine if respirators are needed or going to be used for hazardous jobs before assigning that job to an employee.

1. Refer to Attachment 1 regarding activities requiring the use of respiratory protection.

2. Assign respirators accordingly.

3. Follow all the requirements of this procedure for employees who wish to voluntarily use tight-fitting (e.g., air purifying) respirators.

4. Advanced American Construction, Inc. will provide respirators, training, and medical evaluations at no cost to the employee.

B. Require employees who will use respirators to be medically qualified before assigning them a respirator.

1. Medical evaluation. (OSHA 1910.134(e) Using a respirator may place a physiological burden on employees that varies with the type of respirator worn, the job and workplace conditions in which the respirator is used, and the medical status of the employee. Accordingly, this paragraph specifies the minimum requirements for medical evaluation that Advanced American Construction, Inc. must implement to determine the employee's ability to use a respirator.
2. General. (OSHA 1910.134(e)(1) Advanced American Construction, Inc. will provide a medical evaluation to determine the employee's ability to use a respirator, before the employee is fit tested or required to use the respirator in the workplace. Advanced American Construction, Inc. may discontinue an employee's medical evaluations when the employee no longer required to use a respirator.

3. Advanced American Construction, Inc. will provide a medical evaluation to determine the employee's ability to use a respirator, before the employee is fit tested or required to use the respirator in the workplace. Advanced American Construction, Inc. will discontinue an employee's medical evaluations when the employee is no longer required to use a respirator.

4. The medical questionnaire and examinations will be administered confidentially during the employee's normal working hours or at a time and place convenient to the employee. The medical questionnaire shall be administered in a manner that ensures that the employee understands its content.

5. Advanced American Construction, Inc. will provide the employee with an opportunity to discuss the questionnaire and examination results with the PLHCP.

C. Require respirator users to receive appropriate training.

1. All respirator users must be trained:

a) Before they are assigned a respirator.
b) Annually thereafter.
c) Whenever a new hazard or job is introduced.
d) Whenever employees fail to demonstrate proper use or knowledge.

2. Training must address, at a minimum, the following:

a) Why the respirator is necessary, and what conditions can make the respirator ineffective.
b) What the limitations and capabilities of the respirators are.
c) How to use respirators effectively in emergency situations.
d) How to inspect, put on and remove, and check the seals of the respirator.
e) What the respirator maintenance and storage procedures are.
f) How to recognize medical signs and symptoms that may limit or prevent effective use of the respirator.

D. Require respirator users to be fit tested.

1. Any employee who has been assigned a reusable respirator must be fit tested either on an annual basis (no more than one year may elapse between fit tests), or when an employee is assigned a respirator of a different make, type or size from that previously tested.

2. Fit testing can be performed by contract or in house personnel.

3. Obtain a signed written copy of the fit test results. The fit test results should include:

a) Employee's name and social security number.
b) Respirator brand, model and size fitted for.
c) Date fit tested.
d) Method of fit testing used.
e) Name and signature of fit tester.
f) Statement that fit test protocol met the requirements of 29 CFR 1910.134.
g) Manufacturer and serial number of fit testing apparatus (for quantitative fit test).

Use Attachment 4 to document fit test results.

E. Provide qualified employees with respirator(s) and adequate amounts of parts and cartridges.

1. Assign employees whose duties require respirators their own respirator for which they have been fit tested.

2. Provide special eyeglass inserts designed for the respirator if an employee must wear eyeglasses with a full facepiece respirator. Contact lenses may be worn when wearing a full face respirator.

F. Require respirators to be used properly.

1. Prohibit facial hair where the respirator-sealing surface meets the wearer's face.

2. Require employees to perform a positive and negative fit check every time the respirator is put on.

3. Employees will leave the area where respirators are being used:

   a) Before removing the facepiece for any reason.
   b) To change cartridges.
   c) If any of the following is detected:

      (1) Vapor or gas breakthrough.
      (2) Leakage around the facepiece.
      (3) Changes in breathing resistance.

4. Use cartridges with End of Service Life Indicators or determine the respirator cartridge changeout schedule. See Attachment 3 for Guidance.

G. Require respirators to be cleaned and stored properly.

1. Clean and disinfect respirators after each use.

2. Store respirators in a plastic bag or case and in a clean location.

3. Inspect respirators before use and after each cleaning.

H. Address issues associated with special use respirators (self-contained breathing apparatus; air supply respirators; emergency use respirators).

1. Self Contained Breathing Apparatus

   Inspect self-contained breathing apparatus and other emergency use respirators monthly and after each use in accordance with manufacturer's instructions.

2. Air Supplied Respirators

   a) Air used for atmosphere-supplying respirators must meet or exceed the requirements for Type 1 - Grade D breathing air. Never use oxygen.

      (1) A certificate of analysis must accompany bottled air.
      (2) Compressors used to supply breathing air must:

         (i) Prevent entry of contaminated air into the air supply.

(ii) Minimize moisture content.
(iii) Have suitable in-line sorbent beds and filter to provide appropriate air quality.
(iv) Have a high carbon monoxide alarm that sounds at 10 ppm.

b) Couplings on air hose lines must be incompatible with other gas systems.

I. Require follow up training and medical surveillance to be provided as directed.

1. Provide follow-up physicals as directed by the Occupational Health Physician.

2. Provide annual refresher training.

3. Provide annual fit testing.

J. IDLH Atmospheres

1. Advanced American Construction, Inc. will ensure that one employee or, when needed, more than one employee is located outside the IDLH atmosphere;
2. Visual, voice, or signal line communication is maintained between the employee(s) in the IDLH atmosphere and the employee(s) located outside the IDLH atmosphere;
3. The employee(s) located outside the IDLH atmosphere are trained and equipped to provide effective emergency rescue;
4. Advanced American Construction, Inc. or designee is notified before the employee(s) located outside the IDLH atmosphere enter the IDLH atmosphere to provide emergency rescue;
5. Advanced American Construction, Inc. or designee authorized to do so by the employer, once notified, provides necessary assistance appropriate to the situation;
6. Employee(s) located outside the IDLH atmospheres are equipped with:

a) Pressure demand or other positive pressure SCBAs, or a pressure demand or other positive pressure supplied-air respirator with auxiliary SCBA; and either
b) Appropriate retrieval equipment for removing the employee(s) who enter(s) these hazardous atmospheres where retrieval equipment would contribute to the rescue of the employee(s) and would not increase the overall risk resulting from entry; or
c) Equivalent means for rescue where retrieval equipment is not required under paragraph (g)(3)(vi)(B).

K. Program evaluation. This section requires the employer to conduct

evaluations of the workplace to ensure that the written respiratory protection program is being properly implemented, and to consult employees to ensure that they are using the respirators properly.

1. Advanced American Construction, Inc. will conduct evaluations of the workplace as necessary to ensure that the provisions of the current written program are being effectively implemented and that it continues to be effective.

2. Advanced American Construction, Inc. shall regularly consult employees required to use respirators to assess the employee's views on program effectiveness and to identify any problems. Any problems that are identified during this assessment shall be corrected. Factors to be assessed include, but are not limited to:

   a. Respirator fit (including the ability to use the respirator without interfering with effective workplace performance;
   b. Appropriate respirator selection for the hazards to which they employee is exposed;

   c. Proper respirator use under the workplace conditions the employee encounters; and

   d. Proper respirator maintenance.

5.0 Documentation Summary

A. Shop Location

   1. File these records in the Safety Filing System

      a) Employee Medical Clearances for Respirator Use;
      b) Employee Fit Test Records;
      c) Employee Respirator Training Records; and,
      d) Completed "Voluntary Use of Respirators" form - Attachment 2;

B. Field

   1. File these records in the Project Health and Safety File:

      a) Employee Medical Clearances for Respirator Use;
      b) Employee Fit Test Records;
      c) Employee Respirator Training Records; and,

d) Completed "Voluntary Use of Respirators" form - Attachment 2;

C. Medical Evaluations

a) Records of medical evaluations required by this section must be retained and made available in accordance with 29 CFR 1910.1020.

6. **Resources**

A. U.S. OSHA Standard - Respiratory Protection - 29 CFR 1910.134
(http://www.osha-slc.gov/OshStd_data/1910_0134.html)
B. U.S. OSHA Technical Links - Respiratory Protection
(http://www.osha-slc.gov/SLTC/respiratoryprotection/index.html)
C. ANSI Z88.6, Respirator Use – Physical Qualifications for Personnel, Current Revision
(http://www.ansi.org/cat_top.html)
D. ANSI Z88.2, Respiratory Protection, Current Revision
(http://www.ansi.org/cat_top.html)
E. 3M Cartridge Service Life Interactive Program
(http://www.mmm.com/market/safety/ohes2/html/fservlife.html)
F. NIOSH Respirator Decision Logic
(http:\\222.cdc.gov\NIOSH\87-108.html)
G. NIOSH Guide to Industrial Respiratory Protection
(http:\\www.cdc.gov\NIOSH\87-116.html)
H. AIHA, *The Occupational Environment - Its Evaluation and Control*
(http://www3.issinet.com/aiha/publications/tools.htm)

Advanced American Construction, Inc. Health & Safety Program
TASKS FOR WHICH RESPIRATORY PROTECTION IS REQUIRED

The following table designates the requirements for the use of respiratory protection.

Tasks	Type of Respirator Required
Abrasive Blasting	
1. Outdoors	- Full face air purifying respirator with HEPA cartridges
2. Indoors	- Supplied air with abrasive blasting hood
3. Confined spaces	- Supplied air respirator with pressure demand full face piece and adequate escape air supply as needed
Acids *Liquid or powder acids used in a situation where acid vapors, mists or dust may be breathed.*	
1. Outdoors	- Full face air purifying respirator with combination acid gas/HEPA cartridges
2. Indoors	- Supplied air with pressure demand full face piece
3. Confined spaces	- Supplied air respirator with pressure demand full face piece and adequate escape air supply as needed
Adhesives	
1. Aerosol-propelled adhesives used outdoors	- Half face air purifying respirator with combination Organic Vapor/HEPA cartridges
2. Two-part or any use of adhesives in confined spaces	- Supplied air respirator with pressure demand full face piece and adequate escape air supply as needed
Alkalis/Bases/Caustics	
1. Powdered alkalis used in a situation where an airborne dust may be breathed.	- Half face air purifying respirators with HEPA cartridge.

Tasks	Type of Respirator Required
Cleaning Compounds	
• Organic degreasers or carbon removers used in areas where local exhaust ventilation is not provided.	- Half face air purifying respirator with organic vapor cartridge
• Aerosol propelled cleaning compounds will be used in areas where there is no local exhaust ventilation.	- Half face air purifying respirator with organic vapor cartridges
• Degreasers or carbon removers will be used in voids, tanks, or other confined spaces.	- Supplied air respirator with pressure demand full face piece and adequate escape air supply
Chlorine	
• Work in Paper Mills or other facilities where chlorine releases are possible and emergency protection is required.	- Bite type chlorine escape respirators unless client has a more stringent requirement.
•	
Fuels (including regular or unleaded gasoline, kerosene, diesel fuel, JP-5)	
• Employees inside unventilated fuel cells or other confined spaces containing fuels.	- Supplied air respirator with pressure demand full face piece and adequate escape air supply
Grinding, Cutting, Sanding	
• Cutting, grinding or sanding surfaces that have coatings containing lead, cadmium, chromium, zinc or beryllium.	- Requires initial exposure assessment (see SMS for Lead in Construction). Full face air purifying respirator with HEPA cartridges required until air monitoring deems otherwise.
• Cutting, grinding or sanding surfaces that are concrete or glass without use of ventilation or water.	- Full face air purifying respirator with HEPA cartridges
Paint Materials (including paints, primers, thinners, enamels, lacquers, strippers, coatings and varnishes)	
• Paint materials spray applied outside of spray finishing booth	- Half face air purifying respirator with combination organic vapor/HEPA cartridges
• Two part (mix part a with part b, let set, then apply) polyurethane or epoxy polyamide paints will be brush or spray applied.	- Full face supplied air respirator
• Paints containing lead, chromium, cadmium, beryllium, and zinc (refer to the MSDS).	- Requires initial exposure assessment (see SMS for Lead in Construction).
• Paint materials will be applied in confined spaces.	- Full face supplied air respirator with adequate escape air supply
Solvents	- See Fuels above

Tasks	Type of Respirator Required
Welding/Brazing/Torch Cutting	*Minimum 2000 cfm exhaust ventilation as per confined space standard for each welder/hot operation*
• Welding will be performed in confined spaces.	- Half face air purifying respirator with HEPA cartridge unless otherwise determined by air monitoring.
• Welding galvanized metal or stainless steel.	- Half face air purifying respirator with HEPA cartridge unless otherwise determined by air monitoring.
• Brazing or silver soldering with cadmium or lead.	- Requires initial exposure assessment (see SMS for Lead in Construction). Full face air purifying respirator with HEPA cartridges required until air monitoring deems otherwise.

In addition respiratory protection will be required for any of the above listed activities where:

- an employee will be in the immediate area - within 10 feet of the job or operation, or
- the employee will be inside a confined space where activities are taking place, or employee will be inside a "controlled area" such as found in asbestos abatement, lead abatement, radiation control area, or a hazardous waste site.

Respirators will also be required whenever:

- required by a ***Material Safety Data Sheet***
- required by a ***Product Label***
- required by a ***Product Use Instruction***
- required by a ***Standard Operating Procedure***

Advanced American Construction, Inc. Service, Inc. will select and provide an appropriate respirator based on the respiratory hazard(s) to which the worker is exposed and workplace and user factors that affect respirator performance and reliability.

Advanced American Construction, Inc. Service, Inc. will select a NIOSH-certified respirator. The respirator shall be used in compliance with the conditions of its certification.

Respirators for IDLH atmospheres

2. Advanced American Construction, Inc. will provide the following respirators for employee use in IDLH atmospheres:
3. A full face-piece pressure demand SCBA certified by NIOSH for a minimum service life of thirty minutes, or
4. A combination full face-piece pressure demand supplied-air respirator (SAR) with auxiliary self-contained air supply.

5. Respirators provided only for escape from IDLH atmospheres shall be NIOSH-certified for escape from the atmosphere in which they will be used.
6. All oxygen-deficient atmospheres shall be considered IDLH. Exception: If Advanced American Construction, Inc. demonstrates that, under all foreseeable conditions, the oxygen concentration can be maintained within the ranges specified in Table II of this section (i.e., for the altitudes set out in the table), then any atmosphere-supplying respirator may be used.

Advanced American Construction, Inc. Health & Safety Program
VOLUNTARY USE OF RESPIRATORS

Instructions: Have the employee that is opting to use a respirator for non-overexposure conditions read this page, then sign on the bottom of the page. Forward a copy of the signed form to the Division Training Records Administrator, and maintain a copy in the employee's personnel file.

