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August 3, 2011

Dr. James Kendall
Regional Director, Alaska OCS Region
Bureau of Ocean Energy Management, Regulation and Enforcement
3801 Centerpoint Drive, Suite 500
Anchorage, AK 99503-5823

Dear Dr. Kendall,

As you are likely aware, we have engaged in a dialogue with the Pew Environment Group (Pew) regarding our oil spill prevention and response plans, technology, assets and capacity for the Alaskan Arctic offshore. Despite our best efforts, the questions raised by Pew and other NGO's opposed to Arctic exploration continue to appear based in unfamiliarity of our plans, technologies, and the fundamental principles of risk management.

The body of this letter describes elements of Shell's commitment to the highest standards for our Alaska Outer Continental Shelf (OCS) proposed operations, in response to assertions made in a letter from the Pew and Earthjustice dated May 17, 2011.¹ These and other commitments and standards are outlined in our two submitted Exploration Plans (EP) for the Chukchi Sea and Beaufort Sea (Camden Bay) as proposed for exploration drilling in the open water season beginning in 2012. I am providing this information to help answer any questions or comments you may receive from the public.

Well Control and Blowout Prevention

Shell has gone above and beyond regulatory requirements in designing well control and blowout prevention (BOP) systems for our Alaska OCS operations. For example, the installation of a second set of blind/shear rams in the stack is a voluntary measure adopted by Shell.

A secondary BOP control panel, referred to as the remote operated vehicle (ROV) hot stab panel, has been relocated to the top of the ram stack to improve access. A second remote panel is also being designed with BOP controls to be located several hundred feet from a well cellar to

¹ The letter titled "Shell Offshore Inc. Proposed Outer Continental Shelf Lease Exploration Plan, Camden Bay, Beaufort Sea, Alaska" was addressed to Dr. James Kendall, Acting Director, Bureau of Ocean Energy Management, Regulation and Enforcement. Information with reference to each assertion in Pew's letter is contained in an appendix attached to this letter.

improve access (another voluntary measure). This system is self-contained and has its own accumulator package so that if the BOP is damaged in any manner there would be ample supply of pressured hydraulic fluid to close at least one set of pipe rams, one set of blind shear rams and disconnect the lower marine riser package.

Support vessels will also have redundant ROV and diver capabilities for activating the BOP systems in addition to those required by the agency on the drilling vessel. This redundant capability on a support vessel is another voluntary measure taken by Shell.

Capping and Containment Systems

Shell has gone above and beyond regulatory requirements in designing a capping system and a containment vessel for exclusive use in the Arctic. The capping stack will be available before exploration wells are spudded. The capping stack will be carried on and deployed by one of the vessels accompanying the drilling fleet. It would be available for deployment within a few days of an event.² The same vessel will also have demolition equipment and work class ROVs to clear the well of any debris that could hamper capping operations.

Capping is the preferred path to control a blowout event that results in released hydrocarbons. This technique was successful on the Macondo well and other shallow wells in the Gulf of Mexico. However, Shell will also have relief well drilling capability that would be initiated quickly and continue simultaneously with capping operations.

The areas where Shell plans to drill in both the Beaufort and Chukchi Seas are offshore and not affected by shorefast ice forming in early October. In general, ice does not begin to form at the drill sites in the Beaufort Sea until late November, although Shell has built a program to manage the potential of ice to cover this possibility. In the unlikely event of a blowout, capping should stop the flow of hydrocarbons well before significant ice formation in the area. Further, the ice that does form floats on the surface, whereas capping and containment would occur at or below the seafloor. Thus, capping would not be directly affected by first-year ice formation on the sea surface. Furthermore, ice management capability would be available, if needed, to prevent interference of ice with capping operations or the vessel housing the containment system.

Late Season Operations

Shell has exceeded regulatory requirements in planning to use a vessel fleet capable of working well past the October 31 end of the drilling season, if necessary. This fleet includes Polar Class 10 ice management vessels capable of continuous unassisted operation in multi-year ice one meter thick, the conical drilling unit (CDU) Kulluk specifically designed to deflect ice downward, and the ice-strengthened Noble Discoverer drilling vessel.³ The Noble Discoverer is fully capable of working in ice, met-ocean, and daylight conditions predicted in Camden Bay well into

² Both the capping and containment systems were described by Shell in late-2010 and reviewed by BOEMRE. Shell will provide details of the capping and containment systems with ample time for BOEMRE to evaluate Shell's capping and containment capabilities prior to the initiation of drilling operations.

³ Both drilling vessels have ice-strengthened hulls and it is highly unlikely that an allision or inability to identify, monitor or mitigate ice-related hazards would result in a catastrophic event. One of the main reasons Shell uses floating drilling vessels and rig anchor release equipment involves the rapid escape capability afforded by these systems. The loss or damage of vessel(s) is considered and discussed in the Critical Operations Curtailment Plan (COCP) as required by 30 CFR 250.220(b).

December, especially with the ice management services provided by the ice breakers, anchor handlers, and other vessels in her support fleet.

The Noble Discoverer's hull is ice-strengthened. Sponsons added to the hull in 2007 run from the bow to a point near the stern providing an ice-belt protecting the hull. These sponsons were designed and installed in compliance with DNV ICE-05 class specifications and they carry an endorsement from Det Norske Veritas (DNV). Further, the Noble Discoverer is equipped with a turret that is anchored to the seafloor. The turret remains stationary while the vessel is anchored at the drill site, but the ship itself is not. This allows the heading of the vessel to be changed to meet oncoming waves, winds and ice. Thus, the ship is fully capable of handling ice hazards late into the year.

The CDU Kulluk has an Arctic Class IV hull that is specifically designed to deflect ice downward, and has been used successfully in the Canadian Beaufort Sea for several years. The Kulluk is moored using a 12-point anchoring system and is designed to maintain its location in drilling mode in moving ice with thickness up to 1.2 meters without the aid of any active ice management. With the aid of the ice management vessels, the Kulluk would be able to operate within even more severe ice conditions. In open water conditions, the Kulluk can maintain its drilling location during 24-hour storm events with wave heights up to 5.5 meters while drilling, and up to 12.2 meters when not drilling (far in excess of conditions in the Beaufort Sea).

