

Development of API Selection and Training Guidelines for *in situ* Burning Personnel

James Patrick O'Brien
API Principal Contractor
D & E Technical, Inc.
1008 W. William Street
Champaign, IL 61821

Patrick S. McCaffrey
API Project Leader
Marathon Petroleum Co., LP
539 S. Main St
Findlay, OH 45840

ABSTRACT

Guidance for in situ burning of oil spills has been developed under the auspices of the Joint Industry Oil Spill Preparedness and Response (OSPR) Task Force (JITF) and the American Petroleum Institute (API), Oil Spill, Emergency Preparedness & Response Subcommittee (OSEPR). These groups convened to evaluate the procedures and lessons learned during the *Deepwater Horizon* oil spill response. The initial focus was to identify potential opportunities for improvement to the oil spill response system. One of the categories addressed by the JITF and OSEPR was *in situ* burning of spilled oil. Within this category a number of projects were identified to be worked on by individual project teams. One of those projects was to develop selection and training guidance for oil spill responders to *in situ* burns. Consequently, a project team was formed of volunteers representing the oil and gas industry, federal and state government, subject matter experts, oil spill response organizations and manufacturers of relevant equipment.

INTRODUCTION

This paper is intended to promote the awareness and use of the guidelines. The body of the paper is both a description of the project to put the guidelines together and excerpts from the guidelines to give the reader a better feel for the content within the guidelines.

The guidelines were created to fulfill one improvement opportunity identified in the JITF report on the *Deepwater Horizon* spill. A project team was recruited to assist and develop the guidelines. The team consisted of a cross functional selection of experts from industry, contractors and regulators with experience in the spill response arena and having a background in *in situ* burning of oil. Several early decisions by the project team were: 1) to ensure that the guidelines would recognize experience of those who had previously performed on an *in situ* burn

team, and 2) to be flexible so that training could be adjusted to reflect that needed for the size and complexity of the burn. Additionally, it was recognized that in smaller burns, one person may fill multiple positions on the burn team.

BUILDING THE GUIDELINES

The approach the project team took was to break down burn situations into three scenarios including: open water, terrestrial and ice conditions. Open water conditions are intended to cover situations where burning is conducted primarily from boats. Terrestrial conditions are intended to cover burns conducted primarily on or from land. Ice conditions are intended to cover those burns where there is ice over water or land, which significantly alters burn tactics. The project team made a deliberate decision to exclude *in situ* burning of vessels. The team lacked the expertise to properly evaluate the training needs and vessel burning was not within the scope of its JITF-API assignment.

The project team reviewed several other training standards for format and was most impressed by NFPA standard 472, which specifies competencies per job objective. That standard's general format seems to fit the needs for describing training and experience for *in situ* burning.

The previous lack of guidelines for *in situ* burns has led to a lack of standardization for response structures at the tactical level. Particularly, jobs and job descriptions varied across organizations conducting burn. The project team considered job functions to come up with ten standardized job descriptions into which all *in situ* burn activities could be fit:

- 1) The Burn Boss is the tactical lead of the burn team(s). Burn Boss is a term borrowed from the wildland firefighting operations. Under the National Incident Management System (NIMS) the Burn Boss would be an Operations Supervisor, or perhaps the

Incident Commander on a small isolated response. The Burn Boss is responsible to approve all aspects of *in situ* burn operations but may be assisted by the recommendations of the Safety Officers, Air Monitoring Specialists, the environmental unit (if one is stood up), Vessel Captains, and other subject matter experts.

- 2) The Safety Officer of the *in situ* burn operation is that person who works within an incident command system to ensure that recognized safe practices are followed by all involved personnel throughout the conduct of the *in situ* burn. This safety officer will be called upon to provide technical advice or assistance regarding safety issues to the *in situ* burn boss and to the overall incident Safety Officer at an oil spill involving response activities in addition to *in situ* burning.
- 3) A Vessel Captain is in overall charge of an individual vessel and has the final authority for the safety and navigation of the vessel. This person navigates and steers, or directs the steering of vessels during *in situ* burning operations for spilled oil. This person supervises the loading, unloading, operating signal devices, and the repair of defective marine equipment.
- 4) A Fire Suppression Specialist is a firefighter with specific training or experience to safely and effectively function within an incident command system at an *in situ* burn operation. This person constructs firebreaks, and if necessary extinguishes fire in non-target areas during an *in situ* burning operation for spilled oil. This person uses manual tools, operates fire apparatus, and drives firefighting support vehicles. This person may operate earthmoving equipment if they have sufficient training and experience.

