

North Slope Borough

OFFICE OF THE MAYOR

P.O. Box 69
Barrow, Alaska 99723
Phone: 907 852-2611 or 0200
Fax: 907 852-0337 or 2595
email: edward.itta@north-slope.org



Mahar.dan@epa.gov

Re **Shell Offshore Inc. OCS Air Permit – Kulluk Drilling Operations**
EPA Permit No: R10OCS-AK-07-01 (Revised)

Dear Mr. Mahar:

The North Slope Borough (NSB) received the Environmental Protection Agency's (EPA's) notice of public hearing and comment on the Shell Offshore, Inc. (Shell) Outer Continental Shelf (OCS) Air Permit for the Kulluk Drilling Operation, EPA Permit No. R10OCS-AK-07-01 (Revised). Although we appreciate the opportunity to share our comments with you, we are disappointed with the proposed permit. Based on the legal and technical flaws in this proposed permit and input from NSB residents,¹ NSB recommends that EPA deny the minor source permit and require Shell to submit a major source permit application for its Kulluk exploratory drilling operations.

EPA justifies issuing a minor permit to this major operation by focusing only on the pollution generated by an individual well, rather than the cumulative pollution from the whole Shell project. This approach ignores the fact that the Kulluk is one large drill ship, drilling multiple wells under the same SIC code, and using the same equipment and crew from the same company in the same drilling season. Paradoxically, EPA combines the air pollution impact of all the wells for the purpose of meeting the National Ambient Air Quality Standards (NAAQS) and

¹ Not a single NSB resident testifying at the March 25-27, 2008 EPA hearings recommended that a minor permit be issued to Shell.

Background

² See Kulluk Permit; Frontier Discoverer Permit; Region 10, U.S. EPA, Shell Kulluk Drilling Unit OCS Minor Permit No. R10OCS-AK-07-01 & Frontier Discoverer Drilling Unit OCS Minor Permit No. R10OCS-AK-07-02, Response to Public Comments, June 12, 2007 ("Response to Comments") at 53.

³ To avoid repetition and reduce the length of these comments, all of the 2007 permit records and Board records are incorporated by reference into these comments.

2007 proposed permit and in the appeal, EPA has not evaluated the health impacts from fine particulate matter (PM_{2.5}); nor has EPA examined the health impacts from hazardous air pollutants emitted from the Kulluk operation. EPA has failed to consider the Iñupiat's high rate of asthma, which is well above the national average.

NSB is confident that a major source air permit review would result in Shell's installing additional emission controls on Kulluk air pollution sources, especially the main engines. We urge Shell to be a good neighbor and invest in air pollution controls, to protect our health. We request that EPA work with Shell to complete a best available control technology review, and to further investigate the health impacts of the proposed permit on Iñupiaq communities. Our analysis follows.

A. The record does not support EPA's determination that Planned Wells are not adjacent and therefore are not part of a single stationary source.

In remanding the 2007 permit to EPA, the Board clarified that if EPA modified its determination as to what constitutes a single stationary source, EPA was to "identify the relevant facts in the record that support its new determination and provide a sufficient explanation for its new determination to show how it conforms to section 51.166(b)." Order Denying Review in Part, Remanding in Part, OCS Appeal 07-01, 07-02 (hereafter "Order") at 48. The Board referenced a variety of EPA policy documents and prior PSD determinations as sources of guidance regarding the interrelatedness and proximity needed for aggregation of multiple emissions units as a single stationary source. *See* Order at 40 n37. The order cites the following policy documents:

