An Evaluation of the Alternative Response Technology Evaluation System (ARTES)

Based on the Deepwater Horizon Experience

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Executive Summary

The oil and gas industry convened the Joint Industry Oil Spill Preparedness and Response Task Force (OSPR JITF) in June 2010 to evaluate procedures and lessons learned during the Deepwater Horizon (DWH) oil spill response. The initial focus of the JITF was “to identify potential opportunities for improvement to the oil spill response system in the areas of planning and coordination, optimization of each response tool, research and development (R&D), technology advancement, and training/education of all parties preparing for or responding to an oil spill.” In September 2010, the JITF issued a draft report containing preliminary recommendations for improvements.

Following the November 2010 update of the OSPR JITF report, the American Petroleum Institute’s (API’s) Oil Spill Preparedness and Response Subcommittee, convened to address the recommendations made by the JITF. As a result of two recommendations from this OSPR JITF report later defined as AT-1 and AT-2, an API Technical Working Group (TWG) was formed to complete the tasks. The TWG’s tasks were presented as follows:

- Address Alternative Technology Recommendation #1 (AT-1, Concurrent Incident Evaluation)—The TWG’s evaluation of the existing ARTES process based on the extensive lessons learned from the Deepwater Horizon experience and other applicable oil spill response efforts.

- Address Alternative Technology Recommendation #2 (AT-2, Non-Incident Evaluation)—The TWG’s assessment of information-sharing strategies and incentives for substantive OSPR industry involvement, specifically the following:

  ✓ The feasibility of developing a process that can serve as a transparent “clearinghouse” for sharing new ideas and technologies.

  ✓ The possibility of incorporating incentives to facilitate the development of new oil spill response technologies.

- The TWG took it upon itself to add a third task to their work, which was to formulate an agency engagement plan—The TWG’s recommended path for API to propose endorsed ideas to the appropriate government agencies.

The TWG, under the direction of Mike Cortez (BP), comprises representatives from BP, ExxonMobil, Chevron, the United States Coast Guard, the National Oceanographic and Atmospheric Administration (NOAA), the Environmental Protection Agency, the Office of Oil Spill Prevention and Response within the California Department of Fish and Game, and various response contractors (O’Brien’s Response Management, Lukins & Associates). Virtually all of the TWG members participated in the Deepwater Horizon response.

The existing ARTES process was designed by a workgroup commissioned by regional response teams and has been hosted on the NOAA website since 2002. It was developed to assess proposed non-conventional alternative oil spill countermeasures to determine their usefulness as response tools. The system was designed to evaluate one potential response tool at a time and was used sporadically between 2002 and the 2010 DWH incident. ARTES was used only once during an active response and, therefore, was never embedded in the Incident Command System (ICS). During the DWH response, it was necessary to evaluate conventional (booming, skimming, etc.) countermeasure improvements as well as novel alternative response technologies and ideas.

Outlined below are the TWG's **six primary recommendations for consideration by the appropriate authorizing body**. Supporting information for these can be found in the body of this report and in the attachments.

- A scalable Response Technology Evaluation (RTE) Unit under the direction of an RTE Unit Leader should be made part of the Planning Section within the ICS for future Tier 3 spills and Tier 2 spills as appropriate.

- The RTE Unit should be responsible for collecting, evaluating, and testing all new or improved technology ideas, regardless of their status as conventional or alternative response techniques.

- The RTE Unit, as part of the ICS organization, should be the preferred avenue for the public or vendors to submit ideas to assist in spill response.

- The RTE Unit should use a multi-stage review process of progressive technical assessments to evaluate ideas submitted.

- The National Response Team should solicit for the development of a database system, the basic requirements of which are defined in the body of this report, to be used by the RTE Unit in requesting, consolidating, organizing, and communicating to those who submit ideas for consideration.

- The Responder Knowledge Base hosted by the National Preparedness Directorate within the Federal Emergency Management Agency should be used as the "clearinghouse" to hold and disseminate RTE assessment/test results because this existing public database is readily available to responders.

Although these are the most critical recommendations, others regarding the proposed RTE process are contained in Section 5. It is recognized that, if an RTE is made a formal part of the ICS structure, then training and exercise drilling will be required, but that these activities are beyond the scope of this TWG's responsibilities.

It is recognized that both industry and government have a role in evaluating new OSR technologies under normal circumstances as well as during spill events. During spill events, it is especially important that specific roles and responsibilities of the government and RP be clearly established (and practiced during exercises). When assessing the system and forming their recommendations, the TWG focused on the end result of positioning the Federal On-Scene Coordinator to make fully informed decisions on whether or not to use new technologies, products, and ideas when responding to an oil spill.

An Evaluation of the Alternative Response Technology Evaluation System (ARTES) Based on the Deepwater Horizon Experience

1 Introduction

1.1 Overview

As the response phase of the Deepwater Horizon (DWH) incident entered the fall of 2010, the Joint Industry Oil Spill Preparedness and Response Task Force (OSPR JITF), led by the American Petroleum Institute (API), was finalizing its initial draft of assessments and recommendations based on the DWH response. The OSPR JITF issued a draft of their report in September 2010. This report concluded that a review of the Alternative Response Tool Evaluation System (ARTES) was needed, resulting in the establishment of a Technical Working Group (TWG). The TWG was given the following tasks:

- OSPR JITF Alternative Technology Recommendation #1 (AT-1, Concurrent Incident Evaluation, Task 1)—To examine and recommend potential changes to the existing ARTES process endorsed by the National Oceanographic and Atmospheric Administration (NOAA).

The TWG's evaluation of the ARTES process is based on the following:

  - ✓ The extensive lessons learned from the DWH Alternative Response Technologies (ART) experience
  - ✓ The US Coast Guard's (USCG's) Interagency Technology Assessment Program (IATAP)
  - ✓ Other applicable oil spill response efforts

- OSPR JITF Alternative Technology Recommendation #2 (AT-2, Non-Incident Evaluation, Task 2)—The TWG's assessment of information-sharing strategies and incentives for substantive OSPR industry involvement, specifically the following:

  - ✓ The feasibility of developing a process that can serve as a transparent "clearinghouse" for sharing new ideas and technologies.
  - ✓ The possibility of incorporating incentives to facilitate the development of new oil spill response technologies.

An acronym list is provided in Attachment 1.

1.2 Background

The ARTES process was developed by Regional Response Teams (RRTs) II and III and has been hosted on the NOAA website since 2002. It was developed to assess whether a nonconventional oil spill countermeasure could be a useful response tool. It was designed to evaluate one potential response tool at a time and to assess the tool on its technical merits rather than on economic factors. ARTES is designed to work in concert with the National Contingency Plan (NCP) Product Schedule and the Selection Guide for Oil Spill Applied Technologies. A Response Technologies Specialist from within the Environmental Unit uses the ARTES process to evaluate new technologies. Between 2002 and the DWH incident, the ARTES process was used only a few times. In developing the recommendations provided in this document, the TWG reviewed the ART process used during the DWH incident, the DWH Interagency Alternative Technology Assessment Program (IATAP), and the Enbridge oil spill review process.

When the DWH response was initiated, the NOAA Scientific Support Coordinator (SSC) filled the ARTES role on behalf of the Federal On-Scene Coordinator (FOSC). However, the demands of vendors, operations personnel, and the media required that staffing be quickly increased, and personnel from the Coast Guard's Research and Development (R&D) Center and the Office of Spill Prevention and Response from the State of California were immediately activated.

As the spill continued, Unified Area Command (UAC) recognized that the evaluation and testing of alternative response technologies (ARTs) would be a critical component of the DWH response. The team that was set up to accomplish these tasks was simply called the ART Team. The scale and scope of the spill, the expectations of the public and political decision-makers, and the changing operational needs of responders required an unprecedented need for real-time technology review, evaluation/testing, and the development of an expanded approach to address these needs. The ART Team was led by a technical manager who addressed operational and technological response needs. The Team was also tasked with maintaining consistency within the overall response structure and scaling up, as needed, to process an unprecedented flow of ideas.

In the case of the DWH incident, vast numbers of unsolicited ideas were submitted by product vendors and the general public to the ART system. This encompassed not only non-conventional countermeasures (such as the use of biological and chemical oil spill cleanup agents) but also adaptations to conventional response techniques like skimming, booming, and beach cleaning. The advent of 24-hour news channels, social media, and electronic communications globally provided the platforms for the public to provide even more suggestions. The number of submissions rapidly exceeded 100,000 at a time when the response was still in the early stages. Submitters expected quick responses of resolution/assessment and, from a response perspective, the ART system met these expectations once it was staffed and fully functional.

It is becoming apparent that oil spills in the "Internet Age" will necessarily include a deliberate and robust external engagement element for technology screening and application. An interested public, if not the responders themselves, will insist on it. The expanding capability and interest in proposing solicited and unsolicited solutions poses new challenges for responders, who now must be prepared to sort through vast numbers of unfeasible solutions in a search for a relatively low number of potentially effective ideas. Recommended modifications of the RRT ARTES process are based on the DWH ART and IATAP experiences, as well as those of the Enbridge review process.

1.3 Proposed ARTES Process Enhancements

This document provides the TWG findings and proposes changes to the RRT ARTES process in an effort to position the FOSC to make fully informed decisions on whether or not to use new technologies, products, and ideas during an oil spill response. The TWG team members represent BP, ExxonMobil, Chevron, USCG, NOAA, the US Environmental Protection Agency (EPA), OSPR, and response contractors (O'Brien's Response Management, Lukins & Associates), virtually all of whom participated in the DWH response.

2 Task 1: Examining ARTES and Proposing Changes

The first task recommended for the TWG by the OSPR JITF involved evaluating the existing ARTES process based on its use during responses and proposing changes to the system.

2.1 Expanding ARTES/ART via Response Technology Evaluation (RTE)

2.1.1 Lessons Learned from the DWH Experience

Based on the DWH experience, several issues with existing mechanisms to review oil spill response (OSR) technologies were recognized. The main two are highlighted below:

- The pre-existing ARTES protocols for technology review were not scalable to the DWH event and were not specifically designed to review and test a range of mechanical/conventional technologies in addition to applied response technologies (also abbreviated ART).[1]

- The pre-existing ARTES program, which embraced the potential for at least some limited technology review, had not been embedded in ICS.

These problems were magnified by the sheer scale of the incident and the overwhelming response of the public to requests by the Unified Area Command for technology ideas. The capability of previous protocols like ARTES was designed prior to the current version of the World Wide Web, with its modern robustness in bandwidth, pervasive presence, and social networking tools. As a result, ARTES evaluated applied response technologies on an almost one-by-one basis and would have been completely exceeded by the scope and scale of DWH technology review demands. Additionally, the ARTES protocols did not specifically address the inclusion and evaluation of mechanical/conventional response technologies.

Key improvements and tools to facilitate the response technology review and testing process were developed and implemented during the DWH response. These tools, which are explained in more detail later in this section, took full advantage of current web-based applications for sharing technologies, reviews, and field-test data. Database improvements and suggestions can be found in Section 2.3, submission process improvements can be found in Section 2.4, and testing improvements are at the end of this section.

To capitalize on these lessons learned, this TWG recommends enhancing the ARTES process based on the DWH ART experience as follows:

- Renaming the ARTES effort Response Technology Evaluation (RTE)[2].

- Embedding RTE as part of the ICS structure as its own unit within the Planning Section.

- Assigning the RTE Unit with the responsibility to collect, evaluate, and test both conventional and alternative (or non-conventional) response ideas.

A more in-depth recognition and expectation of how an RTE Unit can better fit within the ICS was also clearly recognized during the DWH response. Suggestions for how to "hard-wire" and improve RTE standing within ICS, while at the same time incorporating the positive improvements in technology solicitation, vetting, and testing developed during DWH, are the subjects of the following section.

2.1.2 Capturing Future RTE within the ICS Framework

During the course of an emergency response, the UAC or Incident Commander (IC) may receive an overwhelming number of requests to review new alternative response technologies or techniques to consider for implementation. Historically, these alternative response technology submissions would fall to the Environmental Unit under the Planning Section to address. Numerous submissions can limit the Environmental Unit from properly assessing and advancing spill response technology.

Establishing a sovereign Technical Specialist Unit under the Planning Section to aggregate, categorize, and prioritize these technologies for evaluation will allow the Environmental Unit to focus on their primary function. This unit is the proposed RTE.

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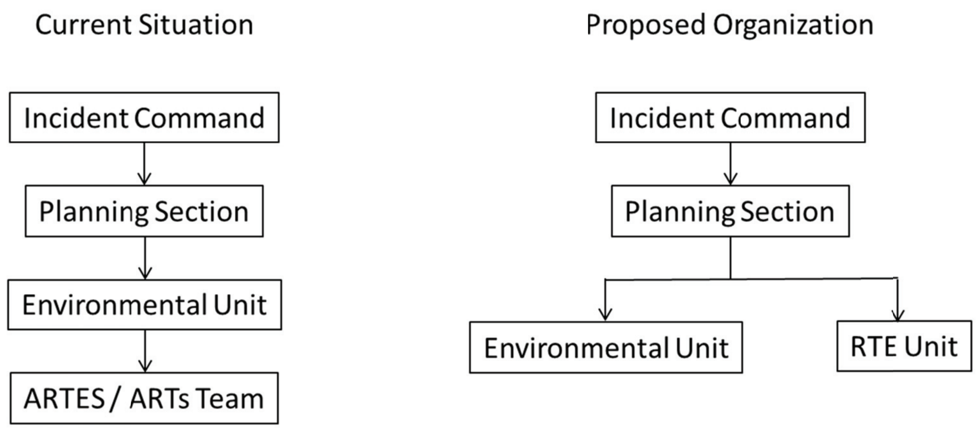
[1] Applied Response Technologies (also abbreviated "ART" in reference literature) is an exclusive term that should only refer to the use of in-situ burning of oil and the use of chemical and biological oil spill cleanup agents, such as dispersants. ARTES is an exclusive term that should be limited to describing the previous system for case-by-case review of ARTs. Both terms were used (conveniently but inappropriately) to describe the teams and processes for the broader technology review developed and used during DWH.

[2] The more inclusive and appropriate term for technology review systems that cover both mechanical/conventional and biological/chemical response technologies is Response Technologies Evaluation (RTE). We recommend use of this terminology going forward.

