299109

2014 INTERNATIONAL OIL SPILL CONFERENCE

Incorporating Well Control Support Functions into a Broader Oil Spill Response Organization

Kelly Lynn Schnapp, Acting Deputy Division Chief, Oil Spill Response Division, Bureau of Safety and Environmental Enforcement. 381 Elden Street, Herndon, VA 20170.

Joseph Leonard, Commander, Chief-Planning Department USCG Incident Management Team, United States Coast Guard, 5505 Robin Hood Road, Suite K, Norfolk, VA 23513.

Michael Drieu, Response Manager, WellCONTAINED, Subsea Containment Solutions Wild Well Control. 2202 Oil Center Court, Houston TX 77073.

Bryan Rogers, Senior Planning Analyst, Gulf of Mexico Region Branch, Oil Spill Response Division, Bureau of Safety and Environmental Enforcement.

ABSTRACT 200109:

This paper seeks to better prepare the oil spill response community for incorporating well control into a response organization, based on conditional considerations rather than long and firmly held assumptions. Techniques used to control a well, after a blowout, are more closely related to technical well drilling and control activities rather than to operations intended to address oil in the environment. When oil is released from a well in the Outer Continental Shelf (OCS), response organizers need to consider various factors influencing the organization that may exist at the time. These include a working knowledge of well control by response leadership; strength of responder relationships; and response complexity (to include authority, stakeholder and public expectations). This is particularly true when incorporating the well control support function in the oil spill response operational planning processes, usually facilitated by the Incident Command System (ICS). Within the last three years, complex well control operations were uniquely incorporated into response organizations during two Government Initiated Unannounced Exercises (GIUEs) and during the DEEPWATER HORIZON incident. Three options will be presented. Considerations for incorporating well control into a response organization will be presented using the case studies noted previously and by comparing similar lessons learned from the salvage industry in the late 1990's. Options presented help demonstrate that response organization flexibility is key to a successful response. This paper seeks to illuminate options surrounding placement of well control within an incident command structure based upon unique incident situational realities.

INTRODUCTION:

The information in this paper is intended to question impulse decisions, or decisions made based on a "planning fallacy" or rigidity, when organizing oil spill response support functions (e.g. Operations, Planning, Logistics, etc). As Dr. Daniel Kahneman points out as a wakeup call to all planners (including planners during a response), "When it comes to rare events, our mind is not designed to get things quite right. For the residents of a planet that may

be exposed to events no one has yet experienced, this is not good news." (Kahneman, 2011) Although oil spills are not rare, each one is unique enough that the specific mix of realities during a response are rarely the same. This is what makes oil spill responders susceptible to planning fallacy or rigidity even though it is easy to think that an oil spill is not a uniquely rare event. If the response organization is established assuming knowledge, relationships and complexity are all best case scenarios, this limits the planner's ability to address the rare combinations of factors that may have a significant impact to a functioning organization.

This paper discusses three options for organizing the response to a well blowout as part of the broader response organization, to determine which option best addresses a given response's realities. These options include establishing a Separate Command Structure for well control operations; creating a separate Well Control Operations Section within the response organization; and incorporating Well Control as a Branch in the Operations Section. Also being discussed is the importance of awareness regarding situational realities at the time of an incident, making it a unique event. Whether one is an Oil Spill Response Plan (OSRP) writer or the Planning Section Chief during a response to a well blowout, setting up an effective organization depends on the planner's awareness and acceptance of factors including knowledge of well control (technical expertise) by response leadership, responder relationships, and response complexity (to include all stakeholder issues).

For the rest of this paper the term "well control" will be used to represent efforts used after a well blowout to prevent further release from the source, an uncontrolled well. Source control is a top priority, second to human health and safety, for any oil spill response effort and is considered part of the broader response operation. During an offshore well blowout, controlling the source means controlling the well. Well control activities during a well blowout are uniquely more technically challenging and more related to engineering techniques used on a daily basis to control wells and prevent blowouts rather than to activities conducted responding to oil in the environment. Using "well" in place of "source" will also help keep the reader focused on expertise and technical knowledge unique to well control activities instead of all potential sources for an oil spill. Well control operations must be coordinated with spill response operations to optimize safety, communication, logistics, and messaging in the response planning cycle.

