IN RE OIL SPILL BY THE OIL RIG "DEEPWATER HORIZON"
IN THE GULF OF MEXICO, ON APRIL 20, 2010

UNITED STATES DISTRICT COURT
EASTERN DISTRICT OF LOUISIANA
MDL 2179, SECTION J
JUDGE BARBIER; MAGISTRATE JUDGE SHUSHAN

REBUTTAL EXPERT REPORT OF FRANK M. PASKEWICH CAPTAIN, UNITED STATES COAST GUARD (RET.)

September 12, 2014

CONFIDENTIAL

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I. INTRODUCTION

I am Captain Frank M. Paskewich, United States Coast Guard (retired). I have more than 33 years of experience in the marine and environmental safety field, including oil spill response. On August 15, 2014, I submitted an expert report evaluating the nature, extent and degree of effectiveness of BP Exploration & Production Inc.'s ("BP") efforts to minimize and mitigate the effects of the *Deepwater Horizon* oil spill.[1] As described in my August 15 report, it is my opinion that BP mounted an extraordinarily effective response effort that minimized and mitigated the effects of the spill.

At the request of counsel for BP, I have reviewed the expert reports of Captain Mark VanHaverbeke, U.S. Coast Guard (Ret.), Dr. Donald Boesch, Dr. Diane Austin, and Dr. Richard Clapp, dated August 15, 2014. In this Rebuttal Report, I respond to the opinions of those experts and add further clarification and context as appropriate. My opinions expressed in this Rebuttal Report are in addition to those set forth in my August 15 report, and I incorporate those conclusions here.

II. EXECUTIVE SUMMARY

Several of the United States' experts offer opinions about the *Deepwater Horizon* Response. Captain VanHaverbeke addresses the identification and development of oil spill response technologies during the Response. Dr. Boesch, Dr. Austin and Dr. Clapp offer opinions about the potential effects of the Response operations. While I agree with aspects of Captain VanHaverbeke's expert report, I offer three main opinions in response. I respond separately to the opinions that Dr. Boesch, Dr. Austin and Dr. Clapp offer relating to the Response.

1. BP and others in the Unified Command substantially advanced spill response capabilities during the *Deepwater Horizon* Response.

Captain VanHaverbeke opines that "[o]il spill response research and development is an ongoing process" that "did not begin with the *Deepwater Horizon* response."[2] While I agree that spill response research and development did not start with the *Deepwater Horizon* Response, BP collaborated with its Unified Command partners to identify, develop, and implement valuable spill response technologies during the Response. BP and others in the Unified Command also established an innovative Alternative Response Technology ("ART") Program to capture and evaluate the flood of spill response ideas being submitted by the public. While Captain VanHaverbeke's report focuses on the ART Program, BP and others in the Unified Command

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1 BP Exploration & Production Inc. was the entity named as the Responsible Party under the Oil Pollution Act of 1990 ("OPA 90") in the *Deepwater Horizon* Response. *See* 4/28/10 National Pollution Funds Center OPA Designation Letter to BP Exploration & Production Inc. (LA-GOV 00032144). For ease of reference, as in my opening report, I refer to BP Exploration & Production Inc. as "BP" throughout this Rebuttal Report.

2 Expert Report of Captain Mark G. VanHaverbeke (Ret.), August 15, 2014 ("VanHaverbeke Report") at 2-3, 11.

developed significant spill response innovations outside of the ART process that substantially advanced existing spill response capabilities.

2. BP collaborated with its Unified Command partners to promote innovations during the *Deepwater Horizon* Response.

Captain VanHaverbeke opines that the process for promoting spill response ideas during the Response "was, like the response itself, a community effort."[3] I agree. Captain VanHaverbeke's report supports the opinions that I offered in my opening report regarding the "unity of effort" that existed throughout the *Deepwater Horizon* Response organization. BP worked collaboratively with the Coast Guard and others to develop and implement innovative technologies—just as BP did in other aspects of the Response.

Captain VanHaverbeke further states that BP is not entitled to "sole credit" for innovations that were developed through the collaborative efforts of the Unified Command.[4] While BP has not contended that it is entitled to "sole credit" for those innovations, that does not mean that BP is entitled to ***no*** credit for their development. BP's contributions were essential to the development of many technologies during the Response.

3. BP has continued to develop and share spill response capabilities.

BP has helped to develop valuable innovations that can be adapted to future spill responses. While I agree with Captain VanHaverbeke that experiences drawn from one spill response may not be directly transferrable to other responses, experience from one response can be adapted to future spill responses. The *Deepwater Horizon* Response produced many spill response capabilities that can be used in future response efforts.

BP has also remained committed to advancing and sharing response innovations and lessons learned in connection with the *Deepwater Horizon* Response. BP has proactively implemented several initiatives outside of the purview of the Unified Command which have advanced spill response capabilities—efforts that were not required and for which the company can fairly take "credit." In my opinion, BP's extensive, proactive, and ongoing efforts to share technological achievements and lessons learned from the Response have been remarkable and have set a high standard for future Responsible Parties.

4. The United States' experts offer certain opinions about the *Deepwater Horizon* Response that are unfounded or incomplete.

Finally, some of the United States' experts, including Dr. Donald Boesch, Dr. Diane Austin and Dr. Richard Clapp, offer opinions about the potential effects of the *Deepwater Horizon* Response operations. Several statements that these experts make in their reports are

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[3] VanHaverbeke Report at 18.

[4] VanHaverbeke Report at 10.

unfounded or based on an incomplete consideration of the record. I offer additional information and context in response to those opinions.

III. OPINIONS

A. BP and Others in the Unified Command Substantially Advanced Spill Response Capabilities During the *Deepwater Horizon* Response.

In his expert report, Captain VanHaverbeke details the history of oil spill response research and development ("R&D") in the United States.[5] He opines that R&D "is an ongoing process" that "did not begin with the *Deepwater Horizon* response."[6] I concur. Clearly, oil spill response R&D did not begin with the *Deepwater Horizon* Response, and to my knowledge, BP has not claimed that it did.

While BP and its Unified Command partners did not start from scratch in developing technologies for the Response, they made substantial strides in advancing spill response capabilities. BP collaborated with others in the Unified Command to develop and implement an array of spill response innovations that provide valuable tools for use in future spill responses. At the same time, BP worked with its Unified Command partners to implement a robust ART Program to establish a process for reviewing and evaluating the tens of thousands of spill response suggestions pouring in from the public. While Captain VanHaverbeke's report focuses primarily on the ART Program, BP and others in the Unified Command innovated key spill response technologies outside of the ART process.

1. BP Helped To Develop and Enhance Valuable Spill Response Capabilities Outside of the ART Program.

During the Response, BP partnered with others in the Unified Command to develop a number of important spill response technologies outside of the ART process. BP and its Unified Command partners implemented the resulting spill response innovations and improvements across the Response, including command and control, source control, offshore, near shore, and shoreline operations.[7]

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5 VanHaverbeke Report at 4-9.

6 VanHaverbeke Report at 4.

7 *Deepwater Horizon Containment and Response: Harnessing Capabilities and Lessons Learned* (Ex. 5882).

Figure 1: *Deepwater Horizon* Response Innovations and Improvements

These spill response technologies were not only important to the *Deepwater Horizon* Response but substantially advanced existing spill response capabilities and provide valuable tools for use in future spills as well. Examples of innovative technologies developed outside of the ART Program include:

- **Capping and Containment Technologies.** BP developed deepwater capping and containment technologies, both during and after the Response. With the assistance of others in the Unified Command, BP developed the deepwater capping stack that ultimately shut in the well on July 15, 2010. Building on this technology, BP later independently developed its Global Deepwater Capping Stack.[8]

- **In Situ Burning.** BP and its Unified Command partners enhanced in situ burning capabilities, including the availability and use of fire boom, monitoring and ignition techniques, and other operational processes. As the Coast Guard-commissioned Incident

[8] BP Resp. to US Interrog. 4 (Ex. 12288); Morrison Dep. (2014) at 173:18-177:18 (listing achievements in the area of well containment and capping technology); Ex. 5881 at 9; M. Chen, *BP To Share Global Deepwater Response Technologies with Industry*, Planet BP Nov. 13, 2012; Phase 2 Tr. at 685:15-686:9 (Dupree).

