



United States Department of the Interior
BUREAU OF SAFETY AND ENVIRONMENTAL ENFORCEMENT

Alaska OCS Region
3801 Centerpoint Drive, Suite 500
Anchorage, Alaska 99503-5823

APR 16 2015

Susan Childs, Alaska Venture Support Integrator, Manager
Shell Exploration and Production
3601 C Street, Suite 1000
Anchorage, Alaska 99503

Dear Ms. Childs:

The Bureau of Safety and Environmental Enforcement (BSEE) recently observed the deployment and testing of the Arctic Containment System (ACS) near Bellingham, Washington. Beginning on March 18, 2015, BSEE Alaska Region personnel observed the initial setting of the clump weights which anchor the containment dome to the seafloor. On a subsequent trip spanning March 25-28, 2015, BSEE Alaska Region and BSEE headquarters representatives observed the full evolution of the dome deployment, including testing the pumping capacity of the dome and witnessing its retrieval back to the deck of the Arctic Challenger barge. There were technical and operational difficulties which Shell encountered, but Shell was able to overcome these difficulties in a timely manner and proceed with the exercise. Shell demonstrated to us that the dome can be deployed and operated as designed, and that it is capable of pumping at a rate greater than the currently calculated worst-case discharge of 25,000 barrels of fluid per day. In addition, our observations of the process module on the Arctic Challenger, coupled with the information Shell provided during on-site briefings, indicate that the ACS is in a state of readiness to receive and process oil, gas, and water from the containment dome.

Despite the general success of the deployment exercise, BSEE does require additional information before concurring that the ACS is ready to be used in the Arctic. Outstanding information requirements include:

1. BSEE understands that Shell is replacing the existing clump weight anchoring system for the containment dome with a new system of anchors with higher resistance to lateral forces. BSEE requires design and operational detail on the new anchor system, demonstrating that it is equal to or better than the existing system of clump weights. We also need to know when the new anchor system will be operational, where it will be staged during operations, how it will be deployed, etc.
2. In addition to the containment dome infrastructure, the Arctic Challenger houses the choke manifold intended to receive flow from a capping stack deployed from another vessel. BSEE observed that the choke manifold on the Challenger is incomplete and in the process of being repaired or upgraded. We understand that Shell has the necessary parts on order, and intends to assemble and test that system this spring. BSEE Alaska Region needs to inspect the completed choke manifold and observe any testing prior to concurring that it is ready for use.
3. During the deployment, BSEE observed that the current protocol for deploying the heavy, stiff gas and oil production hoses and control umbilical connecting the dome to the Challenger involve multiple personnel operating in hazardous positions. Operationally (and possibly structurally)

this process can be improved. BSEE requires additional information from Shell as to how this situation is being improved, and verification that improvement measures have been implemented.

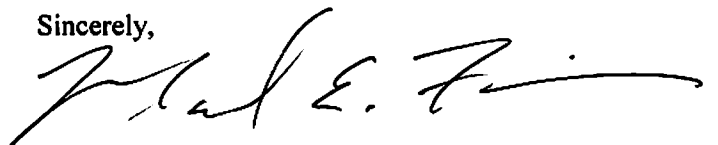
4. The ACS is designed to be deployed in close proximity to a well that is flowing hydrocarbons, thus it is possible that a gas plume could be exiting the sea surface near the Arctic Challenger. It is understood that the Arctic Challenger would be positioned such that prevailing winds would carry the gas plume away from the vessel, but it is not clear to BSEE what procedures would be followed if the wind shifts and carries gases toward the Arctic Challenger. BSEE requires additional detail (e.g. written operational procedures for such an event, etc.) demonstrating that Shell has considered such a possibility and is equipped to deal with it from an operational and safety perspective.

5. During our time on site, we observed the tug boat Corbin Foss continuously anchored off the bow of the Arctic Challenger. While BSEE does not directly regulate support vessels, we do view their operations as an indication of the effectiveness of Shell's Safety and Environmental Management Systems (SEMS). Early on the morning of March 28 and during a period of gale-force winds, the Corbin Foss dragged anchor until it was abreast of the starboard side of the Arctic Challenger. During this event, it did not appear to BSEE that the tug was under its own power, as evidenced by the fact that two small work boats (the "bear cubs") had to rapidly run out to the Corbin, engage into its side, and push it back into position against wind and seas. In the early part of the Corbin Foss' traverse while dragging anchor, BSEE also directly overheard that radio contact could not be readily established with the Corbin Foss. This event raises two primary concerns:
 - a. It is not clear to BSEE what role the Corbin Foss plays once the Arctic Challenger is anchored. If it is intended as additional support for the Challenger, then its inability to rapidly come under its own power or control once the anchor began dragging is problematic. Further, if the Corbin Foss was relying only on its anchor during a period of gale-force winds, and was not able to immediately maneuver under its own power, it is unclear what support it could have provided to the Arctic Challenger if needed.
 - b. The temporary inability of the ACS crew to raise the Corbin Foss on the radio during this event highlights an operational or technical deficiency which must be addressed.

BSEE appreciates the open and candid nature of the deployment exercise and the communications that led up to it and have followed after it. We trust that Shell will address the above concerns in an equally candid manner, and so demonstrate to BSEE that the ACS is ready to support exploration in the Arctic.

Should you have any questions or require further clarification, please contact Kevin Pendergast at (907) 334-5311, or via e-mail at kevin.pendergast@bsee.gov.