Exploration drilling operations are planned to occur during the summer, ending not later than October 31. Sea ice typically does not begin to form until mid- to late-November at the planned drill sites in Camden Bay.

Each EP contains plans for ice management and for critical operations and curtailment. Drilling operations can be interrupted for a variety of reasons, including an approaching ice feature deemed to be hazardous. In this case, the well would be suspended and the moorings released allowing the drilling vessel to either leave the drill site under its own power (in the case of the Noble Discoverer) or be towed to a safe site (in the case of the CDU Kulluk). One of the main reasons Shell uses floating drilling vessels and rig anchor release equipment involves the rapid escape capability afforded by these systems. Simply stated, if the drilling vessel is at risk for any reason, drilling operations will be interrupted, the well will be properly suspended and the drilling vessel will leave the area until it is safe to return to the drill site and resume operations.

Oil Spill Response

Shell has analyzed the potential implications of the unlikely event of an oil spill and we have planned for response capabilities in excess of what is required for effective response. Shell has provided the Bureau of Ocean Energy and Management Regulatory Enforcement (BOEMRE) with significant information to comply with NEPA and evaluate Shell's program regarding the unlikely event of a very large oil spill.

The 2003 multi-sale EIS for lease sales 186, 195, and 202 discusses in detail the effects of a spill of 180,000 bbl of oil from a nearshore well blowout or a pipeline breach in the Beaufort Sea. Shell analysis of a very large oil spill in its Environmental Impact Assessment (EIA) accompanying

its Camden Bay EP appropriately uses this discussion regarding potential effects as relevant to the potential effects of a blowout incident at either Torpedo prospect or Sivulliq prospect. As stated in the EIA on page 4-159 "There is no new information indicating that this approach, and the analytical framework created by the 2003 Multi-Sale EIS, is incomplete, dated or otherwise insufficient".

Shell's approved Beaufort Sea Regional Oil Discharge Prevention and Contingency Plan (ODPCP) provides the required appropriate trajectory analysis with our worst case discharge scenario, as does the revision to this approved ODPCP. The probabilities of a spill of more than 1,000 barrels reaching certain land segments after 3, 10 and 30 days from a blowout event have been assessed and the shoreline protection and recovery assets in our plans are in excess of requirements for this trajectory analysis of the worst case discharge scenario. The potential impact on oil spill response effectiveness of the loss or damage of any vessel(s) is considered and discussed in the Critical Operations Curtailment Plan (COCP).

(Late-Season) Blowout Response

The time required for mobilizing the relief well drilling vessel from the Chukchi Sea (assuming the unlikely circumstance that the primary drilling vessel in Camden Bay is incapable of drilling its own relief well), mooring the vessel, drilling the relief well (including time for homing surveys), making the intercept at the top of the reservoir and killing the blowout from the relief well is 34 days or less, including a 30% downtime assumption for ice, weather and/or mechanical failure. Consequently, relief well drilling is not expected to last into December although the relief well rig, with proper ice management, is capable of staying on the drill site under freeze-up conditions. Furthermore, capping is expected to stop the flow much faster than relief well drilling.

Shell has supplied to BOEMRE all of the requisite information for the agency to assess a realistic scenario for the unlikely event of a blowout. Additionally, 30 CFR 254.26(d) requires a worst case discharge scenario in adverse weather conditions within an oil spill response plan. Since sea ice can be present on the prospect during the summer operating season, it is wholly appropriate to include a worst case discharge response scenario that begins on August 1.

A trajectory analysis under the worst case discharge scenario is required by 30 CFR 256.26(b), and Shell's approved Beaufort Sea ODPCP includes this analysis, as does the revision to this approved ODPCP. The recent historic wind data provided for this analysis is relevant to current atmospheric conditions. Shoreline protection and recovery assets in excess of that required for the potential shoreline impacts in this analysis will be provided by Shell.

Ice Management Plan

It should also be noted that Shell's EPs contain strategies for ice management and for critical operations and curtailment. This is carefully explained in the Ice Management Plan (IMP). This issue has been explained and discussed in response to questions from the public and in previous discussions with the agency. Simply stated, if the drilling vessel is at risk for any reason, drilling operations will be interrupted, the well will be properly suspended and the drilling vessel will leave the area until it is safe to return to the drill site and resume operations.

In-Situ Burning

In-situ burning is a well established and accepted response method. The consensus of research on spill response with in-situ burning of oil on open water and with ice is that burning is an effective technique with removal rates of 85 to 95 percent in most situations (Shell et al. 1983; SL Ross 1983; SL Ross and DF Dickins 1987; Allen 1990; Allen 1991; Allen and Ferek 1993; and Singsaas et al. 1994). Furthermore, a considerable amount of research has demonstrated the success of in situ burning in broken ice. For example, page 3-34 of the approved ODPCP includes circumstances for retaining oil within broken ice conditions where in-situ burning of oil would take place.

Mitigation of Potential Impacts to Bowhead Whale

Mitigation measures included within Shell's revised Camden Bay EP regarding avoidance of impacts to the bowhead whale migration and the subsistence harvest of bowheads conducted by Nuiqsut and Kaktovik are more than robust, and in fact exceed those envisioned by BOEMRE in the 2003 Multi-Sale EIS for the Beaufort Sale lease sales. For example, exploration drilling will be suspended on August 25th prior to the start of the bowhead subsistence hunts at Kaktovik and Nuiqsut (Cross Island), and resume only after the completion of the subsistence hunts (approximately September 15th).

Recent evidence suggests that some bowheads feed during migration and feeding bowheads might be encountered in the project area (Lyons et al. 2009; Christie et al. 2010). The primary bowhead summer feeding grounds, however, are far to the east in the Canadian Beaufort Sea, and the primary feeding area used during fall migration is near Barrow, though bowheads fed near Shell's seismic programs in Camden Bay in both 2007 and 2008 (Pages 4-35, 4-61, 4-140 of the revised Camden Bay EP). In addition, feeding does not appear to be an important activity by bowheads migrating through the eastern and central part of the Alaskan Beaufort Sea in most years. In the absence of important feeding areas, the potential diversion of a small number of bowheads is not expected to have any significant or long-term consequences for individual bowheads or their population (Page 75 of Shell's IHA).