- 5) An Ignition and Spill Control Agent Specialist for *in situ* burning of spilled oil response has the knowledge and experience to deploy hand-held ignition systems to initiate an *in situ* burn and, with appropriate approvals, to deploy spill control agents such as herding agents to contain and concentrate spilled oil or emulsion breakers to assist in ignition and enhance the efficiency of an *in situ* burn. This person may operate from small boats for spills on water, but would usually not be the steersman or small boat operator. This person may operate from aircraft, but usually would direct pilots from the ground.

- 6) A Deck Hand and/or Small Boat Operator performs a wide variety of manual physical-mental tasks necessary to the operation of vessels, small boats and equipment used for *in situ* burning of spilled oil. They load and unload equipment and supplies, operate and repair mechanical equipment, deploy and retrieve boom, connect and anchor boom, deploy towing lines, monitor towed boom, relay information, operate winches and other deck equipment, operate and steer small open boats used for air monitoring and manual ignition system placement.

- 7) An Air Monitoring Specialist collects airborne emissions data from the spilled oil and *in situ* burning. This person collects data in a scientifically defensible manner for use by decision makers to protect workers, the public and other environmental receptors. For *in situ* burning operations in on water, this person is generally anticipated to be operating from vessels or small boats that can readily change locations to collect data. In inland *in situ* burning operations, this person is generally anticipated to be operating from field locations on land and occasionally from small boats that can readily change locations to collect data.

- 8) Skilled Support Personnel provide skills and services on-site that are ancillary to the oil spill response. Examples are airframe pilots, technical experts, ice conditions analysts, mechanics, sampling technicians, on-ice crew workers, wildlife recovery specialists and local conditions experts. It is assumed that skilled support personnel have an intermittent or episodic potential for dermal or inhalation exposure to spilled oil, chemical hazards, or are involved in small boat operations. If that is not so, the person should be classified in a position that accurately reflects their exposure potential.
- 9) An Aerial Surveillance Specialist collects real-time data on the location and condition of spilled oil, as well as, the progress of oil collection and *in situ* burning operations. The observation platform is usually a fixed-wing aircraft or helicopter; however surface vessels, tethered balloons and unmanned aerial vehicles (drones) are also used to collect data in real time. This person relays information through the incident command chain so that tactical operations can be adjusted to enhance efficiency and safety.
- 10) An Observer is a worker designated to record data, formulate opinions or provide custodial services. This person may be advising on the conduct of the response, informing the public (media), public interest surveillance, performing independent scientific (observational) research, conducting governmental or contract oversight, or providing clerical, communications, dedicated medical support, food service or recordkeeping services. It is assumed that an observer has a negligible potential for dermal or inhalation exposure to spilled oil. It is also assumed that observers are not present in small boats at any time.

THE GUIDELINES

The remainder of this paper is selected excerpts from guidelines to give the reader a feel for the organization and content of the Guidelines. Parts of the introduction and administration sections are presented first, followed by the table of contents, references and acknowledgements. This is intended to give the reader insight into content and organization of the guidelines:

Project Mission: To develop guidelines to ensure *in situ* burn responders have the necessary competencies to safely execute their jobs during a burn. The purpose of this guidance is to provide a systematic approach to assist users in the selection of responder qualifications and the training requirements for responders to spilled oil in the open water environment, ice conditions on water bodies, and the inland environment including spills affecting waterways and those lakes not considered open water.

Target Audience: These guidelines are intended to be primarily used by training officers, to develop a curriculum to train *in situ* burn responders, and a burn boss, to determine the level of competency of a burn team.

Charter: This document was produced by a cross-functional team of responders and interested parties who drew on their experience, their colleagues' experience and available literature to develop guidelines of competencies for *in situ* burn responders.

Organization of the Guidelines: Ten specific job positions descriptions are identified, which are designed such that all participants in an *in situ* burn operation can be assigned to one or several of the positions described, for training and experience purposes. The ISB positions are:

1. Burn Boss (ISB Operations Supervisor)
2. Safety Officers

- | | |
|---|-------------------------------------|
| 3. Vessel Captains | 7. Air Monitoring Specialists |
| 4. Fire Suppression Specialists | 8. Skilled Support Personnel |
| 5. Ignition and Spill Control Agent Specialists | 9. Aerials Surveillance Specialists |
| 6. Small Boat Operators and Deck Hands | 10. Observers |

The basic requisite skills, which apply across all positions are presented last, in Section 11 of the guidelines. Each of the ten identified positions has six competency categories. These follow the usual time sequence of a response: analysis, planning, implementation, evaluation, and termination. Training and fitness are a seventh category. Each competency category has a number of competencies that are usually relevant for that position.