- Letter from Richard Long, Director, Air Program, U.S. EPA Region 8, to Lynn Menlove, Manager, New Source Review Section, Utah Division of Air Quality, Request for Guidance in Defining Adjacent with Respect to Source Aggregation (May 21, 1998) (hereafter "Long Letter");
- Letter from Winston A. Smith, Director, Air, Pesticides & Toxics Management Division, U.S. EPA, to Randy C. Poole, Air Hygienist II, Mecklenburg County Dep't of Env'tl. Protection, Applicability of Title V Permitting Requirements to Gasoline Bulk Terminals Owned by Williams Energy Ventures, Inc. (May 19, 1999) (hereafter "Smith Letter");
- Memorandum from William L. Wehrum, Acting Assistant Administrator, to Regional Administrators, Source Determinations for Oil and Gas Industries (Jan. 12, 2007) (hereafter "Wehrum Memo");
- Letter from Director, Air, Pesticides & Toxics Division, U.S. EPA, to Allen Eli Bell, Executive Director, Texas Air Control Board, PSD Applicability Request, Valero Transmission Company (Nov. 3, 1986) (hereafter "Bell Letter");
- Letter from Cheryl L. Newton, Chief, Permits & Grants Section, Air & Radiation Division, U.S. EPA Region 5, to Mike Hopkins, Air Quality Modeling & Planning, Ohio Env'tl. Protection Agency (Aug. 8, 1996) (hereafter "Newton Letter"); and
- ARCO OCS Air Quality Permit Application (Feb. 1993) (hereafter "ARCO Application").

one source, due to their functional inter-relationship (landfarm as an integral part of the brewery operations), evidenced in part by a disposal pipeline between them.

The fourth example from the Long letter (also the subject of the Newton letter) is Acme Steel Company, which operated an integrated steel mill consisting of coke ovens and blast furnaces at a site in Chicago, Illinois, along with basic oxygen furnaces, casting and hot strip mill operations at a site in Riverdale, Illinois, about 3.7 miles away. The blast furnace in Chicago produced hot metal that was transported via commercial rail to the basic oxygen furnace shop in Riverdale for further processing into steel. Although the two sites were separated by Lake Calumet, landfills, I-94, and the Little Calumet River, EPA decided that the close proximity of the sites, along with the interdependency of the operations and their historical operation as one source, were sufficient reasons to group these two facilities as one.

The Smith Letter discusses whether two bulk gasoline terminals were to be aggregated as a single source. The two terminals were approximately nine-tenths of a mile apart "by public road." The terminals shared several employees and were served by common delivery pipelines. EPA determined that the terminals did not need to be aggregated, because neither terminal was a support facility for the other; terminals owned by other companies occupied most of the land area between the terminals at issue; the two terminals were at one time under separate ownership and presumably operated independently when owned separately. *Id.* at 6. EPA qualified its recommendation to treat the facilities as separate by suggesting that any emission decreases at one terminal could not be used in a netting analysis to avoid major or minor source NSR permitting for a future modification at the other facility. *Id.* at 7. Further, EPA explained that changes to operations or the addition of a physical link would nullify the determination to treat the sources as separate. *Id.*

The Smith Letter was the only one of the policy documents cited by the Board to conclude that the facilities at issue should be aggregated as a single source.⁴

The Bell Letter examines whether two companies that both produce natural gas as their principal product should be aggregated as a single source. EPA considered one company to be a support facility to the other, since the former received the processed natural gas from the latter and compressed it for distribution into a pipeline system. The conveyance of the product natural gas through the former company was the only means of introducing the product natural gas into commerce. EPA determined that the distance between the two companies did not affect the applicability of the analysis since they were on contiguous properties.

The Wehrum Memo provides specific guidance on making major stationary source determinations for the oil and gas industry. Page 2 directs air permitting authorities for oil and gas operations to use a major source determination that (1) reasonably carries out the purposes of PSD, (2) approximates a common sense notion of a plant, and (3) avoids aggregating pollutant-emitting activities that as a groups would not fit in the ordinary meaning of building, structure, facility, or installation. The letter suggests that it is unreasonable to aggregate well site activities with the downstream processing plan into a single major stationary source. *Id.* at 3-4.

⁴ The conditions described in the Smith letter do not apply to the Kulluk Drilling Operation, and do not support disaggregation of wells in this case.