This paper is not intended to teach about the Incident Command System (ICS), but instead, share perspectives for consideration when deciding where operational support staff should function within any response management structure, most likely ICS. The key to a successful response organization is to understand and embrace the flexibility in establishing a response organization and how to use this aspect favorably.

Danny Snell, retired Executive Assistant Chief with the Houston Fire Department, and former HAZMAT chief often commented, "ICS is like a toolbox—use only the tools you need for the job. You don't need every tool if all you are doing is putting a nail in the wall." Surface and Subsurface well response operations, by their very nature, are among the most complex of all oil spill response operations, and as experienced during the DEEPWATER HORIZON response, flexibility is critically important. There is no single option that will work for all situations, but awareness regarding influencing factors that are in place at the time of the incident

(politics, relationships, and knowledge/expertise), is critical to establish the basis for a successful response.

METHODS:

All four authors have significant experience with response organizations as contingency planners and responders, most recently in the DEEPWATER HORIZON incident, and with numerous exercises incorporating well control activities in Alaska, the Gulf of Mexico, and Malaysia, as well as experience with BSEE and USCG federal regulations. Specifically, this paper draws from the experiences and lessons learned during the Shell Oil exercise in Anchorage Alaska in 2012, the Shell Oil/MWCC and Noble Energy/Helix equipment deployment and spill management team exercises in 2012 and 2013. Each of these exercises placed the well control support function in a different part of the response organization.

There are also some historic similarities between well control operations and salvage. In a 1999 IOSC Proceedings article, *"Some Thoughts on Salvage Operations During Oil Spills"*, salvage responders seem to have worked many of the same challenges well control responders have in response organization integration. Lessons learned described in the above article followed the Buffalo 292 and Buffalo 286 oil spills and will be included in this discussion as additional experiential data points.

DISCUSSION:

To undergird the ideas presented in this paper, it is important to point out a functional organization not only meets the operational objectives but ensures safety is always the top priority; shares information effectively; includes stakeholders in decisions; provides a creditable message to the public; provides logistics at pace with operational needs, and reduces conflict. As an example, during an offshore well blowout, the Operations Section Chief with a low level of well control expertise could approve a tactic that might not meet the safety standards for well control enforced by the BSEE. A negative result might endanger human health and/or lead to a loss in stakeholder and public confidence. Positioning well control support functions strategically within response structure can help facilitate important safety and operational communication even if the Command leadership well control expertise level is not significant. It is suggested one of three potential organizational options discussed in this paper should lead to a most functional response organization if established with strong situational awareness and understanding of the realities unique to each incident. Further, conscious recognition of the unique technical, operational and logistical needs and challenge of well engineering/well control is imperative to a fully functioning and integrated response.

Well Control as a Separate Command Structure from the Response Organization

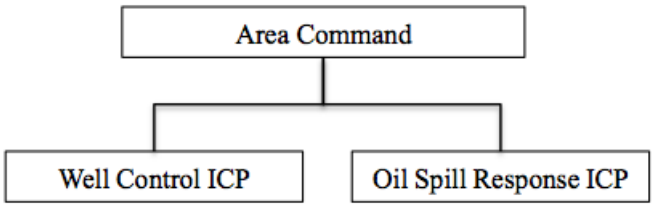

Figure 1: Well Control function managed separately as a second Incident Command Post (ICP) under an Area Command.