Respirators are an effective method of protection against designated hazards when properly selected and worn. Respirator use is encouraged, even when exposures are below the exposure limit, to provide an additional level of comfort and protection for employees. However, if a respirator is used improperly or not kept clean, the respirator itself can become a hazard to the employee. Sometimes employees may wear respirators to avoid exposures to hazards, even if the amount of the hazardous substance does not exceed the limits set by OSHA standards. If your employer provides respirators for your own voluntary use, or if you provide your own respirator, you need to take certain precautions to be sure that the respirator itself does not pose a hazard.

You should do the following:

1. Read and follow all instructions provided by the manufacture on use, maintenance, cleaning and care, and warnings regarding the respirators limitations.

2. Choose respirators certified for use to protect against the contaminant of concern. NIOSH, the National Institute for Occupational Safety & Health of the U.S. Department of Health and Human Services, certifies respirators. A label or statement of certification should appear o the respirator or respirator packaging. It will tell you what the respirator is designed for and how it will protect you.

3. Do not wear your respirator into atmospheres containing contaminants for which your respirator is not designed to protect against. For example, a respirator designed to filter dust particles will not protect you against gases, vapors, fumes, smoke or very small solid particles.

4. Keep track of your respirator so that you do not mistakenly use someone else's respirator.

5. If you have any health conditions (asthma; high blood pressure; emphysema; heart disease) that could be aggravated by using a respirator, you should check with your doctor before using one.

I have read and understand this information on:_____ (date)

Employee's name:_____

Employee's signature:_____

Advanced American Construction, Inc. Health & Safety Program
RESPIRATOR CARTRIDGE CHANGE SCHEDULE

A cartridge change schedule must be developed for cartridges or canisters used with air purifying respirators that do not have an End of Service Life Indicator (ESLI). The purpose of this is to prevent contaminants from breaking through the respirator's sorbent cartridge(s), and thereby over-exposing employees. NIOSH has approved ESLIs for only four cartridges or canisters (mercury vapor, carbon monoxide, ethylene oxide, and hydrogen sulfide). Historically we have relied on the warning properties (odor, irritation) of a contaminant to dictate cartridge change. OSHA no longer allows this as the sole basis for changing respirator cartridges. In developing a change schedule the following factors should be considered:

- Contaminants.
- Concentration.
- Frequency of use (continuously or intermittently throughout the shift).
- Temperature and humidity.
- Work rate.
- The presence of potentially interfering chemicals.

The worst case conditions should be assumed to avoid early breakthrough. This must be documented in the project health and safety plan or, in the cases of office or labs, in the site specific Respiratory Protection Program.

Sources of Help

Manufacturers

3M has an interactive “Cartridge Service Life” program that can be downloaded for free (http://www.mmm.com/market/safety/ohes2/index.html)

This program will estimate cartridge service life for 3M products against many contaminants. The program does not evaluate the service life against mixtures (multiple contaminants). Because of the complexity in evaluating mixtures, OSHA offers the following guidance:

- When the individual compounds in the mixture have similar breakthrough times (i.e., within one order of magnitude), service life of the cartridge should be established assuming the mixture stream behaves as a pure system of the most rapidly migrating component with the shortest breakthrough time (i.e., sum up the concentration of the components).
- Where the individual compounds in the mixture vary by 2 odors of magnitude or greater, the service life may be based on the contaminant with the shortest breakthrough time.

Rule of Thumb (*"The Occupational Environment - Its Evaluation and Control)*

- If the chemical's boiling point is >70°C and the concentration is less than 200 ppm you can expect a service life of 8 hours at a normal work rate.
- Service life is inversely proportional to work rate.
- Reducing concentration by a factor of 10 will increase service life by a factor of 5.
- Humidity above 85% will reduce service life by 50%.

OSHA Interpretation

The OSHA inspection procedures for the respiratory protection standard specifies that where contaminant migration is possible, respirator cartridges/canisters should be changed after each work shift where exposure occurs unless there is objective data to the contrary (desorption studies) showing the performance in the conditions and schedule of use/non-use found in the workplace.

RESPIRATORY PROTECTION
FIT TEST WORKSHEET

Employee Name: _____ Employee No:_____

Office Location: _____ SSN: _____

Last Medical Exam: _____ Corrective Lenses? _____

	Respirator 1	Respirator 2	Respirator 3
Equipment Type			
Manufacturer			
Model			
Size			
Material			

	TEST RESULTS	RESPIRATOR 1	RESPIRATOR 2	RESPIRATOR 3
1	Negative Pressure Check	Pass o Fail o	Pass o Fail o	Pass o Fail o
2	Positive Pressure Check	Pass o Fail o	Pass o Fail o	Pass o Fail o
Qualitative Fit Test				
3	Isoamyl Acetate	Pass o Fail o	Pass o Fail o	Pass o Fail o
4	Saccharin Mist	Pass o Fail o	Pass o Fail o	Pass o Fail o
5	Irritant Smoke	Pass o Fail o	Pass o Fail o	Pass o Fail o
Quantitative Fit Test				
5	Overall Fit Factor Achieved			
6	Printout/Strip Chart Attached (include mfgr and serial no. of unit)			

- Briefed on fundamental principles of respiratory protection, use, inspection, cleaning, maintenance, and storage of equipment — Yes o No o
- Briefed on the procedure for obtaining a lens kit for use with a full face respirator — Yes o No o N/A o

I hereby certify that the subject employee has been FIT tested according to procedures specified in SMS 25, "Respiratory Protection" and in accordance with 29 CFR 1910.134, App. A. The results of the test indicate that the subject employee attains a satisfactory fit on the above respiratory protective equipment.

_____ _____ _____

Examiner's Name (print) Examiner's Signature Date

_____ _____

Employee's signature Date

Distribution: (1) Employee (2) Project/Shop Health and Safety File

ADVANCED AMERICAN CONSTRUCTION, INC. SAFETY MANAGEMENT STANDARD

RIGGING

1.0 Applicability

This procedure applies to Advanced American Construction, Inc. projects/activities involving the use of rigging. For purposes of this procedure, the term “rigging” applies to all hoisting, reeving, guying, plumbing, and other activities involving the use of wire rope, slings, chokers, bridles, and associated fittings and equipment.

2.0 Purpose and Scope

The purpose of this procedure is to require the safe use and proper maintenance of rigging equipment.

3.0 Implementation

Shop Activities – Implementation of this procedure is the responsibility of the Shop Manager/Foreman

Field Activities – Implementation of this procedure is the responsibility of the Project Manager/Superintendent.

4.0 Requirements

A. General

1. Allow only qualified, knowledgeable employees to perform rigging tasks.

2. Refer to U.S. OSHA Standard - Rigging or a reputable rigging manual for rated capacities and other detailed information.

3. Know the safe working capacity of all rigging and equipment. Do not exceed this limit.

4. Know the load weight, including the weight of the rigging.

5. Inspect all rigging before each use and remove any defective equipment from service.

6. Use extreme caution to avoid shock loading, especially when temperatures are below freezing. See Attachment 1.

7. Always maintain safe working distances from energized power lines and equipment as defined in SMS 31, “Utility Clearances”.

8. Keep the load line plumb to maintain a stable load.

9. Never use a kinked or otherwise damaged sling.

10. Mark or tag each sling and choker with its rated capacity.

11. Do not sharply bend a sling – use softeners to prevent damage.

12. Use a shackle with the shackle pin resting on the hook whenever placing two or more eyes over a hook.

13. Use tag lines on all loads whenever feasible.

14. Use chocks, blocks, or other means to prevent movement of materials when unhooking a load.

15. Stay clear of slings when they are being pulled out from under a load.

16. Do not give signals to the crane operator unless it is an emergency stop or you are the designated signalman.

17. Always use a double sling when rigging loads like pipe, rebar, or lumber over 12 feet long.

18. Keep your hands off suspended loads whenever possible.

19. Stay out from under suspended loads.

20. Never ride the load or headache ball.

21. Rigging equipment shall not be loaded beyond its recommended safe working load and load identification shall be attached to the rigging.

22. Rigging equipment not in use shall be removed from the immediate work area so as not to present a hazard to employees.

B. Chain and Wire Rope Slings

1. Use only manufactured certified chain and wire rope slings with the rated capacity stamped on the swag.

2. Protect slings from cutting action when making lifts by using padding, blocks, or corner protectors.

3. Do not point load standard sling hooks.

4. Choose a sling one size larger when conditions will subject the sling to severe wear, abrasion, impact, or corrosive action.

5. Never subject hooks or attachments to a bending action.

6. Lower loads onto blocking or cribbing to avoid damage to the sling.

7. Always face the hook opening out and away from the pull of the sling when making choker hitches. Don't assume that the hook is going to stay in place when the slack is being taken out of the sling.

8. Store slings off the ground, preferably on a choker rack, when they are not in use.

9. Keep slings lubricated to prevent rusting.

10. Require that slings have a minimum safety factor of 5. See Attachment 2.

11. Do not form sling angles greater than 60 degrees.

12. Never use clips to form eyes in wire rope slings or bridles.

13. Remove wire rope from service when:

    a) There are 6 or more randomly distributed broken wires in any one lay, or when there are 3 or more broken wires in any one strand of any one lay.
    b) 1/3 of an individual outside wire's diameter is worn.
    c) There is kinking, crushing, birdcaging, or any other damage or distortion of the wire rope structure.
    d) There is evidence of heat damage.
    e) The rope's diameter is reduced by more than 3/64" in a rope with a diameter up to and including 3/4 "; 1/16" in a rope with a diameter from 7/8" to 1-1/8"; 3/32" in a rope with a diameter from 1-1/4" to 1-1/2".
    f) There are two or more broken wires in any one lay in those sections beyond the end connections, or when there are one or more broken wires at the end connection.

C. Synthetic Web Slings

1. Require that all web slings are marked to show the name of the manufacturer, the rated capacity of the sling, and the type of material of which it is made.

2. Inspect the surface and stitching of the sling for cuts, abrasions, and heat or chemical damage before each use.

3. Do not use nylon slings in the presence of fumes, vapors, sprays, mists, or liquids of acids or phenolics.

4. Do not use polyester or polypropylene slings, or slings with aluminum fittings, in the presence of fumes, vapors, sprays, mists, or liquids of caustics.

5. Do not use polyester or nylon slings at temperatures above 180 degrees F (82 degrees C).

6. Do not use polypropylene slings at temperatures above 200 degrees F (93 degrees C).

7. Remove synthetic web slings from service if any of the following conditions are present:

   a) Acid or caustic burns.
   b) Melting or charring of any part of the sling surface.
   c) Snags, punctures, tears, or cuts.
   d) Broken or worn stitches.
   e) Warning threads are visible.
   f) Distortion of fittings.

D. Fittings, Hooks, and Shackles

1. Require that fittings, hooks and shackles have a minimum safety factor of 5.

2. Inspect fittings for cracks, nicks, bending, and excessive wear prior to each use.

3. Do not use a hook that appears to have been spread from point loading or overloading. Remove from service those hooks that have been spread more than 15 percent of the normal throat opening or twisted more than 10 degrees from the plane of the unbent hook.

4. Never point load a standard hook.

5. Do not weld anything to a hook, or use a hook that has been welded or burned in any way.

6. Use safety shackles whenever possible.

7. Never use any screw pin shackle where the bolt is very difficult to turn. The pin is either bent due to overload or the threads have been damaged.

8. Use the largest bearing surface possible on the shackle pin to reduce bending movement.

9. Use only forged alloy steel shackles with the safe working load stamped on the bale.

10. Use a shackle one size bigger than the sling being used with it.

11. Use only hot dip galvanized turnbuckles.

12. Prevent turnbuckles from unwinding by using locknuts or other locking devices when turnbuckles are used with one part of wire rope.

13. Hooks on overhaul ball assemblies, lower load blocks, or other attachment assemblies shall be of a type that can be closed and locked, eliminating the hook throat opening. Alternatively, an alloy anchor type shackle with a bolt, nut and retaining pin may be used.

E. Wire Rope Clips

1. Do not use cable clips to form eyes for hoisting purposes.

2. Use cable clips and thimbles to form eye splices when splicing is necessary.

3. Use only drop forged steel cable clips.

4. Install cable clips with the U-bolt on the short or “dead” end and the saddle on the “live” or running end of the rope, and require that clips are properly spaced. See Attachment 3.

5. Retighten clips after newly installed rope has been in use for one hour.

5.0 Documentation Summary

File the following documents in the Project/Shop Health and Safety File:

1. Manufacturer’s Sling Certifications.

2. Riggers' Training Certificates.

6.0 Resources

A. U.S. OSHA Standard - Rigging Equipment for Material Handling - 29 CFR 1926.251
(http://www.osha-slc.gov/OshStd_data/1926_0251.html)
B. ANSI B30.9 – 1971
(http://web.ansi.org/public/std_info.html)
C. Bob's Rigging & Crane Handbook (see attached)
D. Rigger's Handbook
(http://www.craneinstitute.com/products.htm#Books)
E. "Mobile Craning Today"
(http://www.oetio.com/05/05fr.htm)

EXAMPLE OF SHOCK

TAKING UP SLACK AT FULL SPEED	
STRESS ON THE ROPE	
TOTAL LOAD AT REST	[redacted] "A" 6,375 LBS.
TAKING UP 3" SLACK	[redacted] "B" 11,200 LBS.
TAKING UP 8" SLACK	[redacted] "C" 12,250 LBS.
TAKING UP 12" SLACK	[redacted] "D" 15,675 LBS.
IF SAFETY FACTOR OF 5 WAS PROVIDED FOR CONDITION "A"	
WHAT FACTOR DO YOU HAVE LEFT WHEN CONDITION HAS CHANGED TO "D"?"	
ANSWER: 6.375 x 5 = 31,875 lbs. B.S. 31,875/15,675 = 2.03 Factor of Safety	NOTE: This example does not apply in figuring the effect of shock when a load falls. The rate of fall and length of travel vary and the effect can be disastrous. The message here is to *eliminate the causes of shock loading.*