Several oil spill response functions have elements within the Planning and Operations Sections of the ICS. RTE will have significant elements in both Sections as well, along with at least one element in the Logistics Section.

The working group recommends that RTE placement within ICS be as a stand-alone unit within the Planning Section. This placement is modeled, as much as appropriate, after the SMART (Special Monitoring of Applied Response Technologies) Protocol[3], developed by USCG and NOAA, and used in several responses, including DWH. The SMART Protocols outline many of the necessary coordination, tasking, and field-data quality assurance / quality control (QA/QC) steps that the RTE system will also need to address. Shoreline Cleanup Assessment Team (SCAT) and Wildlife are two additional groups that also cross over between Operations and Planning. RTE interactions should follow similar patterns.

A simplified ICS organization chart showing the recommended change in ARTES/RTE reporting relationships is included below.



Organizational charts showing RTE placement within the Planning Section of the ICS should clearly identify relevant positions for each tier (1, 2, and 3) of response. Plans should describe for each tier how coordination and communication processes will be managed among Planning and Operations Sections, Unified Area Command, and Liaisons (should multiple Incident Command Posts [ICPs] and a UAC be needed).

These positions for each tier of response are depicted in the ICS organization charts included in Attachment 2 and are described in general terms below. There may not be any need for RTE for a Tier 1 or Tier 2 event (Types 5, 4, 3, and 2 – see mapping in Attachment 2), but if it is included, only one (at minimum, the RTE Unit Leader or RTE Specialist) may be needed to cover multiple activities and still manage to address each of the functional areas described below.

It should be understood that what is described and depicted in this section for a Tier 3 (Type 1 - a full-scale, spill of national significance [SONS]) technology review is modeled after the approach used during the DWH response.

As a response scales up and the need for more robust RTE has been clearly identified, then the RTE work force will need to increase to cover several possible functional areas, even if that entire effort is still managed within one ICP. If a response grows to Tier 3 (SONS), with the potential for more than one ICP and a UAC, then RTE can also scale up appropriately using ICS principles.

2.1.3 Functional Areas for RTE Positions

The RTE should be an independent Unit within the Planning Section and should be led by an RTE Unit Leader. General tasks for the RTE Unit are described in Attachment 3. As a response scales up, separate

[3] http://docs.lib.noaa.gov/noaa_documents/648_SMART.pdf

RTE positions (or teams if the response requires this level of effort) and Field Test Teams (FTT, internal or external to the ICP) may be established or identified by the RTE Unit Leader, as necessary, to focus on various functional areas, such as the following:

- Website management (technology idea receiving and input).
- Database management (screening and categorization of technology ideas).
- Mechanical response technologies review team(s) (e.g., containment, barriers, booming, skimming, oil-water separation, decanting, storage, tar ball/tar mat collection, surf washing).
- Applied response technologies review team(s) (e.g., use of chemical and biological oil spill cleanup agents [OSCAs] such as dispersants, surface washing agents, solidifiers, elasticity modifiers, emulsion breakers, herding agents, bioremediants, and review of new or adapted in-situ burn technologies).

Note: Some of the mechanical/conventional and biological/chemical technologies may overlap, such as sand cleaning systems that are mechanical in nature, but use OSCAs as part of the cleaning cycle.

- Test protocol development. Considerations for test protocol development are included in Attachment 3.

Although bioremediation evaluations are typically part of an ARTES process and were included in the DWH ART's effort, the future handling of bioremediation is being addressed in the API Shoreline Treatment Reports (API SP-2 and SP-3). Therefore, it is not addressed in this report.

It is also recognized that in a SONS situation, the responsibility for dispersant, bioremediation and in-situ burning assessments/decisions may be handled by dedicated teams outside of the RTE (which is what happened during the DWH response) depending on the FOSC decision.

2.1.4 Deputy RTE Unit Leaders

As in the DWH experience, if additional ICPs are established to deal with a significant response, RTE Deputy Unit Leaders may be established (in addition to any Liaison position) at each additional ICP to oversee specific functions (e.g., field-testing). They report directly to and take direction from the RTE Unit Leader at the principal (or first) ICP established.

The RTE Unit Leaders or Deputy Unit Leaders may suggest and support vendor demonstration days for various technologies, and they may task their FTT with coordinating demonstrations.

The RTE Deputy Unit Leader(s) will accept direction from the RTE Unit Leader on any constraints or conditions of technology testing or use that might be imposed by outside agencies (e.g., RRT, trustee agencies). They will also ensure that the FTTs under the RTE Deputy Unit Leader's direction are observing those testing constraints and conditions. The RRT responsibilities are listed in Attachment 4.

2.1.5 Field Test Team (FTT)

The primary tasks of the FTT are to thoroughly and expeditiously test technologies and provide feedback to the RTE Unit Leader in the form of a recommendation. They review technology or proposed products and make an evaluation, based on their professional judgment. A product or idea's acceptance into this process, evaluation, or even testing does not mean the product will be used during the response. The FTT does not approve vendors for use during the response.

The FTT requires skilled, experienced response personnel able to work independently as well as part of a team to guarantee that the best strategies, tactics, and equipment are employed consistently during the course of an emergency response operation. For best operational results, the FTT should work within the ICS as directed by the RTE Unit Leader and be guided by the Incident Action Plan (IAP).

Safety must remain the primary objection of FTT personnel and be a constant consideration throughout any activity. FTT personnel need to be medically approved and trained for use with standard personal protective equipment (PPE), such as respirators, splash suits, hard hats, safety glasses and/or face shields, steel-toed boots, and weather-appropriate clothing.

Note: Fit-testing of Field Test Team members is recommended.

2.2 Additional DWH Experiences and Lessons Learned

The following are additional specific challenges that were recognized during the DWH response in regards to response technology review and testing:

- Limited early recognition for incident-driven response technology review within ICS.
- Internal and external confusion about multiple review processes (BP-ARTES, IATAP, EPA, local Emergency Operations Center [EOC]).

The newly created ART liaison positions lacked sufficient ICS recognition and, therefore, efforts to facilitate communication were hindered. To address this issue, the TWG recommends hard-wiring these positions into the ICS structure when required.

The public, vendors, politicians, and other agencies had the perception that the BP-led ARTES process was not sufficiently responsive; the response feedback system embedded in the database was not as clear, timely, or supportive as the submitters wanted it to be.

During the DWH response, roughly 123,000 technology ideas or suggestions were submitted and required evaluation/testing. A High-Interest Technology Test (HITT) Task Force was developed to perform this task and was based in Alabama. The Houma, LA, based ARTES team performed the same function.

The teams were challenged to review what were determined to be the best of those submissions. Further, the HITT and ARTES reviewed many submissions that were enhancements to existing technologies as opposed to completely new technologies. Team members were chosen because of their experience and expertise with emergency response, oilfield operations, environmental policy, and technical evaluation.

During the DWH response, both groups assessed, analyzed, and evaluated the usefulness of many submissions, in addition to their main role of conducting field tests of new technology ideas. Communication and coordination between the ARTES team in Houma, LA and the HITT Task Force in Alabama was sometimes difficult because of the physical distance between the two efforts effecting testing priorities, testing standard consistency and coordination with trustee agencies (US Fish and Wildlife Service, the National Marine Fisheries Services).

Given the difficulty of completing evaluating and testing tasks, the TWG recommends that the FTT primarily focus on the testing responsibilities. Communication and coordination issues can be addressed by establishing the RTE reporting relationships within the ICS structure as proposed.

Team members' responsibilities included contacting vendors to gather additional information on submissions, to obtain product samples (as appropriate), and to test/evaluate the products. Team members also documented the evaluation procedures and test results/findings and provided feedback to the submitter. State and federal agencies sometimes needed to be contacted to get permission to test in restricted areas, such as state parks. The HITT and ARTES testing did not guarantee that the technology evaluated/tested would be used; and this should be made clear to vendors during any future mobilization. This became an issue from time to time during the DWH incident because many vendors assumed that the evaluated technology, product, service would automatically be made available for use.

HITT positions deployed in Alabama during the DWH incident were not located within the Mobile Incident Command Post and thus were fully staffed with individuals filling positions such as Safety Officer, Public

Information Officer, and Documentation Lead. These positions are already included in ICS and, therefore, unless assigned independently of the Incident Command, should not be required for the RTE Unit under the Planning Section.

2.3 Database Use in the ART Process

2.3.1 ARTES Background

Before the DWH incident, the public submitted few technologies during a spill response. Spills rarely received much attention from the press and the average person did not possess the technology to interact electronically with the appropriate entity. Therefore, the ARTES process was originally set up with the expectation that submissions would be few and the paperwork would be minimal. As technology advanced, multiple methods of digital interaction became available and the public's ability to participate in a response grew in parallel. The ARTES process requires reevaluation to be able to handle a higher level of public input.

2.3.2 DWH Database and Evaluation Processes

Initial Issues

Within the first few days of the DWH response, it was recognized that an expansive, rigorous database was needed to hold and manage the public's suggestions, which were arriving by mail, telephone, Internet messages, and personal visits to the various command posts. In the beginning, many emails had very large file attachments (more than 10 MB) or multiple small ones that also added up to over 10 MB. In addition, paperwork that was scanned and submitted sometimes created large files. Additionally, submitters sent in product samples, DVDs, and other physical objects that had to be cataloged and linked to the appropriate record in the database. Lastly, submissions and telephone calls were received in multiple languages, which required translation and database input. Because multiple people from various organizations and locations needed to access this information, a password system was initiated and access to the database was provided via the Internet. This allowed responders from as far away as the United Kingdom and Alaska to sign into the database remotely to evaluate suggestions/ideas.

Identification of the Evaluation Stages

The following evaluation stages were used during the DWH ART response:

- Stage 1: Primary Evaluation, including feasibility classification / screening
- Stage 2: Idea Categorization (source control, bioremediation, other spill response categories)
- Stage 3: Advanced Technical Review, including determination of the need for further testing
- Stage 4: Operational Review (testing)

More information on the stages is provided in Section 2.4.1.

Standardized Process

The initial input was substantial and difficult to process. The ART Team realized that entering timestamps for each of the stages was crucial for processing and for future documentation. Separation of ideas for spill cleanup, source control, and offers for existing, standard equipment (e.g., boats) also had to be documented and forwarded to the appropriate database and people.

Inputting Data

Data could be input directly by individuals using the Horizonedocs Internet site, entered by Horizon Call Center staff receiving a telephone call, or copied and pasted from a message. A preliminary screen (shown in Figure 2 of Attachment 6) was made available to the public to help educate them on issues that had already been addressed. Figure 3 of Attachment 6 is the idea submission form. This is the same approach that the US EPA used for the Enbridge Pipeline Spill (Figure 4 and Figure 5 of Attachment 6).

Processing Evaluations

Once the initial data were entered, evaluators could bring up a list, select a submittal, and perform an evaluation. If a submittal was determined to be an existing product, service, or piece of equipment (PSE), the submission was moved to a separate PSE database and made available to response Operations. If the submittal was for a new or alternative response idea, it was kept in the ART's database. In case questions about the evaluator's reasoning arose later in the process, the name and date of the evaluator were tagged to the recommendation whether to advance to the next stage. The list could be sorted by number or date of entry, and searches could be performed for specific numbers or technologies.

This database had a system to document the evaluation process and test results. Test results were attached to appropriate database records. Each stage of the review process had a separate screen, and evaluators were able to view the previous stage evaluation results when documenting the current stage. Testing prioritization scores were included in the database while the individual score for each criteria category was kept in a separate document or another database module.

Evaluation results were documented by the scores and comments recorded on the test sheets, which were kept separately. Lists were maintained of all the technologies/submissions that were in each of the evaluation stages. By the middle of the spill response, automated letters to the submitters were being generated.

Other data needs were identified during the evaluation process. At times, calls or emails were received from politicians or someone in the command structure to find out the status of particular submittals. Various search screens were developed that permitted anyone with a password the ability to search for a particular submittal or a class of submittals (e.g., mechanical response) from the FOSC or operations branch.

2.3.3 Recommendations

The following recommendations were derived from the use of the DWH database and are proposed requirements for any future RTE database:

- Maintain a record of all of the submittals including timestamps for all entries, changes, or updates. This is a crucial part of the RTE process. Tagging the evaluation to a particular evaluator may also be helpful.

- Should additional information be required to evaluate a submitter's idea, subsequent submissions providing this additional requested information should be linked back to the original database record and sent to the original evaluator (if possible).

- Make the database secure but flexible enough for access to multiple people at multiple locations.

- Design the database to correspond to specific stages in the evaluation process and to retain records on any testing performed.

- Develop a method for entering information from any government effort into the database. This may be needed after formal review, when the recommendation is forwarded to the FOSC.

- Make the entry format simple and provide minimum and maximum information levels. Include disclaimers for intellectual property (IP) issues, responsible-party (RP) issues, required confidentiality clauses, and types of and parameters for submissions. Include information about the need for ideas that are implementable and what types/areas of ideas are no longer being accepted. Possible keyword searches of submissions could be done when they are entering new submittal information.

- Include in the entry format explicit notice to the submitter that a submission does not create any contractual relationship between the submitter and any other response entity, including the RP.

- Build in the capability of an automated email reply to suggestion submitters after appropriate review stage decisions to maintain communication and establish transparency. Alternatively, possibly include a search portal for submitters to check submission status themselves.

- Build in capabilities for sophisticated searches by RTE members, including key words, record numbers, technologies, companies, email addresses, and individual's name.

- Ensure that a parallel equipment database is established and linked to critical resources and operations.

- Record and keep all parts of the technology evaluation (see Attachment 5) scores in the database.

- Ensure that the database is capable of storing and linking any field-testing results to the actual submission record.

The following recommendations also resulted from the analysis of the DWH review process:

- Hard-wire the newly created RTE liaison positions into the ICS structure when required.

- Establish RTE reporting relationships within the ICS structure, which can address communication and coordination issues.

- Communicate clearly to vendors that FTT and RTE testing does not guarantee that the technology tested will be used.