The ARCO Application (which covered the same lease area as Shell's project) proposed the use of one or two floating drilling vessels located six miles apart and 12 miles offshore, each with up to seven supporting vessels. ARCO assumed that all vessels would operate continuously during a 120-day period. It committed to PSD analysis and the use of best available control technology, and EPA issued a PSD permit to ARCO for the same drilling rig (Kulluk).⁵ In 1993, over 15 years ago, ARCO's best available control technology review for nitrogen oxides (NO_x) control required timing retardation on diesel engines to reduce the peak combustion temperature in the engine, and modification of the engine after coolers, resulting in a 30% reduction in NO_x emissions.⁶ The cost of modifying the Kulluk to reduce NO_x pollution by 30% was estimated at \$80,000 and was determined to be technically feasible and cost effective by EPA. This same 30% reduction in pollution could also be achieved by Shell. Additionally, there may be other advances in NO_x control since 1993 that warrant consideration.

2.

EPA's Supplemental Statement of Basis ("Statement") for the revised 2008 permit, purportedly based on the policy documents, focuses on proximity and interdependence in determining whether Shell's Planned Wells would be "adjacent" for purposes of 40 C.F.R. § 51.166(b)(6). Statement at 13.

While *proximity* is a factor in the determination of *interdependence*, the Statement does not set forth any identifiable criteria for making a determination based on *proximity*. Statement at 15.⁷ Rather, as discussed below, EPA relies on inapplicable statements in the Wehrum Memo and concludes without supporting factual discussion that "none of the Exploratory Operations allowed under the proposed permits would be located in close enough proximity to be considered a single stationary source." *Id.*

The Board decision suggests otherwise. The Board noted that, at the very least, two drill ships situated as close together as is physically possible would seem to be "contiguous or adjacent," and thus classifiable as a single source. Order at 43. The Board also points out that EPA's Response to Comments "does not speak to the relevance of 'proximity' within the meaning of applicable Agency guidance, when the emissions producing activities are not separated by miles." *Id.* at 44. This suggests that closely situated wells should be considered "proximate" and regulated as a single source. While EPA states that Planned Wells may be more than 100 miles apart, the distance between proposed OCS exploratory wells into the Sivulliq Prospect ranges from 0.8 miles to 3.3 miles. Statement at 12. This distance is well within the range of the aggregated facilities cited in the policy documents.

⁵ EPA has not adequately explained in the 2008 proposed permit why it required a PSD permit for ARCO's Kulluk operations in the Beaufort Sea, but did not require one for Shell.

⁶ OCS Air Quality Permit Application and Review Documents for Exploration in the Beaufort Sea, Alaska OCS, Prepared for ARCO Alaska, Inc. by Woodward-Clyde Consultants, February 1993.

⁷ EPA includes a limit in the proposed permit that prohibits Planned Wells from being located within 1,000 meters of each other to avoid a NAAQS exceedance. Yet in the Statement, EPA states that that "this NAAQS issue is not a basis for setting a geographic limitation for the proximity determination." SSOB at 15 n. 13 (emphasis added). EPA, therefore, may not rely upon compliance with NAAQS as a basis for determining that Planned Well sites 1,000 meters apart are not "proximate."

The Statement cites the Wehrum Memo's position that, "We do not believe that it is reasonable to aggregate well site activities, and other production field activities that occur over large geographic distances, with the downstream processing plant into a single major stationary source." Wehrum Memo at 4-5, Statement at 15. NSB does not seek to aggregate emissions associated with the *exploratory phase* with the emissions of any *downstream processing of oil that is ultimately recovered*. Rather, it seeks to aggregate drill sites in close proximity for the same prospect that are, for practical purposes, adjacent. Thus, this portion of Wehrum Memo is not applicable to the proposed permit.