Advanced American Construction, Inc.
Health & Safety Program

SAFETY FACTORS

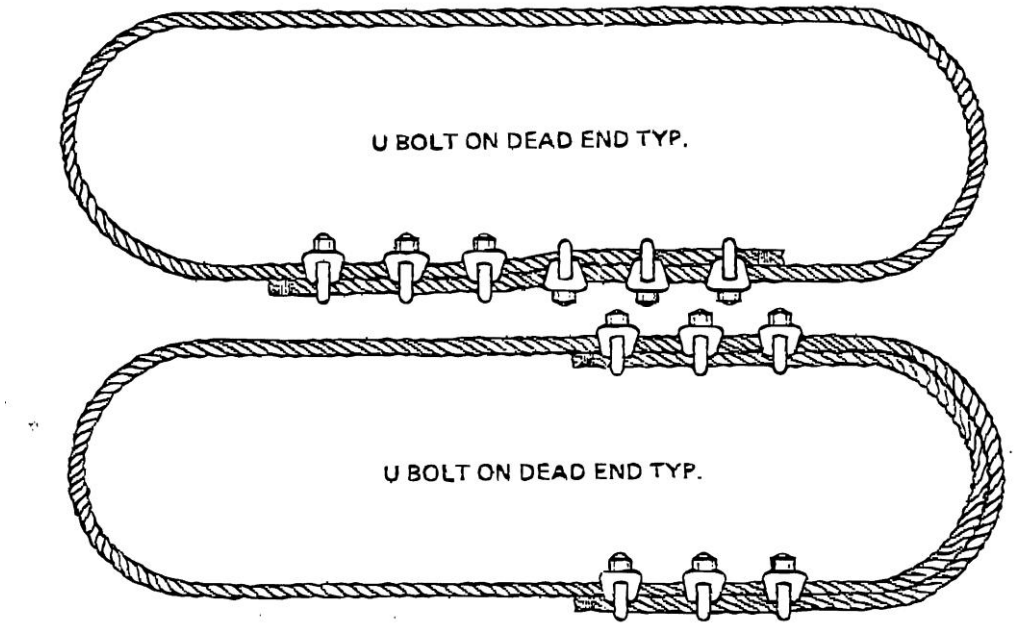
CABLE SIZE	APPROX. BREAKING STRENGTH	FACTOR OF SAFETY & ALLOWABLE LOAD							WEIGHT LBS/FT
		7	6	5	4.5	4	3.5	3	
1/2"	-21,200	3,300	3,600	4,300	4,700	5,350	6,050	7,150	.46
	+26.700	3,700	4,450	5,530	5,900	6,700	7,600	8,900	
5/8"	-33,20	4,800	5,550	6,700	7,300	8,350	9,400	11,150	.72
	+41,200	5,900	6,900	8,300	9,100	10,400	11,700	13,900	
3/4"	-47,300	6,700	7,750	9,400	10,500	11,750	13,500	15,700	1.04
	+58,900	8,450	9,850	11,800	13,000	14,800	16,800	19,700	
7/8"	-64,300	9,150	10,650	12,800	14,200	16,000	18,300	21,200	1.42
	+79,600	11,300	13,150	15,800	17,600	19,700	22,700	25,650	
1"	-83,300	11,900	13,950	16,700	18,500	20,900	23,800	27,900	1.85
	+103,300	14,700	17,150	20,300	22,900	25,400	29,500	34,200	
1-1/8"	-105,100	15,000	17,500	21,000	23,300	28,100	30,000	35,000	2.34
	+130,000	18,600	21,300	26,000	28,800	32,300	37,100	43,200	
1-1/4"	-129,100	18,400	21,250	25,900	28,600	32,200	36,800	43,000	2.80
	+168.900	24,100	28,100	33,900	37,500	42,200	48,200	56,200	
1-3/8"	-155.200	22,100	25,900	31,000	34,400	38,900	44,300	51,600	3.50
	+192,000	27,200	32,000	38,200	42,600	48,000	54,800	64,000	
1-1/2"	-184,000	26,200	30,700	36,900	40,800	46,100	52,500	61,200	4.16
	+228,000	32,500	38,00	45,500	50,600	57,000	65,100	76,000	

-6 x 19 I.W.R.C. improved plow steel hoisting cable (upper line) 1/2" through 1" diameter.
+6 x 19 I.W.R.C. extra improved plow steel hoisting cable (lower line) 1/2" through 1" diameter.
-6 x 37 I.W.R.C. improved plow steel hoisting cable (upper line) 1-1/8" through 1-1/2" diameter.
+6 x 37 I.W.R.C. extra improved plow steel hoisting cable (lower line) 1-1/8" through 1-1/2" diameter.

The above chart is primarily intended to determine safe loads for hoist load lines and guy lines. If used for slings, the values must be reduced by the loss for the type of end fitting

WIRE ROPE CLIP CONNECTIONS

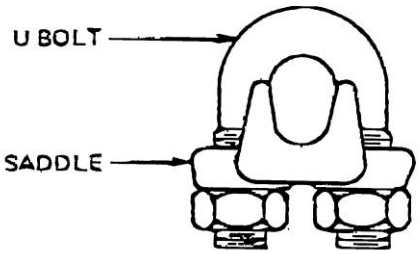
Because the saddle is shaped to form a seat and prevent the cutting of the outer rope strands when the load is applied, it should always be placed on the load end or longer portion of the rope. The U bolt should be in contact with the shorter portion of the loop in the rope. The distance between clips

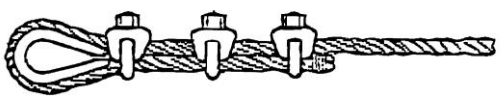


SAME NO. OF CLIPS RECOMMENDED IN CHART EACH END

should not be less than six times the diameter of the rope.

ROPE DIA.	MIN. NO. CLIPS	SPACING C/C	WRENCH SIZE
3/8"	2	2-1/4"	8'
1/2"	3	3"	12"
5/8"	3	3-3/4"	12"
3/4"	4	4-1/2"	16"
7/8"	4	5-1/4"	16"
1"	5	6"	16"
1-1/8"	6	6-3/4"	16"
1-1/4"	6	7-1/2"	16"
1-3/8"	7	8-1/4"	18"
1-1/2"	7	9"	18"
1-5/8"	7	9-3/4"	18"
1-3/4"	8	10-1/2"	18"
2"	8	12"	20"
2-1/4"	8	13-12"	24"





NO. OF CLIPS PER CHART FOR CABLE SIZE

"Bob's Rigging and Crane Handbook" is the industry standard. Get a copy from:
Bob DeBenedictis, Inc.
6410 S. Atlantic Ave., New Smyrna Beach, FL 32169

904-423-7759
904-423-7573 (fax)

ADVANCED AMERICAN CONSTRUCTION, INC. SAFETY MANAGEMENT STANDARD

SANDBLASTING

1.0 Applicability

This procedure applies to Advanced American Construction, Inc. projects where sandblasting materials are disturbed and occupational exposures may occur.

2.0 Purpose and Scope

The purpose of this program is to protect personnel from occupational exposures to sandblasting.

3.0 Implementation

Field Activities - Implementation of this procedure is the responsibility of the Project Manager/Superintendent.

a. All employees subject to silica exposure shall be provided information about adverse health effects, work practices, Hazcom, and use and care of personal protective equipment.

4.0 Requirements

A. Determine whether any surface to be disturbed or altered contains hazardous materials.
B. Establish where necessary, regulated areas and assure that access to and from those areas is limited to authorized employees.
C. Assure the adequacy of any employee exposure monitoring required equipment.
D. Assure that all employees exposed to air levels above PEL wear appropriate personal protective equipment (PPE) and are trained in the use of appropriate methods of exposure control.
E. Assure that proper hygiene facilities are provided and that workers are trained to use those facilities.
F. Assure that the engineering controls required by 29CFR 1926.21 is implemented, maintained in proper operating condition, and functioning properly.
G. All employees potentially exposed to sandblasting hazardous material must:
    1. Be in the Medical Surveillance Program for contaminants.

2. **Have received training as outlined in Attachment 1.**

H. Interim Protection Measures

Until the initial exposure assessment can be conducted the following protective measures must be implemented:

1. **Provide respiratory protection as outlined in Attachment 2.**
2. **Provide coveralls or other similar full body covering.**
3. **Provide gloves, hats, shoes or disposable shoe coverings.**
4. **Provide face shields, goggles or other appropriate protective equipment.**
5. **Provide change areas and hand washing facilities.**

I. Initial Exposure Assessment

1. **Contact the Advanced American Construction, Inc. Safety Manager to determine whether historical air monitoring data is available that accurately represents exposure conditions for the Initial Determination for the project.**
2. **In the absence of representative historical data conduct air monitoring to assess personnel exposure to potential hazard.**

J. Negative Initial Determination

1. **Exposures to Silica requires a written record which includes:**
   a. **Date of determination.**
   b. **Location within the worksite.**
   c. **Name of each employee monitored.**
   d. **Monitoring results.**
   e. **Type of activity conducting during monitoring.**

K. Exposures to Silica:

1. **All employees potentially exposed to silica must:**
   a. **Be in the Medical surveillance Program for Silica.**
   b. **Have received training as outlined in Attachment 1.**
   c. **Utilize appropriate PPE and personal hygiene procedures as outlined in the project-specific safety plan.**

5.0 Exposures:

1. **Develop a silica compliance plan.**
   a) **The compliance plan must include the following topics:**

      (1) **Descriptio of work activities that expose personnel to silica.**
      (2) **Equipment to be used and procedures to be followed during silica exposure activities.**
      (3) **Employee job responsibility and crew size during silica exposure activities.**
      (4) **Maintenance practices to be followed for servicing and cleaning equipment and disposing of waste.**
      (5) **Specific instructions on how to set up engineering controls (ventilation; containment; etc.).**
      (6) **Air monitoring data from initial assessment.**
      (7) **A detailed work schedule for implementation.**
      (8) **A description of arrangements made among contractors on multi-contractor sites with respect to informing affected employees of potential exposure to silica.**
      (9) **The name of the competent person for the site.**

   b) **Appoint a Competent person who will be responsible for performing regular inspections of the job site, materials, and equipment during the job.**

2. **Order the PPE specified in the silica Compliance Plan.**

3. **Provide for the cleaning, laundering, and disposal of protective clothing and equipment.**

6.0 Require that Engineering Controls are on site and installed correctly before work begins. Implement the engineering controls specified in the silica compliance plan for the site.

7.0 Provide hygiene facilities which include:

1. **A clean change room equipped with separate lockers for the storage of street clothes and work clothes.**
2. **A shower and hand washing facilities.**
3. **A lunch area free from silica contamination.**

8.0 Establish rules that will maintain proper housekeeping in the silica area, specifically:

1. **Prohibit contaminated clothing and equipment outside of silica work area.**

2. **Require silica workers to shower at the end of the shift and wash up before eating and drinking outside the silica area.**
3. **Segregate dirty or contaminated equipment from clean work areas.**
4. **HEPA vacuum all silica-contaminated surfaces.**

9.0 Label silica hazardous areas and equipment.

1. **Mark silica hazardous areas with boundary tape and signs stating:**

WARNING
SILICA WORK AREA
POISON
NO SMOKING OR EATING

2. **Mark silica contaminated equipment and debris with labels warning of the silica hazard.**

10.0 Notify contractors and subcontractors before work begins.

Require contractors to know the location of silica in the job site. Even if contract workers are not directly exposed they may need to still perform training required under the hazard communication standard.

11.0 Maintain requirements of the Silica Compliance Plan throughout the job.

Direct the appointed "competent person" to inspect the job site at least daily for those days when silica operations are performed.

5.0 Documentation Smmary

File these records in the Project Safety File:

1. **Physician's medical clearance for silica workers.**
2. **Proof of blood silica testing for personnel.**
3. **Pre-job Silica Hazard Initial Assessment.**
4. **Air monitoring results.**
5. **Completed Silica Job Inspection forms.**
6. **Silica Compliance Plan for the job (as necessary).**

6.0 Resources

A. **U.S. OSHA Standard – Safety and Health Regulations for construction CFR1926.21(B)(3)**
B. **http://www.cdc.gov/niosh/92-102.html**

Advanced American Construction, Inc. Health & Safety Program
TRAINING REQUIREMENTS FOR SILICA WORKERS

Assure each employee is trained in the following:

a) **The content of silica in construction standard, (29 CFR 1926.21(b)(3) for U.S. operations).**

b) **The specific nature of the operations that could result in exposure to silica above the action level.**

c) **The purpose, proper selection, fitting, use, and limitations of respirators.**

d) **The purpose and description of the medical surveillance program and the medical removal protection program including information concerning the adverse health effects associated with excessive exposure to silica.**

e) **The engineering controls and work practices associated with the employee's job assignment including training of employees to follow relevant good work practices.**

f) **The content of any silica compliance plan and the location of regulated areas in effect.**

g) **Instructions to employees that chelating agents should not be routinely used.**

h) **The employee's right of access to records.**

Advanced American Construction, Inc. Health & Safety Program
INTERIM RESPIRATORY PROTECTION MEASURES

During the interim work period while air monitoring is being performed and exposure levels are being determined, the following guidance must be followed regarding respiratory protection for employees:

1. **Provide half face respirators with HEPA cartridges where silica coatings or paint is present and any of the following activities will occur:**

   a) **Manual demolition of structures.**
   b) **Manual scraping.**
   c) **Manual sanding.**
   d) **Heat gun applications.**
   e) **Power tool cleaning with dust collection applications.**

2. **Provide Loose fitting hood or helmet powered air purifying respirator with high efficiency filters, or hood or helmet supplied air respirator operated in a continuous-flow mode when performing tasks involving:**

   a) **Rivet busting.**
   b) **Power tool cleaning without dust collection systems.**
   c) **Cleanup activities where dry expendable abrasives are used.**
   d) **Abrasive blasting enclosure movement and removal.**

3. **Provide full face piece supplied air respirator operated in pressure demand or other positive-pressure when performing tasks involving:**

   a) **Abrasive blasting.**
   b) **Welding.**
   c) **Cutting.**
   d) **Torch burning.**

ADVANCED AMERICAN CONSTRUCTION, INC. SAFETY MANAGEMENT STANDARD

SANITATION

1.0 Applicability

This procedure applies to Advanced American Construction, Inc. field operations.

2.0 Purpose and Scope

The purpose of this program is to provide employees on field assignments with appropriate personal hygiene facilities, including toilets, wash rooms and eating facilities, and to protect employees from unsanitary conditions.

3.0 Implementation

Field Activities- Implementation of this program is the responsibility of the Project Manager.

4.0 Requirements

A. Arrange for the installation of adequate toilet and wash facilities during the planning stage of field projects. Note: Mobile crews having transportation readily available to nearby toilet facilities need not be provided with facilities.

1. Provide job sites without sanitary sewer with one of the following:

   a) Privies (where their use will not contaminate ground or surface water).
   b) Chemical toilets.
   c) Combustion toilets.

2. Provide toilets for employees of each sex at field sites according to the following ratio:

Number of Employees	Minimum # of water closets (1)
1 - 15	1
16 - 25	2
36 - 55	3
56 - 80	4
81 - 110	5
111 - 150	6
Over 150	(2)

Footnote (1) *where toilet facilities will not be used by women, urinals may be provided instead of the minimum specified.*
Footnote (2) *1 additional fixture for each additional 40 employees.*

B. Provide a means for washing hands next to toilet areas.

C. Arrange for fresh potable water to be available.

1. Fixed Facilities

Require backflow prevention devices, testing and administrative controls to be used for all potable water supply branches.

2. Field Sites

a) Require an adequate supply of potable water to be available.
b) Water containers must be tightly closed and marked as to the contents. Containers must have a tap and be refilled daily.