Shell's Incidental Harassment Authorization (IHA) application for a Camden Bay exploration drilling program over one season (Appendix C of the revised Camden Bay EP) cites several authors and their data showing that bowhead that are exposed to drilling activity sounds are only locally and temporarily disturbed (IHA application Section 7.2). Shell's IHA application and Section 10 from the revised Camden Bay EP list tables of estimated takes for bowhead whales and other marine mammals. These estimates are derived from conservative assumptions. The EIA cumulative impact analysis concludes that, "current levels of marine sound are not great enough to affect marine mammal populations in the project area."

Air Emissions

Emissions from Shell's two planned exploration drilling operations in Camden Bay and the Chukchi Sea would be separated in distance and would not cumulatively affect the same resources. The anticipated emissions at both locations are expected to be well below NAAQS

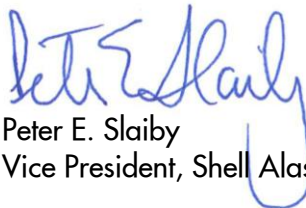
and AAAQS at the shoreline as a result of distance from shore, permit restrictions, and dispersion. The incremental contribution to cumulative impacts on air quality from the proposed EP activities is expected to therefore be negligible. Given that other present and reasonably foreseeable activities will occur during the exploration drilling program at approximately the current level, no additional impacts would be expected and the cumulative effects on air quality are considered minor and last only as long as the drilling, and are therefore not significant.

Black carbon is a constituent of particulate matter (PM). PM is a regulated air emission and the air emissions analyses include any potential effects of PM. Therefore, black carbon emission analysis is included in the PM analysis.

Both national and state standards for air emissions are met within 500m of the hull of the drilling vessel. Since Kaktovik is approximately 55 miles (89 km) from the nearest drill site (Torpedo H) it is reasonable to conclude that any onshore effects are negligible or none existent.

In closing, we are committed to ensuring that loss of well control does not occur and that an effective response capability exists for any unintended discharge of hydrocarbons into the ocean. We have put in place the technology, equipment, systems, and plans to fulfill these commitments. To suggest otherwise is misleading and untrue. We remain dedicated to communicating transparently with the interested public but cannot allow those unwilling to partake in an honest dialogue to further delay a project that exceeds the highest standards for oil spill prevention and response. I am happy to discuss further any aspects of our contingency plans.

Sincerely,



Peter E. Slaiby
Vice President, Shell Alaska

cc: The Honorable Sean Parnell, Governor, State of Alaska
The Honorable Lisa Murkowski, United States Senator
The Honorable Mark Begich, United States Senator
The Honorable Don Young, Congressman
The Honorable Michael Bromwich, Director, BOEMRE, United States Department of the Interior
The Honorable David Hayes, Deputy Secretary, United States Department of the Interior
The Honorable Edward Itta, Mayor, North Slope Borough

Appendix

Information on select elements of Shell's Alaska Outer Continental Shelf proposed operations, with reference to each assertion made in the letter from the Pew Environment Group and Earthjustice to Director Kendall on May 17, 2011.

Well Control and Blowout Prevention

- *Shell's EP and Revised Beaufort Spill Plan omit a description of: the installation of a second set of blind shear rams in the blowout preventer ("BOP") stack (prevention); the relocation of the BOP stack remotely-operated vehicle ("ROV") hot stab from the bottom of the BOP to the top in order to improve its availability (source control and containment); a redundant ROV hot stab panel on a seafloor sled located a safe distance away from the well, as a means to operate the BOP if the ROV hot stab panel on the BOP is inaccessible (source control and containment); and redundant ROV and diver capability on a support vessel, along with launch and recovery systems for each.*

Shell's revised Camden Bay Exploration Plan is a revision of the approved 2010 Camden Bay EP. In late 2010, Shell submitted documents to the agency that met the requirements of NTL 2010-N06 including a description of the measures Shell plans to employ to improve its ability to prevent a blowout event from occurring.

This includes the installation of a second set of blind/shear rams in the stack. This is a voluntary measure adopted by Shell; there is no requirement by BOEMRE for including a second set of blind/shear rams in the BOP stack.

The ROV hot stab panel has been relocated to the top of the ram stack to improve access. This is also a voluntary measure that was clearly described in the NTL 2010-N06 submittal made in 2010.

As a further enhancement to Shell's BOP operations, a remote panel with BOP controls is currently under design. The system will be capable of operating the BOP from a site located several hundred feet away from the well. This system is self-contained and has its own accumulator package so that if the BOP is damaged in any manner there would be ample supply of pressured hydraulic fluid to close at least one set of pipe rams, one set of blind shear rams and disconnect the lower marine riser package. Design and fabrication of this system is another voluntary measure that Shell plans to employ, and it, too, was described in Shell's NTL 2010-N06 filing in 2010.

Support vessels will have redundant ROV and diver capabilities in addition to that required by the agency on the drilling vessel. It is noted that diver capability is not required by the agency; however operation of the BOP stack by an ROV is required. This redundant capability on a support vessel is yet another voluntary measure taken by Shell, and it was explained in Shell's NTL 2010-N06 submittal in 2010.