2.4 Submission Review Process

The ARTES process issued in 2002 was designed for evaluating one non-conventional spill response idea or product at a time. As mentioned previously, given the new public perception that they should be allowed to suggest an unlimited number of conventional and non-conventional spill control and cleanup options, a review system needs to be designed to handle multiple suggestions during an on-going response without burdening the response Operations Section staff. During the DWH response, the public submitted more than 120,000 ideas over a 5-month period, and each of these ideas had to be screened; then, many of them were evaluated further and ultimately tested in near real time. The ART Team identified ideas that had potential merit while also communicating with the submitters to ensure them that their ideas were being considered and acted on in a timely manner. This section will address the DWH ART and two Environmental Protection Agency (EPA) efforts—the DWH and Enbridge oil spill submission review processes. The IATAP system will be described in a separate section of the report.

2.4.1 DWH ART Process

The submission review process used by the UAC during the DWH response was a four-stage process with subsequent, more detailed technical reviews by specialists, which resulted in a decision to field-test the idea if it warranted and met current operational needs. Due to the duration and complexity of the response, non-conventional oil spill ideas as well as modifications to conventional spill response equipment and techniques were submitted. The ART process implemented was designed to handle both. The four-stage process is described below.

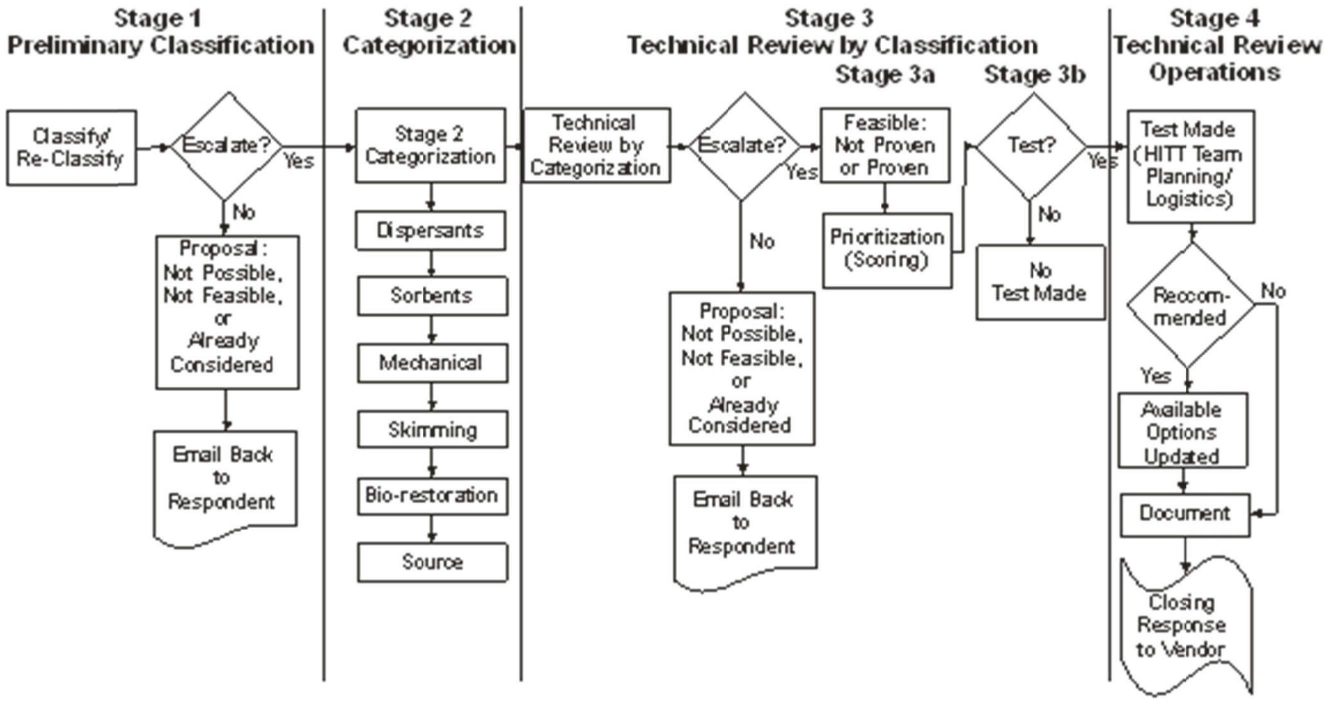


Figure 1: Four-stage ART process.

- Stage 1: Primary evaluation of the technology submission was conducted at this stage by a trained team of evaluators with various backgrounds. The number of evaluators depended on the pace of submissions and the speed at which decisions needed to be made. If a submittal was determined to be "not feasible," "not possible," "previously considered," or simply "advice" (see definitions on following page), it was not escalated to Stage 2 and an automated email was sent to the idea submitter thanking them for their submittal.

- Stage 2: This stage categorized proposals in two ways—whether the submission addressed stopping the oil release at the source, or whether it addressed oil spill cleanup. The second categorization further delineated the oil spill cleanup submissions into the following categories: dispersant, chemical, sorbent, mechanical, skimming, biorestoration, or other.

- Stage 3: If a submission merited further consideration based on the Stage 2 evaluation, a more in-depth review was conducted by specialized technical experts. The goal of this phase was to determine which submissions could assist in achieving the response objectives most efficiently. A scoring methodology was developed and used by the technical experts to facilitate the prioritization of submittals. Submissions were scored in Stage 3A and prioritized in Stage 3B for testing based on current response operational needs.

- Stage 4: The final stage for submissions that received more specialized review involved field-testing, recording performance, and an assessment of whether or not the technology could help satisfy the response objectives. Closing responses on whether technology was successfully tested and recommended for response use or not were then sent back to the submitter from the ART Technical Manager.

Within the proposed RTE Unit, Stages 1, 2, and 3 would be the responsibility of the Technology Review Team(s) while Stage 4 responsibilities would fall to the FTT(s).

A summary of the 5-month DWH ART process is provided below.

The ART team received and evaluated about 123,000 individual ideas, suggestions, and proposals for ending the DWH well flow (80,000 suggestions) or cleaning up the resulting spill (43,000 suggestions).

Approximately 470 suggestions were found by the expert reviewers to meet the criteria for possible formal evaluation and field-testing. The remainder generally fell into these categories:

- **Already considered and/or duplicate submissions**—Three-quarters of all suggestions were substantially similar to ones already submitted/identified.
- **Not possible**—This included ideas not physically feasible at 5,000-ft water depth, pressure (2240 psi), and temperature (39°F), and the well's high flow rate or several thousand psi well flowing pressure.
- **Not new technology** (existing product, service, equipment [PSE])—These were sent to a separate PSE database to be immediately available to response personnel.
- **Adverse impacts**—Suggestions that had undesirable side effects, e.g., hay or hair (which sinks with time) and introducing new bacteria (an act not allowed by regulatory bodies).
- **Non-engineered or invalid scaling**—This included kiddy pool demonstrations, kitchen demonstrations, use of garden hose as simulated well flow.
- **Advice, or not a solution**—Comments and complaints, etc.

Of the 470, approximately 170 suggestions were related to bioremediation and the other 300 addressed booming, skimming, mechanical equipment, sand cleaning, etc.

Nearly 100 suggestions were formally evaluated and/or field-tested, and 45 of these saw use during the response operations.

2.4.2 EPA Oil Spill Technology Submissions Processes

DWH

The EPA launched its DWH technology submission website on April 30, 2010, and received their first proposal within an hour. Ultimately, they received more than 2,300 submissions. The EPA created the submission website to provide a mechanism for the public to share their ideas concerning ways to clean up the oil contaminating the water and near-shore environments. On June 21, 2010, the EPA closed down the site and directed all future submitters to the USCG's IATAP system.

Submissions were put through a two-stage review process, which comprised 1) an initial screen to determine the relevance and potential applicability in meeting the needs of the response and 2) a more in-depth review by technical experts to determine whether or not the EPA should forward the submission to the Coast Guard for further consideration. Key lessons learned from the EPA's effort, which mirrored the lessons learned from the UAC ART process, were as follows:

- Using stages of review assisted in identifying those ideas that had an opportunity to assist the response efforts the quickest. A second technical review by technical experts graded and ranked those ideas that passed the initial stage using a common review checklist of questions.
- The web interface through which submitters provided their suggestions should be prescriptive in nature with respect to personal or company contact information, idea categorization, submission and attachment formats. Free form data input should be minimized as much as possible.
- Submitters should be communicated with as quickly as possible regarding the status of their idea submission.

Enbridge

On July 26, 2010, an inland waterway oil spill occurred near Marshall, Michigan. Enbridge Energy Partners LLP (Enbridge) reported a 30-inch pipeline ruptured and released over 1 million gallons of heavy crude oil into Talmadge Creek, which then flowed into the Kalamazoo River, a Lake Michigan tributary. By August 1, the EPA had stood up another technology submission website to support the responders in the Enbridge spill response. Many of the above lessons learned were implemented. The EPA received 130 ideas from the public over a 20-day period. Website submission improvements included use of a prescribed formatted submission form with explicit data fields requiring population, an automated response system to acknowledge receipt of the submission, and an accommodation of additional information in attachment formats ranging from picture files (.jpg) to PDF and Microsoft Word documents. Each of these improvements enhanced the review process.

In each of the oil spill responses described above, the establishment of a new technology submission review team and processes not only worked as intended but also more significantly freed up the response operational staff to focus on response efforts as opposed to trying to handle the two tasks simultaneously.

2.4.3 Recommendations

When considering the DWH ART and the EPA's DWH and Enbridge experiences, the TWG identified a number of areas of improvement within the submission process. These are outlined below:

- A four-stage review and testing process (see diagram and Stage descriptions above) should be established by the RTE Unit Leader to handle multiple, simultaneous submissions of conventional and non-conventional ideas.

- The evaluation process should include a scoring system that is suitable for submittal ranking and prioritization and that properly weights the ability to test and the idea "fit" with current spill recovery operational needs. The TWG-developed proposed system for achieving this is described in Attachment 5.

- The review process should include an automated communication mechanism that appropriately informs submitters when the suggestion is dropped after any stage assessment but particularly after the Stage 1 preliminary review.

- A letter from the appropriate person within the ICS should be sent to the submitter when his or her submission successfully moves from Stage to Stage to keep the submitter apprised of where the idea is in the review process. Frequent communication is advisable.

- Stage 2 reviewers should be identified by stage categories (i.e., sorbents, mechanical, biorestoration, etc.) based on the area of expertise. These individuals should remain points of contact who monitor/track submissions in those categories from the start of the RTE process through final disposition/evaluation/testing.

- Stage 2/3/3A review and scoring should be completed by technical specialist RTE Team members separated from testing responsibilities. Testing responsibilities should be completed by the field-test team.

- Writing of test protocols should be the responsibility of the FTT members and should adhere to accepted and reproducible test standards (e.g., ASTM) to the degree deemed most appropriate by the FTT Leader. Test protocol development should be led by the FTT Leader and should include input from the RTE Unit Leader to identify any constraints on testing (e.g., RTT policy restrictions, ESA Section 7 concerns) or future operational use.

- The FTT should schedule idea testing in a way that anticipates changing operational needs making allowances for time required to test, then deploy, to address current response requirements.

2.5 Incorporation of IATAP Lessons Learned

2.5.1 IATAP Process Description

As part of the Interagency Solutions Group (IASG), the National Incident Commander (NIC) established several interagency sub-groups, including the Interagency Alternative Technology Assessment Program (IATAP) to collect and analyze thousands of response recommendations from all sources for the whole of the federal government. The NIC stood up IATAP at the USCG Research and Development Center (RDC) in mid-June 2010 to ensure a fair and systematic, government-managed process to solicit, screen, and evaluate public, other government agency, and academia-suggested technologies in support of DWH spill response activities. IATAP consisted of representatives and assessment teams from multiple federal agencies. The IATAP process was consistent with NOAA's ARTES structure.

Solicitation of Proposals

On June 4, 2010, the RDC's Contracting Section issued a Broad Agency Announcement (BAA) for the purpose of organizing the collection and enhancing the DWH response assessment of technology assistance offers by providing for the submission of white papers. The BAA was open to all national and international sources including single entities or teams from academia, private sector persons and organizations, government laboratories, and federally funded research and development centers.

Screening and Technical Evaluation of Proposals

An initial assessment of proposal submissions was conducted where they were screened for technical feasibility, efficacy, and deployability to determine if they:

- Offered an immediate benefit (taken out of the BAA process and sent to the FOSC)
- Needed more evaluation
- Did not support the incident (DNS)

After the submittals had been triaged, the submittals that appeared to have merit but needed further evaluation were sent to the Evaluation Unit lead to distribute to the relevant IATAP agency representatives (CG, EPA, NOAA, MMS [later BOEMRE], etc.) for further in-depth evaluation. A positive agency evaluation could lead to contract action for field-testing, or a recommendation to the UAC for implementation, if the technology/product was fully developed and proven.

Field Testing

The original plan was to use a follow-on contract for field-testing because the initial solicitation came in through a BAA. However, no submissions were independently field-tested following the full IATAP process. RDC personnel were in contract negotiations with several universities, but it was discovered that their products were not ready for a field test. Several submittals that were in the category of offering an immediate benefit were sent directly to the FOSC. At that point, if FOSC personnel deemed the submittal as relevant but in need of further testing, they could then forward them to ART to arrange field-testing.

Communications

To provide information on submission status, several methods were employed to communicate with submitters, including letters, an IATAP call center, and a website. The website was a secure site that allowed collaborative evaluations of proposals and (using a private tracking number) allowed submitters to track the status of their proposals.

Data Management

In order to adhere to Federal Acquisition Regulations, it was extremely important to maintain a secure record and audit trail of BAA submittal reviews and comments on BAA submittals. This was conducted through the USCG's secure collaborative website "Homeport." Homeport was chosen because it allowed federal agency representatives to use it while maintaining the appropriate security for the procurement process.

2.5.2 Lessons Learned

According to interviewees, IATAP met the important goal of giving the public a government outlet through which to submit their response ideas for evaluation. Also, IATAP was able to conclude the RP was not ignoring potential fixes to save money, and it provided an independent verification that the technologies being deployed were the best available for the operational needs.

Linkage and Communications

ART and IATAP were located in different places in the response organization and neither placement was ideal for coordination and communications across the two processes. A technology assessment group needs to be an integral part of the command staff of an ICP or UAC. There should be liaisons between the different command functions and within the organization to ensure efficient and effective communications flow.