D. Maintain existing toilet and wash facilities.

1. Maintain toilets and toilet area in good repair and in a clean and sanitary condition.

2. Provide paper towels and soap or other suitable sanitizing material for washing hands.

3. Locate hand-washing facilities next to or near toilets.

E. Maintain availability and cleanliness of drinking water.

1. Maintain backflow devices in a sanitary condition.

2. Water coolers and water dispensers are to be kept in a sanitary condition and filled only with potable water.

3. Provide fountain-type dispensers or one-use cups at each water dispenser.

F. Maintain lunchrooms in a clean condition.

1. Require microwave ovens to be used for food only.

2. Require refrigerators that are designated for food storage to be used for food only.

3. Do not allow workers to eat or store foods in areas where toxic materials are handled or stored.

4. Periodically clean lunchrooms.

G. Manage waste generated on site.

1. Release sanitary sewage into sanitary sewer lines or to other proper disposal channels.

2. Do not discharge hazardous waste into the sanitary sewer or storm sewer system.

3. Collect garbage and trash daily.

a) Garbage containers located outside buildings should have lids and remained closed. Transport garbage offsite at least weekly.
b) At remote field sites where bears and similar wild animals are a hazard, remove garbage from the site daily (do not let garbage remain on site overnight).

H. Prevent pests and vermin from multiplying on site. Eliminate unsanitary conditions that propagate insects or vermin.

I. Inspect work sites using checksheet provided as Attachment 1 for compliance at the beginning of the project and mid -project.

5.0 Documentation Summary

File completed inspection sheets in the Project Safety File.

6.0 Resources

A. U.S. OSHA Construction Standard - Sanitation - 29 CFR 1926.51
(http://www.osha-slc.gov/OshStd_data/1926_0051.html)
B. U.S OSHA General Industry Standards - Sanitation - 29 CFR 1910.141
(http://www.osha-slc.gov/OshStd_data/1910_0141.html)
C. National Interim Primary Drinking Water Regulations 40 CFR 141
(http://www.access.gpo.gov/nara/cfr/waisidx/40cfr141.html)

Advanced American Construction, Inc.
SANITATION INSPECTION SHEET

Location:_____ **Job No:**_____

Date Inspected: _____ **Name of Inspector:** _____

	Note: All "No" notations must be corrected	Yes	No
	Toilets		
1.	Are there an adequate number of toilets on site? 1 - 15 employees = 1 toilet 16 - 35 employees = 2 toilets 36 - 55 employees = 3 toilets 56 - 80 employees = 4 toilets 81 - 110 employees = 5 toilets		
2.	Toilets are in clean condition.		
3.	Toilet paper is provided.		
4.	Toilet areas are clean and sanitary.		
	Hand Washing Facilities		
5.	Hand washing facilities are provided near toilets.		
6.	Paper towels and soap are provided.		
	Drinking Water		
7.	Drinking water is provided on site.		
8.	Disposable cups are provided or fountain type dispenser is provided.		
9.	Drinking water containers are kept clean and tightly closed or covered.		
	Lunch Rooms		
10.	Lunch rooms or eating areas are kept clean.		
11.	Microwaves are used for food only.		
12.	Microwave ovens are kept clean.		
13.	Refrigerators are kept clean.		
14.	Refrigerators are used to store food only.		
	Vermin		
15.	Rats, mice and other vermin are not living within buildings.		
16.	Cockroaches and fleas are not thriving within buildings.		

REMARKS

_____

_____

_____

_____

_____

ADVANCED AMERICAN CONSTRUCTION, INC. SAFETY MANAGEMENT STANDARD

SCAFFOLDING

1.0 Applicability

This procedure applies to Advanced American Construction, Inc. projects where scaffolding is used.

2.0 Purpose and Scope

The purpose of this procedure is to require the proper construction, use, maintenance and inspection of scaffolding on Advanced American Construction, Inc. project sites.

3.0 Implementation

Field Activities – Implementation of this procedure is the responsibility of the Project Manager.

4.0 Requirements

A. Pre-job Planning

1. Determine the need for stationary scaffolding at the proposal stage of the project for activities that cannot be safely conducted from the ground or from solid construction, except short period work as can be done safely from properly secured ladders.

2. Contract for the services of a scaffold erection company that will be responsible for:

    a) Erection.
    b) Moving.
    c) Dismantling.
    d) Certification for use by an appropriately qualified competent person.

3. Job built scaffolding is prohibited.

B. General

1. Prohibit access to scaffolding until the Scaffolding Erection Competent Person has inspected the scaffolding and certified that it is ready for use and has hung a “Ready for Use Tag” with his/her signature.

2. Conduct pre-shift evaluations of the scaffolding using the format at Attachment 1.

3. Obtain erection contractor certification that scaffolds and components are able to support at least four times the intended load.

4. Require that standard guardrails and toeboards have been installed on all open sides of the scaffold.

5. Verify that:

   a) The platform is tightly planked for the full width of the scaffold.
   b) Planks extend over the end supports between 6 inches and 12 inches.
   c) Cleats are used on the bottom edges to prevent slippage.
   d) The planking is scaffold grade (planks must be stamped on end).
   e) Access has been provided through the use of properly designed stair towers or hook on attachable ladders.
   f) Scaffold is adequately tied into structure.

6. Prohibit climbing on frame members for access.

7. Make sure the legs or uprights of scaffolds are plumb and rigidly braced to prevent swaying.

8. Provide overhead protection for workers on a scaffold exposed to overhead hazards.

9. Never use shore or lean-to scaffolds.

C. General Use Work Practices

1. Scaffolds shall be cleaned off upon completion of work by the craft using the scaffold.

2. A toe board should never be used to aid access to a working platform; grab bars should be used instead.

3. Require that tools, materials, and debris do not accumulate in quantities that create a hazard.

4. Remove any snow, ice, or slippery conditions prior to access by employees.

5. Prohibit use during high winds and storms.

6. Modifications or alterations are to be performed only by competent persons. Appoint appropriately qualified competent person to inspect daily prior to use.

7. Deny access until all deficiencies have been corrected.

8. Tags shall be used as a means to prevent accidental injury or illness to employees who are exposed to hazardous or potentially hazardous conditions, equipment or operations which are out of the ordinary, unexpected or not readily apparent. Tags shall be used until such time as the identified hazard is eliminated or the hazardous operation is completed. Tags need not be used where signs, guarding or other positive means of protection are being used.

9. General tag criteria. All required tags shall meet the following criteria:

    a. Tags shall contain a signal word and a major message.
    b. The signal word shall be either “Danger,” “Caution,” or “Biological Hazard,” “BIOHAZARD,” or the biological hazard symbol.
    c. The major message shall indicate the specific hazardous condition or the instruction to be communicated to the employee.
    d. The signal word shall be readable at a minimum distance of five feet (1.52 m) or such greater distance as warranted by the hazard.
    e. The tag’s major message shall be presented in either pictographs, written or both.
    f. The signal word and the major message shall be understandable to all employees who may be exposed to the identified hazard.
    g. All employees shall be informed as to the meaning of the various tags used throughout the workplace and what special precautions are necessary.
    i. Tags shall be affixed as close as sagely possible to their respective hazards by a positive means such as string, wire, or adhesive that prevents their loss or unintentional removal.
    j. Danger tags shall be used in major hazard situations where an immediate hazard presents a threat of death or serious injury to employees. Danger tags shall be used only in these situations.
    k. Caution tags shall be used in minor hazard situations where a non-immediate or potential hazard or unsafe practice presents a lesser threat of employee injury. Caution tags shall be used only in these situations.

10. Accident prevention tags shall be used as a temporary means of warning employees of an existing hazard, such as defective tools, equipment, etc. They shall not be used in place of, or as a substitute for, accident prevention signs.

D. Rolling Scaffold

1. Do not use rolling scaffolds that extend to a height more than four times the minimum base dimension.

2. Maintain floor level within 3^{o} of level.

3. Lock wheels when workers are on the scaffold.

4. Prohibit workers from riding scaffolds when they are being moved.

5. Secure tools and materials so they cannot fall or roll off when the scaffold is moved.

6. Require guardrails and planking on all rolling scaffold above 6 feet.

7. Never allow the use of ladders from the planking/floor of rolling scaffold.

E. Training

1. Advanced American Construction, Inc. will have each employee who performs
   work while on a scaffold trained by a person qualified in the subject matter to recognize the hazards associated with the type of scaffold being used and to understand the procedures to control or minimize those hazards. The training shall include the following areas, as applicable.
2. The nature of any electrical hazards, fall hazards and falling object hazards in the work area;
3. The correct procedures for dealing with electrical hazards and for erecting, maintaining, and disassembling the fall protection systems and falling object protection systems being used;
4. The proper use of the scaffold, and the proper handling of materials on the scaffold;
5. The maximum intended load and the load-carrying capacities of the scaffolds used.
6. Re-training will occur whenever new equipment is implemented or inadequacies or changes
7. Document training to include, trainers name, date and scope of training.

5.0 Documentation Summary

Retain in the Project Safety File:

A. Qualifications of Scaffold Erection Competent Person

B. Qualifications of Scaffold Daily Inspection Competent Person

C. Daily scaffolding inspection reports

6.0 Resources

A. National Association of Demolition Contractors
(http://www.demolitionassn.com)
B. U.S. OSHA Standard - Scaffolds - 29 CFR 1926 Subpart L
(http://www.osha-slc.gov/OshStd_toc/OSHA_Std_toc_1926_SUBPART_L.html)
C. U.S. OSHA Technical Links - Scaffolding
(http://www.osha-slc.gov/SLTC/scaffolding/index.html)
D. ANSI A 10.8-1987
(http://www.ansi.org/cat_top.html)
E. U.S. OSHA Training Requirements – 1926.454
(http://www.osha.gov.1926.454(a)
F. U.S. OSHA Specifications for accident prevention signs and tags. – 29 CFR 1910.145

Advanced American Construction, Inc. Health & Safety Program
SCAFFOLD INSPECTION CHECKLIST

Location: _____

Date Inspected: _____ **Name of Inspector:** _____

		Yes	No
General			
1.	Erected under proper supervision.		
2.	All structural members adequate for use.		
3.	All connections adequate, pins and crossbracing provided and supports plumb.		
4.	Proper footings provided, sound, rigid and secure.		
5.	Safe tie-in to structure.		
6.	Access ladder provided and used.		
7.	Defective and damaged parts removed from service.		
8.	Ladders and working areas kept free of debris, ice, snow, chemicals and grease.		
9.	Platform complete, planks close together, overlapped at least 12", secured or cleated.		
10.	Guardrails, midrails, and toeboards installed on all open sides of platforms 6 feet or over in height.		
11.	Passerby and overhead protection provided as required.		
12.	Frequent inspections conducted.		

REMARKS

_____
_____
_____
_____
_____
_____
_____
_____

_____
Signature

ADVANCED AMERICAN CONSTRUCTION, INC. SAFETY MANAGEMENT STANDARD

Short Service Employee (SSE)

1.0 Applicability

This program applies to all Advanced American Construction, Inc. facilities and operations.

2.0 Purpose and Scope

Less experienced employees are at greater risk of injury. Having a method in place to assist the new employee transition into the job safely is essential to the prevention of accidents. Pairing new employees with seasoned and more experienced ones will enable them to learn the safe and proper methods to perform their assigned tasks.

3.0 Implementation

Office Locations – Implementation of this program is the responsibility of the Office Manager
Shop Locations - Implementation of this program is the responsibility of the Shop Manager/Foreman
Field Activities - Implementation of this program is the responsibility of the Project **Manager**

4.0 Requirements

a) A new or Short Service Employee (SSE) is at a greater risk of being involved in an accident than a seasoned employee. Because of this fact we must have a means in place to consistently orient the new employee and monitor their progress. This must be done until they demonstrate that they perform to the standards of Advanced American Construction.

b) A SSE is an employee that has less than six months service with the company or less than six months service in their present role.

c) A SSE must never be allowed to work unsupervised or alone. The SSE will be paired with an experienced/ knowledgeable mentor (journeyman) that can assist them with their development and teach them how to safely do their job. The mentor is responsible to ensure that the SSE has all required safety training necessary for the tasks they perform. The mentor must constantly monitor their progress and compliance with health, safety and environmental policies and procedures. The mentor must evaluate the SSE progress and report it up the chain of command.

d) Any crew of less than 5 employees may not have more than one SSE.

A mentor cannot be responsible for SSEs in different crews. Each crew with a SSE must have a mentor and the mentor must remain onsite with them.

e) The owner/ client must be informed in advance whenever there is a SSE present in a workgroup at their facility.

f) The SSE will be easily identified by their hard hat. The hard hat will be plastic and have reflective tape on the front just above the brim that will display the employee name and another piece of reflective tape on the rear. Once they have completed 6 months of service the SSE will be issued a custom decorated fiber AAC hard hat with their name engraved on a brass plate. If the SSE style hard hat is not available they will be issued a green reflective high visibility vest. In either case the owner/ client representative must be informed of the method of SSE identification being used.

g) AAC subcontractors must adhere to the requirements of this SSE program for each of their SSEs.

ADVANCED AMERICAN CONSTRUCTION, INC. SAFETY MANAGEMENT STANDARD

SPILL PREVENTION/RESPONSE

1.0 Applicability

This program applies to all Advanced American Construction, Inc. facilities and operations.

2.0 Purpose and Scope

This program describes the methods employed in the storage and use of liquid materials that can harm the environment. The preplanning and response required at each location in the event of an accidental release.

The objectives of this program are to:

a) Prevent spills and damage to the environment.
b) Ensure that adequate clean up materials are available at each location in the event of a spill.
c) Outline best management practices to avoid spills.

3.0 Implementation

Office Locations – Implementation of this program is the responsibility of the Office Manager

Shop Locations - Implementation of this program is the responsibility of the Shop Manager/Foreman

Field Activities - Implementation of this program is the responsibility of the Project Manager

4.0 Requirements

a) Chemical substances should be stored in proper containers to minimize the potential for a spill. Whenever possible, chemicals should be kept in closed containers and stored so they are not exposed to storm water. Bulk fuel containers will be double lined or placed in secondary containment away from storm drains and natural watercourses. Barrels and Drums of chemical liquids must also be placed in secondary containment.
b) The containers will be labeled as required by NFPA, OSHA and local regulations. Tanks and storage areas must be visually inspected frequently

as determined by the responsible person. The distance between any two flammable or combustible liquid tanks shall be not less than 3 feet.

c) A proper spill kit must contain the appropriate supplies for materials that may be spilled. Supplies must be easily accessible when required, and considerations must be made for both the type and quantity of materials. Employees must also be trained and instructed on the site-specific response procedures/actions to be taken. The size and number of kits and training needed must be determined in advance by the responsible person during the development of the site specific SPCC. The training should include materials available for use, proper waste disposal, and communication procedures.

d) When fueling, operators must stay with the nozzle and not overfill the tank. If the tank is overfilled, it must be reported and the spill contained and cleaned up immediately.

e) Flammable and combustible materials transferred from their original or bulk container must only be put into approved safety containers. Approved safety containers: not more than 5 gallons capacity, having a spring-closing lid and spout cover so designed that it will prevent spillage and safely relieve internal pressure when subjected to fire exposure.

f) An environmental response contractor must be designated for each location. The contractor should be selected based upon a combination of their appropriate capability and projected response time. This information should be posted onsite with emergency services information.

g) Spills must be reported internally immediately via radio or cellular phone to the immediate supervisor onsite. Larger spills (over 1 gallon), any petroleum spill on the navigable waters of the US and any spill exceeding the chemicals reportable quantity per 40CFR must be reported up the complete chain of command through Dee Burch President. Spills must be investigated to determine casual factors and needed corrective action. Specific actions must be included in the site-specific plan. Spills that meet or exceed any applicable jurisdictional RQ must also be reported to the appropriate authorities immediately.

h) Equipment must be inspected daily for leaks. If leaks are found, do not operate the equipment, place absorbent materials under the source, and contact the maintenance department.

i) Safety First! Review Material Safety Data Sheet (MSDS) for information regarding proper PPE, appropriate spill cleanup materials, and proper disposal of used cleanup materials (e.g., absorbents and rags).

j) Areas where chemicals may be used or stored must be maintained using good housekeeping best management practices. This includes, but is not limited to, clean and organized storage, labeling, and secondary containment where necessary.