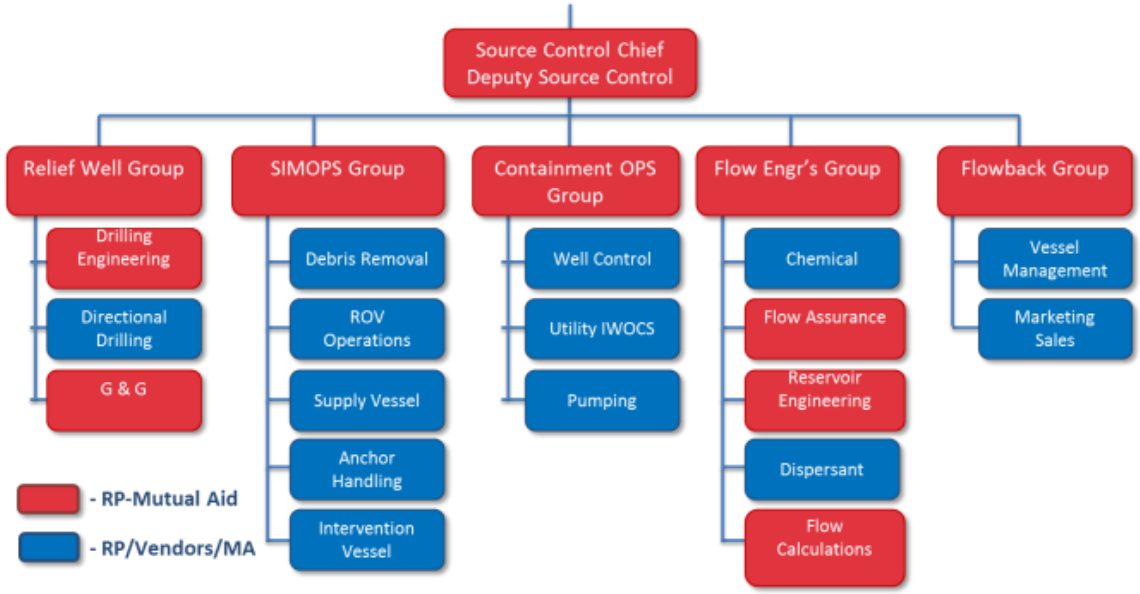

Figure 2: Example from HWCG's incident management handbook for organizing well control as a separate ICP. (HWCG 2012)

One option for incorporating well control into a response organization is to form a separate Incident Command Post (ICP), with the assumption an Area Command is established to coordinate, as seen in figure 1. This option might be considered when an event uses a preponderance of resources that are significantly more technical, engineering based and focused, and different than those used in non-well oil spill responses. Due to event complexity, or the requirement for such a technically focused heavy lift, well control operations may threaten to overwhelm the capabilities of a single command post. Figure 2 shows the complexity within a separate Well Control ICP necessary to support just the well control operations.

Well control responders tend to like this model because they work predominantly with others that speak their technical language, understand well control issues, and are not particularly conversant in ICS. The well control responder role in this model is clearly separate from the response organization and has the feel of an engineering (well-contol) operation versus a typical oil spill response operation. Using this model, well control operations do not have to request logistics through the spill response logistics process that is servicing the broad response

operations. They may typically have their own logistics cell technically responsive to the particular needs of the organization.

In the late 1990's marine salvors faced this same situation as they described reactions to being embedded in the operations section of the ICS organization. "Several members of the group felt that the salvor was buried too deep in the Incident Command System organization [when not a separate organization]. The Salvage Master was either overlooked or minimized in terms of impact and importance of the overall response. A number of participants felt that so long as a salvage situation existed, the salvage master should retain control over the operation." (Buie, 1999) Over the last 15 years, marine salvage operations went from independently organized operations that were not considered under the scope of incident preparedness or response to full integration into these activities, also signified by recently promulgated USCG regulatory requirements regarding Marine Firefighting and Salvage.

Potential consequences from the Separate Command Structure model include broken or disjointed communications between well control and the response operation section. Well control status information and planning process are disconnected from the oil spill response information and planning process. Messaging could become disjointed, shareholder and public perception could be damaged, and if they form the perception response groups are not working together, more oversight could be demanded by authorities, thus slowing the response operation. Spill response operations may not have easy access to critical information affecting key integrations at critical points in the broader operational planning processes. Though achievement of a seamless response should be a primary mission focus, a Common Operational Picture often suffers in the 'stove-piping' that may occur in less coordinated, less well integrated events.