Capping and Containment Systems

- *As a result of Deepwater Horizon, BOEMRE now requires Shell to have a well capping and containment system (NTL 2010-N10 at 2), but Shell's EP does not explain the company's emergency plans for responding to a blowout using those systems. Shell's EP proposes a well capping and Arctic Containment System that is not described, built, tested or verified as effective in arctic conditions. EP at 9-4, App. L, 1. The EP is incomplete because Shell has provided BOEMRE no description of the system, how Shell plans to deploy and respond using this device (including efforts to curtail other containment and response measures), how it will safely secure the blowout preventer to deploy the device to avoid exacerbating the blowout, why Shell believes the system will be appropriate and effective for the Arctic environment, or the availability of the responders trained and ready to deploy and implement this novel system.*

Contrary to the commenter's claim, NTL 2010-N10 does not require Shell to have a well capping and containment system. It advises Operators that BOEMRE will evaluate the capability of the Operator to provide capping and containment capability as part of the approval process for obtaining permits to drill (i.e., part of the Application for Permit to Drill [APD] process). Having such capability is voluntary under this NTL, it is not mandatory. Regardless, Shell is designing a capping system and a containment vessel for use in the Arctic. The capping stack will be fully qualified for service before the wells planned in this exploration drilling program are spudded.

There is also no requirement to explain the capping and containment systems as a part of the exploration plan (EP). Both the capping and containment systems were described in a filing made by Shell in late-2010 in compliance with requirements of NTL 2010-N06 as part of its APD for the Sivulliq N location, a well planned for drilling during the 2011 drilling season. This information was reviewed by BOEMRE and is still on file as a part of the revised Camden Bay EP of which this new version is also a part.

BOEMRE will be provided details of the capping and containment systems with ample time provided for them to make their evaluation of Shell's capping and containment capabilities prior to the initiation of drilling operations under this revised EP.

- *The EP provides no explanation of how quickly Shell could deploy the system—despite Shell's earlier commitment to the agency that the pre-staged containment dome would be available "for immediate deployment." Letter from Marvin E. Odum, President, Shell Oil Company to S. Elizabeth Birnbaum, Minerals Management Service (May 14, 2010) at 5.*

The capping stack will be carried on and deployed by one of the vessels accompanying the drilling fleet. It will be available in theatre within a few days of an event. The same vessel will also have demolition equipment and work class ROVs to clear the well of any debris that could hamper capping operations.

Capping is the preferred path to controlling a blowout event that results in released hydrocarbons. This technique was successful on the Macondo well and other shallow wells in

the Gulf of Mexico. However, we will also have relief well drilling capability that would be initiated quickly and continue simultaneously with capping operations.

- *Shell states that the well capping and containment system will be unaffected by ice or weather conditions at the surface. Revised Beaufort Spill Plan at 1-31. Shell's EP is incomplete because it does not explain how well capping and the containment system will work in ice and Arctic weather conditions. Yet, Shell proposes to operate until October 31st, and shorefast ice typically starts forming in early October.*

The areas where Shell plans to drill in both the Beaufort and Chukchi Seas are offshore and not affected by shorefast ice forming in early October. Ice does not begin to form at the drill sites in the Beaufort Sea until late November. In the unlikely event of a blowout, capping should stop the flow of hydrocarbons well before significant ice formation in the area. Further, the ice that does form floats on the surface, whereas capping and containment would occur at or below the seafloor. Thus, capping would not be directly affected by first-year ice formation on the sea surface.

Surface deployment of subsea devices and equipment such as ROVs will be enhanced by aggressive ice management. If the Chukchi Sea drilling fleet is used for relief well drilling, both ice management vessels and both ice class anchor handlers, along with other ice-class vessels, will be available to prevent interference of the young first-year ice on capping operations. Additionally, Shell's on-site assets for conducting ice management will be available to prevent interference to the vessel housing the containment system. To presume that the containment system would not enjoy the service of the ice management program, despite its unlikely need, is incorrect.

Late Season Operations

- *Shell does not provide information showing that Discoverer is capable of drilling a relief well in December ice conditions. The Kulluk has an Arctic Class IV hull design; the Discoverer does not. EP at 1-15.*

The Noble Discoverer with aggressive ice management provided by the ice breakers and anchor handlers along with other vessels is fully capable of working in ice conditions predicted in Camden Bay well into December. The Noble Discoverer's hull is ice-strengthened. Sponsons added to the hull in 2007 run from the bow to a point near the stern providing an ice-belt protecting the hull. These sponsons were designed and installed in compliance with DNV ICE-05 class specifications and they carry an endorsement from DNV. Further, the Noble Discoverer is equipped with a turret that is anchored to the seafloor. The turret remains stationary while the vessel is anchored at the drill site, but the ship itself is not. This allows the heading of the vessel to be changed to meet oncoming waves, winds and ice. Thus, the ship is fully capable of handling ice hazards late into the year. That the entire vessel does not have an ice classification is irrelevant.

- *Shell wants to drill as late as October 31st, but acknowledges that nearshore response for a spill on October 1st would be futile because shorefast ice typically forms by October 4th. Revised Beaufort Spill Plan at 3-27. Shell's oil spill contractor responsible for nearshore*

recovery operations, Alaska Clean Seas (ACS), acknowledges that nearshore mechanical response could be rendered impossible as of October 1st (i.e., ACS vessels are docked and nearshore mechanical response is impossible) and offshore response could be severely limited. According to ACS, in October offshore oil recovery with vessels drops to 50 percent effectiveness and boom capability drops to 20 percent. ACS, Technical Manual, Vol. 1, Tactics Descriptions at L-7, p.3 (May 2008). By November 1st, recovery with vessels and boom is impeded by ice 100 percent of the time. *Id.* Shell's EP is incomplete because it fails to address these limitations.

Shell's Beaufort Sea Regional ODPCP was approved in 2010, remains so, and the language of the revised Beaufort Sea Regional ODPCP around late season nearshore oil spill response has not been changed between then and now. The discussion and methods detailed within Shell's late season near-shore oil spill response program has been previously approved by both federal and State of Alaska plan reviewers.

- *Shell's EP does not include meteorological reports. 30 C.F.R. § 250.216(b); EP at 5-3 – 5-5.*

According to 30 C.F.R. § 250.216(b), an Operator must include site-specific meteorological reports if they have been attained. On pages 5-3 through 5-5, Shell has listed and described the data from physical environment reports that are site-specific. Meteorological data has been collected from a station at Badami (30 miles to the SW) and is discussed in the EIA (EIA page 3-8).