5.0 Documentation Summary

6.0 Resources

a) Flammable and Combustible Liquids - 29 CFR 1910.106
b) Determination of Reportable Quantities - 40 CFR 117.3
c) Hazard Communication 29 CFR 1910.1200

ADVANCED AMERICAN CONSTRUCTION, INC. SAFETY MANAGEMENT STANDARD

SUBCONTRACTOR HEALTH AND SAFETY REQUIREMENTS

1.0 Applicability

This procedure is applicable to Advanced American Construction, Inc. projects in which subcontractors are retained by Advanced American Construction, Inc.. This procedure is applicable to the operations of subcontractors and sub-subcontractors of any tier.

This procedure does not apply to third party contractor operations where there is no subcontract relationship between the contractor and Advanced American Construction, Inc. Health and Safety issues regarding third party contractor operations are governed by project specific contracts and are not covered by this standard.

2.0 Purpose and Scope

This procedure provides guidelines on the pre-evaluation of subcontractor safety programs. It also provides guidance on contractual risk management, subcontractor safety performance on the job site, and the responsibilities of the Project Manager/Superintendent with respect to subcontractor jobsite safety performance.

Each Advanced American Construction, Inc. subcontractor must be evaluated at least annually using Attachment 1, “Subcontractor Safety Evaluation Form,” in order to perform work on any new AAC projects.

3.0 Implementation

A. Field Activities - Implementation of this procedure is the responsibility of the Project Manager/Superintendent.

4.0 Requirements

A. Pre qualification of Subcontractor -The Project Manager must complete the following procedures for all subcontractors retained on projects which require the implementation of health and safety measures (the PM should also require subcontractors to follow these procedures with respect to prequalification of sub-subcontractors of any tier). Subcontractors will be pre-qualified by reviewing their Safety Programs, Safety Training Documents, and Safety Statistics as follows:

1. Require all subcontractor candidates to complete the attached "Subcontractor Health and Safety Evaluation Form" (Attachment 1).

2. This form is used to identify how acceptable Safety Metrics are utilized in selection of Contractors.

3. Conduct an assessment of each subcontractor's qualifications with respect to the subcontractor health and safety evaluation criteria contained in Attachment 2.

4. Verify that subcontractors meet the insurance requirements as stated in Attachment 2 or as approved by Counsel.

5. If the subcontractor has been successfully evaluated by this process within the last 12 months, that evaluation may be substituted.

6. For long-term projects, this evaluation must be updated within 12 months of the previous evaluation.

B. Contractual and Risk Management Requirements of Subcontractors

1. Ensure that subcontractor is contractually bound to comply with applicable client and Advanced American Construction, Inc. Health and Safety Program requirements.

2. Ensure that subcontractor is contractually bound to develop additional safety procedures for work that is exclusive to their activities on the site and for which they may have superior knowledge.

3. Assess compliance of subcontractor's insurance with the Advanced American Construction, Inc. subcontract requirements (including, but not limited to, necessary types and amounts of coverage, AAC additional insured endorsement, etc.)

4. Ensure that Advanced American Construction, Inc. has the right in its subcontract, without liability to the subcontractor, to stop the subcontractor's work in the event of any violations of the applicable Health & Safety Plan.

C. Subcontractor Safety Representative

1. Require each subcontractor to appoint a Subcontractor Safety Representative (SSR) who:

   a) Is knowledgeable of the subcontractor's activities.
   b) Understands the safety requirements of the subcontractor's activities.

c) Has the ability to recognize and the authority to correct safety. deficiencies and execute a stop work order should an imminent danger arise.
d) Has the responsibility for the administration of the subcontractor Health and Safety Program.
e) Will serve as the direct contact with Advanced American Construction, Inc. regarding resolution of Health and Safety issues.

D. Communication

1. Provide the SSR with information regarding Site Safety Program including but not limited to:

   a) Client Requirements.
   b) Advanced American Construction, Inc. Site Safety Program.
   c) Site Hazard Communication Program.
   d) Site Emergency Action Plan.
   e) Any additional safety information from other contractors or subcontractors working on the site.

2. Provide SSR with name of Advanced American Construction, Inc. project contact and alternate for addressing site Health and Safety issues.

3. Require the participation of subcontractors in all Site Safety Briefings. Subcontractors will be included in Pre-Job Meetings or Kick-Off Meetings, and Safety Orientation Meetings.

4. Require subcontractor compliance with all safety directives and/or stop work orders issued by Advanced American Construction, Inc. site representatives.

5. Subcontractors will be included in Tailgate Safety Meetings, Job Safety Analysis or Hazard Assessments, and on the Job Safety Inspections.

6. Post-Job Safety performance reviews will be conducted on all Subcontractors.

E. Subcontractor Safety Performance

1. To the extent reasonable in light of Advanced American Construction, Inc.'s scope of work under the client contract, observe subcontractors operations (i.e., conduct spot checks) to assess whether subcontractor appears to be conducting its operations in accordance with applicable health and safety requirements. Periodically review any required subcontractor health and safety written documentation for compliance with applicable requirements.

2. In the event that deficiencies are observed immediately bring them to the attention of the SSR for resolution.

3. In the event of observation of an “Imminent Danger” situation involving a risk of serious harm, immediately contact the SSR and stop the work.

4. Investigate all injuries/illnesses related to subcontractor operations to identify causes and effect corrective actions.

5. In the event of serious and/or continuing subcontractor breaches of applicable health and safety requirements contact legal counsel to assess whether formal contractual action is appropriate under the subcontract.

5.0 Documentation Summary

A. File in the Project Safety File

1. Subcontractor Health and Safety Evaluation Form.

2. Applicable and current Insurance Certificates.

3. Names and telephone numbers of SSR for each subcontractor.

4. Verification of Health and Safety documents transmitted to subcontractors and received from subcontractors.

5. Identified safety deficiencies as applicable for subcontractors and verification of correction of conditions.

6. All other safety related documentation between Advanced American Construction, Inc. and subcontractor such as training certifications, etc.

7. Subcontractor safety plan, incident reports and resolution reports.

6.0 Resources

A. Federal OSHA Workplace Injury and Illness statistics (http://www.osha.gov/oshstats/work.html)
B. *Managing Subcontractor Safety*, Prepared by The Construction Industry Institute, Safety Task Force, Publication 13-1, The University of Texas at Austin, Austin, Texas, 1991 (http://www.construction-institute.org/)
C. *American National Standard Construction and Demolition Operations -- Safety and Health Program Requirements for Multi-Employer Projects*, ANSI A10.33-1992, National Safety Council, Itasca, Illinois 60143-3201 (http://www.nsc.org)
D. "Liability, OSHA and the Safety of Outside Contractors," *Professional Safety*, American Society of Safety Engineers, January 1993 (http://www.asse.org)
E. "Proactive Construction Management; Dealing With the Problem of Subcontractor Safety," *Professional Safety*, American Society of Safety Engineers, January 1990 (http://www.asse.org)
F. "Design Professional Liability Under OSHA," Presented by Thomas F. Holt, Jr., HWAC Lawyer's Roundtable, June 14, 1995 (to be Published) (http://www.hwac.org)
G. "*Occupational Injury and Illness Rates by SIC",* Bureau of Labor Statistics, U. S. Department of Labor (http://stats.bls.gov/sahome.html)
H. Attachment 1 - Subcontractor Safety Evaluation Form
I. Attachment 2 - Subcontractor Evaluation Criteria

Advanced American Construction, Inc. Health & Safety Program
SUBCONTRACTOR SAFETY EVALUATION FORM

It is the policy of Advanced American Construction, Inc. to provide a safe and healthful work environment for all of its employees through the prevention of occupational injuries and illnesses. As such Advanced American Construction, Inc. considers safety as paramount and requests the following information of all subcontractors.

Company Name _____

Company Address _____

_____

Submitted by: _____

Title: _____

Phone/fax Numbers: _____

Type of Services Performed: _____

Standard Industrial Classification (SIC) Code _____

Number of employees in company _____

Date of Submittal _____

SAFETY PERFORMANCE DATA

1. Has your company performed work as a subcontractor to Advanced American Construction, Inc. previously? ❑ Yes ❑ No
   If yes, explain the nature of the work, project location, and project dates.

   _____

   _____

2. Worker Compensation Experience Information

   a) List your Interstate Worker Compensation Experience Modification Rate (EMR) for the last three full years below:

   Interstate

   20___ EMR ____ Carrier_____ Policy Number_____

   20___ EMR ____ Carrier_____ Policy Number_____

   20___ EMR ____ Carrier_____ Policy Number_____

   Intrastate (List statistics for highest EMR state)

   20___ EMR ____ Carrier_____ Policy Number_____

   20___ EMR ____ Carrier_____ Policy Number_____

   20___ EMR ____ Carrier_____ Policy Number_____

   b) We require verification of your EMR. Please attach the endorsement page from your policy listing your EMR, or have your insurance carrier or broker provide this information on their letterhead.

c) If your EMR is 1.0 or exceeds 1.0 for any one or more years above, please explain: _____

_____

_____

3. Workplace Injuries and Illnesses

PROVIDE THE FOLLOWING INFORMATION:	20___	20___	20___
A. Number of Fatalities [1] (Totals from Columns 1 and 8 of OSHA 200 Log)			
B. Number of cases that involved either lost workdays or restricted duty (Totals from Columns 2 and 9 of OSHA 200 Log)			
C. Number of cases involving recordable injuries without lost workdays (Totals from Columns 6 and 13)			
D. Total Cases (Sum of Items A, B and C above for each given year)			
E. Total Manhours Worked			
F. OSHA Total Case Incident Rate[2]			
G. OSHA Lost Workday Case Incident Rate			

[1] Attach description of event

[2] Incident Rate (Item F) = $\frac{\text{Total Cases (Item D) x 200,000}}{\text{Total Manhours Worked (Item E)}}$

[3] Lost Workday Case Incident rate (Item G) = $\frac{\text{Total Lost Workday Cases (Item B) x 200,000}}{\text{Total Manhours worked (Item E)}}$

4. Describe any workplace safety regulatory agency (e.g., OSHA) citations and violations the Company has received in the past three years. Explain the nature of the citation, classification, and final fine. Describe the resolution of any serious violations. Please feel free to attach separate statements where more space is required.

20___ # of Citations _____ Final Fine Value $_____

Citation Statement _____

_____

20___ # of Citations _____ Final Fine Value $_____

Citation Statement _____

_____

20___ # of Citations _____ Final Fine Value $_____

Citation Statement _____

_____

5. Has your company received any Willful violations? ❑ Yes ❑ No

6. Does your company maintain a written Health and Safety Program? ❑ Yes ❑ No
If yes, please include a copy of the Table of Contents.

7. Does your firm have a safety officer? ❑ Yes ❑ No
If yes, please provide name and telephone number:_____

8. Is your company capable of preparing safety procedures specific to the work proposed for this project? ❑ Yes ❑ No

RISK MANAGEMENT/INSURANCE DATA

1. Does your firm have insurance coverage for commercial general liability and automobile liability with limits of at least $1,000,000? ❑ Yes ❑ No

   (*Note that certain AAC client contracts require insurance in excess of the levels noted above. Inability to supply insurance at levels required by AAC client contract could result in disqualification)*

2. Are you able to provide AAC with insurance certificates naming Advanced American Construction, Inc. and if requested, Advanced American Construction, Inc.'s client as an additional insured? ❑ Yes ❑ No

3. Please provide proof of current Workers Compensation and Employers Liability Insurance coverage (attach certificate).

VERIFICATION OF DATA

Please have an officer of the Company sign below certifying that the information provided in this document is current and correct.

Name (Printed): _____

Title: _____

Signature: _____

Date: _____

Misrepresentation of data requested is grounds for immediate termination of contracts and disqualification from future consideration.

ADVANCED AMERICAN CONSTRUCTION, INC. USE ONLY

Date Received: _____

Evaluated by: _____
Project Manager

Referrals only required as per Attachment 2:

- π Submitted to Health and Safety Rep for evaluation H&S Rep: _____ name
  - π Pass
  - π Fail
- π Submitted to Counsel for evaluation Counsel: _____ name
  - π Pass
  - π Fail

Final Evaluation

Project Manager: _____

π Pass Signature: _____

π Fail Date: _____

Advanced American Construction, Inc. Health & Safety Program
SUBCONTRACTOR EVALUATION CRITERIA

Prior to engaging a subcontractor on a project, Project Managers are required to ensure that the contractor has an effective safety program, is capable of conducting it's operations in a safe manner and has appropriate insurance coverage. The following guidelines shall be followed in determining whether the subcontractor may be used on a Advanced American Construction, Inc. project.

General Information

The contractor must be able to complete the header section on Page 1 of the questionnaire including their Standard Industrial Classification. For assistance determining the SIC for a business refer to the Standard Industrial Classification Manual online at http://www.osha.gov/oshstats/sicser.html.

Safety Performance Data Responses

The numbers in this section directly correspond to the questions in Attachment 1.

1. If yes, check safety performance history.

2. For any EMR listed as greater than 1.0 the contractor has failed the evaluation. If all EMRs listed, are 1.0 or below, continue with evaluation.

3. Determine the most recent OSHA Incident Rate and Lost Workday Case Rate for the subcontractors SIC. This may be done online at http://www.osha.gov/oshstats/work.html.

   For rates in excess of the published averages, the subcontractor has failed the evaluation.

   If the rates are at or below the average for the subcontractors SIC, continue with the assessment.

4. Determine the subcontractors citation history at http://www.osha.gov/cgi-bin/est/est1. Compare the published data to the contractor questionnaire. Any discrepancies must be explained by the subcontractor.

   Look for large numbers of serious and repeat violations.

5. If subcontractor answers yes to willful violations request a detailed explanation.

6. For small subcontractors a no answer is not unexpected and may be acceptable with good EMR and OSHA statistics. Generally, some minimal program is expected depending on the breadth and complexity of the work.