This option works best when the well control operations are significantly more substantial than, (or equal to) resources in the spill response operation, and relationships between well control support staff and the spill Unified Command have been pre-established. It also helps to have Well Control personnel that understand how ICS works and understand the terminology. Many engineering personnel are not familiar with response organization processes or terminology, limiting their empowerment to work within the broader team. Information may still flow between response organizations but success relies on each response organization's awareness of the other's needs and IC leadership making this a priority. Response events demand access to a complete and common operational picture by all stakeholder groups. Thus, Area Command is critical in the facilitation of the integration piece in this model. The degree to which Area Command is successful in that undertaking will directly impact the integration of all response parties and the creation of a common mission mindset.

Separate Well Control Operations Section

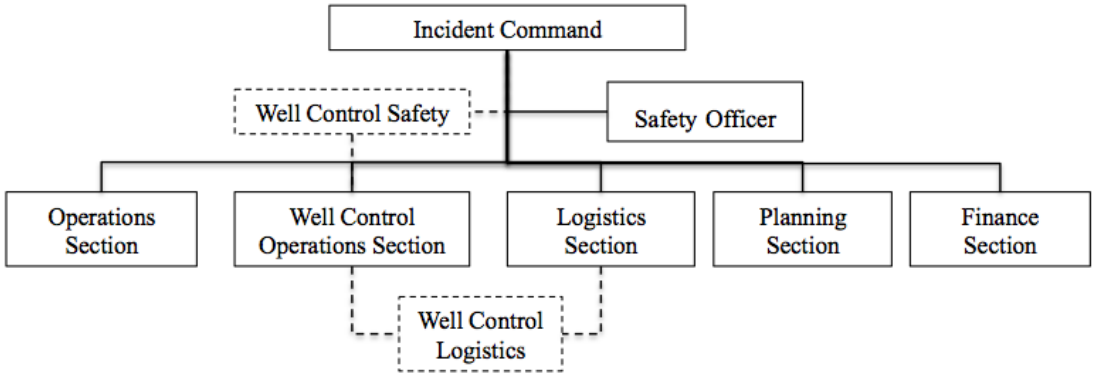

Figure 3: Well Control managed as a separate Operations Section but integrated into a single organization.

A second option is to create a separate Well Control Operations Section within the response organization as seen in figure 3. This option results from a natural tendency for well control engineers and experts to fall into their natural working groups. Here they are also compelled to find a place within a response organization. Technical logistics coordination needs may also drive the development of an autonomous Well Control Operations Section within a response organization. From the authors' experiences, it is likely a second Logistics Section or Logistics Liaison (and a Planning Liaison and a Well Control Safety Officer) will be needed over the course of the response to provide direct support to a Well Control Operations Section.

Having a separate Well Control Operations Section may be the best option if the assigned oil spill Operations Section Chief or Deputy are not familiar with Well Control and/or do not have a pre-established working relationship with well control experts. Having separate operations sections allows the two groups to plan independently of each other and may assist in preventing stove-piping through common planning requirements integrated by the planning section. The functionality of this organization is tested during the tactics planning and operations briefings. If stove-piping develops, important information may not be included in developing the incident action plan for the next day's operations, potentially leading to ineffective operations when implemented and initial failure of operational coordination.

Another consideration for this option is to use nontraditional representatives, with specific knowledge about offshore drilling, in positions that can take advantage of their specialized expertise. For example, BSEE representatives could help coordination and integration by serving as Deputy Well Control Operations Section Chief, Assistant Situation Unit Leader, as well as other positions within the Well Control Operations branches, the Resource Unit, and as a Technical Specialist in the Planning Section.