For each position:

- Competencies are listed in the section with the position description.
- Competencies are further defined by Job Performance Requirements.
- Training and/or experience for each Job Performance Requirement are described by the listed *Requisite Knowledge* and *Requisite Skills*.
- Competencies are identified for three types of spill locations:
 - Open water,
 - On land, rivers, streams and small lakes,
 - Various ice on water conditions.

The detail of Job Performance Requirements is only contained in Section 11 of the guidance to avoid repetition. Section 11 is cross referenced with section 1 through 10 by using a parallel numbering system in the following manner.

X Position

X.X Competency Category

X.X.X Competency

X.X.X.X Job Performance Requirement

Requisite Knowledge...

Requisite Skills...

0.1 General

0.1.1 Scope: This guidance is intended to be international in its scope with United States regulatory requirements used as exemplars that may be replaced by applicable jurisdictional requirements. References to the Hazardous Waste Operations and Emergency Response (HAZWOPER) regulation (29 CFR 1910.120) and the Incident Command System (ICS) may be replaced by local jurisdictional requirements outside of the United States. In the absence of applicable local requirements HAZWOPER and ICS should be considered as a recognized standard of practice. This guidance is not intended to instruct the reader on how to conduct an *in situ* burn, or overlap with either of the *in situ* burn manuals (API technical reports 1251 & 1252).

0.1.2 Purpose: The purpose of this guidance is to provide a systematic approach to assist users in the selection of responder qualifications and the training requirements for responders to *in situ* burning of spilled oil in the open water environment, ice conditions on waterbodies, and the inland environment including spills affecting waterways and those lakes not considered open water. It is not intended to describe when to use *in situ* burning.

0.1.3 Applicability: The intent of this guidance is not to specify minimum training and/or competency requirements applicable to all situations. Instead, it is intended to inform those

managing an oil spill response of likely skill levels needed to perform in a variety of circumstances. Situation specific requirements should be selected from among the following guidance by spill managers to reflect the needs of that incident, with personnel safety being a primary consideration. In some situations one person may have dual roles for which a blend of competencies and/or training may be appropriate.

0.1.4 Equivalency of Experience and Training: Competencies listed in this guidance are designed to be met by either experience or training, except where applicable law specifies training. Each competency has a description of the requisite knowledge and skills that usually apply to that competency. Those managing responder selection for a specific incident can modify the knowledge and skills necessary for the situation and conditions.

0.1.5 Medical Qualification and Skills:

0.1.5.1 Medical Qualification: Some jurisdictions require by law or regulation that workers assigned certain tasks be medically qualified as capable of performing the tasks without risk of medical complications due to a lack of medical fitness of the worker. In the United States the HAZWOPER regulation has such requirements that apply to oil spill response using *in situ* burning. The fitness of each worker for assigned tasks is determined by a licensed health care professional, usually an occupational health physician. If a worker exhibits symptoms of exposure, the worker must be re-qualified to be allowed to return to performing those tasks.

0.1.5.2 First Aid: Some jurisdictions require by law or regulation that employers ensure the ready availability of medical treatment in near proximity to the workplace. In the United States the OSHA regulation on Medical Services and First Aid (29 CFR 1910.151(b)) applies. Near proximity means 3-4 minutes in workplaces where serious accidents such as those involving falls, suffocation, electrocution, or amputation are possible. The employer must ensure that an available employee trained in basic first aid, EMS response personnel or a clinic, infirmary or hospital must be in near proximity. The HAZWOPER regulation at 29 CFR

1910.120(q)(3)(vi) also has requirements about advanced first aid availability, see the standard and the OSHA interpretation letter of July 17, 1991.

0.1.6 Position Competency Matrix: This matrix provides an overview of the competencies recommended for each of the defined positions. Designated personnel are to have training or experience meeting or exceeding OSHA's Best Practices for Workplace First Aid Training Programs taking into account the rapid availability of professional medical care and the potential of specific kinds of injuries.