7. See 6.

8. It is expected that a subcontractor being hired to perform services on the project site should be the best prepared to address safety issues for their operations, especially when specialty work is being conducted or for work in which the subcontractor possesses superior knowledge of their operations.

Risk Management/Insurance Data

1. The inability to provide insurance coverage at or above $1,000,000 requires referral to Counsel.

2. Proof of Workers Compensation Insurance is required. Refer any questions to Counsel.

3. Ability to provide Insurance Certificates naming Advanced American Construction, Inc. as an additional insured is required. Refer any questions to Counsel.

Advanced American Construction Inc.

SUBCONTRACTOR HEALTH AND SAFETY REQUIREMENTS

Subcontractor Safety Readiness Review Training Outline

GO / NO GO

SUBCONTRACTOR NAME:	
DATE OF TRAINING/ MEETING: **TRAINER/ LEADER:** **NAME:**_____ **SIGNATURE:**_____ *All attendees print and sign name*	**TIME:**_____**am/pm** **LOCATION:**_____
SUB REPRESENTATIVES PRESENT: _____ _____ _____ _____ _____ _____ _____ _____	**AAC / OWNER REPS PRESENT:** _____ _____ _____ _____ _____ _____ _____ _____

INTRODUCTIONS:

- Project Manager:_____
- Superintendent:_____
- General Foreman:_____
- Site Safety Representative:_____
- Other:_____

EXPECTED LINES OF AUTHORITY: Who is in charge of safety for all field operations and do they have the authority to cause the correction of any unsafe act or unsafe condition?

_____

_____

QUALIFICATIONS SUMMARY: Please detail the safety qualifications of site / craft managers.

- Superintendent / General Foreman:_____

_____
_____

- Site Safety Representative:_____
_____
_____

ACCOUNTABILITY PROTOCOL: Please detail how and when your site managers, supervisors, and craft workers will be held accountable to perform their tasks in the safest possible manner.

_____
_____
_____

PLANNING: (Job Hazard Analysis – JHAs, Pre-Task Planning)

- How do you intend to plan safety into the individual assigned tasks and how will you document that planning process? _____
_____
_____
- How do you intend to update the "plan" in the event that the scope of work changes?
_____
_____

TRAINING: How will you ensure that all required safety training is current with ALL field personnel? Who will provide the training and how will it be documented?

- OSHA required annual training, i.e. Fall Protection, PPE, Bloodborne Pathogens, etc.?
_____
_____
- Task specific safety training, i.e. Respiratory Protection, Ladder Use, Scaffolds, etc.?
_____
_____

SUBCONTRACTOR SAFETY MANAGEMENT:

- How will you ensure that all safety and project management related information is relayed downstream to your subcontractors? (All Tiers)_____
_____
_____
- How will you ensure that all required reports, i.e. Daily Logs, Incident Reports, Safety Inspection Reports, etc. are turned in on time and thoroughly complete?
_____
_____
- How will you deal with subcontractor non-compliance / non-performance issues?
_____
_____

EQUIPMENT OPERATIONS:

- How will you ensure that only qualified operators operate your equipment, i.e. Cranes, Earth Moving, Aerial Lift, Forklift, etc.?

  _____
  _____
  _____

- How do you document equipment operator qualifications? (NOTE: Being dispatched from a union operators local does not necessarily mean that the individual is qualified to operate all forms of equipment)

  _____
  _____
  _____

REPORTS:

- Who is responsible to complete and turn in required written reports / documentation?
  - JHAs:_____
  - MSDSs:_____
  - Incident Reports:_____
  - Safety Inspection Reports:_____

PERSONAL PROTECTIVE EQUIPMENT (PPE):

- Advanced American Construction Inc. operations require a minimum of safety glasses (good quality side shields on prescription glasses), sturdy work boots, hard hats, etc. for all field work. How will you ensure that your field crews consistently use and maintain their PPE?

  _____
  _____
  _____
  _____
  _____

VEHICLE & PEDESTRIAN CONTROLS:

- What is your plan to develop and maintain vehicle controls through your work area?

  _____
  _____
  _____

- What is your plan to develop and maintain pedestrian controls through your work area?

  _____
  _____
  _____

- All temporary pedestrian walkways will need to have handicap assess. How will you maintain handicap access?

  _____
  _____

SAFETY INSPECTIONS:

- Safety Audits or Inspections are required to be documented a minimum of once a week. What is the type and frequency of Safety Inspections performed by your Management group and how are those inspections documented?

  _____
  _____
  _____
  _____

INJURY CASE MANAGEMENT:

- What is your Early Return to Work / Modified Duty Policy? How, when and by whom is it implemented?

  _____
  _____
  _____

- What is your policy for obtaining Doctor's Releases for Off-The-Job injuries and illnesses?

  _____
  _____

- Who will be responsible for obtaining these releases for this Project and how will the determination be made that the Off-The-Job injury/illness would or would not expose the worker to further or new injury?

  _____
  _____

ENVIRONMENTAL:

- How will you ensure that you have immediate onsite access to the MSDS sheets for Hazardous Chemicals you bring onto the site? _____
  _____

- What is your fueling plan for your fuel burning equipment? NOTE: Off site (Mini Tanker) type fuel sources is preferred.

  _____
  _____

- What is your plan for storing combustible and flammable liquids, i.e. fuel cans and compressed gasses, and what quantity of these materials do you plan to have on site?

  _____
  _____

- What is your spill response plan and what spill response materials will you keep on site?

  _____
  _____
  _____

DRUG AND ALCOHOL TESTING:

- What is your process of meeting the minimum drug testing requirements for pre-hire, post accident, reasonable cause and random?

  _____
  _____

- What will be your response to a non-negative or confirmed positive test result to any of the above?

  _____
  _____

- Do you need assistance establishing any of the above testing protocols?

_____

STRETCH & FLEX:

- Pre-Work Stretch & Flex has been proven to reduce the numbers and severity of over exertion type of injuries. Will your workers perform pre-work stretching exercises prior to the beginning of tasks? If so, who will lead these exercises?

  _____
  _____
  _____

COMMENTS:

_____
_____
_____
_____

ADVANCED AMERICAN CONSTRUCTION, INC. SAFETY MANAGEMENT STANDARD

UTILITY CLEARANCES AND ISOLATION

1.0 Applicability

This procedure applies to Advanced American Construction, Inc. projects where personnel may encounter subsurface or overhead utilities.

2.0 Purpose and Scope

Many field activities are conducted near aboveground and underground utilities. The primary purpose of this Standard is to establish operating requirements that will permit employees to work safely in the vicinity of electrical, natural gas, fuel, water, and other utility systems and installations. The secondary purpose is to prevent economic damage to utility systems from operations associated with project-related activities.

The term "utility clearance" includes:

A. The positive locating of utility systems in or near the work area.

B. A signed statement by an appropriate representative attesting to the location of underground utilities and/or the positive de-energizing (including lockout) and testing of electrical utilities.

Note that in some cases, utility representatives may deem it appropriate or necessary to use insulating blankets to isolate a power line; this is an acceptable alternative to positive de-energizing (only utility representatives can make the determination).

"Contact" with overhead power lines is considered to occur when equipment is closer to power lines than permitted by the criteria in the table in Section 4.0.C.2,b below.

3.0 Implementation

Field Operations - Implementation of this procedure is the responsibility of the Project Manager/Superintendent.

4.0 Requirements

A. Time for Completion

Complete utility clearances prior to the start of any work in the area of the utility that could feasibly result in contact with or damage to that utility.

B. Local Regulations

Research local codes and regulations regarding utility locating and isolation requirements. Utility companies and locating services are among the appropriate resources.

C. Overhead Power Lines

1. Proximity to Power Lines

No work is to be conducted within 50 feet of overhead power lines without first contacting the utility company to determine the voltage of the system. No aspect of any piece of equipment is to be operated within 50 feet of overhead power lines without first making this determination.

2. Operations adjacent to overhead power lines are **PROHIBITED** unless one of the following conditions is satisfied:

a) Power has been shut off, positive means (such as lockout) have been taken to prevent the lines from being energized, lines have been tested to confirm the outage, and the utility company has provided a signed certification of the outage.

b) The minimum clearance from energized overhead lines is as shown in the table below, or the equipment will be repositioned and blocked so that no part, including cables, can come within the minimum clearances shown in the table.

MINIMUM DISTANCES FROM POWERLINES

Powerlines Nominal System Kv	Minimum Required Distance
0-50	10 feet (3 meters)
51-200	15 feet (3.6 meters)
201-350	20 feet (4.6 meters)
350-500	25 feet (6.1 meters)
500-750	35 feet (7.6 meters)
750-1,000	45 feet (10.7 meters)
over 1000	(as established by the utility owner/operator or registered professional engineer who is a qualified person with respect to electrical power transmission and distribution.

c) The power line(s) has been isolated through the use of insulating blankets that have been properly placed by the utility. If insulating blankets are used, the utility will determine the minimum safe operating distance; get this determination in writing with the utility representative's signature.

3. All inquiries regarding electric utilities must be made in writing and a written confirmation of the outage/isolation must be received by the Project Manager/Superintendent prior to the start of work.

D. Underground Utilities

1. Do not begin subsurface work (e.g., trenching, excavation, drilling, etc.) until a check for underground utilities and similar obstructions has been conducted. The use of as-built drawings must be confirmed with additional geophysical or other survey.

2. Contact utility companies or the state/regional utility protection service at least two (2) working days prior to excavation activities to advise of the proposed work, and ask them to establish the location of the utility underground installations prior to the start of actual excavation.

   Obtain utility clearances for subsurface work on both public and private property. Clearances are to be in writing, signed by the party conducting the clearance.

3. Protect and preserve the markings of approximate locations of facilities until the markings are no longer required for safe and proper excavations. If the markings of utility locations are destroyed or removed before excavation commences or is completed, the Project Manager must notify the utility company or utility protection service to inform them that the markings have been destroyed.

4. Do not conduct mechanical-assisted subsurface work (e.g., powered drill rig, mechanical excavator, etc.) within five (5) feet of a confirmed or suspected utility or other subsurface structure. Confirm minimum distances for mechanical-assisted subsurface work with the utility owner, as distances beyond this five foot minimum may be required.

5. Subsurface work within five feet of a confirmed or suspected utility or other subsurface structure must be done by hand (e.g., hand auger, shovel) to the point where the obstruction is visually located and exposed. Once the obstruction location is confirmed in this manner, mechanical-assisted work may commence.

6. Reference SMS 10, "Excavation Safety" for additional information regarding subsurface operations.

E. Training

Conduct a site briefing for site employees regarding the hazards associated with working near the utilities and the means by which the operation will maintain a safe working environment. Detail the method used to isolate the utility and the hazards presented by breaching the isolation.

5.0 Documentation Summary

File these records in the Project Safety File:

A. Documents requesting utility clearance.

B. Documents confirming utility clearance.

C. Training/briefing documentation of each isolation.

6.0 Resources

A. Utility Locating Services (typically under "Utility" in the Yellow Pages)
B. NIOSH Alert - Preventing Electrocutions from Contact Between Cranes and Power Lines
(http://www.cdc.gov/niosh/crane.html)
C. One Call Utility Locating List
(http://www.underspace.com/refs/ocdir.htm)
D. National Utility Location Contractor's Association
(http://www.underspace.com/nu/index.htm)

ADVANCED AMERICAN CONSTRUCTION, INC. SAFETY MANAGEMENT STANDARD

WATER SAFETY & WATER SURVIVAL

1.0 Applicability

This procedure applies to Advanced American Construction, Inc. projects, which are conducted at location inland lake, streams, and rivers, and offshore oceans.

2.0 Purpose and Scope

The purpose of this program is to protect and inform project personnel of requirements and safety issues associated with working on/near the water.

3.0 Implementation

Field Activities - Implementation of this procedure is the responsibility of the Project Manager/Superintendent. Pertaining information contained herein shall be included in project Job Safety Analysis (JSA), and job specific training shall be conveyed and documented through frequent safety meetings. Documentation of training shall be maintained through project records.

4.0 Requirements

A. Personal Protective Equipment (PPE)

1. Employees working over or near water, where the danger of drowning exists, shall be provided with U.S. Coast Guard-approved life jackets or buoyant work vests.

    a) Life Jacket (PFD) shall be a Coast Guard Approved Types I, II, III or V for each person aboard.

    b) Life Jacket (PFD) shall be worn per manufactures instructions. Device shall be zipped and buckled.

    c) Perform routine inspection of personal floatation devices for integrity. Replace deteriorated PFD, and dispose of inoperable units.

2. Type IV (throwable device) shall be located in an accessible location, complete with 300’ rope.

B. Boating / Vessel Transportation

1. Licensing
   a) Operators of vessels shall be licensed according to current US Coast Guard and Oregon State Standard, and documentation shall be maintained in Company maintained personnel files.

   b) Operator (Captain) of the vessel has the authority of maintaining and monitoring conduct of the vessel, including:
      (1) Vessel capacity
      (2) Vessel Cargo
      (3) Personnel / Passengers
      (4) Sea State
      (5) Work Activity

2. Alcohol and Substance Abuse
   a) Operators of commercial vessels in behalf of AAC will be required to comply with ADVANCED AMERICAN CONSTRUCTION, INC. SERVICE, INC. DRUG AND ALCOHOL POLICY FOR USE WITH DOT/USCG REGULATED EMPLOYEES. (SMS 32)

3. Communication
   a) Vessels shall monitor and maintain communication with navigational traffic through VHF radio.
      (1) Coast Guard VHF Channel 16
      (2) US Army Corp of Engineers VHF Channel 14
      (3) Advanced American Construction, Inc. Working Activity VHF Channel 69

   b) Emergency – To be implemented for Man Overboard or Vessel Distress.
      (1) Emergency Services Phone Numbers applicable to the project location shall be posted.

      (2) Vessel Distress may be broadcasted via dedicated distress and calling frequencies VHF Channel 16. Use **"MAYDAY, MAYDAY, MAYDAY"** on the radio. Upon initial contact with USCG, State:

      (i)

      - Your location or position
      - Exact nature of the problem
      - Number of people on board
      - Description of your boat

- Safety equipment on board
- Your boat name and registration
- Any special problems.

(ii) Contact on regular intervals, State:

- Medical emergency developments
- Storm / sea state conditions
- You begin to take on water
- Your last reported position changes.

4. Vessel Personnel Orientation

a) Employees are required to familiarize themselves with vessels they are working aboard. Orientation and training is the responsibility of the onsite Superintendent. Orientation required for:

(i) Location of Safe Practices Manuals

(ii) Location of MSDS Manuals

(iii) Location of Emergency Action Plans

(iv) Location of Applicable Emergency Phone Numbers.

(v) Location of First Aid Equipment

(vi) Location of Safety Equipment (Life Jackets, Life Rings, etc.)

(vii) Orientation with Deck Equipment.

b) Boarding of Vessels by others (non employee or non essential personnel) must be granted Permissions by a Company Officer prior to access on vessels.

