



In-Situ Burn Guidance for Safety Officers and Industrial Hygienists



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Abstract

In-situ burning (ISB) of spilled petroleum has been conducted since the late 1950s. Most burns were performed from ground level on upland areas, inland waters, or test basins and the frequency of use has been relatively low. Response to the Deepwater Horizon incident reminded the spill response community of this strategy by illustrating the utility of ISB for spills offshore. Over 400 individual burns were conducted during the summer of 2010 in the Gulf of Mexico. The Deepwater Horizon response resulted in an unprecedented and extensive use of offshore ISB, and media coverage repeatedly demonstrated successful ISB operations.

This poster covers the health and safety concerns that need to be addressed before, during and after ISB operations by Safety Officers and industrial hygienists. Specifically, the poster is in two parts highlighting the research to date. Part one is a summary of the literature research and an evaluation of safety baseline information for ISB. The second part demonstrates how to use the information from the first part and develop an ISB site safety plan by conducting a job hazard analysis and risk assessment. The end result will be a better understanding of potential ISB hazards, their associated risks, and the range of control methods available to the response community to mitigate those risks.

Introduction:

What images do you see when you think of *in-situ* burning?

Does it typically involve something like this:



Photo by United States Coast Guard, 2010 (BP oil spill Gulf of Mexico)

Does the smoke pose the greatest hazard?
No, not necessarily.

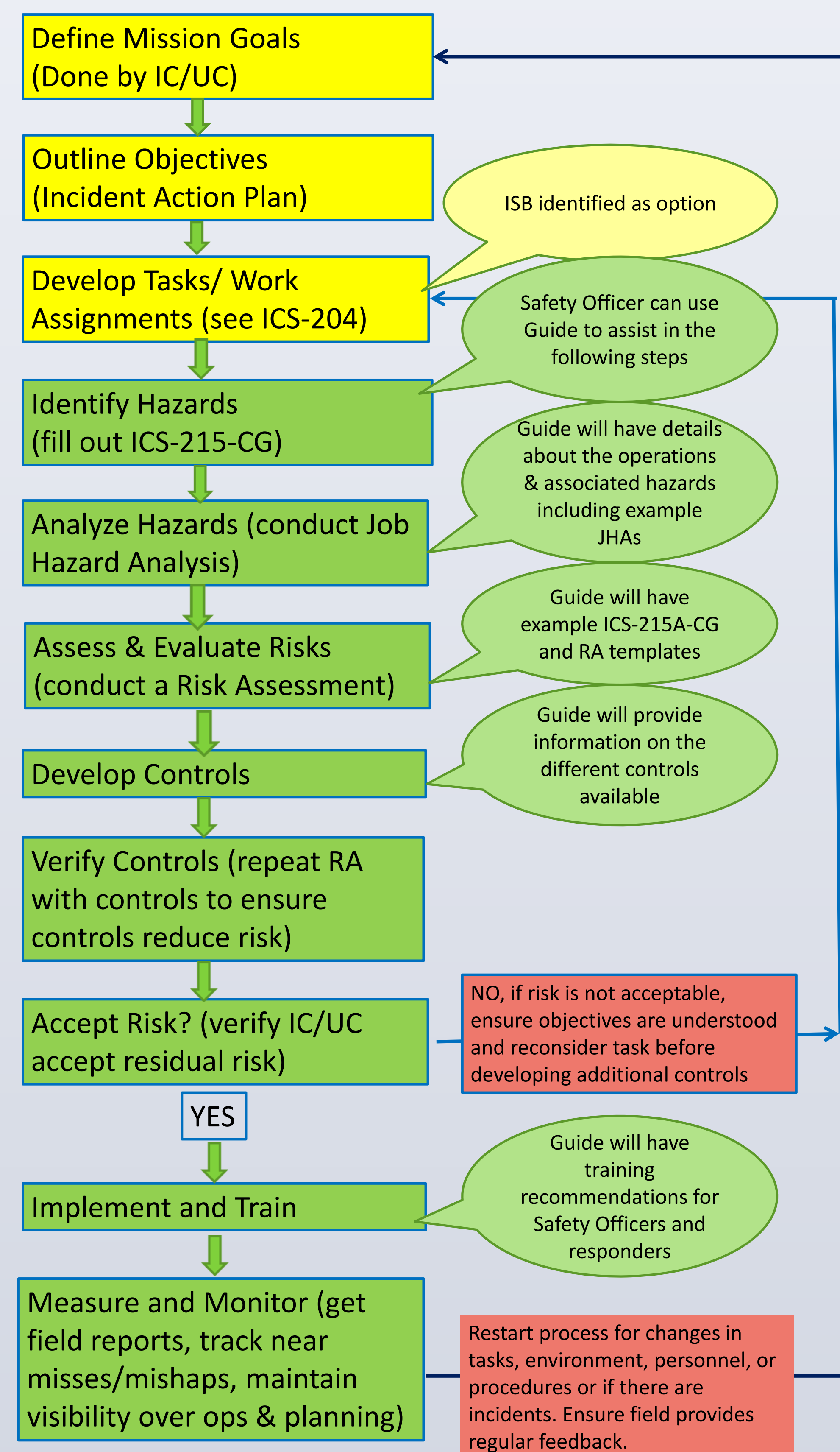
If not, then what does and how do we relay that information to the responders, regulators and public?