Specific Preparedness Review ("ISPR") team found, "[t]he scale and success of [in situ burning] during the *Deepwater Horizon* incident demonstrated the capability of this important response tool" and established "detailed operational and tactical information for use in future spills."[9]

- **Dispersant Applications**. BP and its Unified Command partners advanced existing capabilities for aerial dispersant applications, including development of (1) more precise application through imaging and other technologies, (2) quicker aircraft sortie turnarounds (30 minutes rather than 2 hours), and (3) enhanced sampling and monitoring techniques.[10] With respect to subsea dispersant applications, BP and others in the Unified Command deployed a new technology, injecting dispersants at the source to minimize surface oiling.[11] As the ISPR team concluded, "subsea dispersant application proved to be effective" during the *Deepwater Horizon* Response and is a valuable tool for future responses.[12]

- **Common Operating Picture.** BP worked with its Unified Command partners to develop and deploy an integrated response information management system. "At the beginning of the operation, a series of maps prepared by a contractor was the source for situational awareness in the Unified Area Command. The response organization soon outgrew this process."[13] BP worked together with the Unified Command to develop a Common Operating Picture, which "created an integrated view across more than 200 previously disparate data types, enabling rapid, coordinated decision-making; development of common communication tools."[14]

In his expert report, Captain VanHaverbeke focuses almost exclusively on the ART Program and overlooks the substantial strides that BP and others achieved outside of the ART process. The result is that Captain VanHaverbeke discounts the significance of the spill response advancements achieved during the Response, as well as the importance of BP's contributions to those efforts. As detailed in my opening report, BP proactively provided the personnel and resources needed to support the development and implementation of these technologies. In my opinion, these advancements simply would not have been possible without BP's contributions.[15]

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9 ISPR (Ex. 9124) at 46, 49-50; Morrison Dep. (2014) at 167:19-168:16 (existing response tools such as dispersants and in situ burning "were advanced enormously during the Deepwater Horizon spill"); Paskewich Report at 23-26.

10 *Harnessing the Lessons of Deepwater Horizon--Contributing to a New Era of Deepwater Response* (Ex. 5881) at 20; Morrison Dep (2011) at 314:6-315:19.

11 Morrison Dep. (2011) at 314:6-315:19; Kulesa Dep. at 233:13-25 (testifying that he believed that subsea dispersant injection had not been seen before on an oil spill response).

12 ISPR (Ex. 9124) at 44; Paskewich Report at 26-32.

13 Federal On Scene Coordinator Report: Deepwater Horizon Oil Spill (Ex. 9105) (Sept. 2011) ("FOSC Report") at 189.

14 BP Resp. to US Interrog. 4 (Ex. 12288).

15 Paskewich Report at 12-17; Hanzalik Dep. at 43:20-44:9, 47:7-24.

2. BP Helped To Develop Valuable Spill Response Technologies Through the ART Program.

The *Deepwater Horizon* Response generated tremendous public interest, and people from all around the world had ideas about how to respond to the spill. One of BP's guiding principles during the Response was to "leave no stone unturned as far as trying to access the industry, the community, the science teams, anybody that could assist [BP] in the effort."[16] With this goal in mind, on April 25, 2010, BP and others in the Unified Command implemented an innovative ART Program that was designed to capture and evaluate the flood of spill response ideas being submitted by the public.[17]

The *Deepwater Horizon* ART team included engineers and scientists from the U.S. Coast Guard, BP, National Oceanic and Atmospheric Association ("NOAA"), the Environmental Protection Agency ("EPA"), and others. A BP representative, Michael Cortez, headed the Program. At its peak, the ART team included more than 80 engineers and other subject matter experts.[18]

In establishing the *Deepwater Horizon* ART Program, BP and others in the Unified Command enhanced the processes traditionally used to develop new innovations during a spill response. As Captain VanHaverbeke points out, in 2002, the federal government developed an Alternative Response Technology Evaluation System ("ARTES").[19] ARTES is a process for assessing "proposed nonconventional spill response countermeasures to determine their usefulness as response tools."[20] Between its development in 2002 and the *Deepwater Horizon* Response in 2010, ARTES had been used in only one active spill response and had never been embedded in the Incident Command System.[21] BP and others in the Unified Command made several improvements to the pre-existing ARTES process to facilitate the review and evaluation of the massive number of response proposals submitted during the Response.

The *Deepwater Horizon* ART Program ramped up quickly. By April 27, 2010, working within the Unified Command, BP had established a call center in Houston, which was eventually staffed with many as 200 operators working around-the-clock shifts and fielding as many as 12,000 calls per day relating to response suggestions and other inquiries.[22] By April 30, 2010,

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16 Phase 2 Tr. at 596:621-597:11 (Dupree).

17 Cortez & Rowe, *Alternative Response Technology Program for the Deepwater Horizon in the Gulf of Mexico -- An Overview*, Proceedings of the 34th AMOP Technical Seminar on Environmental Contamination and Response 2011 ("*ART DWH Overview*") at 2.

18 6/22/10 ART Organizational Chart (BP-HZN-2179MDL05106584); Utsler Dep. at 142:20-143:14.

19 VanHaverbeke Report at 12; American Petroleum Institute, *An Evaluation of the Alternative Response Technology Evaluation System (ARTES)*, API Technical Report 1142, July 2013 (US_PP_MVH003103-60) ("*API Technical Report*") at iii.

20 *ART DWH Overview* at 2; API Technical Report at iii.

21 *API Technical Report* at iii, 1, 7, 9, 16; VanHaverbeke Report at 12.

22 *ART DWH Overview* at 3; Utsler Dep. at 309:19-310:9.

the Unified Command had established an ART database that allowed the public to submit response ideas online.[23] The ART database received as many as 5,000 suggestions per day.[24]

All told, the ART Program received more than 43,000 spill response suggestions.[25] Each of these proposals was screened and categorized. Spill response technology ideas were evaluated by engineers or scientists, and where appropriate, tested and deployed. Ultimately, more than 100 spill response ideas were tested, and roughly 40 spill response ideas were implemented during the Response.[26]

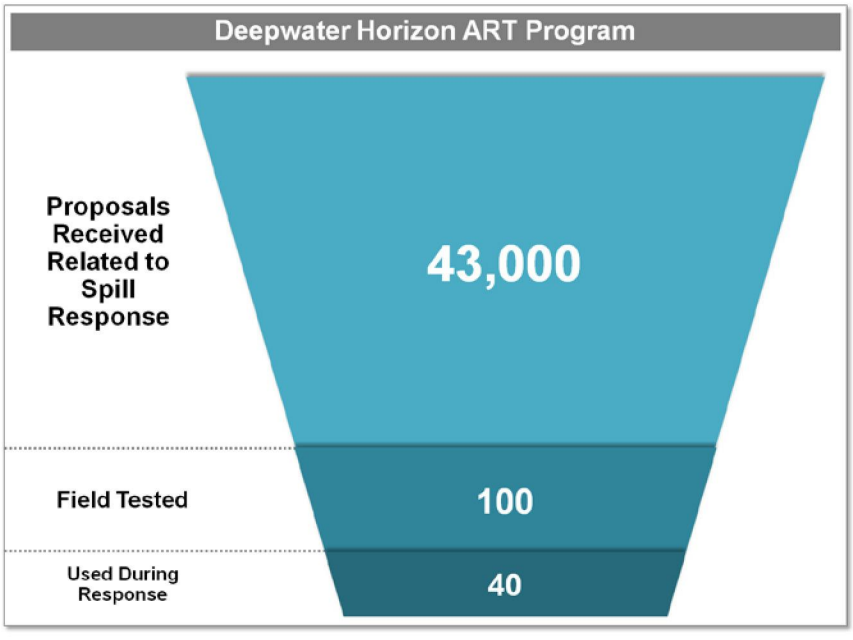

Figure 2: *Deepwater Horizon* ART Program By the Numbers

The Unified Command implemented spill response technologies identified through the ART Program for use in off-shore, near shore and shoreline operations during the Response, as summarized below.