C. Cold Water Survival

1. Proper use of Personal Floatation Device (PFD)

a) PFD should be of snug fit, and worn to manufacture recommendation.

2. Personnel exposure to cold water (Man Overboard)

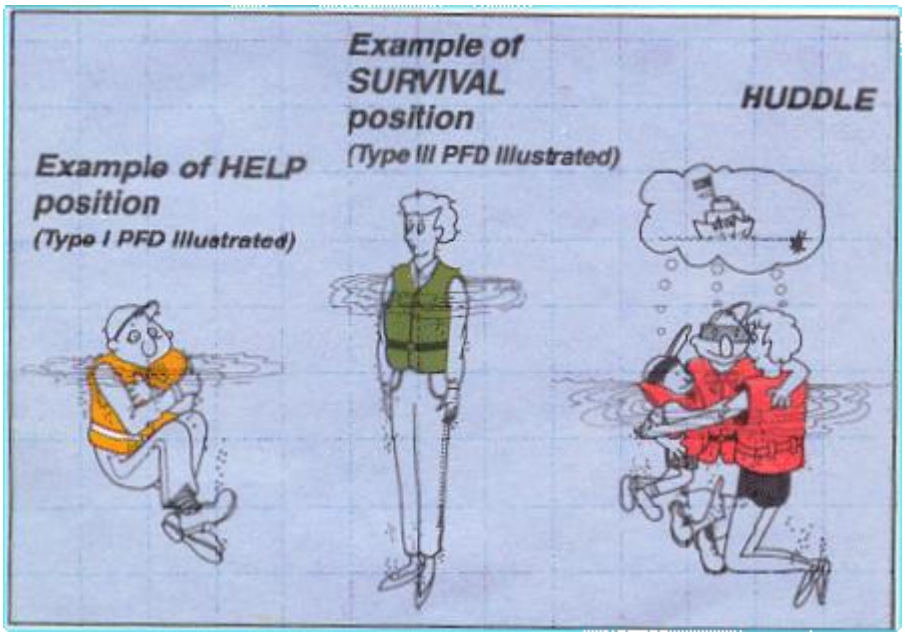
a) Minimize movement, do not swim unless can reach a fellow survivor, boat, or floating object.

b) Swimming lowers body temperature.

c) Maintain head and body out of the water to fullest extent possible. If available, pull up on large debris to decrease body exposure to water.

d) If other personnel are in the water, Huddle together for warmth.

e) Survival Position:



D. Marine Litter

1. Construction debris and garbage is to be deposited in appropriate storage containers. Scheduled maintenance for disposal to approved upland disposal site.

2. Portable toilets capable of crew capacities are to be established on location. Scheduled maintenance of units is required.

5.0 Documentation Summary

File these records in the Project Safety File:

1. Employee acknowledgment of Advanced American Construction, Inc. Service Company Policy regarding the proper use of Personal Floatation Devices (PFD).

2. Licensing documentation for Registered Vessel Operators

3. Operators of Vessels DOT / USCG registered with the Advanced American Construction, Inc. Service Substance Abuse Policy.

6.0 Resources

A. U.S. OSHA Standard – Personal Protective Equipment - 29 CFR 1926.106(a)
(http://www.osha.gov/doc/outreachtraining/htmlfiles/osha2202.html#construction)
B. U.S. Coast Guard – Marine Safety and Environmental Protection -Volume 3
(http://www.uscg.mil/hq/g-m/nmc/pubs/msm/vol3.htm)
C. U.S. Coast Guard – Marine Safety Center
(http://www.uscg.mil/hq/msc/referenc.htm)

ADVANCED AMERICAN CONSTRUCTION, INC. SAFETY MANAGEMENT STANDARD

WORK ZONE TRAFFIC CONTROL

1.0 Applicability

This procedure applies to Advanced American Construction, Inc. field operations involving work performed on roads, highways, and similar areas where motor vehicles may be a hazard.

2.0 Purpose and Scope

This procedure is intended to protect personnel from the hazards associated with work performed on or next to highways and roads.

3.0 Implementation

Field Activities - Implementation of this program is the responsibility of the Project Manager.

4.0 Requirements

A. Review the project in the planning phase to determine if any work will be performed on or adjacent to any road that will disrupt normal traffic flow.

B. Hire a qualified contractor or have an in house Competent Person devise a traffic control plan based on the work to be performed.

1. Competent persons are those who are knowledgeable about the fundamental principles of temporary traffic control and the work activities to be performed.

2. Traffic control plans will be designed to meet requirements as set in the Manual on Uniform Traffic Control Devices (MUTCD) (Resource A) as well as those rules set by state, county and cities in which work is performed.

3. Require that the plan is commensurate with the complexity of the project.

C. Submit the traffic control plan to the road authority for approval.

1. Submissions will be made to the state department of transportation or highways if state or federal highways are impacted as well.

2. Local county representatives.

3. Local city representatives, if within city limits.

D. Decide whether to have qualified in house personnel or contract personnel implement the traffic control plan in the field.

1. Certified flaggers may set up work zones.

   Flaggers must attend an eight-hour work zone traffic control course as taught by an ATSSA certified instructor (or equivalent).

2. Obtain appropriate traffic control equipment as described in Resource A.

E. Execute the traffic control plan developed for the job site. Require all personnel who work on/or adjacent to the roadway to wear bright orange, strong yellow-green or fluorescent versions of these colors of approved work zone clothing, including:

1. Vests, at a minimum.
2. Coveralls, if desired.
3. Rainwear or other apparel as needed.

F. Require that a Competent Person who is certified as a Worksite Traffic Supervisor supervises flaggers at least once a day.

G. Develop a plan for the periodic inspection and maintenance of the Traffic Control Zone utilizing Attachment 1.

5.0 Documentation Summary

Records required in the Project Safety File:

A. Copies of traffic control plans used on site.

B. Training certificates for Advanced American Construction, Inc. flaggers and Competent Persons.

C. Qualifications of contracted flaggers and Competent Persons.

D. Inspection records.

6.0 Resources

A. Part VI of the Manual on Uniform Traffic Control Devices (MUTCD)
(http://www.ohs.fhwa.dot.gov/devices/mutcd.html)

B. American Traffic Safety Services Association
(http://www.atssa.com/)
C. ATTSA Flagger Train the Trainer Program
(http://www.flagger.com/)

Advanced American Construction, Inc. Health & Safety Program
TRAFFIC CONTROL INSPECTION CHECKLIST

Project Name:_____ Project Number:_____

Item	Yes	No	How Many?
1. Are any devices missing?			
Do any devices need repair?			
Were all replaced or repaired?			
2. Are any lights (flashers, etc.) not functioning?			
Were they all replaced or repaired?			
3. Are any devices improperly placed?			
Were all positions corrected?			
4. Do any devices need cleaning?			
Were all devices cleaned?			
Additional comments:			

The above check was completed by:_____
(name/title)

on _____ at _____ ❑a.m. ❑p.m.
(date) (time)

ADVANCED AMERICAN CONSTRUCTION, INC. SAFETY MANAGEMENT STANDARD
WORKER RIGHT TO KNOW (HAZARD COMMUNICATION)

1.0 Applicability
This procedure applies to all operations.

2.0 Purpose and Scope

The worker right-to-know program provides Advanced American Construction, Inc. personnel with information and training about safety and health hazards associated with the chemicals they might encounter in the workplace. This procedure describes how chemical safety hazards are communicated to personnel working in offices, shops and at field site locations, and how information is to be provided to employees of other employers working at the location. The requirements include steps to acquire this information, maintain it, and train everyone to use it.

3.0 Implementation

Office Locations:	Implementation of this procedure is the responsibility of the Office Manager.
Shop Locations:	Implementation of this program is the responsibility of the Shop Manager.
Field Activities:	Implementation of this program is the responsibility of the Project manager/Superintendent.

4.0 Requirements

A. Hazardous Material Inventory

1. Advanced American Construction, Inc. will implement, and maintain at each workplace, a written hazard communication program which at least describes how the criteria for labels and other forms of warning, material safety data sheets, and employee information and training will be met, and which also includes the following:

    a. The methods used to inform employees of the hazards of non-routine tasks (for example, the cleaning of reactor vessels), and the hazards associated with chemicals contained in unlabeled pipes in their work areas.

b. “Multi-employer workplaces.” Employers who produce, use, or store hazardous chemicals at a workplace in such a way that the employees of other employer(s) may be exposed (for example, employees of a construction contractor working on-site) shall additionally ensure that the hazard communication programs developed and implemented under this paragraph (b) include the following:

c. The methods Advanced American Construction, Inc. will use to provide the other employer(s) on-site access to material safety data sheets for each hazardous chemical the other employer(s)’ employees may be exposed to while working;

2. Maintain a hazardous material inventory that lists all of the hazardous materials used at this workplace. Use chemical names consistent with the applicable MSDS's.

3. File a copy of the chemical inventory in the Safety Filing System.

B. Material Safety Data Sheets (MSDS's)

1. Obtain a MSDS for each chemical before it is used.

2. Review each MSDS when it is received to evaluate whether the information is complete and to determine if existing protective measures are adequate.

3. Maintain a collection of all MSDS's where they are accessible at all times.

4. Replace MSDS sheets when updated sheets are received. Communicate any significant changes to those who work with the chemical.

5. MSDS's are required for all hazardous materials used on site by project personnel.

C. Labels

Label all chemical containers with:

1. Identity of the hazardous chemical(s),
2. Appropriate hazard warnings, or alternatively, words, pictures, symbols, or combination thereof, which provide at least general information regarding the hazards of the chemicals, and which, in conjunction with the other information immediately available to employees under the hazard communication program, will provide employees with the specific

information regarding the physical and health hazards of the hazardous chemical.
3. Name and address of the chemical manufacturer, importer, or other responsible party.
4. Employer or employees shall not remove or deface labels on incoming containers of hazardous chemicals.

D. Hazardous Non-routine Tasks

Periodically, employees are required to perform hazardous non-routine tasks. Prior to starting work on such projects, provide each employee with information about hazards to which they may be exposed during such an activity.

This information will include:

1. Specific chemical hazards.
2. Protective/safety measures which must be utilized.
3. Measures that have been taken to lessen the hazards including ventilation. respirators, presence of another employee and emergency procedures.

E. Informing Contractors/Subcontractors

Provide contractors/subcontractors the following information on the chemicals used by or provided to personnel:

1. Names of hazardous chemicals to which they may be exposed while on the jobsite.
2. Precautions the employees may take to lessen the possibility of exposure by usage of appropriate protective measures.
3. Location of MSDS's and written chemical inventory.

F. Training

1. Conduct training of all employees potentially exposed to hazardous Materials on the following schedule:

   a) Before new employees begin their jobs.
   b) Whenever new chemicals are introduced into the workplace, or
   c) Annually thereafter

2. This training will include:

   a) Applicable regulatory requirements.
   b) Names of those responsible for implementing this program.

c) Location of the program, inventory and MSDS.
d) Chemicals used, and their hazards (chemical, physical and health).
e) How to detect the presence or release of chemicals.
f) Safe work practices.
g) How to read an MSDS.

3. Document the training.

G. Program Audit

Annually, an audit of the program and its effectiveness shall be performed. Documentation of the audit is to be kept . Appendix 1 outlines the audit Procedure and form.

H. Non-English Speaking Employees

1. Labels shall be legible, in English.
2. Non-English speaking employees, information will be provided in their language as well.

5.0 Documentation Summary

A. File these records in the Safety Filing System:

1. Chemical Inventory.
2. Location of the MSDS inventory.
3. Training records.
4. Contractor/Subcontractor notifications.
5. Annual Audit Report.

6.0 Resources

A. U.S. OSHA Technical Links - Hazard Communication
(http://www.osha-slc.gov/SLTC/hazardcommunications/index.html)
B. U.S. OSHA Standards – 29 CFR – Hazard Communication 1910.1200

ADVANCED AMERICAN CONSTRUCTION, INC. SAFETY MANAGEMENT STANDARD

WORKING OVER WATER

1.0 Applicability

This procedure applies to Advanced American Construction, Inc. projects where personnel will work above or immediately adjacent to water where a drowning hazard exists.

2.0 Purpose and Scope

This procedure is intended to protect employees from drowning while working above or adjacent to water.

3.0 Implementation

Field Activities - Implementation of this procedure is the responsibility of the Project Manager/Superintendent.

4.0 Requirements

A. Review the project in the planning phase to determine if any work will occur above or immediately adjacent to water where a drowning hazard exists. In general, a risk of drowning (ROD) is present when:

1. Employees perform work on or under bridges without constant protection from falling into the water, or

2. Working surfaces at riverbanks slope so steeply that an employee could slip or fall into the water when no portable protection (like roping off) is used.

NOTE: Employees working on or under bridges who are constantly protected by guardrail systems, nets, or body belt/harness systems are deemed to be adequately protected from the danger of drowning and are not required to wear life jackets or buoyant work vests.

B. If any activities pose a risk of drowning do the following during the activity:

1. Provide employees with an approved (USCG for U.S. operations) life jacket or buoyant work vest. Employees should inspect life jackets or work vests daily before use for defects. Do not use defective jackets or vests.

2. Post ring buoys with at least 90 feet of line next to the work area. If the work area is large, post extra buoys 200 feet or less from each other.

3. Provide at least one life saving skiff, immediately available at locations where employees are working over or adjacent to water. Require that the skiff is in the water and capable of being launched by one person and is equipped with both motor and oars.

4. Designate at least one employee on site to respond to water emergencies and operate the skiff at times when there are employees above water.

    a) If the designated skiff operator is not within visual range of the water, provide him or her with a radio or provide some form of communication to inform them of an emergency.
    b) Designated employee should be able to reach a victim in the water within three to four minutes.

5. Require that at least one employee trained in CPR and first aid is on site during work activities.

5.0 Documentation Summary

Records required in the Project Safety File:

Copy of the fall protection plan designed for work activities – (as necessary)

6.0 Resources

A. U.S. OSHA Standard - Working Over or Near Water - 29 CFR 1926.106
(http://www.osha-slc.gov/OshStd_data/1926_0106.html)

ADVANCED AMERICAN CONSTRUCTION, INC. SAFETY MANAGEMENT STANDARD

WORKPLACE VIOLENCE PREVENTION PROGRAM

1.0 Applicability

This procedure applies to Advanced American Construction, Inc. operations.

2.0 Purpose and Scope

The purpose of this procedure is to establish procedures to minimize the potential for work related violence to occur, and to effectively handle potential situations and events.

3.0 Implementation

Office Locations- Implementation of this procedure is the responsibility of the Office Manager.

Shop Locations- Implementation of this procedure is the responsibility of the Shop Manager Foreman.

Field Activities- Implementation of this procedure is the responsibility of the Project Manager.