Sincerely,



Mark Fesmire, PE JD
Regional Director

cc: Brian Salerno, BSEE Director



Shell Exploration & Production

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June 11, 2015

Re: BSEE Request for Additional Information: Arctic Containment System

Dear Mr. Fesmire:

Shell Exploration & Production Company, on behalf of Shell Offshore Inc. (collectively “Shell”) provides the following in response to a letter from the Bureau of Safety and Environmental Enforcement (BSEE) dated April 16, 2015. In that letter, BSEE acknowledges the success of test deployments of the components of the Arctic Containment System (ACS) and the state of readiness of the ACS; however, while noting the success, BSEE still requires additional information around the five observations or areas of understanding that are outlined in the April 16th letter. Shell offers the following responses, plus extends an invitation to BSEE for the physical review of material documents which support responses 1, & 3-5 at Shell’s Anchorage office. Shell believes this affords BSEE the best chance to finish its’ evaluation and concur that the ACS is ready for use in the Arctic.

1. A study was commissioned by Shell on a previous containment dome anchoring system. This study was conducted with the intent to determine the necessity for enhancement of the capability to hold the containment dome in position on the seafloor when deployed and in operation. The previous anchoring system consisted of eight (8) clump weights each approximately 9,000 pounds (lbs.), relying solely on these weights to hold the dome to the seafloor. The commissioned study recommended a new containment dome anchoring system that consists of one (1), 15,000 lb. stockless anchor with 90 feet of 3.25 inch chain which weighs 9,010 lbs. In addition, it recommended seven (7) clump weights per mooring leg, each 4,000 lbs. Therefore, for each of the 8 mooring legs there is now approximately 28,000 lbs. of clump weights, 9,010 lbs. of chain, in addition to the 15,000 lb. anchor. This total system provides holding capacity well in excess of what is required to hold the containment dome in place. This new system is operational and the mooring legs are currently assembled and being loaded onto the barge *American Trader* for transport to Goodhope Bay in Kotzebue Sound. The mooring legs will then be transported for wet storage in the vicinity of the Chukchi Sea drill site Burger “A” along with the mooring anchors for the *Arctic Challenger*. Thus, everything will be ready to be retrieved and deployed should the ACS be called upon for a response.

Should the ACS be needed in the unlikely event of a loss of well control, an anchor handler (e.g., the *Ross Chouest*) would retrieve the mooring legs and deploy them on the seafloor in the prescribed pattern around the wellhead. If a gas plume is emitting and constraining deployment of one or more mooring legs, a support tug (e.g., *Montana*) would assist in deploying the leg(s) constrained by the gas plume onto the seafloor by taking an end of the mooring and maneuvering around the plume to properly lay out the mooring leg. Then, the containment dome would be attached to the mooring legs using the same type of attachments as used with the clump weights from the previous containment dome anchoring system.

2. Since the writing of the BSEE April 16th letter, BSEE inspector [REDACTED] visited the *Arctic Challenger* May 2-3, 2015, specifically to witness the testing of the high pressure hoses and choke manifold. ACS operational personnel & representatives of Wild Well Control were on-hand during the testing. [REDACTED] acknowledged verbally after witnessing the test that the choke manifold and the testing were satisfactory.
3. Changes have been made to the deployment and communication procedures for the personnel involved in hydrocarbon production hoses and control umbilical deployment. These changes help ensure the safety of personnel executing the deployment. These procedures are available at Shell's Anchorage office for BSEE's review.
4. Personnel of Shell and Superior have further assessed operations of the *Arctic Challenger* and its component systems in a response situation, particularly while in the proximity of flowing hydrocarbons (i.e., gas plume) and how changes in weather and sea state conditions could affect operations. An Activity Specific Operating Guideline, or ASOG document, has been created that provides guidance to the Offshore Installation Manager (OIM) of the facility on total times ("T-Times") to be followed for a variety of changing circumstances. This document will assist the OIM in making preparations to move the asset should there be a prediction of changing weather. In the event of a sudden shift of wind direction, our consequence modelling has shown that the distance of the asset from the well head is sufficient that the asset would not be in a position to be affected by any flammable vapors (i.e., gas plume). The ASOG is similarly available at Shell's Anchorage office for BSEE's review.
5. Superior Energy (Superior) and their towing contractor Foss Maritime (Foss) investigated the event of March 28th that occurred during heavy weather and is described in BSEE's letter. First, in response to 5a, Shell confirms the *Corbin Foss* is the tow vessel for the *Arctic Challenger*, and remains attached to the tow bridle of the *Arctic Challenger* should it have to move off of station in a response. Should the ACS have to be used in a response, the *Corbin Foss* will have its own dedicated single point mooring buoy on which to tie off and not have to rely on its' vessel's anchor to keep station.

[REDACTED]

[REDACTED] Superior, Foss, and Shell note that notwithstanding these issues during the event of March 28th, there was no damage done to any equipment or harm to any personnel. Shell and our contracting partners Superior and Foss have taken the opportunity to learn from this event and make effective changes to ensure we don't have a repeat of such a situation. The protocols and policies identified in this response are available at Shell's Anchorage office for BSEE's review.

Bureau of Safety and Environmental Enforcement

June 11, 2015

Page 3 of 3

Shell is confident the preceding responses, plus the information within material documents available for BSEE's review in our Anchorage office, will continue the open and candid nature of this process as recognized by BSEE, and adequately address the items in your letter. Shell is confident our deployment exercise and the material documents demonstrate to BSEE that the ACS is ready to support the unlikely event of a well control incident in the Arctic.

Thank you,

A handwritten signature in blue ink that reads "Susan Childs". The signature is written in a cursive style with a large initial "S".

Susan Childs

Shell Exploration & Production, Alaska

Venture Support Integrator, Manager

Cc:

Jason Fosdick, Shell Exploration & Production Company

Greg Horner, Shell Exploration & Production Company

Norman Custard, Shell Exploration & Production Company

James Duran, Shell Exploration & Production Company