Oil Spill Response

- *Shell states that The Response Group, of Houston, Texas, conducted the oil spill trajectory modeling using OilMap software, Revised Beaufort Spill Plan 1-60, 1-64 – 1-66, 1-69, but Shell does not provide information on whether OilMap is capable of modeling a subsea blowout in Arctic conditions. Shell's modeling does not show how oil moves from the subsea wellhead to the surface. Nor does it provide information on how currents below the water surface could affect spill trajectory in the presence of ice (e.g. oil trapped under ice and travelling long distances without response access).*

30 CFR 256.26(b) requires Shell to provide an appropriate trajectory analysis with our worst case discharge scenario, and Shell's approved Beaufort Sea Regional ODPCP has done so, as does the revision to this approved ODPCP. The trajectory model Shell has chosen is appropriate for a subsea release under arctic conditions.

- *For planning purposes, Shell assumes a small amount of shoreline oiling will occur. For a spill of 16,000 barrels of oil per day, it only assigns two skimming vessels, two workboats, three skimmers, and 63 feet of boom to nearshore recovery operations. Revised Beaufort Spill Plan at 1-80. Shell only provides four workboats with 2,000 feet of boom for shoreline containment. *Id.* Shell includes an oil spill trajectory map that shows shoreline oiling within 72 hours; yet, the scenario narrative concludes that "shoreline impact is not expected with the current trajectory." *Id.* at 1-74. Shell's EP is incomplete because it fails to explain how it can*

recover all the oil to prevent shoreline oiling, especially given the limited resources the company will have available.

The trajectory analysis provided indicates there is no shoreline impact despite the higher worst case discharge volume. As such, the shoreline protection and recovery assets listed are in excess of that required.

- *Shell's proposal is incomplete because it could be jeopardized by a single point of failure. Shell is proposing to have only one oil storage tanker, constituting more than 90 percent of Shell's oil storage capability. Revised Beaufort Spill Plan at A-12 – A-13. Yet, Shell never explains the company's plans for storing oil if that single tanker is damaged or destroyed as OCSLA's regulations require.*

The loss or damage of vessel(s) is considered and discussed in the Critical Operations Curtailment Plan (COCP) as required by 30 CFR 250.220(b).

- *Shell is planning to use an anchor handling/ice management vessel to support spill response. Revised Beaufort Spill Plan at A-2, see also id. at 1-89 (Hull 247 constitutes Task Force-2 with a storage capacity of 13,000 barrels). Yet, Shell acknowledges that the vessel will be managing ice up to 38 percent of the time when within 25 miles of the drilling site. Id. at A-2. Shell includes this vessel's skimming and storage capability in its spill response plan; if the vessel is damaged, Shell has insufficient skimming and storage capability 12 hours out of every day. Id. at 1-73.*

The loss or damage of vessel(s) is considered and discussed in the Critical Operations Curtailment Plan (COCP) as required by 30 CFR 250.220(b).

- *The EIA fails to analyze the effects of an oil spill larger than 48 barrels of oil from Shell's proposed drilling. Although Shell references an analysis of a large spill from a gravel island in an eight-year-old EIS prepared in connection with the sale of Beaufort Sea leases, EP, App. F at 4-152 – 4-160, that analysis is insufficient for BOEMRE to comply with NEPA. For example: it does not provide information to enable BOEMRE to analyze a subsea oil spill; it does not provide information to enable BOEMRE to analyze a spill lasting more than 15 days; and it does not provide BOEMRE with project-specific trajectories based on contemporary data.*

The 2003 multi-sale EIS for lease sales 186, 195, and 202 discusses in detail the effects of a spill of 180,000 bbl of oil from a nearshore well blowout or a pipeline breach in the Beaufort Sea (2003 EIS pages IV-227 through IV-247). Shell analysis of a very large oil spill in the EIA accompanying its Camden Bay EP appropriately uses this discussion regarding potential effects as relevant to the potential effects of blowout incident at either Torpedo prospect or Sivulliq prospect. As stated in the EIA on page 4-159 "There is no new information indicating that this approach, and the analytical framework created by the 2003 Multi-Sale EIS, is incomplete, dated or otherwise insufficient".

In Shell's EIA, page 4-158, Table 4.5-5 (Summer Conditional Probabilities that an Oil Spill Greater than or Equal to 1,000 bbl (Greater than or Equal to 159 m³) Starting at Launch Area 15 Will Contact a Particular Land Segment or Environmental Resource Area in 30 Days) provides the probability of oil reaching certain land segments (i.e. trajectories) after 3, 10 and 30 days from a blowout (subsea oil spill) event. Shell's revision of its approved ODPCP also discusses in detail trajectories in sections 1.6, 3.2, 4.3 and Figure 1-14.

In summary, BOEMRE has ample information to comply with NEPA and evaluate Shell's program regarding the unlikely event of a very large oil spill.

(Late-Season) Blowout Response

- *Shell's explanation of its "worst case discharge scenario" in "adverse weather conditions" is incomplete because Shell does not explain why it selected a scenario based on a well blowout on August 1st—even though the EP seeks approval to drill through October and acknowledges a relief well might not be completed until December. EP at 2-5 – 2-6; Revised Beaufort Spill Plan at 1-68.*

The worst-case discharge calculations apply regardless of when the blowout scenario starts. The time required for mobilizing the relief well drilling vessel from the Chukchi Sea (assuming the unlikely circumstance that the primary drilling vessel in Camden Bay is incapable of drilling its own relief well), mooring the vessel, drilling the relief well (including time for homing surveys), making the intercept at the top of the reservoir and killing the blowout from the relief well is 34 days. Shell has supplied to BOEMRE all of the requisite information for the agency to assess a realistic scenario, for the unlikely event of a blowout, contrary to the assertion in this letter. It is noted that capping is expected to stop the flow much faster than relief well drilling. Further, it is noted that the relief well drilling is not expected to last into December although the relief well rig, with proper ice management, is capable of staying on the drill site under freeze-up conditions. Thus, Shell does not anticipate relief well operations to last until December as asserted by this letter. The commentors have conveniently misinterpreted and misrepresented the information provided in the EP regarding relief well drilling operations. Additionally 30 CFR 254.26(d) requires a worst case discharge scenario in adverse weather conditions within an oil spill response plan and Shell's approved Beaufort Sea Regional ODPCP includes such. And since sea ice can be present on the prospect during the summer operating season, contrary to the assertion of PEW, it is wholly appropriate to include a worst case discharge response scenario that begins on August 1.