The Statement cites a portion of the Wehrum Memo that suggests that units located at least ¼ mile away from each other are separate sources. *See* Statement at 15. The Wehrum Memo actually states, "In making major stationary source determinations for this industry, some southern States apply a rule that generally results in separating pollutant-emitting activities located outside a ¼ mile radius." Wehrum Memo at 5n16. The Wehrum Memo does not elaborate on what other factors these "southern States" consider. Adherence to a ¼-mile rule would be inconsistent with the advice that EPA offers in almost all of its policy letters—decisions to aggregate must be made on a case-by-case basis. *See, e.g.*, Long Letter at 1 (citing August 7, 1980 PSD rules) ("EPA is unable to say precisely at this point how far apart activities must be in order to be treated separately. The Agency can answer that question only through case-by-case determinations."); Poole Letter at 2; Bell Letter at 2; Wehrum Memo at 5. Thus, this portion of Wehrum Memo is not applicable to the proposed permit.⁸

Prior to issuing the proposed permit, EPA should clarify its criteria for proximity. While the Board disagreed with NSB that emissions from drill ships on adjacent or contiguous lease blocks on the Outer Continental Shelf *must necessarily* be aggregated as a single stationary source, Order at 6-7, it did not rule out this method of evaluating proximity. For the reasons discussed in its 2007 comments, NSB suggests that EPA revisit the suggestion that emissions from contiguous lease blocks (if not the entire prospect) be aggregated as a single stationary source.

In evaluating *interdependence*, EPA considered the four factors from the Long Letter. *See* Statement at 13-14. The example of the terminals in the Smith letter is the only illustration cited from any of the policy documents, however. As discussed below, the basis for much of EPA's determination is Shell's February 7, 2008 letter assuring the EPA that its drill site locations are not chosen so as to be integrated. *Id.* at 13.

1. *Was the location of the new facility chosen primarily because of its proximity to the existing facility, to enable the operation of the two facilities to be integrated? In other words, if the two facilities were sited much further apart, would that significantly affect the degree to which they may be dependent on each other?*

EPA indicates that it has considered whether the location of a subsequent site was chosen primarily because of its proximity to the existing facility, to enable the operation of the two

⁸ Notably, EPA does not cite the portion of the Wehrum Memo calling for air permitting authorities to use a major source determination that reasonably carries out the purposes of PSD and approximates a common sense notion of a plant. *Id.* at 3-4. The references it does use are irrelevant and do not serve as a sufficient basis for concluding that two wells drilled by the same drill ship, on the same prospect, during the same open-water season, using the same crew and support vessels, should not be considered as a single source.

facilities to be integrated. Statement at 13. EPA does not provide adequate analysis of any consideration, however. The permit now provides that well sites will be 1000 meters apart in order to avoid exceeding NAAQS. *Id.* at 15n13. It is not clear why 1000 meters was chosen, other than that EPA accepted Shell's assertion that wells this far apart would have distinct information gathering utility.⁹

In the Statement, EPA cites a comment from Shell stating that "SOI's drill site locations are not chosen so that operations at those separate locations can be integrated." Shell also states that each site has value as a "potential source of information on what is thought to be an individual accumulation of oil."¹⁰ The record does not support these assertions, however, and the confidential nature of the exploration business does not allow the public access to exploration data and plans to verify Shell's claims.¹¹ A separate plan was not submitted for each well, nor was a separate state consistency review done for each well. By locating the wells to investigate the same prospect, in close geographic proximity, Shell appears to be planning to use the resulting data to develop a production scenario for a single petroleum reserve.

When the Minerals Management Service (MMS) controlled offshore air emission permits (prior to 1990), it required operators to combine all the operations required for a single prospect into a single exploration plan and air emission approval. Under this system, Chevron obtained approval to drill at the Canvasback Prospect for 120 days in the Beaufort Sea using the Kulluk.¹² Through a separate application, Chevron obtained approval to drill at the West Maktar Prospect for 120 days in the Beaufort Sea using the Kulluk.¹³ This suggests a determination on the part of MMS, a natural resource agency, that wells drilled into the same prospect are interconnected.