Interoperability between Databases

Interoperability between the ART and IATAP databases would have been extremely beneficial in eliminating any duplication of efforts. However, it was not feasible during the DWH response due to constraints imposed by the Federal Acquisition Regulations as well as political sensitivities to maintain independence of IATAP as the government-only technology evaluation process. Access to the ART database was provided to the RDC with limited search capability and was very helpful in understanding any operational implementation issues based on the ART evaluation. In the future, it would be very beneficial to have a common database, but it may still not be feasible. It will need to be further investigated to determine if there are mechanisms that will allow appropriate visibility/coordination and protections under the Federal Acquisition Regulations.

Implementation

The UAC had difficulty field-testing and implementing technology from either IATAP or ART, although ART was eventually able to overcome most of its issues. ART was more successful than IATAP in this respect because it had direct linkage to the ICP and teams within the ICP to support testing. IATAP was not successful in field-testing ideas that were potentially useful. A number of factors contributed to this lack of success:

- IATAP was basically an evaluation process. As with ART, only a very small percentage of proposals merited consideration for field-testing.
- The choice of a BAA as the contracting vehicle for solicitation limited the sharing of submissions with the UAC due to procurement sensitivities.
- IATAP was purposely established outside the UAC structure and was working in parallel with ART. Resources from other agencies with decision-making authority were involved in other aspects of the response efforts.
- Some technology ideas were not ready for field-testing.

- The IATAP liaison at the UAC was located in the Critical Resources Unit (CRU). CRU personnel were interested in equipment that could be used immediately. Because of this, they are not the best people to be looking at testing emerging technology.

Evaluation and implementation of new technology, for either ART or IATAP, does not currently have a standard location in the emergency response structure.

2.5.3 Recommendations

The unique and complex nature of a national incident such as DWH challenges emergency response technology and often requires innovative solutions. Responders to any significant emergency need to have a single process that efficiently and effectively evaluates and helps implement new, emerging, or non-conventional technologies in the ongoing response. The RDC recommended incorporating a single mechanism meeting this need into the ICS organization as a dedicated position. They also recommended scaling its process to the size of any type of incident response where new technologies may be valuable to the success of incident response.

Integration into the UAC Structure

RTE should be an integral and recognized component of the National Incident Management System (NIMS) ICS organization. NIMS does not, however, specify how this support should fit into the UAC/ICS Operational Command structure. This TWG recommends that the RTE Unit be part of the Planning Section of the first (and possibly only) ICP established. The RTE Unit structure should be matched to the response organization construction. Most response will have a single ICP. If, as in the DWH experience, multiple ICPs and an UAC are established the RTE Unit should remain within the first ICP established. Then there should be liaison positions in the command staff of the NIC or UAC (if there is one) and the subsequent ICPs established to ensure timely and accurate communication flow.

Goals and Objectives

The primary goal of the NIMS RTE Program is to identify response technologies that can improve the efficiency and effectiveness of emergency response operations. The secondary goal, however, should be to minimize impact on response operations by serving as a buffer between operations personnel and people submitting their ideas.

Process

The recommended RTE process would be based on the successful aspects of the IATAP and ART processes. The response requirements identified by Operations (most likely at the ICP level) are an important input into the process. Ongoing USCG Research Development Testing and Evaluation (RDT&E) efforts are not technically part of the response process, but may intersect with it in one of two ways:

- Ongoing R&D efforts may be ready to test for immediate response and could be submitted for screening.

- Ideas from the RTE process that are not ready for testing or implementation may be referred to ongoing RDT&E, pending funding availability.

The recommended RTE process includes rapid testing and evaluation (T&E) of promising ideas. The inclusion of RTE as a standard, accepted part of emergency response should allow for operations resources to be made available to the RTE Unit Leader to conduct T&E. If the proposed RTE process is adopted, detailed responsibilities and roles, such as those described in Attachments 3 and 4, will need to be developed.

The details of a single solicitation process and related contracting issues need to be determined prior to an event. A Request for Information (RFI) followed by individual solicitations may be a more flexible method to rapidly conduct T&E within the UAC and ensure linkage with UAC objectives.

The selection and programming of a single database to document and track the RTE process is critical. A database should be established to hold all submissions, regardless of their source. Entries into the database should be made using a web-based submission system. This system would provide the public with a way to submit ideas as an avenue for helping address incident issues and to obtain status on the evaluation of their submittals. The submission management system needs to be set up and exercised prior to an event.

Interagency participation is critical. It is also important to include experienced responders. Communications between the various levels of the RTE organization is extremely important. There should be liaisons among the different command functions and within the RTE organization to ensure efficient and effective communications flow.

A technology assessment group needs to be an integral part of the Incident Management Team of an ICP or UAC. There should be liaisons between the different command functions and within the organization to ensure efficient and effective communications flow.

Interoperability should exist between the ART and IATAP databases.

2.6 ARTES in Other Spill Responses

In an attempt to determine whether an Alternative Response Technology evaluation program was implemented on other previous spill responses, several spills were identified and appropriate contacts were made with responding parties. Investigated spills were the Yellowstone River (July 2011); Enbridge (July 2010); Cosco Busan (November 2007); Selendang Ayu (December 2004); the New Carissa (February 1999); and the North Cape (January 1996).

Several members of this Technical Work Group team responded to one or another of the spills mentioned above. For those where firsthand knowledge of the spill did not exist, a request was made to NOAA's Scientific Support Coordinators for additional information.

Other than the Enbridge ART experience documented in the earlier chapter of this paper, it was determined that a formal ARTES process was not implemented during most of the other spills investigated. One bioremediation agent was assessed during the North Cape spill. A few formal ARTES consultations were performed during non-spill response times at the request of RRTs 2 and 3, but assessments were not a routine occurrence. Prior to establishment of the ARTES process, shoreline cleaners were tested at the Julie N spill in 1996 and at the Morris Berman spill in 1994.

As such, minimal additional insight could be gained to compare and contrast against the DWH and Enbridge experiences.

3 Task 2: Clearinghouse, incentives, and standards

The effective management of technology performance information on oil spill response (OSR) abatement and cleanup is essential to ensure that it is useable and easily accessible during a time of crisis. While the oil spill response community typically focuses on tried and true technologies, there are technology innovators who are continually trying to identify better, faster, and more cost effective ways for dealing with the aftermath of an oil spill. An innovation may, in fact, provide a more efficient and/or expedient alternative under certain circumstances.The DWH response relied upon proven technologies but the door was opened to innovators to share their ideas and technologies with the response community. Some technologies had undergone a limited amount of testing while others were "back of the envelope" ideas that may have merited further consideration. The idea floodgates opened and the responders were faced with culling through tens of thousands of submissions. Truly the phrase "looking for a needle in a haystack" applied to this exercise. The responders were faced with a spill of epic proportions and an urgent demand by the public to resolve the damage with the least amount of impact to the public, the environment, and the economic base of the communities surrounding the Gulf.

The response community did not have access to a technology information clearinghouse to find the answers to performance questions but rather had to build and operate an evaluation and testing enterprise (the DWH ART program) on the fly and in the midst of crushing public and government pressure to do something to mitigate the damage. In hindsight it has become clear that there is a need for the creation of a national oil spill response technology performance information management system.

The following sections provide some further discussion of this topic and include a description of key clearinghouse functions, comparable technology information clearinghouse activities, a suggestion as to responsibility and management for such a function, and a brief discussion about funding the enterprise. The chapter concludes with a brief discussion on options that can be considered for ways to spur innovation and the advancement of new ideas and technologies.

3.1 Clearinghouse Benefits

The obvious benefit is that the clearinghouse could provide an efficient and more cost-effective method of accessing the most comprehensive and cutting-edge information on oil spill response technologies. It is possible that the clearinghouse could provide a global link to essential and extensive databases, as well. Even post-DWH, no central clearinghouse yet exists.

An effective clearinghouse serves not only as a depository for information but also as a focal point for its constituents. The exchange of information is greatly facilitated when a central entity exists. With the state of current information technology so advanced, much of the infrastructure to support a powerful electronic information network is already in place. This network could link with other databases and clearinghouses (where they exist) and national (possibly international) organizations. Such a network would only strengthen the existing relationships with these organizations.

An information clearinghouse that provides a data and analytic foundation for identifying and applying the appropriate oil spill response technologies that could be used at the global, national, regional, and local scales would be well used. It could also serve as a means to highlight tools and strategies for improved pollution control and natural resource management.

3.2 Clearinghouse Functions

The purpose of a technology clearinghouse is multifaceted. At a minimum it should accomplish the following:

- Serve as a ready resource for oil spill responders (NRT/RRT/OSC real-time database access). Having such provides another tool in the oil spill response toolbox.
- Provide a common framework for managing information submissions and information delivery.
- Track technologies being tested by OHMSETT (Oil and Hazardous Materials Simulated Environmental Test Tank), as well as the successes and failures of any future incident-specific RTE process.
- Provide a documented measure of quality assurance about the performance information stored in the system (vendor submissions are okay, but performance must be verifiable via an RTE evaluation or a third party testing company).
- Maintain after action reports from past spills with an emphasis on technology performance.
- Disseminate best practices.

- Have an online presence.

It would be desirable for the clearinghouse to have the following capability:

- Facilitate discussion/dialog among industry, government, and the technology innovation community.
- Track R&D by industry, government, and academia.
- Provide a limited amount of on-site support by clearinghouse personnel during a response.
- Sponsor an annual oil spill technology conference.
- Facilitate innovation through competitive award of seed money for technology development (a function that could/should reside somewhere else).

The clearinghouse's primary function will be to serve as an information interchange that facilitates the dissemination of expertise, research, and development, and also enhances the advancement of cutting-edge issues, trends, and ideas relevant to oil spill response technologies. This would mean not only providing information upon request, but also gathering information through electronic and non-electronic means for dissemination. In circumstances where a request may be beyond the scope of the clearinghouse's range of functions, it will act as a referral service. By its online presence, it would advance the concept of the virtual library. The virtual library has unlimited potential with respect to size, content, and value of data.

3.3 Clearinghouses Supporting Other Industries

Information clearinghouses exist in support of many industries and for many applications. By way of example, the following subsections briefly describe three active clearinghouses.

3.3.1 Responder Knowledge Base

The Responder Knowledge Base (RKB) is a national information resource for emergency responders that is funded by the Federal Emergency Management Agency (FEMA) National Preparedness Directorate. The RKB mission is to "provide emergency responders, purchasers, and planners with a trusted, integrated, online source of information on products, standards, certifications, grants, and other equipment-related information." The RKB has been serving the responder community online since October 2003.[4]

According to a recent article in EMSWorld,[5] the RKB has become an important tool for supporting emergency responders by providing access to information targeted at their operational needs. The system has more than 78,000 subscribers that include first responders, emergency managers, government personnel, purchasers, and planners. The RKB offers information on responder equipment, certifications, standards, training, grants, and a number of other things.

The cost to operate the system is completely covered by FEMA. The site is partitioned into Focus Areas that include Emergency Medical Service (EMS), Emergency Management, Fire Service, Law Enforcement, and Communications. RKB sorts the information it collects into categories including products, safety notices, web links, conferences, standards, publications and references, training and education, and operational assessments.

The RKB also offers additional resources that are useful to the emergency response community, including the following:

[4] http://www.rkb.us
[5] http://www.emsworld.com/article/10653869/accessing-femas-responder-knowledge-base

- A publications section that contains a compendium of nearly 2,000 publications, such as guidance documents and journal articles
- Access to approved equipment standards from
  - ✓ The Department of Homeland Security (DHS)
  - ✓ The Interagency Board (IAB) (https://iab.gov)
- Access to a companion site called Lessons Learned Information Sharing (https://www.llis.dhs.gov), which maintains a national, online network of lessons learned, best practices, and innovative ideas for the emergency management and homeland security communities.

3.3.2 The SBA National Information Clearinghouse

SBDCNet (http://www.sbdcnet.org) is the official National Information Clearinghouse of the US Small Business Administration's (SBA's) Small Business Development Centers (SBDCs). The SBA National Information Clearinghouse serves the Network and America's small business community.

SBDCNet is funded in part by a Cooperative Agreement with the US SBA. It also receives funding from a matching grant from its local sponsoring institution—The University of Texas at San Antonio—where it is hosted by the South-West Texas Border Region's SBDC. It is also a member of, and receives financial support from, the Association of Small Business Development Centers.

SBDCNet provides small business research services to the entire 1,100+ member SBDC Network of Small Business Development Centers located in all 50 states, Guam, and Puerto Rico. In partnership with local SBDCs, the SBDCNet Clearinghouse can produce a broad range of financial, market, and demographic research reports customized to each member's industry and geographic location. In addition to supporting small business entrepreneurs, SBDCNet now offers an array of products and services to support small- to mid-size community development projects.

The site provides a myriad of information to the small business owner, including market research reports, industry links, an info center (with 18 subtopics involving the development of business plans, marketing tips, etc.), and links to other resources (which includes a large array of success stories [i.e., lessons learned]).

3.3.3 The Smart Grid Information Clearinghouse

The Smart Grid Information Clearinghouse, maintained by the Department of Energy, is a web portal (http://www.sgiclearinghouse.org/) for sharing and disseminating smart grid information, including background documents, deployment experiences, technologies, standards, and on-going projects around the world. It is designed to serve as the first-stop shop for all smart grid information.

Contents in the SGIC portal include demonstration projects, use cases, standards, legislation, policy and regulation, lessons learned and best practices, and advanced topics dealing with research and development. The SGIC database highlights the rapidly evolving opportunity to use electricity in an environmentally responsible way. It is envisioned that the SGIC portal will be the essential gateway that connects the smart grid community to the relevant sources of information that are currently scattered and distributed on the worldwide web. The portal also directs its users to other pertinent sources or databases for additional data, case studies, etc. It is designed to serve as a decision support tool for both state and federal regulators in their deliberations for rule-making and for evaluating the impact of their investments in the smart grid technologies and software.

SGIC has identified high-level themes: Smart Grid 101, Smart Grid Projects, Deployment Experience, In-Depth Information, and International. The section devoted to In-Depth Information includes the following subtopics: Standards, Technologies, Cyber Security, Legislation, Education and Training, and Demand

Response. The design of this website could serve as a useful template for building an oil spill response information technology clearinghouse.

3.4 Incentives to Innovation

As mentioned earlier, one of the proposed facets of the clearinghouse is to facilitate the advancement of innovative and emerging technologies. The DWH cleanup experience demonstrated that while traditional technologies were successfully deployed, there were unique situations that demanded a fresh approach and there were opportunities for creative ideas.