Well Control Branch within Operations Section

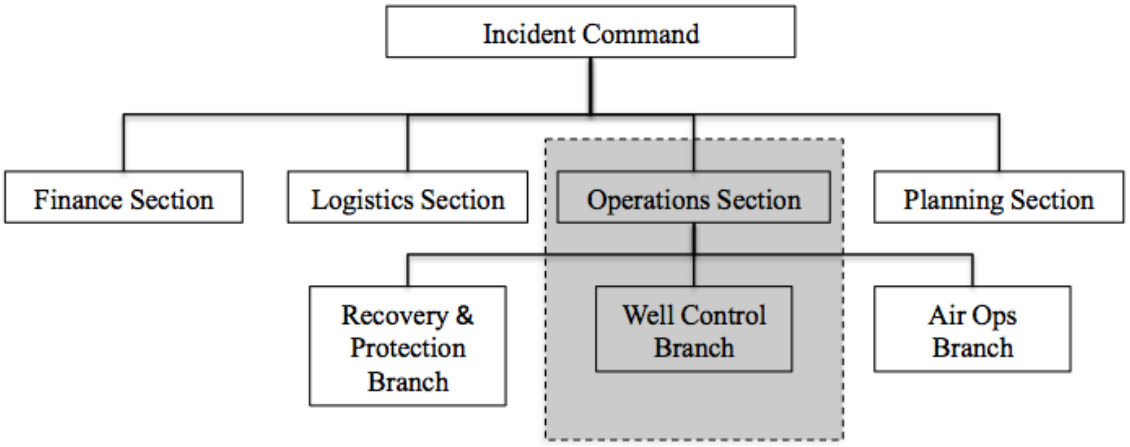

Figure 4: Well Control Branch integrated into the Operations Section.

The ICS purist will likely conclude that the best option is to place well control support functions as a branch within the Operations Section, as depicted in Figure 4. There is much to gain from leveraging the planning process simplicities that come with full integration. This success still relies on the Operations Section Chief (or Deputy) having the necessary level of expertise regarding well control operations to ensure necessary representation in operations briefs and in acquiring logistics, or having a deputy section chief who understands.

Again, we can learn from the salvage industry's experiences about the benefits of fully integrating into the Operations Sections. The Operations Section Chief's knowledge level, or awareness of the lack of salvage expertise, was the key success factor indicated by salvage master William Millwee, Jr. in predicting the success of the ICS. "[The response organizations] salvation may lie in the designation of the FOSC as the party to resolve disputes and ensure timely decisions--if the FOSC is sufficiently experienced and knowledgeable to make the correct decision, or wise enough to listen to those who are." (Buie, 1999). Of note, salvage operations are typically conducted today within a highly autonomous Branch of the Operations Section because of the Coast Guard's successful efforts to provide salvage knowledge to those that could fill leadership positions and trust in the expertise of those supporting them.

If the Operations Section Chief's well control subject matter expertise is limited at the time of an incident, awareness of this is needed to ensure that Well Control Branch representatives attend planning meetings to assist the Operations Section Chief with necessary subject matter expertise.

Another factor that would promote integrating Well Control into the Operations Section is the size of the spill response verses the complexity and challenges of the well control operations. In a smaller incident or in shallow waters, where the preponderance of the resources may be used for spill response, Well Control may well be managed effectively as a Branch within the Operations Section. Should the situation warrant, the "Well Control Branch" can always be elevated into a Section or initiated as a separate Incident Command Post as warranted.

Choosing an Integration Option Based on Operational and Planning Assessment Realities

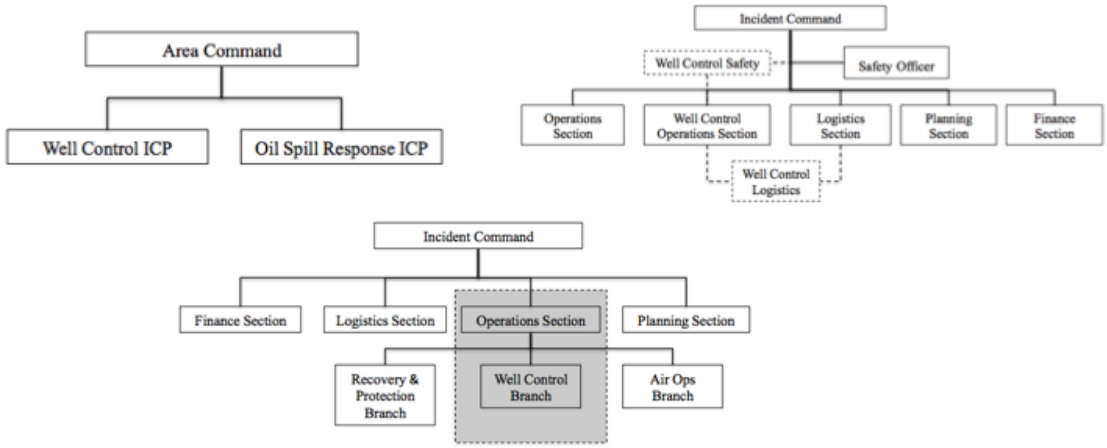

Figure 5: Three options for integrating well control into a broader response organization presented for consideration.