- *Shell's EP for responding to a blowout assumes the company will recover 90 percent of the oil spilled in open water. Revised Beaufort Spill Plan at 1-33. Shell's EP is incomplete because it fails to provide any evidence or rationale supporting this unprecedented recovery rate.*

Shell has an approved Beaufort Sea Regional Oil Discharge Prevention and Contingency Plan (ODPCP), and has since 2007. The most recent submittal is a revision to the ODPCP unconditionally approved again by BOEMRE in 2010. Although the WCD volume has changed with the recent revision, the proportion of oil recovered has not. This has been an

acceptable standard previously; PEW provides no rationale for why it should now be changed.

- *Shell has reduced its estimate for the number of days it takes to drill a relief well from its earlier exploration and spill plans. According to Shell's last EP, completing a relief well would take "approximately 34 days for a 14,000 ft (4,300 m) TVD blowout well depending on the depth of the intercept point." Shell, 2010 Outer Continental Shelf Lease Exploration Plan, Camden Bay, Alaska at 51 (June 2009). In the current proposal, Shell states it would take 25 days. EP at 2-5 – 2-6. Shell does not explain this reduction in time or explain why it was appropriate to eliminate certain steps in the drilling process (i.e., construction of a relief well cellar, resupply the alternative rig, weather-related downtime). BOEMRE's 2011 technical analysis of a relief well operation, by contrast, specifically contemplated additional time for these procedures.*

Shell has not reduced the estimated time required to drill a relief well in Camden Bay from previous plans. The figures quoted in this letter are for a 14,000-ft relief well. The intercept point for either the Sivulliq or Torpedo wells is much shallower than 14,000 ft. Shell's estimate does include a 30% downtime assumption for ice, weather and mechanical failure. This estimate is predicated on actual penetration rates and time required for drilling other wells in the Beaufort Sea and includes the time required for ranging (or homing) surveys. The 25-day time estimate is for the deepest relief well planned for the Torpedo H location. It would be even less for the shallower Sivulliq locations.

The relief well will not employ a mudline cellar, no formation evaluation, no extensive testing of formation parting pressures at casing shoes and no cores. The intent is to drill the relief well as fast as possible, intercept the blowout, kill the flow and abandon both wells with minimal lost time. This time estimate is based on actual conditions at the drill site and not a regional relief well plan.

- *Shell's "worst case discharge scenario" fails to provide current wind data for its modeling of an oil spill. Its oil spill trajectory is based on wind data that is more than 23 years old. Revised Beaufort Spill Plan at 1-68. Shell's EP is incomplete because it does use current data or explain why these old data are used.*

The recent historic wind data provided is relevant to current atmospheric conditions. Unless PEW can show that recent wind speed and direction is so radically different from that used and creates a radical difference in oil spill modeling, this comment is without merit.

Ice Management Plan

- *Shell does not explain to BOEMRE how it can maintain safe drilling and operating conditions if one of its ice breakers is damaged or lost. One of the most important aspects of Shell's drilling plan is the need for ice management to prevent damage to the drill rig and ensure the safety of the drilling crews. See 75 Fed. Reg. 803, 804 (Jan. 6, 2010) ("Shell Exploration & Production Company indicated that it is highly likely that any allision or inability to identify, monitor or mitigate ice-related hazards that might be encountered [during Shell's drilling]*

would result in a catastrophic event.”). Yet, the EP provides no explanation for responding to the loss of or damage to Shell’s ice support vessels, including precautions for protecting the Kulluk or the Discoverer from ice hazards without its icebreakers.

Both the CDU Kulluk and the Noble Discoverer have ice-strengthened hulls and both can resist ice. Further, it is noted that the exploration drilling operations are planned to occur during the summer ending on or before midnight, October 31. Sea ice typically does not begin to form until mid- to late-November at the planned drill sites in Camden Bay.

The EP contains outline plans for ice management and for critical operations and curtailment. Appendix J, Critical Operations and Curtailment Plan (COCP), on page 1, clearly lists the loss of an ice management vessel as a potential cause of drilling interruption and a curtailment trigger event. “Drilling operations can be interrupted for a variety of reasons. Some factors affecting curtailment include: Loss of ice management vessel support due to mechanical issues or as a result of temporary reassignment of vessel(s) to another area (for example, to provide rescue, supply/logistics support, etc.)”. Should the ice breaker not be available for any reason and an approaching ice feature be deemed hazardous, the well would be suspended and the moorings released allowing the drilling vessel to either leave the drill site under its own power (in the case of the Noble Discoverer) or be towed to a safe site (in the case of the CDU Kulluk). This is carefully explained in the Ice Management Plan (IMP), Appendix K. This issue has been explained and discussed in response to questions from the public and in previous discussions with the agency. Simply stated, if the drilling vessel is at risk for any reason, drilling operations will be interrupted, the well will be properly suspended and the drilling vessel will leave the area until it is safe to return to the drill site and resume operations.

It is noted that the citation provided by PEW refers to a previous version of the Camden Bay EP and not the version currently under review. Further, because both drilling vessels have ice-strengthened hulls, Shell disagrees with this statement. It is highly unlikely that an allision or inability to identify, monitor or mitigate ice-related hazards would result in a catastrophic event. One of the main reasons Shell uses floating drilling vessels and rig anchor release equipment involves the rapid escape capability afforded by these systems.