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[23] *ART DWH Overview* at 3, 5. By late May, the Louisiana Business Emergency Operations Center, the EPA, and others were using the ART database to organize ideas submitted to those entities. *ART DWH Overview* at 5.

[24] *ART DWH Overview* at 3; *Alternative Oil Spill Response Technology: Results from the Deepwater Horizon Response*, Journal of Petroleum Tech. (Sept. 2012) (BP-HZN-2179MDL09243788) ("*Alternative Oil Spill Response Technology*").

[25] The ART Program received a total of 123,000 ideas from more than 100 countries. 80,000 of the ideas submitted related to capping and containment, while 43,000 related to spill response. *Alternative Response Technology (ART) Program Final Report* (BP-HZN-2179MDL05106417) at 9 ("*ART Program Final Report*"); *ART DWH Overview* at 1.

[26] *Alternative Oil Spill Response Technology*; Utsler Dep. at 195:18-22; *see also* Hanzalik Dep. at 262:10-263:14.

Figure 3: ART Innovations in *Deepwater Horizon* Response

I described several of the spill response innovations that the ART team identified for use in the Response in my opening report.[27] These technologies include the Sand Shark mechanical beach cleaner, the *Big Gulp* large-capacity skimmer, and accelerated boom cleaning tools, such as the Boom Blaster and the Yates Boom Cleaner.[28]

The ART Program advanced several other spill response technologies that were used during the Response as well.[29] For example, BP and other ART team members supported the development of the Wave Glider—a satellite-controlled, unmanned vehicle that can be equipped to provide constant monitoring of water quality. The Wave Glider data collection platform is powered by wave and solar energy and can provide a steady stream of data, including detection of any emulsified, dissolved or dispersed oil in water; dissolved oxygen; marine mammal vocalizations; weather; and water temperature.

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[27] Paskewich Report at 74-76.

[28] Paskewich Report at 75-76. Not all spill response ideas were successful. For example, the federal government identified the *A Whale* weir skimmer for further testing. After a two-day test, the FOSC determined that *A Whale* was ineffective in the conditions found in the Gulf. *See* FOSC Report (Ex. 9105) at 72-73.

[29] Utsler Dep. at 306:21-307:25 (describing new technologies and techniques developed during the Response).

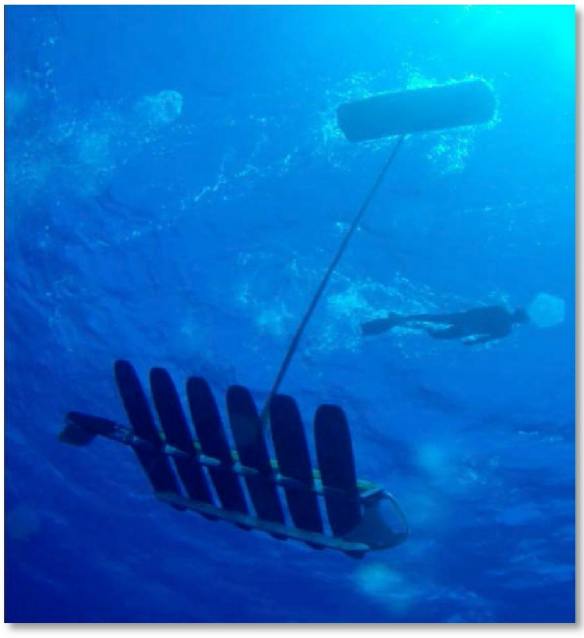

Figure 4: Wave Glider

BP continued to promote the development of the Wave Glider outside of the Unified Command-led Response effort. For example, BP sponsored a competition in 2012 that invited the public to come up with the most inventive application of data gathered by two Wave Gliders crossing the Pacific Ocean. The prize consisted of a $50,000 research grant provided "courtesy of BP," plus the use of a Wave Glider for six months (valued at $300,000).[30] Wave Gliders have been used for a number of purposes since 2010, including mapping the loop current and searching for natural seeps in the Gulf.[31]

Many ideas submitted to the ART team were adapted from other industries. In addition to the Sand Shark (which was derived from loaders used in paving and road maintenance), the Boom Blaster (which was derived from car wash technology), and the Yates Boom Cleaner (which used dishwasher-like jets), the Gravely Sand Cleaner was based on a submission that Gravely, a lawn mower company, made through the ART database. The Gravely Sand Cleaner consists of a beach-cleaning attachment that hooks onto a two-wheeled, self-propelled tractor. The Gravely Sand Cleaner is maneuverable and can clean sensitive or small areas.[32]

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30 The PacX Challenge, *available at* http://liquidr.com/resdown/resources/case-studies/pacx.html.

31 T. Woody, *Why Climate Scientists, Oil Drillers And The Military Are Clamoring For Green Ocean Robots*, Forbes Magazine Sep. 26, 2011, *available at* http://onforb.es/pIoWq2 (last visited Sep. 8, 2014); NOAA PMEL, *Arctic Wave Glider Summer 2011*, *available at* http://www.pmel.noaa.gov/arctic/arctic-wave-glider-summer-2011 (last visited Sep. 8, 2014); Liquid Robotics, *Case Study: Undersea Volcano Study*, *available at* http://www.liquidr.com/resdown/resources/case-studies/plocan.html (last visited Sep. 8, 2014); Liquid Robotics Oil+Gas, *Hydrocarbon Detection: Cost effective and persistent platform to detect the presence of naturally occurring Seep and residual hydrocarbons at the water surface*, *available at* http://www.lrog.com/images/docs/Hydrocarbon%20pds_final-s.pdf (last visited Sep. 8, 2014).

32 Cortez & Rowe, *Alternative Response Technologies: Progressing Learnings* (Feb. 15, 2012) (BP-HZN-

Figure 5: Gravely Sand Cleaner

The ART team also worked to identify and test new marsh cleaning techniques for deployment in the Response. For example, BP and other ART team members tested a low pressure marsh flusher, which used low-pressure, high-volume water to gently mobilize oil from marshes while reducing native mud disturbance. Based on input from SCAT teams, the Unified Command used the marsh flusher to clean several miles of marsh in Louisiana.[33]

Figure 6: Low-Pressure Marsh Flusher

The sheer number and range of spill response technological innovations proposed, evaluated, and ultimately implemented during the *Deepwater Horizon* Response was impressive.

2179MDL08875298) ("*ART: Progressing Learnings*") at 14-19; Unified Area Command, *Improving Response by Leveraging Technology: Success Stories* (Sep. 24, 2010) (BP-HZN-2179MDL05106603).

[33] Unified Area Command, *Improving Response by Leveraging Technology: Success Stories* (Sep. 24, 2010) (BP-HZN-2179MDL05106603) at 7, 17.

BP provided the personnel and resources needed to support this massive initiative. More than half of the 80 scientists and engineers working in the ART Program were BP employees or contractors.[34] And BP committed substantial financial resources to the identification, development, and testing of new and enhanced spill response technologies.