Innovators by their very nature will strive to invent new technologies, but their efforts are largely driven to meet some specific market demand or need. Certainly, beyond investments by oil companies and OSROs, private sector (corporate) investment in new oil spill-related cleanup technology will typically only occur when a clear market demand exists and the company can demonstrate to its shareholders that there will be return on its research and development investment.

The oil spill cleanup technology market is dominated by traditional technologies, and there appears to be an opportunity to encourage the market to provide innovative ideas to push the technology further. In the absence of a clear market pull, there must be some type of financial incentive for innovators to explore new ways to clean up oil. The clearinghouse could provide two incentives to innovators:

- The first incentive is that of the primary function of clearinghouse itself—to provide responders with ready access to technology performance information. This is an important function of Responder Knowledge Base (discussed above). The RKB contains information about emergency response technologies that is easily accessible by emergency responders. Homeland Security technology vendors are continuously supplying the RKB with information to ensure that the users have the information at their fingertips. Although some of the vendor-provided information may be little more than marketing material, it still motivates the companies because it has the potential to generate sales.

- The other facet of the clearinghouse that would help drive innovation is to competitively provide seed money to emerging technologies. Seed money is often enough to support prototype development (analogous to Phase I Small Business Innovative Research funds), but it will not be sufficient to carry the innovator through to commercial marketability of the technology.

As it so often does, the success of an effort to encourage new technologies for oil spill response comes down to free market economics. In the absence of clear market pull for alternative oil spill cleanup technologies, other means must be explored to help technologies break into this marketplace.

3.5 Development and Use of Standards

While the development and promulgation of standards is not typically considered the responsibility of a clearinghouse, an effectively designed clearinghouse should be capable of tracking and reporting on standards as they emerge from non-government standards bodies (NGSBs) (e.g., ASTM International).

The primary NGSB that is addressing oil spill response-related standards is ASTM International's Committee F20 on Hazardous Substances and Oil Spill Response. Committee F20 has 13 subcommittees that cover most of the major oil spill response technical and technology areas. The standards include those for testing and evaluating technologies as well as those for guiding the selection of technologies during a response.

The RKB serves as a central index and, in some cases, a repository for emergency response-related standards. Clearly, this works to the advantage of the emergency response professional because he/she does not have to search across the Internet to find applicable standards.

3.6 Funding

Supporting an effort like this will necessitate collaboration between the government and the private sector. Given the current national economic situation, it will be difficult to identify new or even existing sources of Federal funds to support the clearinghouse function. The Science and Technology Committee of the NRT has been discussing similar issues. Progress has been limited due to lack of funding.

A strong, articulate planning document will have to be prepared and vetted through a variety of private and government organizations to attempt to gain support for it. There is clearly a need for an oil spill technology information clearinghouse, but in the face of many other needs, it may be difficult to rally the support.

3.7 Recommendations

The creation of a national oil spill technology clearinghouse would provide emergency responders with an important asset to support spill response efforts.

It is recommended that the oil spill technology clearinghouse work in concert with (or be an extension of) an existing system, e.g., the RKB, to take advantage of the existing IT infrastructure and staff it offers. It would be prudent to approach FEMA to determine whether such would be feasible and at what cost.

4 Agency Engagement Plan

To implement any changes recommended by the API, it will be necessary to obtain the endorsement of the National Response Team (NRT). This section lays out the path to obtain endorsement not only at the national level but also at the regional level.

The agency engagement process has already started. At the May 2012 NRT Co-Chairs meeting, Ed Levine (TWG member from NOAA) introduced the API effort and presented an update of the TWG's progress. He indicated to the Preparedness Committee (PREP) that the expected completion of the API report would be in time for the next annual meeting. At that time, the report recommendations may be ready to "roll out" via a presentation at the following RRT Co-Chairs meeting.

4.1 National-Level Strategy

4.1.1 National Response Team (NRT)

The likely route through to the NRT will be via the PREP. With the completion of this report and API endorsement of its primary recommendations, the TWG will seek to make a presentation to the PREP for their review and endorsement to forward on to the full NRT for concurrence. Once the NRT concurs, establishment of the RTE Unit within the ICS structure can be sent out to the RRTs for their implementation (see recommended Organization Charts in Attachment 2).

4.1.2 Benefits of a National Approach/Standardization

The benefits of RTE standardization are as follows:

- Single, objective approach to technology solicitation, review, and testing (reduces dual/conflicting review processes, perceptions of bias)
- Database interoperability
- Comparability
- Tracking

- Coordination between regions
- Transparency
- Benefit to industry
- Foster innovation

4.2 Regional and Local Strategies

4.2.1 Regional Response Teams (RRTs)

RRTs ensure that the multi-agency resources and expertise of the National Response System (NRS) are available to support the FOSC as needed during a pollution incident. There are 13 RRTs, one for each of the 10 EPA federal regions, plus one for Alaska, one for the Caribbean, and one for Oceania. The RRTs comprise representatives from the 15 federal NRS member agencies, plus state representatives, and are co-chaired by the EPA and USCG. The more local area plans (Area Contingency Plans, or ACPs) are designed to work with the Regional Contingency Plan (RCP) for regional responses.

Through NRS and NRT guidance, the representatives can form workgroups to incorporate RTE into the RCPs. Each RRT includes NOAA and USCG representatives who may be able to lead this effort. RRT responsibilities are described in Attachment 4.

4.2.2 Area Committees

Similar to RRTs, Area Committees are made up of federal, state, and local agency representatives, but additionally include industry and other local groups that can participate in local responses. Engagement of the local Area Committees will be left to the RRT's as opposed to being part of the API TWG plan. Area Committee responsibilities are described in Attachment 4.

5 Comprehensive List of Report Recommendations

5.1 Primary Recommendations

The following list summarizes the major recommendations made throughout the report:

- A scalable RTE Unit under the direction of an RTE Unit Leader should be made part of the Planning Section within the ICS for future Tier 3 spills and Tier 2 spills as appropriate. The RTE Unit Leader will be selected in similar fashion as other Unit Leader positions and may come from either the Responsible Party (RP), government agencies (USCG, EPA, others) or a qualified contractor.

- The RTE Unit should be responsible for collecting, evaluating, and testing all new or improved technology ideas, regardless of their status as conventional or alternative response techniques.

- The RTE Unit, as part of the ICS organization, should be the preferred avenue for the public or vendors to submit ideas to assist in spill response.

- The RTE Unit should use a multi-stage review process of progressive technical assessments to evaluate ideas submitted.

- The National Response Team should solicit for the development of a database system, the basic requirements of which are defined in the body of this report, to be used by the RTE Unit in requesting, consolidating, organizing, and communicating to those who submit ideas for consideration.

- The Responder Knowledge Base hosted by the National Preparedness Directorate within the Federal Emergency Management Agency should be used as the "clearinghouse" to hold and disseminate RTE assessment/test results because this existing public database is readily available to responders.

The next step is for an appropriate authorizing body to review and endorse or refine the recommendations.

5.2 Additional Recommendations

The following additional recommendations are made by the TWG in an effort to improve the RTE effort in future responses and to help facilitate the implementation of the primary recommendations. Support for these recommendations is provided within individual sections of the report.

General recommendations include the following:

- Renaming the ARTES effort Response Technology Evaluation (RTE).
- Embedding RTE as part of the ICS structure as its own unit within the Planning Section.
- Assigning RTE the responsibility to collect, evaluate, and test conventional and alternative (or non-conventional) response ideas.

The following recommendations were derived from the use of the DWH database and are proposed requirements for any future RTE database:

- Maintain a record of all of the submittals and include timestamps for all entries, changes, or updates. This is a crucial part of the RTE process. Tagging the evaluation to a particular evaluator may also be helpful.
- Should additional information be required to evaluate a submitter's idea, subsequent submissions providing this additional requested information should be linked back to the original database record and sent to the original evaluator (if possible).
- Make the database secure but flexible enough for access to multiple people at multiple locations.
- Match the database specifically with the evaluation process, including any testing performed.
- Develop a method for entering information from any government effort into the database if necessary, probably after formal review when the recommendation is forwarded to the FOSC.
- Make the entry format simple and provide minimum and maximum information levels. Include disclaimers for intellectual property (IP) issues, responsible-party (RP) issues, required confidentiality clauses, and types of and parameters for submissions. Include information about the need for ideas that are implementable and what types/areas of ideas are no longer being accepted. Possible keyword searches of submissions could be done when they are entering new submittal information.
- The entry format should contain explicit notice to the submitter that submission does not create any contractual relationship between the submitter and any other response entity including the Responsible Party.
- Build in the capability of an automated email reply to suggestion submitters after appropriate review stage decisions to maintain communication and establish transparency. Alternatively, possibly include a search portal for submitters to check submission status themselves.
- Build in capabilities for sophisticated searches, including key words, entry numbers, technologies, companies, and individuals.

- Ensure that a parallel equipment database is established and linked to critical resources and operations.

- Record and keep all parts of the Stage 3 scores in the database.

- Ensure that the database is capable of storing/linking any field-testing results to the actual submission record.

The following recommendations are based on the DWH and Enbridge submission review process and are proposed for RTE consideration:

- A four-stage review and testing process should be established by the RTE Unit Leader to handle multiple, simultaneous submissions of conventional and non-conventional ideas.

- The evaluation process should include a scoring system that is suitable for submittal ranking and prioritization which properly weights the ability to test and the idea “fit” with current spill recovery operational needs. The TWG-developed proposed system for achieving this is described in Attachment 5.

- The review process should include an automated communication mechanism that informs submitters when the suggestion is dropped after any Stage assessment but particularly after the Stage 1 preliminary review.

- A letter from the appropriate person within the IMT should be sent to the submitter when their submission successfully moves from Stage to Stage to keep them apprised of where their idea is in the review process. Frequent communication is advisable.

- Stage 2 reviewers should be identified by Stage categories (i.e., sorbents, mechanical, biorestoration, etc.) based on the area of expertise. These individuals should remain points of contact who monitor/track submissions in those categories from the start of the RTE process through final disposition/evaluation/testing.

- Stage 2/3/3A review and scoring should be completed by technical specialist RTE Team members separated from testing responsibilities. Testing responsibilities should be completed by the field-test team.

- Writing of test protocols should be the responsibility of the Stage 3/3A submission technical specialist review team members.

- The field-test team should schedule idea testing in a way that anticipates changing operational needs making allowances for time required to test, then deploy, to address current response requirements.

- The newly created RTE liaison positions should be hard-wired into the ICS structure in the event that they are required.

- RTE reporting relationships should be established within the ICS structure, which can address communication and coordination issues.

- It should be communicated clearly to vendors that FTT and RTE testing does not guarantee that the technology tested will be used.

The following recommendations were derived from the USCG review of the IATAP process:

- The USCG RDC recommended that a single review process be incorporated into the ICS organization as a dedicated position and that its process be scalable to the size of any type of incident response.

- RTE should be an integral and recognized component of the National Incident Management System (NIMS) ICS organization. The structure should be scaled to address multiple command posts and a UAC, as appropriate.

- There should be liaisons among the different command functions and within the organization to ensure efficient and effective communications flow.

- The details of a single solicitation process for testing and evaluation of ARTs and related contracting issues need to be determined prior to an event.

- The selection and programming of a single database to document and track the RTE process is critical. The data management system needs to be set up and exercised prior to an event.

Attachment 1

List of Acronyms Used in Document

Acronym	Definition
API	American Petroleum Institute
ARTES	Alternative Response Tool Evaluation System
ARTs	Alternative Response Technologies
ASTM	Formerly, American Society for Testing and Materials
AT-1	Alternative Technologies Project 1-API
AT-2	Alternative Technologies Project 2-API
BAA	Broad Agency Announcement
BMPs	Best Management Practices
BOEMRE	Bureau of Ocean Energy Management, Regulation, and Enforcement*
BSEE	Bureau of Safety and Environmental Enforcement*
CARVER	Criticality, Accessibility, Return (or Recuperability), Vulnerability, Effect, and Recognizability
CRU	Critical Resources Unit
DNS	Did not support
DWH	Deepwater Horizon
EMS	Emergency Medical Service
EOC	Emergency Operations Center
EPA	Environmental Protection Agency
ETA	Emerging Technology Assessment
FAR	Federal Acquisition Regulations
FEMA	Federal Emergency Management Agency
FOSC	Federal On-Scene Commander
FTTs	Field Test Teams
HITT	High interest technology test
IAB	Interagency Board
IAP	Incident Action Plan
IASG	Interagency Solutions Group
IATAP	Interagency Technology Assessment Program
IC	Incident Commander
ICP	Incident Command Post
ICS	Incident Command System
IMT	Incident Management Team
ISB	In-situ burn
IT	Information Technology
JIC	Joint Information Center
JITF	Joint Industry Oil Spill Preparedness & Response Task Force
LBEOC	Louisiana Business Emergency Operations Center

LLIS	Lessons Learned Information Sharing
MMS	Minerals and Management Service*
NCP	National Contingency Plan
NGSB	Non-government Standards Body
NIC	National Incident Commander
NIMS	National Incident Management System
NOAA	National Oceanic and Atmospheric Administration
NRS	National Response System
NRT	National Response Team
OHMSETT	Oil and Hazardous Materials Simulated Environmental Test Tank
OL	Operations Leader
OSCAs	Oil spill cleanup agents
OSPR	Office of Spill Prevention and Response
OSR	Oil spill response
PIER	Public Information Emergency Response
PREP	Preparedness Committee of the NRT
PSE	Product/Service/Equipment
QA/QC	Quality assurance / quality control*
R&D	Research and development
RCP	Regional Contingency Plan
RDC	Research and Development Center (USCG)
RDT&E	Research Development Technology and Evaluation
RFI	Request for Information
RKB	Responder Knowledge Base
ROM	Rough order of magnitude
RP	Responsible party
RRT	Regional Response Team
RTE	Response Technology Evaluation
SBDC	Small Business Development Center
SMART	Special Monitoring of Applied Response Technologies
SME	Subject Matter Expert
SONS	Spill of National Significance
SSC	Scientific Support Coordinator
T&E	Testing and evaluation
TET	Technical Evaluation Team
TWG	Technical Work Group
UAC	Unified Area Command
USCG	United States Coast Guard
USFWS	United States Fish & Wildlife Services

Attachment 2

Organizational Charts of RTE within ICS

Based on information utilized by the USCG, the following are the current categorizations of ICS incident types, which have been correlated to response tiers:

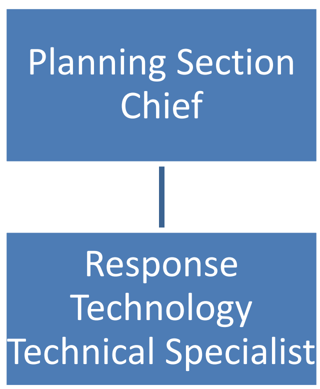
Tier 1 (or Type 5): Small, quickly contained

In this type of event, an RTE unit is unlikely to be established.