In-Situ Burning

- *Given the limitations of mechanical recovery in a late season spill response, Shell relies substantially on in situ burning to remove oil, but Shell has not provided BOEMRE with information demonstrating that burning is a viable method in late fall/early winter Arctic conditions. To the contrary, Shell states that within hours of reaching the surface oil will be so emulsified that ignition will be “difficult to impossible.” Revised Beaufort Spill Plan at 3-32.*

In-situ burning is a well established and accepted response method. PEW chooses to "cherry-pick" a statement out of context from a robust, approved ODPCP that also summarizes peer-reviewed documents that conclude to the contrary. The consensus of research on spill response with in situ burning of oil on open water and with ice is that burning is an effective technique with removal rates of 85 to 95 percent in most situations (Shell et al. 1983; SL Ross

1983; SL Ross and DF Dickins 1987; Allen 1990; Allen 1991; Allen and Ferek 1993; and Singasaas et al. 1994). A considerable amount of research has demonstrated the success of in situ burning in broken ice. For example, page 3-34 of the approved ODPCP includes circumstances for retaining oil within broken ice conditions where in-situ burning of oil would take place, such as..."There could be a reduction in the air/water surface area to accumulate oil and allow for efficient sustained combustion." ...".ice..rafting and accumulating to create a natural barrier within which burning of the oil and free gas could take place"....and, "The ice boundaries would provide considerable natural containment for the oil and enhance the potential for elimination by burning."

Mitigation of Potential Impacts to Bowhead Whale

- *The EIA fails to provide information about potential alternatives to Shell's drilling proposal, for example avoiding drilling during the fall bowhead migration or employing different forms of sound mitigation.*

This comment implies Shell's EIA must include a "no action alternative", which it does not, given that the bowhead migration may occur August through October. This timeframe coincides with the optimal arctic exploration drilling season at the water depths at which the Sivulliq and Torpedo prospects occur, where drilling will be conducted from a floating drill vessel. Mitigation measures included within Shell's revised Camden Bay EP regarding avoidance of impacts to the bowhead whale migration and the subsistence harvest of bowheads conducted by Nuiqsut and Kaktovik are more than robust, and in fact exceed those envisioned by BOEMRE in the 2003 Multi-Sale EIS for the Beaufort Sale lease sales.

- *The EIA fails to acknowledge or analyze a recent determination by the National Marine Fisheries Service that the area near the proposed drill-sites has special significance as a feeding site for bowhead whales during their fall migration.*

Recent evidence suggests that some bowheads feed during migration and feeding bowheads might be encountered in the project area (Lyons et al. 2009; Christie et al. 2010). The primary bowhead summer feeding grounds however, are far to the east in the Canadian Beaufort Sea, and the primary feeding area used during fall migration is near Barrow, though bowheads fed near Shells seismic programs in Camden Bay in both 2007 and 2008. (Pages 4-35, 4-61, 4-140). In addition, feeding does not appear to be an important activity by bowheads migrating through the eastern and central part of the Alaskan Beaufort Sea in most years. In the absence of important feeding areas, the potential diversion of a small number of bowheads is not expected to have any significant or long-term consequences for individual bowheads or their population. (Page 75 of IHA). Less consistently used feeding areas are in coastal and shelf waters near and east of Kaktovik. In 2007 and 2008, bowhead whales also used areas near Camden Bay to feed during the migration (Ireland, et. al.2008; Funk, et. al. 2010) (Page 3-79 of the Camden Bay EIA; Pages 14-15 4MP Camden Bay IHAA). NMFS' own quote from Camden Bay 2010 Drilling IHA FR Notice "However, Camden Bay is one of a few feeding areas for bowhead whales in the U.S. Arctic Ocean. The disruption to feeding is not anticipated to have more than a negligible impact on the affected species or stock."

- *The EIA does not include any analysis of potential harm to bowhead whale cow-calf pairs. Females with young are thought to be more responsive to noise and human disturbance, and yet the EIA does not consider the possible effects of disrupting their migration or deflecting their route away from an important feeding area.*

PEW does not cite a source for its assertion that females with young are "thought" to be more responsive. A clear citation of where this determination comes from is needed. In the NMFS Biological Opinion to BOEMRE (then the MMS) for authorization of takes for oil and gas activities in the Beaufort and Chukchi Seas (issued 17 July 2008), NMFS does not place any special significance to females with young (cow/calf pairs). Regarding vessel traffic in the arctic, NMFS states, "We are not aware of data that would allow us to determine whether females with calves tend to show avoidance and scattering at a greater, lesser, or at the same distances as other segments of the population" (page 84 of the biological opinion).

Recent evidence suggests that some bowheads feed during migration and feeding bowheads might be encountered in the project area (Lyons et al. 2009; Christie et al. 2010). The primary bowhead summer feeding grounds however, are far to the east in the Canadian Beaufort Sea, and the primary feeding area used during fall migration is near Barrow, though bowheads fed near Shells seismic programs in Camden Bay in both 2007 and 2008. (Pages 4-35, 4-61, 4-140). In addition, feeding does not appear to be an important activity by bowheads migrating through the eastern and central part of the Alaskan Beaufort Sea in most years. In the absence of important feeding areas, the potential diversion of a small number of bowheads is not expected to have any significant or long-term consequences for individual bowheads or their population (Page 75 of IHAA). Less consistently used feeding areas are in coastal and shelf waters near and east of Kaktovik. In 2007 and 2008, bowhead whales also used areas near Camden Bay to feed during the migration (Ireland, et. al. 2008; Funk, et. al. 2010) (Page 3-79 of the Camden Bay EIA; Pages 14-15 4MP Camden Bay IHAA). NMFS' own quote from Camden Bay 2010 Drilling IHA FR Notice "However, Camden Bay is one of a few feeding areas for bowhead whales in the U.S. Arctic Ocean. The disruption to feeding is not anticipated to have more than a negligible impact on the affected species or stock." Federal Register / Vol. 75, No. 74 / Monday, April 19, 2010 / Notices 20505

- *The EIA does not explain when drilling will resume after the August 25th cessation of activities for the Nuiqsut and Kaktovik bowhead whale hunts. This information is important to assessing effect to migrating bowhead whales and other migratory species such as beluga whales.*