Perhaps more important than the particular spill response technologies identified through the ART Program was the avenue that it provided for community involvement. By establishing an innovative and inclusive process for capturing and evaluating ideas during the Response, the ART Program allowed BP and others in the Unified Command to leverage the "public's ingenuity and entrepreneurial spirit."[35] Advancements made in the ART Program itself will serve as a model for future responses.

B. BP Collaborated with Its Unified Command Partners To Promote Innovations During the *Deepwater Horizon* Response.

In his expert report, Captain VanHaverbeke opines that the process for evaluating technological "alternatives suggested for the response, and the evaluation and adaptation of those ideas was, like the response itself, a community effort."[36] I agree. As discussed in my opening report, BP worked collaboratively with the Coast Guard and other Unified Command partners in responding to the *Deepwater Horizon* spill.[37] This "unity of effort" was evident throughout the Response organization, and the process for developing response technologies was no exception.

Captain VanHaverbeke's opinions support those that I offered in my August 15 report regarding the collaboration that existed between BP and the U.S. Coast Guard throughout the *Deepwater Horizon* Response. Indeed, as I noted in my opening report, ***every single*** Coast Guard witness in this phase of the litigation has recognized the cooperative relationship between the Coast Guard and BP.[38] Captain VanHaverbeke can be added to that list:

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[34] ART Organization Chart (US_PP_USCG2_1916858) at 2.

[35] *ART DWH Overview* at 1.

[36] VanHaverbeke Report at 18.

[37] Paskewich Report at 4, 54-55.

[38] Paskewich Report at 54-55, Figure 18.

Source	Recognition of BP-USCG Cooperation
ISPR	"[P]ersonnel provided by the RP and Coast Guard personnel worked effectively together, and . . . there was 'unity of effort' throughout the response organization."[39]
FOSC Report	"The *Deepwater Horizon* oil spill response was ultimately successful, due to the unity of effort and perseverance of more than 1000 organizations that contributed to this unprecedented response. . . . [T]he Incident Command System's scalable organizational structure proved critical to multiple agencies working with the RP [here, BP] toward common goals under an effective construct." [40]
ADM Thad Allen (National Incident Commander)	FOSC and BP were "working the issues" cooperatively, and they were both "working very hard" to establish a "unity of effort."[41]
CAPT James Hanzalik (FOSC; Houma Incident Commander)	Based on his experience working "shoulder-to-shoulder" with BP every day, BP and the Coast Guard "worked effectively together" and "with a unity of effort" and that BP was "proactive in working with the Coast Guard and also other members of the Unified Command."[42]
RADM Meredith Austin (Houma Incident Commander)	Agreed that BP and the Coast Guard worked "effectively together" with "a unity of effort" "toward the common goal as part of the response."[43]
CAPT Julia Hein (FOSC)	BP and the Coast Guard "did work collaboratively" during the Response.[44]
CAPT Larry Hewett (Houma Incident Commander)	BP "collaborated with the Coast Guard" during the Response.[45]
CAPT Roger Laferriere (Houma Incident Commander)	Agreed that "there was a unity of effort between the United States Coast Guard and BP during the Response."[46]
CAPT Stephen McCleary (FOSC Team)	Agreed that interactions between the Coast Guard and BP were "cooperative" and "collaborative," and that BP and the Coast Guard did "work effectively together in responding to the *Deepwater Horizon* oil spill."[47]

39 ISPR (Ex. 9124) at 4.

40 FOSC Report (Ex. 9105) at xiv, 111.

41 Allen Dep. at 102:3-7, 190:23-192:15.

42 Hanzalik Dep. at 14:19-15:4, 16:19-22, 19:6-10, 28:5-32:2, 35:12-36:13, 223:22-225:4.

43 Austin Dep. at 96:4-97:22.

44 Hein Dep. at 37:3-18, 38:15-39:2, 40:3-18, 67:11-68:14, 69:6-70:11, 81:25-82:7, 199:8-11, 250:16-252:13.

45 Hewett Dep. at 54:15-55:10.

46 Laferriere Dep. at 109:20-24.

47 McCleary Dep. at 37:3-17, 222:13-23.

Source	Recognition of BP-USCG Cooperation
LCDR Drew Casey (ISPR Team)	Agreed that the BP personnel with whom he interacted "were very cooperative" and "very responsive."[48]
LT Frank Kulesa (Branch Director, Plaquemines Parish)	Agreed that there was "a great deal of collaboration" between BP, the Coast Guard, and others in the Unified Command and that there was a "unity of effort between BP and the Coast Guard."[49]
CAPT Mark VanHaverbeke (Ret.) (US ART Team Lead & US Expert)	"A unity of effort was evident in the way the organization solicited, analyzed, and implemented technological solutions proposed by outside actors and the general public."[50]

Figure 7: Coast Guard-BP Collaboration During the Response

Captain VanHaverbeke does not dispute the value of any of the innovations or the collaboration that was achieved during the *Deepwater Horizon* Response. Rather, he opines that "unity of effort was achieved to such an extent that it is unlikely that BP can claim sole credit for the creation of any advances that may have resulted from this response."[51] But BP has not contended that it is entitled to "sole credit" for innovations developed within the Unified Command—a point that Captain VanHaverbeke himself recognizes.[52] While BP does not claim "sole credit" for these innovations, that does not mean that BP is entitled to ***no*** credit. As discussed, BP made meaningful and sustained contributions to the development of technologies that have advanced the state of spill response across the industry.

C. BP Has Continued To Develop and Share Spill Response Capabilities.

1. BP Helped Develop Valuable Innovations that Can Be Adapted to Future Spill Responses.

In his expert report, Captain VanHaverbeke points out that "[e]very oil spill is unique" and that "[e]xperiences drawn from one oil spill response may not be directly transferable to future spill responses."[53] He concedes that "[r]esponders to the *Deepwater Horizon* spill acted appropriately in seeking response techniques tailored to the unique circumstances they

48 Casey Dep. at 18:8-12, 33:18-35:15.

49 Kulesa Dep. at 72:19-73:7, 121:25-122:19, 134:17-24, 223:11-224:12, 267:8-21.

50 VanHaverbeke Report at 11-12.

51 VanHaverbeke Report at 10.

52 BP's Resp. to US Interrog. No. 4 (Ex. 12288) ("BPXP, *together with the Unified Command*, developed several innovative advancements in spill-response technologies, tools, equipment and processes.") (emphasis added); VanHaverbeke Report at 10 (quoting same).

53 VanHaverbeke Report at 17.

confronted" and opines that "[r]esponders to future oil spill[s] will be called upon to undertake the same type of incident specific analysis."[54]

While I agree that experiences drawn from one oil spill response may not be directly transferable to another response, experience and lessons learned from one response can be applied to future responses. The federal government, industry groups, and others have recognized the importance of advancements made during the *Deepwater Horizon* Response for future spill responses and scientific studies. For example, Dr. Jane Lubchenco, while head of NOAA, concluded that the "[r]esponse to future deep spills globally will benefit from the many scientific breakthroughs applied to DWH."[55] Innovations achieved during the Response have been, and will continue to be, adapted for use in other response efforts.

2. BP Has Shared Spill Response Innovations and Lessons Learned.

BP has proactively shared innovations and lessons learned from the Response with others to advance spill response capabilities. During the Response, BP actively engaged with stakeholders to provide information about Response tools and techniques. BP engaged the community through meetings, the internet, community outreach centers, state and local officials, and other channels. BP shared information with its Unified Command partners, including through weekly technology updates.[56] The ART team also prepared a Final Report documenting its work, which they provided to the Unified Command.[57]

BP also took the initiative to share spill response innovations and learnings from the Response with those outside of the Unified Command. BP prepared and published a report, titled *Deepwater Horizon Containment and Response*: *Harnessing Capabilities and Lessons Learned*, documenting the advancements and lessons learned during the Response.[58] BP representatives traveled around the world, making dozens of presentations to industry groups, governments, and others about learnings from the Response.[59] BP representatives also took lead

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54 VanHaverbeke Report at 17.