Position Competency Matrix

Position →	Burn Boss	Safety Officer	Vessel Captain	Fire Fighter	Ignition Specialist	Small Boat Operators & Deck Hands	Air Monitoring	Skilled Support Personnel	Aerial Survey Specialist	Observer
Oil Hazards	X	X	X	X	X	X	X	X	X	X
Sensitive Resources	X		X	X	X			X*	X	X*
Risk to Environment	X							X*		X*
Task Force Tactics	X	X	X	X	X	X	X	X*	X	X
Vessel Navigation			X							
Vessel Handing			X							
Small Boat Safety	X	X	X		X*	X	X*	X*		
Spill Control Agent Usage	X	X			X*					
PPE	X	X	X	X	X	X	X	X		X
On-Water Ignition	X	X	X		X					
Ignition on Land / Ice	X	X			X					
Aerial Ignition	X	X			X					
Ops Briefing	X	X	X	X	X	X	X	X	X	X
Boom Deployment	X		X		X	X				
Boom Towing			X			X				
Deck Hand & Small Boats	X		X		X*	X	X*	X*		
Fire Fighting	X	X	X	X	X	X	X	X*		
First Aid	X*	X*	X*	X*	X*	X*	X*	X*		X*
Air Monitoring	X	X					X			
Aerial Survey	X		X						X	
Worker Exposure	X	X	X	X	X	X	X	X	X	X
Response critique	X	X	X	X	X	X	X	X	X	X*
Impact to Environment	X						X	X*		
OSHA HAZWOPER	24	24	8 to 24	24	24	8 to 24	24	24	Briefing	Briefing
ICS	ICS-300+	ICS-200+	ICS-200	ICS-200	ICS-100	ICS-100	ICS-100	ICS-100	ICS-100	
Fitness	Light	Moderate	Moderate	Arduous	Arduous	Arduous	Moderate	As Needed	Light	Light

* When this is an assigned task.

TABLE OF CONTENTS

- INTRODUCTION
- ADMINISTRATION
- SCOPE - PURPOSE - APPLICABILITY
- MEDICAL QUALIFICATION AND SKILLS
- POSITION COMPETENCY MATRIX
- BURN BOSS - SELECTION AND TRAINING RECOMMENDATIONS
- SAFETY OFFICERS - SELECTION AND TRAINING RECOMMENDATIONS
- VESSEL CAPTAINS - SELECTION AND TRAINING RECOMMENDATIONS
- FIRE SUPPRESSION SPECIALISTS - SELECTION AND TRAINING RECOMMENDATIONS
- IGNITION AND SPILL CONTROL AGENT SPECIALISTS - SELECTION AND TRAINING RECOMMENDATIONS
- SMALL BOAT OPERATORS AND DECK HANDS - SELECTION AND TRAINING RECOMMENDATIONS
- AIR MONITORING SPECIALISTS - SELECTION AND TRAINING RECOMMENDATIONS
- SKILLED SUPPORT PERSONNEL - SELECTION AND TRAINING RECOMMENDATIONS
- AERIAL SURVEILLANCE SPECIALISTS - SELECTION AND TRAINING RECOMMENDATIONS
- OBSERVERS - KNOWLEDGE AND TRAINING RECOMMENDATIONS
- COMPETENCY DETAILS, JOB PERFORMANCE REQUIREMENTS, REQUISITE KNOWLEDGE AND SKILLS FOR ALL POSITIONS
 - ANALYZING THE SITUATION
 - PLANNING THE *IN SITU* BURN RESPONSE
 - IMPLEMENTING A PLANNED *IN SITU* BURN RESPONSE
 - EVALUATING PROGRESS OF AN *IN SITU* BURNING RESPONSE
 - TERMINATING THE *IN SITU* BURNING RESPONSE
 - TRAINING AND PHYSICAL FITNESS
- DEFINITIONS
- ACKNOWLEDGEMENTS
- REFERENCES

Example Job performance requirement with requisite skills and knowledge:

3 Vessel Captains - Selection and Training Recommendations

3.3.2 Vessel Navigation

3.3.2.1 Be able to navigate a vessel to reach the intended destination safely and efficiently.

3.3.2.2 Understanding and obeying navigational Rules of the Road.

Requisite Knowledge: Know the International Regulations for Preventing Collisions at Sea, 1972 as amended (72 COLREGS) for marine and inland waters.