NSB requests that EPA provide a factual basis, apart from Shell's unsupported statements, that the locations of the wells are not chosen so that the data—or the "product"—from the exploration activities can be integrated and used to provide information on a single prospect or petroleum reserve. NSB also requests that EPA obtain the information from Shell on the 2008 Kulluk Exploration Drilling Program, and provide this information to the public, or have a

⁹ NSB is concerned that EPA has not given sufficient thought to this distance. Even if Shell commits "to limit its emissions to below the major source threshold level for each Exploratory Operation, or less than 1000 tons of NO_x (less than ½ of ARCO's projected emissions) should Shell drill four Planned Wells within a single season," (Statement at 16), Shell would be free to emit 1000 tons of NO_x from a 1000-square meter area. Statement at 20. (This does not even account for ice breakers and support vessels, which are the largest contributors to NO_x, and are allowed to operate and emit pollutants within 25 miles of any Planned Well.) Further, drill sites "can be less than 1000 meters apart if they are "associated with the same Exploratory Operation, or [t]he previously occupied Drill Site was last occupied in a different calendar year." Permit at 16.1.

¹⁰ EPA cites Attachment 25 at 22 for these quotations; however, they are not at that location. NSB asks that EPA clarify where this original information can be found in the record.

¹¹ For example, Shell's OCS Exploration Plan at 10-17 and 19-27 states that prospect information has been removed from public review documents. The result is that a permit remanded for clarification of the definition of stationary source now relies on secret data that cannot be verified by the public.

¹² Exploration Plan Canvasback Prospect, Beaufort Sea Alaska, prepared by Harding and Lawson Associates for Chevron USA, July 1990.

¹³ Exploration Plan West Maktar Prospect, Beaufort Sea Alaska, prepared by Harding and Lawson Associates for Chevron USA, July 1990.

petroleum engineer review this data and summarize the government's findings. Information should include the following:

- A written exploration well plan for each well to be drilled in 2008, including a geologic and geophysical assessment, a stratigraphic section showing the target reservoirs, the depth and route of the well, data to be collected, and overall goals and objectives for each well;

A copy of the Sivulliq Prospect geologic and geophysical assessment, including a map showing the estimated structural trap(s) and hydrocarbon reservoirs that make up this prospect and a copy of the Sivulliq Prospect reservoir model if one has been developed; and

- A 3D map showing the exact subsurface target location for each well relative to the Sivulliq Prospect structural trap(s) and hydrocarbon reservoirs.

It is critical that this information either be provided to the public or examined by government experts to ensure an independent professional assessment has been made to verify that the exploration wells are unrelated and not tied to a common prospect/reserve.

2. *Will materials be routinely transferred between facilities? Supporting evidence for this could include a physical link or transportation link between the facilities, such as a pipeline, railway, special-purpose and public road, channel, or conduit.*

EPA indicates that it has considered whether materials will be routinely transferred between facilities, i.e., through a physical link such as a pipeline, railway, special purpose or public road, channel or conduit. Statement at 14. Yet EPA does not set forth its own considerations, relying instead on Shell's determination that the only "materials" involved are "information about a specific aspect of a particular hydrocarbon accumulation collected at a Drill Site," and that such information would not be transferred. *Id.* at 14.¹⁴

Shell has conceded that it is possible that "information from a prior well might be used to adjust operating parameters of a later well" (emphasis in original). Statement, Attachment 25 at 29. As the Wehrum Memo notes, EPA has historically used "operational dependence" as a criteria in determining the scope of a single stationary source. *Id.* at 3. EPA failed to discuss and assess relevant facts in omitting Shell's own admissions that the operating parameters at one well could rely upon the data collected from a previous well.

EPA also notes that "the operations themselves at each location are not dependent on each other" since "[e]ach well can only be drilled at its own unique location." Statement at 14. Each of the facilities aggregated in the policy documents as a single source clearly had its own "unique location," however, which was sometimes miles apart. With the exception of the facilities in the Smith letter, each facility was nevertheless aggregated.