55 Lubchenco et al., *Science in Support of the Deepwater Horizon Response*, (Ex. 12500) at 6; *Alternative Oil Spill Response Technology*.

56 *See, e.g.*, ART Updates (HCG904-003788; EPE082-007079; HCE912-003408; US_PP_USCG2_1916822; US_PP_NOAA146389).

57 *ART Program Final Report*; 6/10/10 J. Best Email to Coast Guard personnel (HCG952-003603).

58 Ex. 5882; Morrison Dep. (2011) at 141:9-142:2 (BP believed it had "an obligation to share what we had learned" during the Response).

59 Morrison Dep. (2011) at 124:11-125:1, 313:6-21, 372-375 (describing BP's efforts to share lessons learned from Response around the world); Morrison Dep. (2014) at 284:8-14 (by 2014, Morrison had participated in dozens of trips to 20 countries to share lessons learned from the Response); Ex. 5881; Cortez, *Alternative Response Techs.*, SPE Americas 2011 E&P HSSE Conf.; Cortez, *Alternative Response Tech. API Study--Progressing Learnings* (Nov. 6, 2013) (presentation to RRT III); Mabile, *ISB Operations--DWH Response* (2013) (BP-HZN-2179MDL08925907); Sweeten, *Integrating Green Waste Mgmt. Strats. Into Emerg. Response Waste Mgmt. Programs: Examples from the Deepwater Horizon Response,* SPE/APPEA Int'l Conference, Perth, Australia (Sept. 2012); Sweeten & Taylor, *Add'l Challenges for Skimming Operations: Experience from the Deepwater Horizon Event*, 35th Arctic and Marine Oilspill Program (AMOP), Vancouver (2012); Sweeten,

roles in working with the American Petroleum Institute ("API") and other industry organizations to share information from the Response. For example, BP worked extensively with the API to incorporate lessons learned into best practice guides for the entire industry. Guides on a variety of topics, including shoreline cleaning techniques, in situ burning, and other removal methods, have been or will be published and made publicly available.[60]

In January 2011, BP joined the Marine Well Containment Company ("MWCC"), an independent, not-for-profit source control company that provides well containment equipment and technology in the deepwater U.S. Gulf of Mexico.[61] BP gave MWCC containment, collection, and capping equipment that had been developed during the *Deepwater Horizon* Response, along with hundreds of supporting records, drawings, permits, licenses and other technical information and know-how that BP had developed.[62] BP also sponsored workshops for MWCC representatives to gain source control knowledge and learnings from the Response.[63]

As another example, in 2012, BP's technology team prepared a comprehensive guide for managing waste during an emergency response. The resource guide, called *The Waste Management Handbook: Guidance for Pre-Planning, Preparedness & Response to Emergency Response Events*, captures knowledge on topics ranging from recycling strategies to waste treatment options. BP proactively compiled these "lessons learned" and shared information from the handbook with the industry.[64]

In 2012, BP also launched a royalty-free licensing program, through which it shared with the industry and others at no cost several technologies that it developed during the *Deepwater Horizon* Response.[65] BP filed patents for approximately 30 capping and containment innovations, which it then made available free-of-charge through the licensing program.[66] For

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Rapidly Deploying Aerial Imaging Platforms in Oil Spill Response, 35th AMOP Tech. Seminar (2012).

60 *E.g.*, API Technical Report; API, *Shoreline Protection on Sandy Beaches, Phase 2--Field Guide*, API Technical Report 1150-2, September 2013; API, *Subsurface Oil Detection and Delineation in Shoreline Sediments, Phase 2--Field Guide*, API Technical Report 1149-2, September 2013; API Joint Industry Task Force newsletter, January 2014; API, *Oil Spill Prevention + Response R&D Center*.

61 1/31/11 Press Release, *BP Joins Marine Well Containment Company*.

62 Morrison Dep. (2014) at 190:20-191:8, 192:4-194:20; Phase 2 Tr. at 585:6-586:18 (Dupree) ("My main purpose on [the MWCC] board was to ensure that all the Macondo equipment that we used and built during the response get refurbished and be put into the Marine Well Containment Company to be used by the industry potentially in the future"); MWCC Transfer Overview; 7/12 Source Control Well Response Systems - Overview for MWCC (Parts 1 & 2); MWCC Handover Summary; Document Register for Transmission.

63 *E.g.*, 4/20/11 MWCC Transfer Workshop presentation with agenda for two-day knowledge transfer workshop).

64 *E.g.*, Sweeten, *Integrating Green Waste Mgmt. Strategies Into Emergency Response Waste Mgmt. Programs: Examples from the Deepwater Horizon Response,* SPE/APPEA Int'l Conference on Health Safety and Envt. in Oil & Gas Explor. & Prod., Perth, Australia (Sept. 2012); Sweeten, *Incorporating Green Alternatives into Emergency Response Waste Mgmt. Programs, Examples from the MC252 Deepwater Horizon Event*, Gulf Oil Spill Focused Topic Meeting, SETAC North America (April 2011).

65 M. Chen, *BP To Share Global Deepwater Response Technologies with Industry*, Planet BP Nov. 13, 2012.

66 *Id.*; *see also* Morrison Dep. (2014) at 200:4-18 (patented technology was licensed to MWCC "free of charge").

example, in 2012, BP entered a technology license agreement with PEMEX Exploration & Production, a subsidiary of Mexico's national oil company, pursuant to which BP shared its Global Deepwater Capping system technology and know-how with PEMEX for no charge.[67] BP's contributions to this free licensing program are, like many other efforts described above, completely voluntary.

Richard Morrison, BP's Regional President for the Gulf of Mexico, has noted that "BP is committed to sharing the learning from the *Deepwater Horizon* accident and response in the Gulf of Mexico in 2010 with those who can benefit from it."[68] It is my opinion that BP's extensive, proactive, and ongoing efforts to share lessons learned and technological achievements from the Response bear this out.

3. BP Has Remained Committed To Advancing Spill Response Capabilities.

BP has remained committed to furthering spill response research and capabilities. After the ART team demobilized in the fall of 2010, BP representatives transitioned to a technology team within the Gulf Coast Restoration Organization ("GCRO") and continued to develop spill response technologies and provide technical support to ongoing Response operations.[69] BP has also voluntarily continued to support ongoing research and development, scientific studies, and other efforts to advance the state of spill response across the industry over the last four years, as detailed in my opening report.[70]

All told, through the work of GCRO, BP devoted roughly $12-15 million annually in the years following the spill to the development, testing, and sharing of spill response innovations made in connection with the *Deepwater Horizon* Response. These amounts are many times more than the annual spending on spill containment and response technology in the years leading up to the spill by the industry, and dwarf such spending by the Coast Guard's Research and Development Center.[71] Captain VanHaverbeke describes the limited federal funding available for spill response R&D.[72] In my opinion, this limited government funding only underscores the importance of BP's contributions to promote spill response research and development.

In addition to this R&D spending, BP has committed to fund up to $500 million over 10 years to support the Gulf of Mexico Research Initiative ("GoMRI"), an independent research

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67 Technology License Agreement Between BP Exploration & Production Inc. and BP Corporation North America Inc. and PEMEX-Exploración Y Producción (Oct. 2012); *see also* Bayon & Karlsen, *BP Global Deepwater Well Cap and Tooling Package*.

68 M. Chen, *BP To Share Global Deepwater Response Technologies with Industry*, Planet BP Nov. 13, 2012.

69 *ART DWH Overview* at 3, 16; *ART: Progressing Learnings* at 5.