Making decisions for well control integration requires an accurate assessment of at least three major contributing factors involved in choosing an organizational approach. Table one lists three factors to consider and a quick guide to assessing the situation. Table two offers some specific benefits and consequences for each option based on the assessments made about expertise, relationships, and complexity. They may assist in organizing the response structure for quick success during the initial response phase and adjust the organization as the response progresses.

Realistically Assessing Levels of Expertise, Quality, and Complexity During an Oil Spill Response with Well Control Operations			
Level	**Operations Section Chief Expertise**	**Responder Relationship Quality**	**Well Control Operations Complexity**
Low	Never worked in the geographic area or with well control	Minimal trust	Preponderance of resources focused on oil spill removal
Medium	Some level of knowledge and/or experience	Some trust and experience working together	Resources for well control and oil spill removal are about equal
High	Experience and knowledge with well control operations	Strong trust that would not easily be broken	Preponderance of resources focused on well control

Table 1: Level descriptions for the three major awareness factors.

Quick Guide to Choosing an Organization Based on an Accurate Assessment	
Level/Factor	**Specific Considerations**
High Complexity	Even the most organized and functional ICPs might not be able to handle this level of well control operational needs. For example, broader response organization logistics section will likely not be able to service the well control operations adequately. When complexity is high, it is likely that a response starting out with a separate Well Control Operations section will evolve into a separate ICP anyway. Best to just start out that way and focus on establishing lasting lines of communications.
High Expertise & High Relationship	Full integration would be considered the most efficient and optimal integration within a response organization since all lines of communication are established and somewhat failsafe. However, a high complexity level may supersede these factors. Suggest avoiding a separate Well Control Operations Section when knowledge level is high and relationship quality is high because it would be a lost opportunity to fully integrate as a Branch and optimize organizational functionality.
Medium Expertise & Medium Complexity	Relationship quality is less of a factor when considering a separate Well Control Operations Section compared to the benefit in filling a gap in expertise and addressing a more complex well control operation.
Medium Relationship	When responder relationships are at a medium level, full integration is more likely to function when the knowledge level is medium. A medium relationship level is also important when considering a separate ICP to help naturally fill the hard-to-avoid communication gap.
Low Complexity	When well control operations are not a significant part of an oil spill response, fully incorporating it into the broader response organization will provide the greatest coordination with logistics and communication despite low relationship quality or well control expertise. When expertise is low, full integration may not provide the best representation in operations meetings. When responder relationship quality is low, full integration may result in confrontation that is best addressed prior to or following a response.

Low Expertise	The greatest benefit to from having a separate Well Control Operations Section occurs is when the expertise level is low. The knowledge gap is filled through specific representation in operations planning. Consequences are seen in the logistics and safety coordination since response planning is most efficient without bifurcated operations.
Low Expertise & Low Relationship	Forcing integration into a broader response organization when the Operation Section Chief knowledge is low and the relationships are not trusting, during a response, may limit the functionality regardless of the complexity level.

Table 2: Summary assessment guidance of three options presented.

Case Studies

BSEE-initiated two recent unannounced exercises including Table Top Exercise components intended to test the response organization's ability to incorporate well control support functions. Each exercise included a deployment and operation-testing component that was overseen by BSEE well control experts. The first exercise used a separate Well Control Operations Section. The second exercise used a Well Control Branch within the Operations Section. While both organizations were able to meet their objectives, there were unique consequences with each structure.

The first structure accepted the need for Well Control operations to have separate representation in operational planning processes. The separate operations section had trouble coordinating with planning and logistics sections, which often forgot they existed. Resource conflicts with the other Operations Section were elevated to the Unified Command.