Tier 1 (or Type 4): More resources needed but under control in one operational period

In this type of event, an RTE unit is unlikely to be established. It is possible that a chemical oil spill cleanup agent (such as a shoreline cleaner) may be used to clean a cement wall, etc., and this evaluation would likely be handled by the Planning Section Chief (or the ICS position that is assuming this role), or if needed, an ART Technical Specialist who reports to the Planning Section.

Example: #1



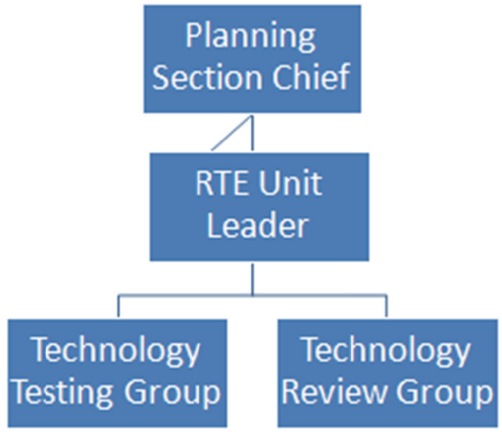
Tier 1 (or Type 3): ICS staff positions added as needed, written Incident Action Plan, more than one operational period

In this type of event, a small RTE unit may be established, depending on operational needs. It is assumed that there is a single Command Post and an Area Command is not being stood up. Depending on the type and volume of oil spilled and the location of the event, possible technologies that may need to be evaluated to meet operational needs could include the following:

- Remote sensing of technology for finding oil in low visibility weather patterns (fog, rain, etc.)
- Booming and skimming technologies that are more effective in fast water or shallow area
- Mechanical/Chemical options for cleaning shorelines based on shoreline type (sand beaches, marshes, rip rap)

Typically, in these types of events, a call for new technology is not put out in the press or to the general public, although vendors and contractors may show up at a Command Post or staging area hoping to have a product reviewed. In this scenario, a simple organizational chart may look as follows:

Example #2



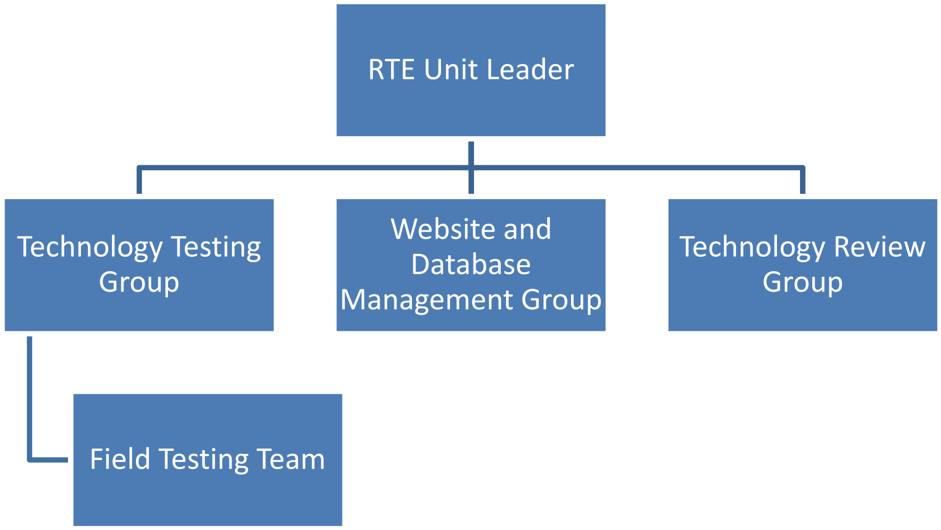
Depending on the scope and breadth of the response, the technology review and testing group may need to be further divided into functional teams, but for most events of this size, this structure should be sufficient.

Tier 2 (or Type 2): Extends beyond the capabilities of local control, regional and state resources may be needed, multiple operational periods

In this type of event, a more robust RTE Unit may need to be established, depending on operational needs. In this type of event, there may be more than one Incident Command Post, and this may necessitate the establishment of an Area Command. Given public demands and social interests and concerns, a website and database may be established to take in and process information from the public and vendors regarding response technologies. Depending on the type and volume of oil spilled and the location of the event, possible technologies will need to be evaluated to meet operational needs identified throughout the emergency, response, and cleanup phases of the response.

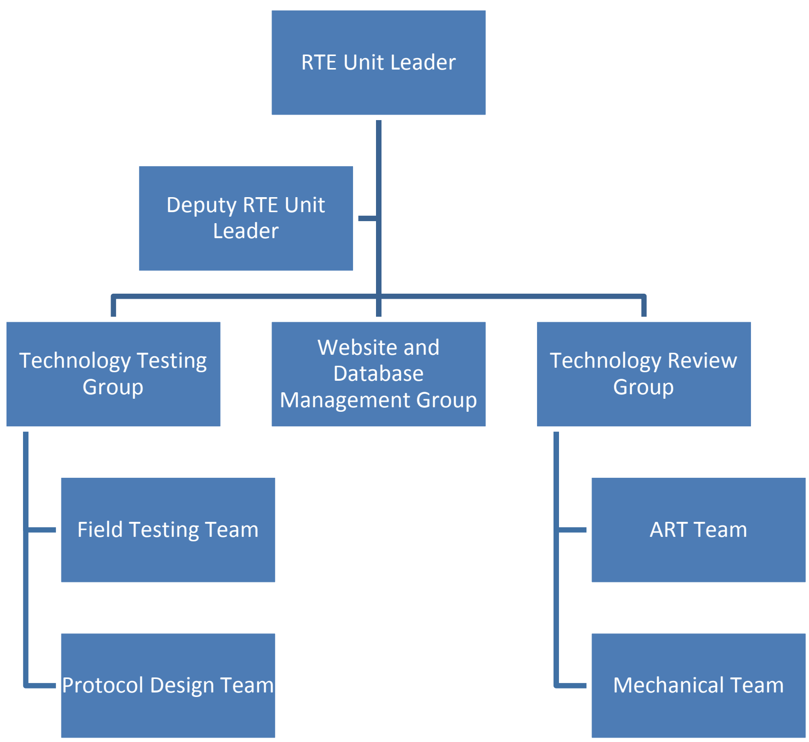
This first organizational chart shows a simple group structure that includes a field-testing team, technology review, and website/database management group. This structure assumes one Incident Command Post and does not have an Area Command established.

Example #3



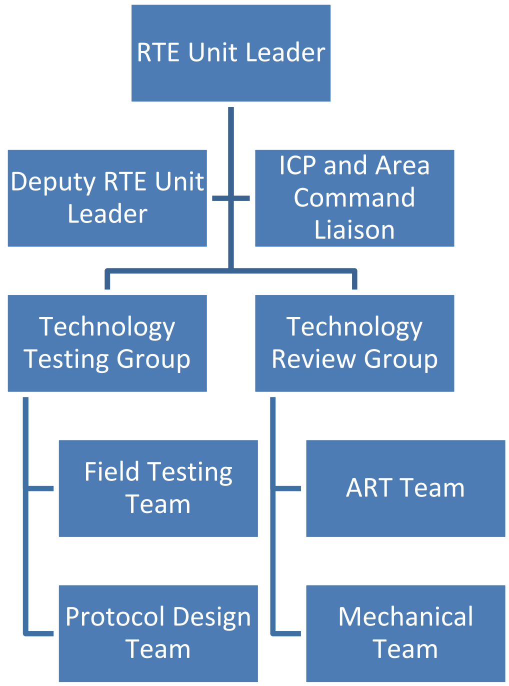
This second organizational chart shows an expanded group structure compared to the above, assuming expanded roles in protocol development, field teams, and a larger effort in technology review. This still assumes one Incident Command Post and does not have a Unified Area Command established.

Example #4: Expanded RTE Group Structure with single ICP

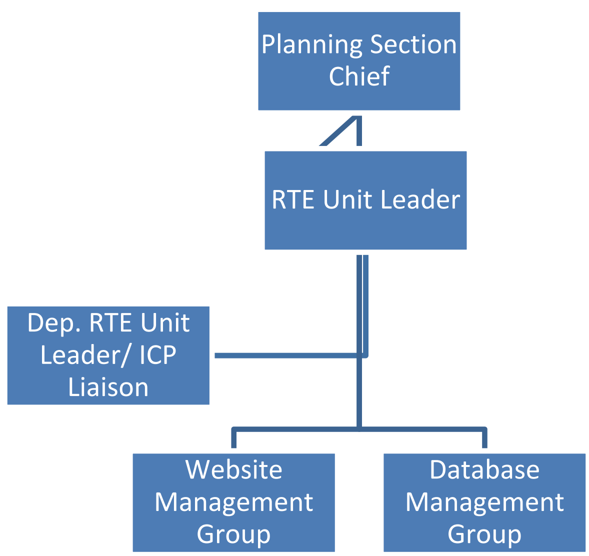


This third organizational chart (Example #5) shows the change in RTE Unit Structure at the Incident Command Post level once a second Command Post and a Unified Area Command are established. Functions that span command posts, such as the website development and data-management groups, would be coordinated under a RTE Unit in the Area Command (Example #6). Because the Unified Area Command is not tasked with "tactical operations," it is best if functions supporting specific command post objectives—such as technology review and protocol development as well as field-testing teams—remain in the ICP structure. This will require RTE unit leaders as well as group supervisors to establish regulator communication between command posts as well as with the Unified Area Command.

Example #5: RTE Unit Structure in the ICPs when an Area Command is established



Example #6: RTE Area Command Structure with multiple ICPs

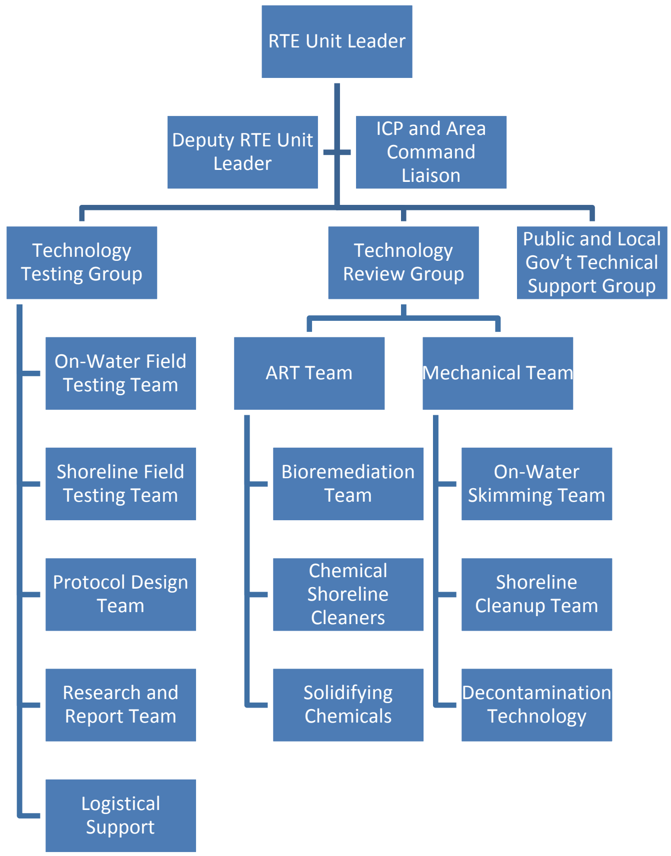


Tier 3 (or Type 1): National resources needed for effective management and response

This type of event is larger and more complex than the Tier 2 and has an Area Command established as shown in Examples #5 and #6 above. A Spill of National Significance (SONS) may be declared and coordination may also need to be established with more command posts as well as with the National Incident Command (NIC). Public and town hall meetings will likely be on-going, requiring support of the RTE unit. A separate group may be established to provide technical and outreach support to both the

Public Information Officer (PIO) as well as the Liaison Officer (LO). Additional field-testing teams may be necessary as well as further specialization of the technical review teams. The IC structure is designed to expand and collapse to meet these needs. An example of an ICP organizational chart for this type of event is found below.

Example #7: RTE Unit Structure in the Incident Command Posts when an Area Command is established for a Tier 1 or SONS Event



Attachment 3

RTE Unit and FTT Roles and Responsibilities

RTE Unit Tasks

The RTE Unit will likely have the following general responsibilities:

- Develop all of the ICS-related documentation needed for input into IAPs and other planning documents that address RTE staffing and the execution of unit responsibilities.
- Conduct the initial screening of technology ideas submitted through a single/consolidated web portal (described in Section 3 of this report), and determine which ideas merit elevation for further review.
- Organize and formalize the criteria used to select and prioritize ideas for field-testing (using the TWG-developed New Technology Evaluation Guide system described in Attachment 5).
- Coordinate with Operations to make sure the technologies identified by the Operations Section Chief as priorities for testing are also being addressed and evaluated by the RTE Unit.
- Coordinate with the NOAA SSC and the Regional Response Team (RRT) to determine any limitations of use for particular technologies.
- Coordinate with trustee agencies (US Fish and Wildlife Service, National Marine Fisheries Service) to determine Endangered Species Act (ESA) Section 7 issues and any BMPs to use during technology testing and/or implementation.
- Standardize the evaluations and prioritize technologies (by type) that warrant field-testing using the system described in Attachment 5.
- Conduct the QA/QC review of RTE Field Team Test (FTT) results for each technology tested, and forward any recommendations to Operations Section Chief (via RTE Unit Leader) regarding technology utility/modifications and suggested implementation and/or conditions of implementation (e.g., sampling and observation needs during the use of a particular technology).
- Participate as needed (daily, weekly) in conference calls with the RTE Unit Leader, Deputy Unit Leaders, and other RTE Team(s) and Field Test Team Leaders to identify needs and resolve problems.
- Consider development of access-limited platform (for NRT, RRTs, EPA HQ, etc.) that allows concerned agencies to review testing progress and results. (This might be housed by the JIC but fed by the RTE Unit Leader.)
- Communicate with Logistics regarding technologies that are currently available, approved for use, and can be accessed by a Product, Services, and Equipment (PSE) Database. (PSEs may be offered as an entry option on the website, but Logistics buyers need to know where to find the PSE resource information.)
- Work with Operations to identify promising technologies that are still in the conceptual stage, but may attract the attention of the Operations Section Chief and warrant pilot development/testing/funding.
- Communicate available technologies (both existing and successfully tested) to Operations section.
- Participate as needed in development of outreach materials for distribution via web, vendor technology demonstration events, public outreach expos, etc.