70 Paskewich Report at 73-76.

71 GCRO Science and Technology Budget (2010) (budgeting $12 million and $15 million for research and development in 2011 and 2012 respectively).

72 VanHaverbeke Report at 4-9.

program dedicated to studying oil spills and spill mitigation technologies.[73] As Captain VanHaverbeke points out, "GoMRI makes research grants to independent academic and research institutions using National Science Board protocols."[74] BP does not control or direct the way in which grants are awarded or the topics or findings of any studies.[75] Significantly, BP's commitment to fund GoMRI was not the result of any mandate or requirement, but was an initiative that BP undertook voluntarily.[76]

In my opinion, BP's civic and financial commitments during and after the Response are unique and set a high standard for future Responsible Parties involved in response activities.

D. The United States' Experts Offer Certain Opinions About the *Deepwater Horizon* Response that Are Unfounded or Incomplete.

Some of the United States' experts, including Dr. Donald Boesch, Dr. Diane Austin and Dr. Richard Clapp, offer opinions about the potential effects of the *Deepwater Horizon* Response operations. Several statements of these experts are unfounded or based on an incomplete consideration of the record. I offer the following observations in response to those opinions.

1. Dr. Boesch's Opinions

Dr. Boesch opines that certain actions taken in response to the spill—in particular, the use of dispersants, shoreline cleanup operations, the Louisiana berm project, and the Mississippi River diversions—may have had negative environmental impacts. Several points are worth clarifying regarding these opinions.

First, Dr. Boesch states that the decision to allow dispersant applications "was based on weighing the benefits of reducing the amount of oil that would reach the surface, and potentially be transported to sensitive coastal areas or contact birds or marine mammals, against the risks of harm that might be caused by introducing toxic compounds into the waters of the Gulf of Mexico."[77] Yet Dr. Boesch himself admits that the chemical dispersant used in the Response "had little toxicity in itself."[78] Dr. Boesch does not acknowledge that dispersant applications during the Response were approved and monitored by the FOSC, in consultation with the EPA and others. Finally, Dr. Boesch does not mention that a group of more than 50 scientists from the federal and state government, industry and academia gathered at a two-day meeting in May 2010 in Baton Rouge to consider dispersant use. After the meeting, participants issued a Report,

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[73] Folse Dep. at 64:19-65:10, 108:10-110:4, 111:2-9; Morrison Dep. (2011) at 322:12-24; FOSC Report (Ex. 9105) at 209; GoMRI: Master Research Agreement (July 11, 2012).

[74] VanHaverbeke Report at 9.

[75] Folse Dep. at 214:1-215:23.

[76] Folse Dep. at 215:9-216:8.

[77] Boesch Report at 14.

[78] Boesch Report at 8.

concluding that the application of dispersants up to that point had "been demonstrated to be effective for the DWH incident and should continue to be used."[79]

Second, Dr. Boesch opines that certain shoreline cleanup operations "produced negative impacts as well as benefits."[80] Once again, Dr. Boesch's analysis is incomplete. Besides the fact that he does not actually identify or quantify specific negative impacts from shoreline operations, Dr. Boesch also fails to mention that the FOSC authorized cleanup operations based, in part, on detailed Shoreline Treatment Recommendations ("STRs"). Shoreline Cleanup Assessment Technique ("SCAT") experts prepared STRs based on comprehensive net environmental benefit analyses, which considered potential effects of response operations when determining appropriate treatment methods. SCAT teams also specified Best Management Practices to minimize effects of the recommended treatment.[81]

Third, Dr. Boesch opines that "barrier sand berms constructed to protect coastal wetlands from oil exposure had . . . potentially harmful consequences."[82] Dr. Boesch does not point out, however, that BP did not recommend or advocate for the construction of these berms, and that BP funded the project only after the State of Louisiana had requested it and the National Incident Command had approved it based primarily on the demands of local and regional interests.

Finally, Dr. Boesch opines that "[t]here was potential harm to oyster stocks" due to the State of Louisiana's diversions of the Mississippi River.[83] Dr. Boesch does not acknowledge that these freshwater diversions were not "response actions" taken by the Unified Command or BP. Rather, the diversions were unilateral actions taken by the State of Louisiana without the approval or oversight of the Unified Command.[84]

2. Dr. Austin's Opinions

Dr. Austin is an anthropologist who offers opinions about alleged sociocultural effects of the *Deepwater Horizon* spill. In her report, Dr. Austin makes certain assertions about Response operations that require further clarification and context. ***First***, Dr. Austin describes "constraints regarding who could work on what aspect of the oil spill cleanup," in particular boom placement and cleaning oiled birds and mammals.[85] As I explained in my opening report, and as Dr. Austin recognizes, the National Contingency Plan ("NCP") authorizes the FOSC to direct, monitor, and

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79 *Deepwater Horizon* Dispersant Use Meeting Report (Ex. 11839); Paskewich Report at 61-62.

80 Boesch Report at 31.

81 Paskewich Report at 38-44.

82 Boesch Report at 31-32.

83 Boesch Report at 36-37.

84 Paskewich Report at 66; Hewett Dep. at 37:20-43:8, 67:3-68:18; United States' Resp. to Defs' First Set of Disc. Reqs., RFA 8 at 8.

85 Austin Report at 25.

coordinate all government and private response actions through the Unified Command.[86] In my opinion, it is critical that the FOSC maintain control over what response actions are taken, when, and by whom. For sound reasons related to worker safety and protection of the environment, these responsibilities include ensuring that qualified individuals carry out response operations such as the deployment of boom and the rehabilitation of wildlife.

Second, Dr. Austin makes several observations about the VOO Program, including that it did not help "docks, processors, distributors, and others in the seafood industry" and led to "local discord."[87] As discussed in my opening report, the VOO Program played a significant role in the Response and assisted local fisherman whose livelihoods may have been affected by the spill.[88]

3. Dr. Clapp's Opinions

Dr. Clapp opines that the Response "caused numerous short-term health impacts on workers and volunteers" and that "[l]ong-term impacts may also be observed in on-going follow-up studies of those exposed."[89] While I do not offer opinions about any human health impacts of the spill or the Response, I do note that Dr. Clapp fails to make any mention the substantial steps that BP and others in the Unified Command took to protect response workers. As detailed in my opening report, these protective measures included providing workers with appropriate training and personnel protective equipment for their assigned roles.[90] As the U.S. Coast Guard concluded in its official Report documenting the Response, safety "was the number one strategic goal throughout the Response."[91]

IV. CONCLUSION

Innovation, collaboration, and implementation of accepted response techniques are key components of a successful response operation. Captain VanHaverbeke's report confirms that BP and its Unified Command partners achieved all three of these goals during the *Deepwater Horizon* Response. As described in my August 15 report, BP played a critical role in supporting the Unified Command-led Response, working tirelessly and collaboratively to respond to the spill and minimize its effects. The collaboration between the Coast Guard and BP was evident throughout the Response organization, and the process for developing spill response capabilities was no exception. BP's contributions to response innovations both during and after the Response have led to the creation of valuable tools that are now in the industry's kit for use in future responses.[92] With respect to Dr. Boesch, Dr. Austin and Dr. Clapp, those experts offer

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86 Paskewich Report at 8; Austin Report at 24 ("the response to the spill was almost completely top down").

87 Austin Report at 30.

88 Paskewich Report at 33-36.

89 Clapp Report at 11.

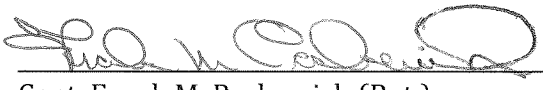
90 Paskewich Report at 49-53.