The second exercise used the Well Control Branch integration structure. The organization evolved into designating a well control expert to participate in the Objectives Meeting, Command and General Staff Meeting and the Planning Meeting with roles similar to the Operations Section Chief to represent Well Control concepts. This result shows how important it is to understand the reality surrounding the Operations Section Chief's ability to represent well control operations. However, resource conflicts between well control and on-water oil spill response were dealt with more efficiently than the first exercise described above in which Well Control was found at the section chief level.

During the Macondo 252 Blowout, what eventually became a centralized hub for Well Control issues formed on the West side of Houston in a number of the Responsible Party offices, far away from the oil spill response command. Of particular note was the "Hive", a BP command and control facility used to monitor surface and subsea wellhead activities. It also housed a number of technical subject matter cells used to generate ideas regarding the well capping, control and relief well efforts. It functioned as a stand-alone adjunct to the ongoing oil spill response activities, a de facto incident command post dealing with the technical specifics of capping and controlling the well, a Well Control ICP. This was a prudent course of action due to the overwhelmingly heavy technical and logistical lift needed to address the complexity of the

well control problem. Response integration and communication, while not perfect, were adequate in light of the Well Control ICP operating as a necessary stand-alone component.

GENERAL WAYS TO IMPROVE RESPONSE FOR ALL THREE OPTIONS:

The following are general suggestions applicable to all three-response organization options described to increase organizational effectiveness. The suggestions include understanding federal oversight and frontline authority and a building well control vocabulary. Speaking the same language during a response involving well control activities is key to increasing communication effectiveness.

Regulatory oversight authority considerations

It is important for responders to understand the unique federal oversight and authority that applies to an oil spill response with an uncontrolled well as the source. The USCG has the federal authority over oil spill response operations, including the authority to ensure an objective of the response is to control the "source". However, when it comes to well control, and mitigation activities, BSEE has the federal authority to ensure it is controlled safety and effectively. This distinction is important to ensure appropriate standards are applied and approvals are obtained throughout the operational planning process.

Speaking the Same Language

It is important all parties speak the same language before and during a response. For the oil and gas industry, well control activities are related to a direct intervention in a loss of well control event at the source point (wellbore). The primary goal is to shut-in or control the release of hydrocarbons to the environment. Depending on the magnitude, incident type (e.g. fixed or floating rig), location of the incident (e.g. shallow or deep water), well activity (e.g. production, drilling), and type of well (e.g. oil or gas), the response activities are scalable and may or may not include following activities:

Surface & Subsea SIMOPS

Simultaneous Operations (SIMOPS) is a formal written process guiding two or more marine operations concurrently that might cause conflicts with one another in normal or emergency situations. SIMOPS should be coordinated to ensure safe and efficient operations between all marine and subsea assets deployed in support of the incident.

Site Survey & Initial Assessment

Site assessment operations should be conducted to determine the extent of hydrocarbon release, damage to the well, chart damaged structures and equipment, and plan debris removal operations to gain safe access to the well. Initial assessments can also indicate whether specialized subsea intervention tools are needed. After a site survey and assessment is completed, the same vessel can transition to troubleshooting or functioning the Blowout Preventer (BOP) or wellhead to stop the flow of hydrocarbons and shut in the well without having to install a capping stack.

Subsea Debris Removal (gain access to wellbore)

Debris removal is conducted as needed to make the site safe for work and allow access to the source so that well intervention and capping operations can be conducted. Debris removal is a dynamic aspect of the well control schedule due to the inability to accurately predict the size and scope of the operation. If the rig sinks near, or on top of the well, the removal of the entire structure may be necessary before any well control activity is conducted.

Capping Stack Install/Operation

The Operator is responsible for developing and implementing plans for capping operations. Initial operations should address capping device mobilization and support equipment deployment to the well site. Operator's Well Containment Plan outlines the type of equipment and procedures. The capping stack, or well control closure device, is installed on the BOP or wellhead to stop the flow of hydrocarbons and shut in the well until the well pressure is decreased to zero pressure, or "killed" as a permanent solution.