- Participate in vendor interactions as necessary (at ICP, via email/phone, at public expos) to explain the review process and provide referrals for idea submission, updates, etc.

- Participate, as much as possible, in vendor technology demonstration events and public outreach expos.

- In consultation with FTT Leader, produce/provide all necessary ICS forms for incorporation into IAPs.

- Participate as needed in Planning and Operations Section meetings to communicate progress and results.

Field Test Team (FTT) Tasks

General tasks of the RTE FTTs will likely include the following:

- Test new alternative techniques or technologies submissions for use during a specific response under specific circumstances.

- Make any necessary recommendations to Incident Command through consultation with the RTE Leader regarding options for oil or chemical spill response technologies for dynamic response situations, consistent with existing or incident-specific use policies and permits.

- Improve the efficiency and effectiveness of response and cleanup operations through evaluation and testing of new and improved response technologies.

- Conduct field-testing of identified technologies, using the established protocols.

- Enter test results (evaluation forms, photos, suggested improvements) into Sharepoint-type system and work with the RTE Database Manager to link test results with the original idea record in the database.

- Notify the RTE Unit Leader of test result availability so that RTE Unit can conduct QA/QC on test data, and note QA/QC results on Sharepoint-type system.

- Advise the RTE Unit Leader of any test data information gaps or needs; RTE Deputy Unit Leaders and FTTs should suggest any technology adaptations that might lead to greater technology utility and efficiencies.

- Be willing to re-test technologies as necessary.

- Development of field-test protocols, which should include the following considerations:

- ▪ Using other standardized and measurable test procedures, as possible, such as those of ASTM International and the USCG Research and Development Center.

- ▪ Testing common technologies to same standard (and side-by-side) to the degree possible.

- ▪ Making sure regional response teams (RRTs) and Endangered Species Act (ESA) Section 7 concerns are addressed before testing, and incorporate Best Management Practices (BMPs) into test design and evaluation.

- ▪ Taking advantage of, and designed for, any technology testing set-aside areas, to the degree possible.

- If requested, assist the RTE Unit members with the review and scoring of technologies proposed for field-testing.

Responsibilities of the FTT Leader

Under the leadership of the RTE Unit Leader, responsibilities for the Field Test Team (FTT) Leader include, but are not limited to, the following:

- Assisting the RTE Unit Leader by providing the input needed for ICS-related documents, including but not limited to the IAP.
- Participating in discussions with various businesses to capture the methods and contractors' processes used to receive and screen ideas presented for consideration during a response.
- Organizing and formalizing the criteria used to select and prioritize ideas for field-testing (using the TWG-developed New Technology Evaluation Guide system described in Attachment 5).
- Defining and communicating to the RTE Unit Leader the role and organization of the FTT, as well as key experience requirements for positions on the FTT.
- Formalizing work schedule including rotation and back fill considerations.
- Developing list of required support equipment needed for the basic office setup (ensuring office and personnel are portable and completely transportable without outside assistance).
- Identifying minimum procurement authorities required.
- Defining and communicating to the RTE Unit Leader the relationship between the FTT and any local or area command.
- Defining and communicating to the RTE Unit Leader the relationship with other government agencies.
- Defining roles and responsibilities for team members or parts of the team.
- Formalizing/Creating a boilerplate "introduction packet" presented to members assigned to the team.
- Identifying key logistic considerations for team deployment.
- Developing reporting guidelines for test results.
- Identifying internal and external communications needs.
- Identifying report sharing methods; and gathering other information that may be relevant to enable creation and deployment of FTT with minimal delay.
- Identifying/Formalizing interaction with the Operations Section and Environmental Unit for permits.
- Developing a process for the Operations Section to receive/review results of field-test process.
- Assisting the RTE Unit Leader and the Environmental Unit in identifying, coordinating, and implementing any of the following: permit needs, RRT/RCP constraints on technology use, Best Management Practices suggested by trustee agencies, etc. The FTT Leader will coordinate with the Operations Section to make sure all policies and permits are in place and complied with during testing.

FTT Personnel Skills

The Field Test Team (FTT) should have the following skills and competencies:

- Team Leader qualifications should include a background in crisis management and emergency response, experience with NIMS IMT, and experience with large-scale emergency operations and management.

- Deputy Team Leader qualifications should be similar to those of the Team Leader.

- Response personnel with experience in disciplines (as appropriate) such as oil spill response, chemical response, firefighting, salvage, etc.

Attachment 4

Regional and Local Responsibilities

RRT Responsibilities

The responsibilities of each RRT are as follows:

- Determining regional policies to adopt
- Facilitating cross-border cooperation
- Ensuring ability to stand up an Incident Management Team (IMT) quickly
- Facilitating set-aside test areas
- Incorporating RRT policies on the use of particular technologies
- Incorporating technology testing and operational implementation

Responsibilities of Area Committees

Area Committees have the following responsibilities:

- Implementing ARTES/RTE review committees
- Bringing RRT/agency members onto local ARTES/RTE planning teams
- Training and using local team members on technology review/testing teams during a response
- Identifying procedures for set-aside areas
- Following decision-making protocols
- Endangered Species Act (Section 7) and Section 106 of the National Historic Preservation Act consultations

Attachment 5

New Technology Evaluation Guide

This Response Technology Evaluation Guide was developed based on TWG member experience. During the DWH response, an initial attempt was made to use the CARVER scoring system to prioritize testing of Stage-3 items (ones that had passed two technical assessments). The CARVER system proved difficult to use and was altered twice to more appropriately reflect response emphasis and priorities.

This TWG has designed the following scoring/prioritization system and recommends that it be used in future responses. It is intended to assist RTE personnel in the evaluation of new technologies and equipment to determine if further evaluation or testing should be performed. The criteria are categorized by importance and relevance. If an evaluated item scores a 1 at any time, the evaluation should be stopped, and the item should be returned to the RTE Unit Leader for reconsideration before continuing.

Table: Initial Information

ID #	**Product Name/Description**
Category	**Tactic Description**
Date	**Evaluators**

Table: Health/Safety

Award high score for ergonomically designed equipment, minimized possibility of slips, trips, and falls, and features designed to increase safety; increased visibility, safety guards, reduced pinch points, etc.	
	(4) Major safety features, worker health and safety a major priority
	(3) Some safety features, worker health and safety considered
	(2) Minimal safety features, worker health and safety minimally considered
	(1) No safety features, high probability of worker injury
Notes	
Score	

Table: Personal Protective Equipment (PPE)

Award high score to equipment/technology that requires lower levels of PPE, training, supervision, or safety controls. ***Example: manual skimming versus mechanically-powered; water separation equipment would be evaluated based on quality of output water versus quantity treated***	
	(4) Administrative controls, no special requirements
	(3) Level D PPE; safety glasses, gloves, steel toed shoes
	(2) Level C PPE; air purifying respirator, splash suit
	(1) Level B PPE; self-contained breathing apparatus
Notes	
Score	

Table: Operational Functionality

Award high scores for technology that appears to be highly effective, or has good potential to operate as designed.	
	(4) Potentially highly functional
	(3) Functional with minimum adaptations or changes
	(2) Functional with moderate adaptations or changes
	(1) Potentially functional after major adaptations or changes
Notes	
Score	

Note: If the equipment/technology has scored a 1 or 2 on any of the above categories, the evaluators should reanalyze and determine actual need for this item. If the scores are 3 or 4, the evaluation should be continued.

Table: Mission Critical

Operations have requested this item or have identified a scenario where this equipment would be of use.	
	(4) High operational need
	(3) Operational need or short-range need
	(2) Medium range need
	(1) Long range need, not yet identified
Notes	
Score	

Table: Habitat Sensitivity

High scores awarded for equipment is deployable and serves a critical need for operations in sensitive areas that require a low-impact approach.	
	(4) May be used or designed for extremely sensitive areas and/or areas with environmentally sensitive species
	(3) May be used or designed for sensitive areas or with environmentally sensitive species
	(2) May be used or designed for moderately sensitive areas and/or areas with environmentally sensitive species
	(1) For use only in non-sensitive areas or areas without environmentally sensitive species
Notes	
Score	

Table: Ease of Deployment

Geographic ease of deployment in operational environment of item; tidal flats or shallow/restricted waters for marine applications; off-road, low-impact, tracked or heavy lift vehicles required for terrestrial applications.	
	(4) Easily deployed
	(3) Moderately difficult, special vehicles/platforms
	(2) Uncommonly available or modified platforms
	(1) Extremely specialized platform
Notes	
Score	

Table: Decontamination

Award high scores for items requiring minimum amount of decontamination, taking into account time and materials used.	
	(4) Minimum decontamination requirements
	(3) Typical decontamination requirements when compared with current technology
	(2) Expensive or disproportional decontamination required
	(1) Extremely expensive decontamination required or specialized equipment
Notes	
Score	

Table: Availability for Testing and Deployment

Award high scores for equipment that is in production that is readily available or already in production for other purposes. Lower scores are awarded for in development, lower production quantities, or logistics problems/difficulties.	
	(4) Readily available/deliverable (quantities and proximity), or already on-hand and is available prior to the window of opportunity
	(3) Moderately available/deliverable (quantities and proximity) and meets the window of opportunity
	(2) Available/ deliverable (quantities and proximity) just beyond the window of opportunity
	(1) Limited availability/ deliverability(product may be currently in R & D phase) and greatly exceeds the window of opportunity
Notes	
Score	

Table: Waste Production

Award higher scores for technology that generates minimal waste. Important to recognize when by-products can be offset/used for alternative purposes, i.e. energy production by gasification or manufacture of other products (e.g., road resurfacing)	
	(4) Marginal to no waste generated
	(3) Small amount of waste generated
	(2) Moderate waste stream (no offsets or secondary uses)
	(1) High waste stream or special disposal requirements
Notes	
Score	

Table: Regulatory Concerns

Award higher points if there are no or minimal regulatory/policy concerns. Lower scores involve regulatory/policy challenges. ***For example: ESA, RRT guidance, Local/State/Federal trustees, landowner, historic or archeological concerns.***	
	(4) No known regulatory concerns
	(3) Low chance of regulatory concerns
	(2) Marginal chance of regulatory concerns
	(1) Significant challenges, conflict with current guidance/regulations
Notes	
Score	

Attachment 6

Alternative Technology Response Forms

Alternative Technology Response Form

BP very much appreciates your consideration and help in providing suggestions to contain the source of flow and/or clean up the spill. To date, we have received a great number of submissions with each submission receiving individual consideration and priority based on merit and need.

Many submissions with similar content have been received multiple times. Such repetition will not affect judgments made by the expert reviewers, and can only serve to slow down the overall evaluation and notification process as well as defer attention from other potentially important ideas.

Please carefully read the following prior to making any submission.

Already Considered:

The following suggestion types have been received multiple times and have already been considered or are planned for field testing and deployment:

- ✔ Actions designed to completely shut down flow from the well
- ✔ Manipulations of the Blowout Preventer, to make it functional (already attempted)
- ✔ Containment of the spill at the source (subsea) and collection on a vessel (ongoing already)
- ✔ Drilling relief wells to intersect well casing and kill the offending well (ongoing)
- ✔ Any sort of work involving the Well Riser (which is no longer connected)
- ✔ Pumping into the well to "kill" the flow (already attempted)
- ✔ Setting a new Blowout Preventer on top of the existing one (previously considered)
- ✔ Subsea dispersant injection (ongoing)
- ✔ Hydrate remediation (ongoing)
- ✔ Open water skimming (ongoing)
- ✔ Dispersant application by plane or ship (ongoing)
- ✔ In-situ burning (ongoing)
- ✔ Placing booms to corral oil on the water surface (ongoing)

Not Possible / Not Feasible:

The following suggestion types have been studied and determined to be Not Feasible or Not Possible:

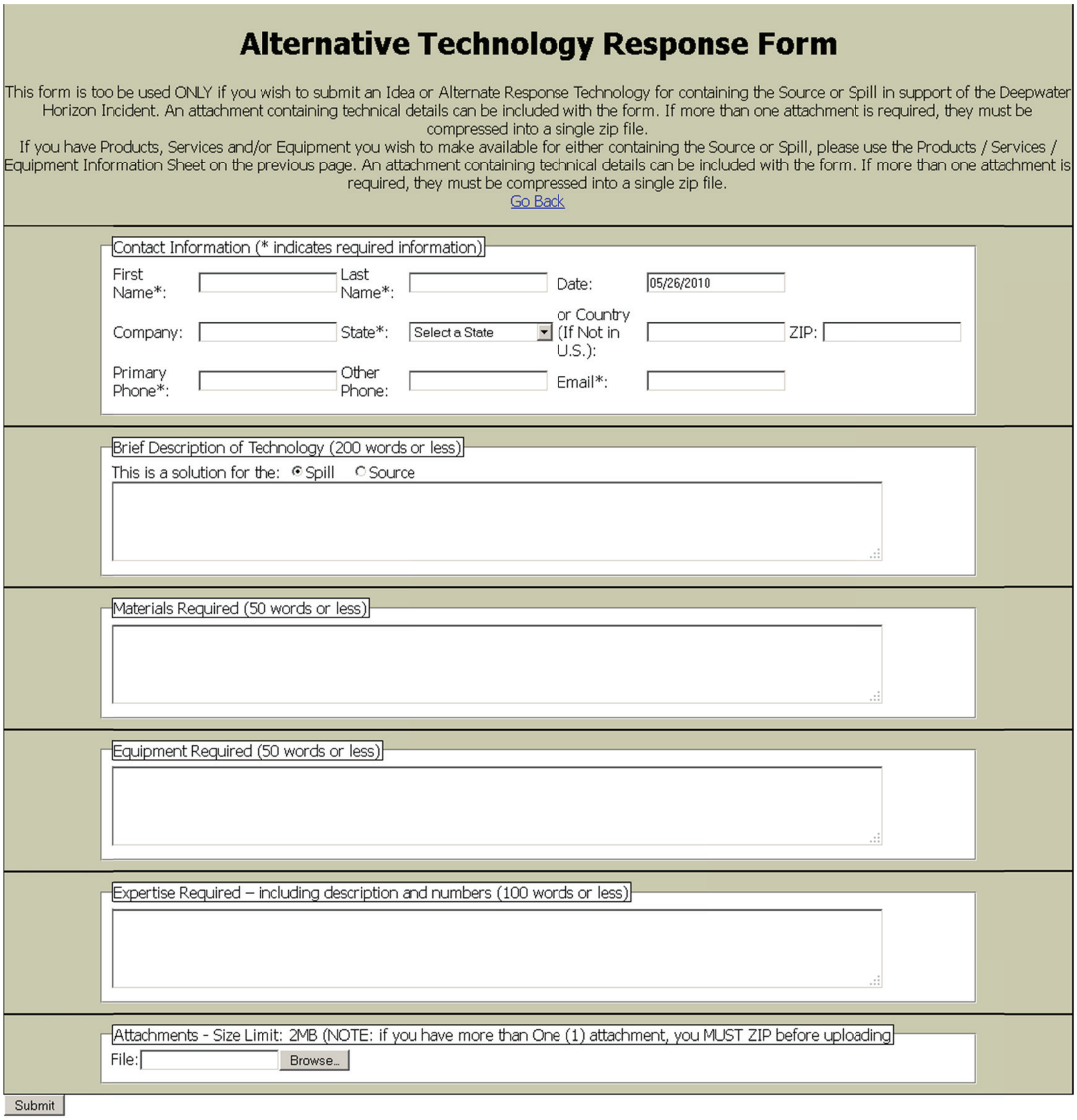
- X Freezing the Blowout Preventer or wellhead
- X Insertion of balloons, bladders, stents or plugs into the riser
- X Use of explosives, including nuclear
- X Dumping of boulders, concrete, sand or debris to bury the wellhead
- X Large subsea collection canopies made of fabric, plastic or other material
- X Use of lightweight materials subsea
- X Containers to collect oil which are shuttled back and forth to the surface
- X Use of peat moss based products for adsorption/skimming
- X Use of straw, hay, woodchips or hair to absorb oil
- X Use of bioaugmentation agents not listed on the EPA approved product schedule

In submitting your suggestion, it is important to be specific. The evaluation process relies on your providing sufficient information regarding methods, materials, equipment and expertise. Of particular interest at this time are ideas relating to cleaning up the spill and affected shoreline areas.

○ I have reviewed the information presented above, and wish to proceed.
○ I wish to exit the submission site.

Submit

Figure 2: First page of response form for DWH.



Alternative Technology Response Form

This form is too be used ONLY if you wish to submit an Idea or Alternate Response Technology for containing the Source or Spill in support of the Deepwater Horizon Incident. An attachment containing technical details can be included with the form. If more than one attachment is required, they must be compressed into a single zip file.
If you have Products, Services and/or Equipment you wish to make available for either containing the Source or Spill, please use the Products / Services / Equipment Information Sheet on the previous page. An attachment containing technical details can be included with the form. If more than one attachment is required, they must be compressed into a single zip file.
Go Back

Contact Information (* indicates required information)

First Name*: Last Name*: Date: 05/26/2010
Company: State*: Select a State or Country (If Not in U.S.): ZIP:
Primary Phone*: Other Phone: Email*:

Brief Description of Technology (200 words or less)
This is a solution for the: Spill Source

Materials Required (50 words or less)

Equipment Required (50 words or less)

Expertise Required – including description and numbers (100 words or less)

Attachments - Size Limit: 2MB (NOTE: if you have more than One (1) attachment, you MUST ZIP before uploading
File: Browse...

Submit

Figure 3: Main page for idea submission for the DWH response.

EPA

EPA Response to Enbridge Spill in Michigan

Technology Solutions - Ideas & Suggestions

Since the Enbridge oil spill in the Kalamazoo River, EPA has received numerous suggestions regarding possible technology solutions for the oil spill response efforts. As a result, EPA has developed the voluntary submittal process described below to allow for faster review of the suggestions being offered and to provide guidance regarding what information would be most useful to the reviewing officials. The information we receive through this voluntary submittal process will be scrutinized for innovative ideas and technological solutions that are safe for the environment and public health and can be deployed along the Kalamazoo River to help with cleanup. The information you submit will be forwarded to the appropriate reviewing official who will contact you, if necessary. Thank you for your interest in helping develop technology solutions for the oil spill response efforts.

Before you submit your suggestion there are a few things you should know. **If you are looking for information about businesses currently working at the site, visit our Contractor Information page.** Specifically, you should be aware that:

1. EPA will **NOT** accept information claimed as confidential business information (CBI). By submitting information through this website, you acknowledge that none of the information you submit is CBI. If you do submit information claimed as CBI, it will be deleted without review.
2. This mechanism for the public to submit ideas and suggestions and is not a request for proposals or a request for a quote to do business with EPA or other parts of the Federal government.
3. There is a regulatory process for assessing the performance, including the potential environmental impacts of dispersants, surface washing agents, surface collecting agents, bioremediation products, and sorbents, before they can be used in this or any other response. If you have not already submitted your product through that process, you can do so by completing the requirements described in Subpart J of the National Contingency Plan (NCP). If your product is currently listed on the NCP Subpart J Product Schedule (PDF) (21pp, 212K, About PDF), please note that you do *not* need to make us aware of your product, *nor* do you need to submit any additional information, through this website.

There are a number of important environmental problems created by the oil leaking into the Kalamazoo River and migrating downstream. Please help us understand *what part of the response efforts your suggestion is intended to help* by reviewing the choices below. If you feel your suggestion could be applied to more than one aspect of the problem, then you should identify each in the submittal form.

I. ***Surface Water Containment and Cleanup*** – clean, safe, and innovative solutions for preventing further spread of the oil and removing it from surface water.
   1. *Surface washing agents* (see note) - Surface washing agent is any product that removes oil from solid surfaces, such as beaches and rocks, through a detergency mechanism and does not involve dispersing or solubilizing the oil into the water column.
   2. *Surface collecting agents* (see note) - Surface collecting agents means those chemical agents that form a surface film to control the layer thickness of oil.
   3. *Miscellaneous oil spill control agents* (see note) - Miscellaneous oil spill control agent is any product, other than a dispersant, sinking agent, surface collecting agent, bioremediation agent, burning agent, or sorbent that can be used to enhance oil spill cleanup, removal, treatment, or mitigation.
   4. *Sorbents* (see note) - Sorbents are essentially inert and insoluble materials that are used to remove oil and hazardous substances from water through adsorption, in which the oil or hazardous substance is attracted to the sorbent surface and then adheres to it; absorption, in which the oil or hazardous substance penetrates the pores of the sorbent material; or a combination of the two. EPA does not require technical product data submissions for sorbents and does not include sorbents on the NCP Product Schedule. Manufacturers that produce sorbent materials that consist of materials other than those identified on the NCP Product Schedule website will need to file a Miscellaneous Oil Spill Control Agent application.
   5. *Hardware/mechanical* (e.g., booms, vacuums)
   6. *Monitoring and detection equipment*

II. **Air Monitoring and Detection** – clean, safe, and innovative solutions for monitoring air quality and the emissions from the oil as it volatilizes.

III. **Riverbank Cleanup** – clean, safe, and innovative solutions for protecting and cleaning the banks.
   1. *Soil remediation*
   2. *Disposal of waste material*
   3. *Bioremediation* (see note) - Bioremediation agents means microbiological cultures, enzyme additives, or nutrient additives that are deliberately introduced into an oil discharge and that will significantly increase the rate of biodegradation to mitigate the effects of the discharge.
   4. *Sorbent* (see I.5 above) (see note)
   5. *Surface Washing Agents* (see I.2 above) (see note)

IV. **Wildlife Protection and Cleanup** – clean, safe, and innovative solutions for protecting and cleaning wildlife affected by the oil spill.

V. **Other categories of interest** (e.g., data collection and management, GIS)

NOTE : Product categories included in the National Contingency Plan Product Schedule

PROCEED TO SUBMISSION FORM

Last updated on Thursday, July 14, 2011

Figure 4: First page on EPA site for ideas for Enbridge Pipeline Spill (July 2010).

EPA Response to Enbridge Spill in Michigan

Submit Ideas & Suggestions

Thank you for taking the time to share your idea or suggestion with us. The following submission form is only intended to provide us with a brief summary of who you are and the nature of your contribution. There are instructions at the bottom of this page for sending us a more detailed description.

Name *(required)* :

Address *(required)* :

City *(required)* :

State *(required)* :

Zipcode *(required)* :

Company:

Is this company registered as a small business and/or a small disadvantaged, woman-, veteran -or service-disabled veteran-owned business?

Yes

No

Email Address *(required)* :

Product category: Please select as many as apply.

Surface Water - Hardware/Mechanical
Surface Water - Monitoring and Detection
Air Monitoring and Detection
Riverbank Cleanup - Soil Remediation
Riverbank Cleanup - Waste Disposal
Wildlife Protection and Cleanup
Other

Hold the "Control" key and click to make multiple selections

Brief Description: (2000 characters maximum)

Help us stop spam by typing in the word ***human*** *(required)* :

Submit your idea or suggestion

Instructions for Providing Additional Information

To help us evaluate your idea or suggestion we need you to address some key technology performance and operational characteristics specific to the category of technology you are suggesting. Review the performance and operational characteristics (opens in a new window) for each of the seven technology categories previously identified. Identify the category that best fits your suggestion and provide the additional information to us by following the instructions below.

- Please include the additional description in a Word or Adobe Acrobat file and email it as an attachment to us at EOC_ORD@epamail.epa.gov.
- Please identify yourself using the same name and address as you provided on the submission form.
- Please limit your submission to four (4) pages in length (inclusive of all pictures, drawings, text, cover sheet, and references).

WARNING - DO NOT submit any information claimed as confidential business information (CBI) to EPA via this website or via email. EPA will not accept such information.

Last updated on Thursday, August 25, 2011

Figure 5: Main page for idea submission during Enbridge Pipeline Spill.

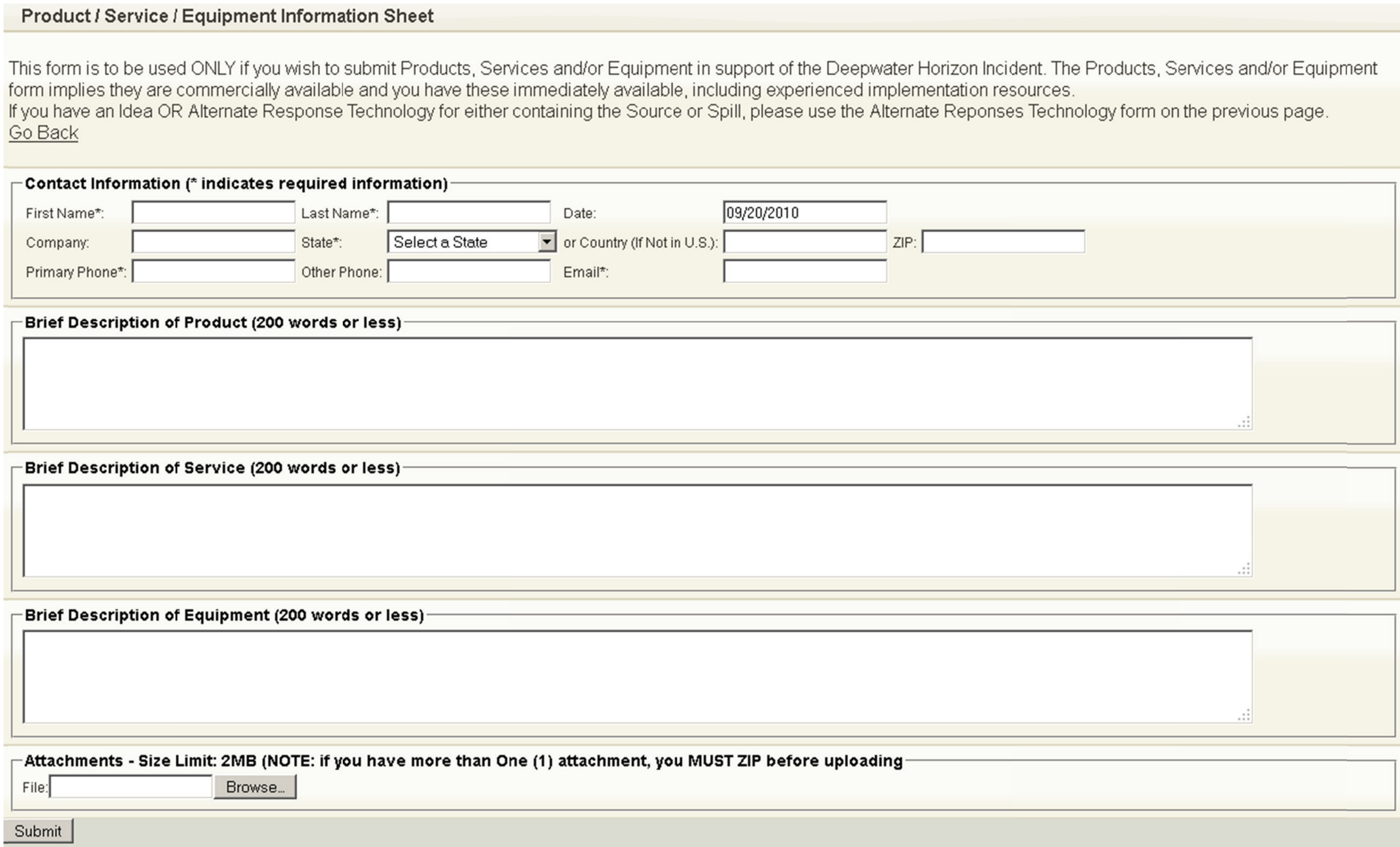


Figure 6: Product/Service/Equipment (PSE) submission page.

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