91 FOSC Report (Ex. 9105) at ix; Paskewich Report at 49-53.

92 *E.g.*, Phase 2 Tr. at 585:6-586:18 (Dupree); Mabile, *ISB Operations--DWH Response* (2013) (BP-HZN-2179MDL08925907); *ART: Progressing Learnings* at 1.

observations about the Response that are unfounded or incomplete. A complete review of the record demonstrates the extraordinary effectiveness of this Response.

Respectfully submitted,



Capt. Frank M. Paskewich (Ret.)

APPENDIX A: MATERIALS CONSIDERED

This rebuttal report incorporates the list of materials considered contained in Appendix A of my August 15, 2014 expert report. In addition to those documents, the following materials are added to the list of materials that I have considered in forming my opinions in this matter:

Document Title / Description	Bates Begin	Bates End	Exhibit Number
Aug. 15, 2014 Expert Report of Captain Frank M. Paskewich (Ret.), including Appendices & Consideration Materials	N/A		
Aug. 15, 2014 Expert Report of Captain Mark G.VanHaverbeke (Ret.), including Appendices & Consideration Materials	N/A		
Aug. 15, 2014 Expert Report of Donald F. Boesch (Ph.D.), including Appendices & Consideration Materials	N/A		
Aug. 15, 2014 Expert Report of Diane E. Austin (Ph.D.), including Appendices & Consideration Materials	N/A		
Aug. 15, 2014 Expert Report of Richard W. Clapp (D.Sc., MPH), including Appendices & Consideration Materials	N/A		
Deposition Transcript of Richard Morrison (2011) and Exhibits	N/A		
Deposition Transcript of Richard Morrison (2014) and Exhibits	N/A		
Deposition Transcript of Michael Utsler and Exhibits	N/A		
Deposition Transcript of Laura Folse and Exhibits	N/A		
Deposition Transcript of Capt. James Hanzalik (Ret.) and Exhibits	N/A		
Deposition Transcript of Adm. Thad Allen (Ret.) and Exhibits	N/A		
Deposition Transcript of Capt. Roger Laferriere (Ret.) and Exhibits	N/A		
Deposition Transcript of Capt. Julia Hein and Exhibits	N/A		
Deposition Transcript of Rear Adm. Meredith Austin and Exhibits	N/A		
Deposition Transcript of Capt. Larry Hewett and Exhibits	N/A		
Deposition Transcript of Capt. Stephen McCleary and Exhibits	N/A		
Deposition Transcript of Lt. Cdr. Drew Casey and Exhibits	N/A		
Deposition Transcript of Lt. Frank Kulesa and Exhibits	N/A		
Phase 2 Trial Testimony of James Dupree	N/A		
BART Response Guide 2009 Revised Final 4 September 2009	BP-HZN-2179MDL01093604	BP-HZN-2179MDL01093776	
Oil Spill Containment, Remote Sensing and Tracking for Deepwater Blowouts: Status of Existing and Emerging Technologies - Final Report	BP-HZN-2179MDL01426137	BP-HZN-2179MDL01426257	TREX-002297
Response to June 2nd letter (2 of 5 emails)	BP-HZN-2179MDL01454314	BP-HZN-2179MDL01454314	
Dispersant Studies Vol 1 Final 4June10.pdf	BP-HZN-2179MDL01454315	BP-HZN-2179MDL01454413	
Email from M. Cortez to L. Folse et al. re ARTs Final Report-MC252 DW Horizon, attaching MC252 Deepwater Horizon ART Program Final Report.zip	BP-HZN-2179MDL01885328	BP-HZN-2179MDL01885360	Dep Ex 012284
Deepwater Horizon Containment and Response: Harnessing Capabilities and Lessons Learned	BP-HZN-2179MDL04473369	BP-HZN-2179MDL04473452	Dep. Ex. 5882
Email from M. Cortez to M. Matcek, et al. re ARTs Final Report-MC252 DW Horizon	BP-HZN-2179MDL05106415	BP-HZN-2179MDL05106416	
Alternative Response Technology (ART) Program Final Report and Attachments	BP-HZN-2179MDL05106417	BP-HZN-2179MDL05106448	
Email from T. Hauser to D. Tiffin, et al. re Process for handling Alternative Response Technologies (ARTs) - Ideas / Solutions from the Public	BP-HZN-2179MDL07669125	BP-HZN-2179MDL07669125	
Cortez & Rowe, Alternative Response Technologies: Progressing Learnings (Feb. 15, 2012)	BP-HZN-2179MDL08875298	BP-HZN-2179MDL08875335	
Nere Mabile, ISP Operations - DWH Response	BP-HZN-2179MDL08925907	BP-HZN-2179MDL08925975	
ICCOPR Oil Pollution Research and Technology Plan 1997	C2K001-004330	C2K001-004412	
FW ARTs Weekly Summary	EPE082-007079	EPE082-007080	
ART Operational Period Objectives (page1)	EPE082-007081	EPE082-007081	
ART Stage 4 Summary _July 30	EPE082-007082	EPE082-007082	
ART Weekly Report-073010 FINAL	EPE082-007083	EPE082-007083	

Document Title / Description	Bates Begin	Bates End	Exhibit Number
Technology Success Stories ARTs 30Jul10	EPE082-007085	EPE082-007107	
Technology Success Stories ARTs 30Jul10	EPE082-056284	EPE082-056306	
National Response Team Unified Command Technical Assistance Document	EPG007-063989	EPG007-064028	
RE: ARTES Daily Report 7 AUG 2010	HCE912-003406	HCE912-003406	
ART Daily Report IAP input-080710	HCE912-003407	HCE912-003407	
ARTs Weekly Summary-Aug 6	HCE912-003408	HCE912-003409	
ART Operational Period Objectives Wk Aug 9	HCE912-003410	HCE912-003410	
ART Stage 4 Summary _6Aug10	HCE912-003411	HCE912-003411	
ART Weekly Report-080610 FINAL	HCE912-003415	HCE912-003416	
ARTs Org 8-5-10 Final	HCE912-003417	HCE912-003418	
Technology Success Stories ARTs 6Aug10	HCE912-003419	HCE912-003442	
Email from M. VanHaverbeke - M. Cortez re FW: Fwd: A WHALE	HCE932-000244	HCE932-000244	
AWHALE - IATAP Recommendations	HCE932-000245	HCE932-000249	
1824346 National Incident Management System December 2008 (2009-01-29 18-48-30).pdf	HCE937-003905	HCE937-004074	
CIM 16000.6 - MSM I.pdf	HCF049-011944	HCF049-012450	
FYI-ARTs Technology Success Stories & Latest Org	HCG904-003788	HCG904-003788	
ARTs Org 7-15-10 Draft	HCG904-003789	HCG904-003789	
Technology Success Stories ARTs 16Jul10	HCG904-003790	HCG904-003790	
A WHALE - Close-out	HCG938-004985	HCG938-004985	
J. Best Email to Coast Guard personnel forwarding ARTs Final Report and Attachments	HCG952-003603	HCG952-003850	
US Coast Guard: Commandant Instruction 3120.14	HCJ112-000662	HCJ112-000666	
On Scene Coordinator Report - DWH Oil Spill	HCP008-002191	HCP008-002434	TREX-009105
2014 USCG Incident Management Handbook (2014)	US_PP_MVH000091	US_PP_MVH000472	
API, Recommendations of the Oil Spill JITF Sept. 3, 2010.pdf	US_PP_MVH000473	US_PP_MVH000573	
GAO_12_585_DispersantResearch_May2012.pdf	US_PP_MVH001307	US_PP_MVH001379	
ICCOPR 1996 Biennial Report to Congress	US_PP_MVH001400	US_PP_MVH001415	
Institutionalizing Emerging Technology Assessment Process into National Incident Response (Report No. CG-D-11-13)	US_PP_MVH001521	US_PP_MVH001537	
ICCOPR Oil Pollution Research and Technology Plan 1992	US_PP_MVH001878	US_PP_MVH002130	
Oil Spill R&D Forum Proceedings-1992.pdf	US_PP_MVH002131	US_PP_MVH002470	
USGS_Annotated_Biblography_on_Oil_Pollution_2007.pdf	US_PP_MVH002471	US_PP_MVH002830	
American Petroleum Institute - An Evaluation of the Alternative Response Technology Evaluation System (ARTES) API Technical Report 1142	US_PP_MVH003103	US_PP_MVH003161	
American Petroleum Institute, An Evaluation of the Alternative Response Technology Evaluation System (ARTES), API Technical Report 1142, July 2013	US_PP_MVH003103	US_PP_MVH003160	
Interagency Coordinating Committee on Oil Pollution Rsearch: FY 2012-2013 Activities Biennial Report to Congress, June 25, 2014	US_PP_MVH003681	US_PP_MVH003776	
RDC Notes Phone Interview with BSEE 6 Aug 14	US_PP_MVH003856	US_PP_MVH003859	
MASTER LIST OF OIL SPILL RESPONSE RESEARCH (OSRR) PROJECTS	US_PP_MVH004050	US_PP_MVH004053	