Subsea Dispersant Application

In incidents involving highly volatile organic compounds (VOCs) on the surface, subsea dispersant may be used to enable a safe working environment by accelerating the breakdown of hydrocarbons below the surface and minimizing VOCs on the surface. Subsea dispersant can be injected into the flow of hydrocarbons from a release point. Application rates and methods will vary based on conditions. Government approval may be required depending on incident and country location.

Relief Well Drilling/Intercept/Well Kill

Plans for drilling a relief well to stop the flow of oil or to permanently secure the well should be implemented at the beginning of an assumed worst case discharge and run simultaneously with all other well intervention operations. Relief well locations are identified in the Well Containment Plan. The relief well and intercept for well kill is needed if no other means for killing the well is successful, such as circulating well bore fluids, or pumping in additional fluids and pumping rate designed to kill the well.

Capture & Collection

Capture & collection operations apply to subsea hydrocarbon collection in the interim of, or simultaneous to, the execution of the capping solution, or primarily as a contingency if shutting-in the well would cause the casing to fail and result in hydrocarbons broaching the seafloor. It also refers to the integration of flow lines with the capping device to transfer hydrocarbons to the surface in the instance of a cap and flow scenario. In this instance an intervention riser system can be used to direct the release for processing, transfer, and offloading of oil to a shuttle vessel.

Decontamination & Demobilization

Decontamination (decon) must be conducted as soon as equipment has been mobilized to prevent cross contamination of relatively clean environments. Decon stations should be established at the entry/exit of ports that support the Well Control efforts of the response. Vessels may be required to go through a gross decon at the entrance to a port prior to entry.

Separate and distinct resources should be made available for each part of the well containment plan or scheduled to accommodate each part of the response activities described. Some items such as the capping stack, cap and flow equipment, and subsea injection equipment are readily available through consortium membership as dedicated equipment for members. Other resources are available in the region or can be mobilized through standard contractual agreements, such as vessels, rigs and well services equipment.

Well Intervention Strategy

Separate and distinct resources should be made available for each part of the well control containment plan or scheduled to accommodate each part of the response. Deepwater well intervention strategies should support the overall response strategies. Specific well intervention strategies should address; well control response personnel, stopping the well flow at the sea floor as fast and safely as possible, ensuring no seafloor breaching from the well design or control strategies, and permanently secure the well thereby securing the source

The Operator should have the organizational capability, through company personnel, contractors, and consultants or through mutual aid agreements to effectively and safely implement the Well Containment Plan. This includes developing an organizational structure to manage the many facets of a subsea well control incident.

The well control organization varies among Operators with some having Well Control operations as a Branch under Operations Section while others have Well Control as an additional Section with Operations. In some cases, such as the Deepwater Horizon incident, Well Control may be entire organization with its own Incident Commander and support staff. Regardless of the organization, Operators have worked diligently in the US, as well as globally, following industry practices for managing a subsea uncontrolled well incident based on the lessons learned and subsea practices established after the Deepwater Horizon incident.

CONCLUSION:

The three options presented here describe ways to incorporate well control into a response organization. It is important to first assess the level of Unified Command Leadership expertise in well control, the strength of cooperative relationships between responders, and well control complexity before determining which option to use. Once established, “The keys to success are open communications, leadership, wisdom, and an effective organization.” (Buie, 1999) The concepts presented in this paper can also be used as a preparedness tool. Awareness of the expertise and relationship levels when preparing for an incident can help focus exercises, training, and encourage participation in the National Response System. We can improve knowledge/expertise and relationships everyday that there is not an incident. When there is an incident, response organizations like ICS provide the flexibility to adapt to the specific incident scenario.

REFERENCES:

LCDR Gregory W. Buie (1999) Some Thoughts On Salvage Operations During Oil Spills. International Oil Spill Conference Proceedings: March 1999, Vol. 1999, No. 1, pp. 1205-1209. doi: http://dx.doi.org/10.7901/2169-3358-1999-1-1205

D. Kahneman. "Thinking Fast and Slow". Farrar, Straus and Giroux. New York. 2011.

Helix Well Containment Group (HWCG) and O'Brian's Response Management. "The Helix Well Containment Group Incident Management Handbook". March, 2012.