¹⁴ NSB notes again that the citations to the Attachments provided by EPA in the Statement are incorrect. *See, e.g.,* Statement at 14 (citing incorrectly to Attachment 25 at 28).

NSB has provided the declaration of Ms. Susan Harvey (Attachment No.1), which concludes that information obtained from exploratory wells drilled within a few miles of each other to examine the same prospect would be shared by the exploration staff during the exploration season, and data from prior wells would be used to optimize or refine subsequent wells during the same season (especially if results are unexpected). For example, two dry holes would certainly cause Shell to pause and reflect on the data from the first two wells prior to making a decision to move forward with the third well into the Sivulliq Prospect.

NSB asks EPA to consider the absurdity of keeping all information at each point separate. If it were true that no information is shared or used from one well to another, then EPA could include a permit stipulation that prohibits Shell from using any information collected on one exploration well for any other exploration wells drilled that season. Separate exploration teams and staff would be needed for each well to ensure no data was shared, and the projects were in fact completely independent activities. We make this extreme point to show the absurdity of a claim that no data information or "products" are shared between one exploratory well and another. We suspect Shell would vehemently oppose such a permit limitation. Shell cannot claim well products are not shared to avoid PSD permitting, and then use integrated data and integrated exploration team to optimize subsequent exploration wells. From a business standpoint, it is much more important to make the right economic decisions on whether to drill the next multi-million dollar well using the data obtained from the exploration well which was just drilled into the same hydrocarbon structure/accumulation, or use this data to optimize the placement of the next multi-million dollar well, than to save a few dollars on installing emission control to short-circuit the air permitting process.

3. *Will managers or other workers frequently shuttle back and forth to be involved actively in both facilities? Besides production line staff, this might include maintenance and repair crews, or security or administrative personnel.*

EPA indicates that it has considered whether managers or other workers (including production line staff, maintenance and repair crews, security or administrative personnel) frequently shuttle back and forth to be involved actively in both facilities. *Id.* at 14. Yet in the very next line, EPA admits, "Drill Sites are served by the same crew and equipment performing functions at locations separated by less than one mile."¹⁵ As the Board observed, "A single drill ship moving from site-to-site apparently does rely upon the same crew **and may otherwise share common connections similar to those analyzed in previous PSD determinations**" (emphasis added). Order at 43.

EPA nevertheless relies on Shell's assertion that PSD is not appropriate because the common crew "does not in an of itself demonstrate 'interdependence' between separate drilling locations" because the crew "will not be 'shuttling back and forth' to and from a non-existent second site." *Id.* While not shuttling "back and forth" between two sites, the crew will clearly be shuttling "forth" from one drill site to the next drill site. A single integrated, exploration team located at Shell's headquarter offices will oversee all these wells during the whole exploration season.

¹⁵ The supporting materials to the Statement likewise indicate that the Kulluk will rely upon the same crew and the same support vessels that separate well sites. Attachment 25 at pg. 31. Even at locations separated by more than one mile, it would be difficult to fathom Shell importing an entire new crew to do the same work in the middle of the Beaufort Sea.

4. *Will the production process itself be split in any way between the facilities, i.e., will one facility produce an intermediate product that requires further processing at the other facility, with associated air pollution emissions? For example, will components be assembled at one facility but painted at another?*

EPA indicates that it has considered whether the production process is split in any way between the facilities. *Id.* at 14. The record again fails to support EPA's determinations with respect to these criteria.

Shell's February 7, 2008 letter to EPA states that it carefully considers the location of each drill site with respect to other drill sites in order to obtain a unique set of information from each site. *See* Statement at 8: "This means selecting Drill Site Locations to ensure that no two wells provide duplicative information." Thus, the decision as to where to place each drill site is integrated. The information from a single well in isolation would be of little use to Shell. The information is, in a sense, an intermediate product that requires further processing.