Document Title / Description	Bates Begin	Bates End	Exhibit Number
OSRR Project Number 647 and 1016(3): TECHNOLOGY ASSESSMENT PROGRAMS (TAP) PROGRAM and OIL SPILL RESPONSE RESEARCH (OSRR) PROGRAM	US_PP_MVH004055	US_PP_MVH004056	
GoMRI Website - Scientific Integrity, http://gulfresearchinitiative.org/about-gomri/scientific-integrity/	US_PP_MVH004057	US_PP_MVH004058	
Final- ARTs Weekly Summary-Sept 17	US_PP_NOAA146389	US_PP_NOAA146390	
ART Stage 4 Summary _15Sept10	US_PP_NOAA146391	US_PP_NOAA146391	
ART Weekly Report-091710final	US_PP_NOAA146392	US_PP_NOAA146393	
2010 USCG Innovation Expo - IATAP Presentation - Fast Tracking Innovation and How Collaboration Find Solutions during Crisis Response Operations	US_PP_NOHD3099556	US_PP_NOHD3099556	
1402352310_5625_ ARTs Weekly Summary-Aug 13	US_PP_USCG2_1916822	US_PP_USCG2_1916822	
ART Operational Period Objectives Wk Aug 16	US_PP_USCG2_1916823	US_PP_USCG2_1916823	
ART Stage 4 Summary _13Aug10	US_PP_USCG2_1916824	US_PP_USCG2_1916824	
ART Weekly Report-081310 FINAL	US_PP_USCG2_1916825	US_PP_USCG2_1916826	
Technology Success Stories ARTs 13Aug10	US_PP_USCG2_1916827	US_PP_USCG2_1916857	
ARTs Org 8-13-10 Final	US_PP_USCG2_1916858	US_PP_USCG2_1916858	
ERC_report_11.pdf	US_PP_USCG551986	US_PP_USCG552064	
Email from R. Nash to S. McCleary re FW: A WHALE	US_PP_USCG713464	US_PP_USCG713465	
A WHALE	US_PP_USCG713465	US_PP_USCG713469	
Email from R. Nash to M. VanHaverbeke & S. McCleary re RE: A WHALE	US_PP_USCG713593	US_PP_USCG713594	
Deepwater Horizon Containment and Response: Harnessing Capabilities and Lessons Learned	N/A		TREX-006113
2011 Budget GCRO S&T	N/A		
2012 & 2013 Project Snapshot	N/A		
Alternative Oil Spill Response Technology Results from the Deepwater Horizon Response	N/A		
AMOP Seminar, Applicability of Flourescence Detection to Enhance In Situ Characterization and Assessment of Crude Oil Releases	N/A		
AMOP, Sweeten, Rapidly Deployed Aerial Imaging Platforms in Oil Spill Response	N/A		
API Joint Industry Task Force Oil Spill Preparedness and Response Newsletter, January 2014	N/A		
API Technical Report 1149-2, Subsurface Oil Detection and Delineation in Shoreline Sediments, Phase 2 -- Field Guide (Sept. 2013)	N/A		
API Technical Report 1150-2, Shoreline Protection on Sand Beaches, Phase 2 -- Field Guide (Sept. 2013)	N/A		
Art and Non-Art Stage 4 Summary	N/A		
Assistant Commandant for Response Policy White Paper Subject: Changes in the 2014 CG-IMH compared to the 2006 CG-IMH	N/A		
BP to share technology for deepwater well cap with PEMEX E&P	N/A		
Cortez Presentation, Alternative Response Technology Overview	N/A		
Cortez, Alternative Response Technologies, SPE Americas 2011 E&P Health/Safety/Security/Environmental Conference	N/A		
Cortez, Alternative Response Technology API Study--Progressing Learnings (Nov. 6, 2013) (presentation to Regional Response Team III)	N/A		
Document Register for Transmittal	N/A		
Email from H. Rowe to A. Perry, et al. re AMOP Paper and Presentation	N/A		

Document Title / Description	Bates Begin	Bates End	Exhibit Number
Email from M. Cortez - H. Rowe & M. Moran re FW: 2011 Budget S&T 2011 Plan and Cost Centers	N/A		
Email from M. Moran to B. Ladner, et al. re Stage 4 Items & Check against Houston	N/A		
Email from R. Morrison re BP Capping & Containment Intellectual Property Patents and Technology Sharing	N/A		
Email from S. Gupta to M. Cortez, et al. re ART Stage 4 Spreadsheet and Success Stories	N/A		
Federal Business Opportunities Web Page, https://www.fbo.gov/	N/A		
GoMRI Website - RFP-IV-Closed, http://gulfresearchinitiative.org/request-for-proposals/rfp-iv/	N/A		
Guidance for Responding to an Oil Spill With a Robust Sampling and Analytical Program: A User's Manual	N/A		
History, Development & Research Offshore Controlled In-Situ Burning, Nabile (2013)	N/A		
ICCOPR 2012 Biennial Report to Congress	N/A		
Interagency Coordinating Committee on Oil Pollution Research (ICCOPR) Biennial Reports - webpage - http://www.iccopr.uscg.gov/apex/f?p=118:331	N/A		
Interagency Coordinating Committee on Oil Pollution Research (ICCOPR) Meet the Members Page - webpage - http://www.iccopr.uscg.gov/apex/f?p=118:322	N/A		
J. Petroleum Tech., Sep. 2012, Alternative Oil Spill Response Technology, Results From The Deepwater Horizon Response	N/A		
Jims-Status-HITT Field Tests 30Nov10-1	N/A		
Liquid Robotics Oil+Gas, Hydrocarbon Detection: Cost effective and persistent platform to detect the presence of naturally occurring Seep and residual hydrocarbons at the water surface	N/A		
Liquid Robotics, Case Study: Undersea Volcano Study	N/A		
Marine Well Containment Company, About us	N/A		
MWCC Handover Status RevI	N/A		
MWCC Handover Summary	N/A		
MWCC Hardware Overview RevD (Pasrts 1 & 2)	N/A		
MWCC Transfer Overview	N/A		
MWCC Transfer Workshop - Day 1 Opening Items and Agenda	N/A		
MWCC Transfer Workshop - Overview of Transfer Scope	N/A		
Nere Mabile (BP America) - The Coming of Age of Controlled In-Situ Burning	N/A		
NOAA PMEL, Arctic Wave Glider Summer 2011	N/A		
O'Brien's Response Management, Alternative Response Technology Overview	N/A		
Oil Spill Prevention + Response R&D Center	N/A		
OSPR JITF Progress Report	N/A		
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Sweeten Presentation, Case Study on Handling Skimmed Emulsion from the MC 252 Response	N/A		
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