Requisite Skill: Be able to navigate a vessel safely by properly maneuvering a vessel in sight of other vessels and in restricted visibility, use appropriate sounds signals, and display correct lights and signal shapes. [referenced in 3.3.2.2]

Acknowledgements

The project team thanks Jim for doing all the heavy lifting on this project.

James Patrick O'Brien, DETech

The contributions of the following project team members in preparation of this report are gratefully acknowledged:

Ann Whelan, USEPA Region 5

Chris Muzzy, MSRC

Ed Murphy, USDOT-PHMSA

Erik Demicco, ExxonMobil

Mike Crickard, USCG National Strike Force

Pat McCaffrey, Marathon Petroleum

Shon Mosier, Elastec

We also acknowledge the following people for providing their assistance, insights and review comments in the development of this report:

Al Allen, Spiltec

Chris Hall, Alaska Clean Seas

Donnie Wilson and the extended Elastec Company

John Allen, Spill Control Association of America

Ken Barton, DETech

Lee Major, Alaska Clean Seas

Paul Smith, Elastec

Stewart Ellis, Elastec

Steve Henne, MSRC

The extended MSRC Corporation

Vicky May, DETech

Thanks for the review and comments from API ISB and OSEPR subcommittees.

References

American Conference of Governmental Industrial Hygienists. *Threshold Limit Values and Biological Exposure Indices (TLVs and BEIs)*, updated annually.

American Petroleum Institute (API), 2005. *In-Situ Burning: A Decision-makers Guide to In-situ Burning*. Publication 4740

API, 2013. *Personal Protective Equipment Selection for Oil Spill Responders*. Recommended Practice 98

API, 2015a. *Field Operations Guide for In-Situ Burning of Inland Oil Spills*. Technical Report 1251

API, 2015b. *Field Operations Guide for In-Situ Burning of On-Water Oil Spills*. Technical Report 1252

API 4740, *A Decision-maker's Guide to In-situ Burning*, Publication Number 4740

API, in preparation. *In-Situ Burn Guidance for Safety Officers and Safety and Health Professionals*. Technical Report 1254

ASTM International, 2014, *Standard Practice for Reporting Visual Observations of Spilled Oil: Ignition devices*. ASTM F 1779-08

ASTM International, 2013, *Standard Guide for In-Situ Burning of Oil on Water*. ASTM F 1990-07

ASTM International, 2012, *Guide for Visually Estimating Oil Spill Thickness on Water*. ASTM F 2534-12

ASTM International, 2013, *Standard Guide for In-Situ Burning of Spilled Oil: Ignition Devices*. ASTM F 1990-13

International Marine Contractors Association (IMCA), 2010, *Guidance on the Transfer of Personnel To and From Offshore Vessels*. Publication M202

International Maritime Organization, 1972 as amended, *International Regulations for Preventing Collisions at Sea*.

National Academy of Sciences, 2001-, *Acute Exposure Guideline Levels for Selected Airborne Chemicals*.

National Fire Protection Association (NFPA), 2013. *Standard for Competence of Responders to Hazardous Materials Incidents/Weapons of Mass Destruction Incidents*.

NFPA 472

National Oceanic and Atmospheric Administration (NOAA), 2006. *Special Monitoring of Applied Response Technologies (SMART Protocol)*. version 8

NOAA, 2007, *Open Water Oil Identification Job Aid for Aerial Observation*.

National Wildfire Coordinating Group, 2012 as amended, *Interagency Aerial Ignition Guide*.

PMS 501

National Wildfire Coordinating Group, U.S. forest Service, National Park Service websites, *Aerial Ignition Project Aviation Safety Plan (PASP) Templates*.

Occupational Safety and Health Administration (OSHA), 29 CFR 1910.120. *Hazardous Waste Operations and Emergency Response*.

OSHA, 29 CFR 1910.134. *Respiratory Protection*.

OSHA, 29 CFR 1910.1000, Subpart Z. *Limits for Toxic Air Contaminants*.

OSHA 2001. *Training of Oil Spill Response Workers Under OSHA's Hazardous Waste Operations and Emergency Response Standard*. Publication 3172

OSHA 2006. *Best Practices Guide: Fundamentals of a Workplace First-Aid Program*. Publication 3317

United States Environmental Protection Agency (USEPA), 40 CFR 50, *National Ambient Air Quality Standards*.

USEPA, 40 CFR 300, *National Contingency Plan*.