Although a few bowheads are sometimes present in the Beaufort Sea in late August, most westward-migrating bowhead whales typically reach the Kaktovik and Cross Island areas in early September when the subsistence hunts for bowheads typically begin at those locations (Kaleak 1996; Long 1996; Galginaitis and Koski 2002; Galginaitis and Funk 2004, 2005; Koski et al. 2005). In recent years the hunts at those two locations have usually ended by mid- to late September (Page 24 of the Camden Bay IHAA). Based on data in Richardson and Thomson (2002), the number of whales expected to pass each day after conclusion of the bowhead subsistence hunts (assumed to be 15 September for purposes of these

calculations) was estimated as a proportion of the estimated 2012 bowhead whale population (Page 32 of the Camden Bay IHAA). Exploration drilling will be suspended on 25 August prior to the start of the bowhead subsistence hunts at Kaktovik and Nuiqsut (Cross Island). After the completion of the subsistence hunts (for purposes of these calculations this was assumed to be 15 September),... (Page 32 of Camden Bay IHAA). Fall whaling for Kaktovik and Nuiqsut residents occurs from late-August to mid-September (Page 3-79 of the Camden Bay EIA).

- *Although it acknowledges that consideration of Shell and others' planned Chukchi Sea drilling, EP, App. F. at 4-128, the EIA does not analyze the cumulative effects on migrating marine mammals such as bowhead whales of such concurrent drilling, see id. at 4-131 – 132, 4-135.*

The potential cumulative impacts on migratory marine mammals are analyzed in section 4.2.4.1 of the revised Camden Bay EP EIA, including information on potential cumulative effects on migrating bowhead whales from concurrent seismic operations in Camden Bay and production operations at Northstar, ODS, and SID. Several marine mammal species that occur in the proposed project area are migratory species, therefore consideration has been given to the effects of potential disturbances that these species could encounter anywhere along their migration routes. Sources of cumulative impacts considered in this analysis include marine traffic, commercial fisheries, offshore and nearshore development (related to oil and gas operations, as well as other industries, including tidal power generation and marine construction projects), mining, hunting, invasive species, and military exercises.

The sources of potential impacts were derived from a global list of developments and activities occurring in offshore and coastal environments. However, developments and activities with the potential to impact migratory marine mammal species are often localized and concentrated in relatively small areas of the oceans as opposed to encompassing entire geographic regions or habitat types. Individual marine mammals may or may not encounter any of these potential impacts and some animals are likely to avoid industrial activities and other potential sources of disturbance (Richardson et al. 1995, 1999; Stone 2003; Gordon et al. 2004; Smultea et al. 2004). It is highly unlikely that individuals from any migratory marine mammal species would experience all of the potential impacts considered in this analysis due to the localized nature of development and activity in their vast ocean environment and the tendency for many animals to avoid sources of disturbance. For all of these reasons, while some individual mammals may experience multiple activities during migration, the cumulative impacts on migratory marine mammal species found in the project area are not expected to result in population-level effects for any species or stock.

- *Shell's EP does not include adequate mitigation measures that would "avoid or minimize" the take of bowhead whales, protected by the ESA and Marine Mammal Protection Act. 30 C.F.R. § 250.223(b). Despite its Marine Mammal Monitoring and Mitigation Plan, Shell acknowledges that its planned drilling within the bowhead whale migratory corridor could affect thousands of whales over the life of the project.*

Shell's IHA application for a Camden Bay exploration drilling program over one season (Appendix C of the revised Camden Bay EP) cites several authors and their data showing that

bowhead that are exposed to drilling activity sounds are only locally and temporarily disturbed (IHA application Section 7.2). Shell's IHA application and Section 10 from the revised Camden Bay EP list tables of estimated takes for bowhead whales and other marine mammals. These estimates are derived from conservative assumptions. Nowhere within the EP or EIA does Shell acknowledge an "affect to thousands of whales over the life of the project." On page 4-141 of the EIA within the cumulative impact analysis, the analysis concludes..."Current level of marine sound are not great enough to affect marine mammal populations in the project area."

Air Emissions

- *The EIA fails to analyze the air pollution impacts from Shell's proposed drilling, stating only that the emissions will not harm health or the environment because the Environmental Protection Agency will regulate them. EP, App. F at 4-5. BOEMRE has an independent obligation to examine air pollutant impacts in the outer continental shelf, and Shell's EIA must provide information to support this conclusion. 30 C.F.R. § 250.218. The EIA does not analyze black carbon emissions from Shell's drilling or their effect on the environment.*

Air Emissions are addressed at page 4-133 of the EIA. Emissions from Shell's two planned exploration drilling operations in Camden Bay and the Chukchi Sea would be separated in distance and would not cumulatively affect the same resources. The anticipated emissions at both locations are expected to be well below NAAQS and AAAQS at the shoreline as a result of distance from shore, permit restrictions, and dispersion. The incremental contribution to cumulative impacts on air quality from the proposed EP activities is expected to therefore be negligible. Given that other present and reasonably foreseeable activities will occur during the exploration drilling program at approximately the current level, no additional impacts would be expected and the cumulative effects on air quality are considered minor and last only as long as the drilling, and are therefore not significant.

Black carbon is a constituent of particulate matter (PM). PM is a regulated air emission and the air emissions analysis includes any potential effects of PM. Therefore, black carbon emission analysis can be said to be included in the PM analysis.

- *Shell's EP does not include data describing the onshore effects of the Discoverer's air emissions in the Beaufort Sea required by OCSLA regulations. 30 C.F.R. § 250.218(f) (exploration plan must describe air modeling results); § 250.303(e) (applicant must determine the drilling's contribution to onshore pollution levels); EP at 7-20 (providing information for Chukchi Sea but not Beaufort Sea).*

Table 7.f-4 has been replaced with a table showing a summary of the maximum modeled impact for Kaktovik, the closest village to the program area (the previous table was placed in error). However, if one was to look at the previous table on the previous page, it is clear that both national and state standards for air emissions are met within 500m of the hull of the drilling vessel. Since Kaktovik is approximately 55 miles (89 km) (EIA page 1-4) from the nearest drill site (Torpedo H) it is reasonable to conclude that any onshore effects are negligible or nil.