During an oil spill response, the incident Safety Officer, often with the support of an industrial hygienist, must be able to identify accurately the hazards associated with *in-situ* burning operations (ISB) and assess their associated risks. Moreover, this must be accomplished in a timely manner so that this type of time sensitive operation can be conducted.

Goal

This Guide will provide the Safety Officer and industrial hygienist with the tools they need to anticipate, recognize, evaluate and control the hazards associated with ISB using risk based decision making and a continual improvement process.

Further define the step by step process -
Anticipate, Recognize, Evaluate, Control



Each step for this continual improvement process loop is outlined in the Guide. The purpose is to assist safety professionals involved in ISB operations during each step of the planning process using the NIMS/ICS response framework. To be effective, Safety Officers need to be part of the Operations and Planning Team.

Methods

1. Team of industrial hygienists, emergency responders, and toxicologists
2. Focus is on the burning and fate of the petroleum products
 - Crude oil
 - Diesel
3. Phase 1: Research and identify state of knowledge of
 - ISB operations and best practices
 - Hazards before, during and after ISB operations (during all phases)
 - Known and possible health effects from the emissions of oil based on response strategy
 - Physical and chemical composition of smoke plumes and burn residue
 - Known and possible health effects of constituents of smoke plume and burn residue
4. Phase 2: Prepare guide for offshore, near shore, shoreline and upland/inland burns including site control and safety zones
5. Phase 3: Develop for Safety Officer or Industrial Hygienist (IH) a Personnel Qualification Standard outlining the critical information that must be understood and capabilities that should be demonstrated before being assigned to ISB operations. Make recommended updates to the FEMA Safety Officer Training Curriculum.
6. Phase 4: Develop templates for the Safety Officer / IH
7. Phase 5: Share the information.
 - Present to National Response Team
 - Develop educational materials for regulators, responders and the public

Results Outline of Guide

1. Roles & responsibilities of Safety Officer during ISB planning and ops
2. Introduction to oil & *in-situ* burning
 - Overview of operations in order to prepare JHA
 - Overview of properties of oils covered in Guide
3. Anticipation and recognition of hazards
 - Outline of hazards present before, during and after ops
 - Includes references to gather more information
4. Evaluation of hazards
 - Outline of how to detect and measure the hazards so as to determine the risks and prioritize them
 - Reminder to consider all hazards, not just chemical, including ergonomic, biological, and physical
5. Control of hazards
 - Includes possible control measures to use
 - Focus is on working with Ops & Planning Sections to ensure controls are integral to the planning process
6. Templates
 - JHAs – Job Hazard Analyses
 - Risk Assessments
 - Site Safety Plan
 - ICS form 215A-CG
7. PQS – Personnel Qualification Standard



Conclusions

The hazards of *in-situ* burn operations are not well understood, and are, therefore, often over-estimated by responders and the public alike. For example, during the Deepwater Horizon response (2010) the focus was on the smoke plume and the perceived hazards from the actual burn operations. Research has shown that the highest risk operations were the vessel to vessel transfer of personnel and ergonomic issues associated with materials handling. The smoke plume was found to have very low toxicity and it quickly dissipated.

Due to the time sensitive nature of ISB operations, response personnel need to come prepared. The Safety Officer and/or industrial hygienist supporting the response need not only to be knowledgeable on the hazards but must be able to assess their associated risks accurately and in a timely manner so as to be useful. Those risks must then be prioritized so that control measures can be developed and implemented. For a Safety Officer or IH, this job may seem overwhelming.

This Guide will break down the job into actionable task lists and will provide the key information needed to make sound decisions. The Guide is due out in 2015 and will be an API publication.

References (partial list)

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