4.0 Requirements

A. Policy Statement

For many occupations, workplace violence represents a serious occupational risk. Acts such as physical assault or the threat of physical assault are considered workplace violence. Homicide is the second leading cause of all job-related deaths and the leading cause of such deaths for women, according to the Bureau of Labor Statistics (1994). For each murder, there are countless other incidents of workplace violence in which victims are threatened or injured. The financial costs of assault from injuries, lost work time, and restricted duty are tremendous.

The Occupational Safety and Health (OSH) Act's General Duty Clause requires employers to provide a safe and healthful working environment for all workers covered by the OSH Act of 1970. Recognized violence hazards in the workplace require our organization to take feasible steps and to exercise the procedures outlined in this program.

B. Actions to Prevent Violence

1. Reporting Of Incidents Or Concerns

   Employees are required to report any suspicious behaviors to their manager immediately. All situations will be addressed and if needed authorities contacted for assistance. Report all violent incidents in writing to the supervisor, even if there were no injuries, or direct confrontation.

2. Hiring Practices

   Our organization's Human Resources Policies and Procedures dictates that all applicants be interviewed, and that references and backgrounds be checked to verify application information. These procedures are to be followed in all cases.

3. Training

   Since workers may be reluctant to report assaults, awareness training will be provided annually and at orientation to promote awareness of the dangers of workplace violence, and clearly articulate goals and plans for preventing it. Training will address:

   a) awareness, avoidance and prevention of mugging, robbery, rape, and other assaults.

   b) Use of a communication system, such as a cellular phone, for employees to use while in the field.

   c) Instruction to alert employees not to enter any location where they feel unsafe. Utilization of the "buddy system," escort service, or police assistance in potentially dangerous situations or at night.

   d) Establishment of procedures to decrease the risk robbery (e.g., procedures for processing and retaining any monies or valuables).

   e) Requirement for field staff to prepare a daily work plan and keep a contact person informed of their location throughout the day.

   f) Proper maintenance of employer provided vehicles.

   g) Where applicable, the provision to field personnel of hand held alarms or noise devices.

   h) Discussion on recognizing, avoiding, or diffusing potentially violent situations.

   i) Procedures for alerting management to any concerns about safety or security.

C. Follow-up When Violence Occurs

If a violent or potentially violent situation occurs, the following procedures are required to be followed:

1. All employees are required to report all incidents and threats of workplace violence. These will be logged by management and promptly reported to the local police department.

2. If needed, prompt medical evaluation and treatment after each incident, regardless of severity will be provided.

3. Victims of workplace violence will be informed of their legal right to prosecute perpetrators.

4. Discussions as appropriate will be held with other staff members of the circumstances of incidents. Open communication will be encouraged for employees to share information about ways to avoid such problems in the future. Workers who have been assaulted or seen co-workers attacked have reported experiencing short and long term psychological trauma, fear of returning to work, and changes in relationships with co-workers and family. Critical incident stress debriefing sessions and post-trauma counseling services will be established when needed to help workers recover from a violent incident.

5. All violent incidents and threats will be investigated. Trends will be monitored by type or circumstance, and corrective actions instituted.

5.0 Documentation Summary

File the following documents in the Office/Shop/Project Health and Safety File

A. Training Records

1. Training records will include the date of training session, summary of the contents of the training session and the names and qualifications of the persons presenting the training.
2. All attendees to training will sign a log with name and job title.
3. Training records will be maintained for three years from the date on which the training occurred.

B. Availability

1. All records will be available to the Oregon Occupational Safety and Health Division for examination and copying.

2. Training records and Incident Reports will be available upon request for examination and copying to employees, their representatives, the Oregon Occupational Safety and Health Division.

C. Incident Investigation Forms, and support information.

6.0 Resources

National Institute of Occupational Safety and Health (NIOSH) - information on preventing workplace homicides, telephone 1-800-356-4674.

Workplace Violence: A Report to the Nation. The University of Iowa Injury Prevention Research Center (2001, February), 331KB PDF. This report summarizes the problem of workplace violence and the recommendations identified by participants at the Workplace Violence Intervention Research Workshop in Washington, D.C., April, 2000. The workshop brought together 37 invited participants representing diverse constituencies within industry, organized labor, municipal, state, and federal governments, and academia.

OSHA Recommends Protective Measures to Help Prevent Violence Against Taxi Drivers. OSHA National News Release (2000, May 9), 2 pages.

Risk Factors and Protective Measures for Taxi and Livery Drivers. OSHA Facts (2000, May), 40KB PDF file.

Workplace Violence. OSHA Summary Sheet (1999), 2 pages.

Guidelines for Preventing Workplace Violence for Health Care and Social Service Workers. OSHA Publication 3148 (1998). Also available as a 168KB PDF file.

Recommendations for Workplace Violence Prevention Programs in Late-Night Retail Establishments. OSHA Publication 3153 (1998). Also available as a 110KB PDF file.

Stress at Work. DHHS (NIOSH) Publication No. 99-101 (1999), 32 pages. Job stress poses a threat to the health of workers and, in turn, to the health organizations, this booklet highlights knowledge about the causes of stress at work and outlines steps that can be taken to prevent job stress.

Recommendations for Night Retail Workers. Press Conference speech by Charles N. Jeffress on Worker Memorial Day (1998, April 28), 2 pages. Common sense recommendations to reduce workplace violence.

Dealing with Workplace Violence: A Guide for Agency Planners. U.S. Office of Personnel Management (1998). This handbook is the result of a cooperative effort of many Federal agencies sharing their expertise in preventing and dealing with workplace violence. It is intended to assist those who are responsible for establishing workplace violence initiatives at their agencies. PDF version is available in two forms: as individual chapters, and as a single 1.78MB PDF file.

Workplace Violence Initiative. OSHA (1996), 1 page. A list of links related to the Workplace Violence Initiative.

Long Island Coalition for Workplace Violence Awareness & Prevention. OSHA and The Long Island Coalition for Workplace Violence Awareness and Prevention (1996, February), 30 pages. Includes facts and figures about workplace violence, elements of a workplace violence prevention program, and a sample program.

Protecting community workers against violence. OSHA Program Highlights (Fact Sheet 96-53).

Workplace Violence, 1992-96. U.S. Dept. of Justice (revised: 1998, July 18). Analysis of workplace violence from a crime victimization survey from the Bureau of Justice Statistics.

New Directions from the Field: Business Community. U.S. Dept. of Justice, 145 KB PDF file. Provides practical advice for the business community on dealing with the victims of workplace violence.

Training

OSHA's Training Materials for Workplace Violence. OSHA Office of Training and Education.

Violence in the Workplace – Risk Factors and Prevention Strategies. DHHS (NIOSH) Current Intelligence Bulletin 57 (1996, July).

What You Should Know About Coping with Threats and Violence in the Federal Workplace. Federal Protective Service.

Workplace Violence: Can You Close the Door On It? American Nurses Association.

Violence in the Workplace: A Resource Guide. This resource guide is a component of an educational program initiated by the Registered Nurses' Association of Nova Scotia (RNANS) as a result of a resolution passed at the 1995 Annual General Meeting. It can be used independently or in conjunction with the video produced by RNANS, entitled "Violence in the Workplace." Also available as a 64KB PDF file.

Violence in the Workplace / Oregon, 1991-1995. Department of Consumer & Business Services (1996, December), 66KB PDF file. A Study of Workers' Compensation Claims Caused by Violent Acts, 1991 to 1995.

Developing an Effective Violence Prevention Program. Oregon OSHA Online Course 120.

Cal/OSHA Guidelines for Workplace Security. State of California.

Violence in the Workplace - The Workplace Violence Prevention Resource Center. Minnesota Department of Labor & Industry.

Human Resources & Risk Management - Workplace Violence Prevention. University of California - Davis.

ADVANCED AMERICAN CONSTRUCTION, INC. SAFETY MANAGEMENT STANDARD

Cal/OSHA Electric Welding

1.0 Applicability

This procedure applies to Advanced American Construction, Inc. projects involving all electrical equipment when used to perform electric welding, cutting, heating and other operations and processes pertaining to electric welding and includes resistance brazing and resistance soldering. The definitions for resistance brazing and resistance soldering as contained in American National Standards Institute/American Welding Society, ANSI/AWS A3.0-94, Standard Welding Terms and Definitions, are hereby incorporated by reference.

2.0 Purpose and Scope

All electrical equipment used to perform operations and processes noted above, shall be installed and maintained in accordance with the California Electrical Safety Orders and chapters 11, 12 and 13 of the American National Standards Institute, ANSI/ASC Z49.1-94, Safety in Welding, Cutting and Allied Processes, which are hereby incorporated by reference.

3.0 Implementation

Field Activities - Implementation of this procedure is the responsibility of the Project Manager/Superintendent.

Shop - Implementation of this procedure is the responsibility of the Shop Manager.

4.0 Requirements

Arc Welding and Cutting:

(a) Where the work permits, the welder shall be enclosed in an individual booth painted with a finish of low reflectivity, such as zinc oxide and lamp black, or shall be enclosed with noncombustible screens having a similar low reflectivity finish. Booths and screens shall permit circulation of air at floor level. Workers or other

persons adjacent to the welding areas shall be protected from the rays by noncombustible or flameproof screens or shields or shall be required to wear appropriate goggles.

(b) Welding machines shall be left on the outside of a confined space and heavy portable equipment shall be blocked to prevent accidental movement.

(c) When operations are suspended for any substantial period of time, such as during lunch or overnight, welding machines shall be shut off at some point outside the confined space. Where practicable, the electrodes and electrode holders shall be removed from the confined space. All electrodes shall be removed from the holders and the holders carefully located to prevent accidental contact. Upon completion or discontinuance of welding operations, the welder shall provide some means of warning other workers of the location of hot metal.

(d) Manual Electrode Holders.

1. Advanced American Construction, Inc. will ensure that only manual electrode holders intended for arc welding and cutting and capable of handling the maximum current required for such welding or cutting shall be used.

2. Current-carrying parts passing through those portions of the holder gripped by the user and through the outer surfaces of the jaws of the holder shall be insulated against the maximum voltage to ground.

(e) Welding Cables and Connectors.

1. Arc welding and cutting cables shall be insulated, flexible and capable of handling the maximum current required by the operations, taking into account the duty cycles.

2. Only cable free from repair or splice for 10 feet (3m) from the electrode holder shall be used unless insulated connectors or splices with insulating quality equal to that of the cable are provided.

3. When a cable other than the lead mentioned in Subsection (e)(2) wears and exposed bare conductors, the portion exposed shall not be used until it is protected by insulation equivalent in performance capacity to the original.

4. Insulated connectors of equivalent capacity shall be used for connecting or splicing cable. Cable lugs, where used as connectors, shall provide electrical contact. Exposed metal parts shall be insulated.

(f) Ground Returns and Machine Grounding.

1. Ground return cables shall have current-carrying capacity equal to or exceeding the total maximum output capacities of the welding or cutting units served.

2. Structures or pipelines, other than those containing gases or flammable liquids or conduits containing electrical circuits, may be used in the ground return circuit if their current-carrying capacity equals or exceeds the total maximum output capacities of the welding or cutting units served.

3. Structures or pipelines forming a temporary ground return circuit shall have electrical contact at all joints. Arcs, sparks or heat at any point in the circuit shall cause rejection as a ground circuit.

4. Structures or pipelines acting continuously as ground return circuits shall have joints bonded and maintained to ensure that no electrolysis or fire hazard exists.

5. Arc welding and cutting machine frames shall be grounded, either through a third wire in the cable containing the circuit conductor or through a separate wire at the source of the current. Grounding circuits shall have resistance low enough to permit sufficient current to flow to cause the fuse or circuit breaker to interrupt the current.

6. Ground connections shall be mechanically and electrically adequate to carry the current.

(g) When electrode holders are left unattended, electrodes shall be removed and holders placed to prevent employee injury.

(h) Hot electrode holders shall not be dipped in water.

(i) Advanced American Construction, Inc. will ensure that when arc welders or cutters leave or stop work or when machines are moved, the power supply switch shall be kept in the off position.

(j) Arc welding or cutting equipment having a functional defect shall not be used.

(k) The control apparatus of arc welding machines shall be enclosed except for operating wheels, levers, and handles.

(l) Input power terminals, top change devices and live metal parts connected to input circuits shall be enclosed and accessible only by means of insulated tools.

(m) When arc welding is performed in wet or high humidity conditions, employees shall use additional protection, such as rubber pads or boots, against electric shock.

(n) Training

1. Insist that cutters or welders and their supervisors are suitably trained in the safe operation of their equipment and the safe use of the process.

5.0 Resources

A. Cal/OSHA T8 CCR 4850
B. Cal/OSHA T8 CCR 4851

ADVANCED AMERICAN CONSTRUCTION, INC. SAFETY MANAGEMENT STANDARD

Working Alone

1.0 Applicability

This program applies to all Advanced American Construction, Inc. facilities and operations.

2.0 Purpose and Scope

Controlling the hazards and having a plan in place is essential to reducing problems related to working alone. While it is not hazardous to work alone, it can be when other circumstances are present. Whether a situation is high or low risk will depend on location, type of work, or the consequences of an emergency, accident, injury, ect. This wide variety of circumstances makes it important to assess each situation individually.

3.0 Implementation

Office Locations – Implementation of this program is the responsibility of the Office Manager

Shop Locations - Implementation of this program is the responsibility of the Shop Manager/Foreman

Field Activities - Implementation of this program is the responsibility of the Project Manager

4.0 Requirements

a) When workers are required to work alone a hazard assessment must be done. The hazard assessment shall address hazards and identify control measures in order to minimize risk associated with working alone. High-risk activities are the greatest concern for employees working alone.
High-risk activities can involve risks from a variety of sources such as:
Work at heights
Confined spaces
Electrical
Hazardous substances or materials
Hazardous equipment
Based on the assessment a plan must be implemented and communicated to control the risk faced by the lone worker. The plan must include all needed training ensuring that all involved clearly understand their role and duties.

A check–in procedure must be established. Employees need to be contacted either verbally or visually. Individuals must be monitored at regular intervals, or the individual contacts the employer at pre-determined intervals based on determinations made in the risk assessment. The time intervals for checking the single employee's well-being must be understood and agreed to by all parties. Intervals should reflect the hazardous nature of the work and the methods available for checking.

Workers must carry a cellular phone or electronic monitoring device at all times while working alone. The use of a cell phone or a company radio is the best option. In areas where reception is not dependable, the employee must be physically checked on.

b) The immediate supervisor is the person responsible for checking on any employee working alone in their crew. A back-up system of verifying the status of the lone worker is essential. For example if radio or phone contact cannot be established the supervisor must immediately make a physical check. Whenever there is any doubt a physical check must be done. Check times and worker status must be documented.

c) In the event that a worker does not respond when a verbal check is made the immediate supervisor must investigate. Other employees must accompany the supervisor to assist. If the employee cannot be found the site-specific emergency action plan must be initiated.

5.0 Documentation Summary

6.0 Resources

a) General Working Conditions - 29 CFR 1915.84
b) Oregon Administrative Rules 437-007-0210