Shell and MMS have repeatedly referred to Shell's operations as a single project, known as the Sivulliq Prospect, "Sivulliq Exploration Project," or Sivulluq Drilling Program." *See*, e.g., Shell's fact sheet¹⁶ at 1 ("Exploration drilling on the Sivulliq Prospect (formerly known as Hammerhead) will help to increase knowledge regarding known reservoirs of existing hydrocarbons as well as testing deeper prospective hydrocarbon-bearing zones . . . Vessels will be mobilized to the Sivulliq Prospect beginning in late June or July 2008."); *id.* at 2 "Up to four wells are proposed to be drilled to depths of prospective hydrocarbon-bearing zones during 2008 on the Sivulliq Prospect"; Shell's Environmental Assessment at 2 (Shell is proposing to drill four OCS exploration wells at the Sivulliq prospect); Shell's 2007 OCS exploration plan (including up to four wells into the "Sivulliq Prospect"); Oil Spill Risk Analysis: Sivulliq Prospect, OCS Report, MMS 2007-039 at 1; MMS's February 15, 2007 approval of Shell's January 2007 Exploration Plan for the Sivulliq Prospect at 1 and 3.

Shell and MMS have consistently treated and permitted the Sivulliq Exploration Program as a single project, allowing a few wells to be drilled in a single year to delineate the extent of the hydrocarbon reservoir(s), and to properly size and design a production platform to develop Sivulliq reserves. These are not independent and unrelated exploration wells.

The proposed permit is internally inconsistent on the timeframe for computing emissions. The permit requires a rolling 52-week period (rather than a calendar year) to be used to determine the application of PSD to operations at a particular well. *See* permit at 11, Condition 8: "The permittee shall not allow the sum of emissions . . . of that Exploratory Operation to exceed 245.0 tons of NO_x within any Rolling 52-week period." Yet, for the purpose of determining whether the wells are adjacent, EPA focuses on the emissions that occur during a given calendar year (i.e., January 1—December 31). If EPA is to employ a rolling 52-week period for applying PSD, it should do the same for determining whether the wells are adjacent.

NSB again requests that EPA obtain from Shell factual support for the proposition that data from the three exploration wells at Sivulliq will not be used together to delineate the characteristics of a single hydrocarbon reserve or production scenario.

While the Statement relies on EPA policy documents to support its proposed permit, EPA questioned the applicability of these documents during the March 25-27, 2008 public meetings for use in this case. EPA noted that the policy documents address simultaneous facility operation, not facility operations in a series (one well drilled after another). If the permitting of offshore drilling truly represents a new era in EPA decision-making, EPA should not be making substantial policy decisions at the individual permit level. Substantial policy decisions should be addressed in rulemaking. The Code of Federal Regulations should be amended to properly address the aggregation question, so as to allow for broader public input and a national review process.

3. Summary of Source Determination

As the Board noted in its Order in 2007, EPA's conclusion that any pollution emissions unit separated from other units by 500 meters constituted a single stationary separate source is "cryptic and conclusory." *Id.* at 48. EPA's conclusion in 2008 that any pollution emissions unit separated from other units by 1000 meters constitutes a single stationary separate source is no less cryptic and conclusory. EPA has: 1) failed to articulate the standards it uses to determine proximity; 2) failed to set forth its own conclusions with respect to interdependence; 3) failed to provide factual support for its conclusions on interdependence; and 4) ignored evidence in the record that contradicts its conclusions on interdependence. NSB asks that EPA revisit the policy documents on determining what constitutes a separate stationary source and reconsider its analysis. Alternatively, NSB requests that EPA address what it may be a substantial policy through the public rulemaking process. If EPA maintains the conclusion that pollution outputs separated by 1000 meters are separate sources, NSB asks that EPA clearly set forth its *own* reasoning (rather than simply restating self serving and conclusory statements made by Shell).

B. EPA's 160 day operating limit for the Kulluk Drilling Operation supports the dependent nature of all wells drilled by the Kulluk in a single season.

EPA proposed a single combined OCS permit for the Kulluk Drill Ship to operate for up to 160 days per year in the Beaufort Sea for an indefinite period.¹⁷ Yet EPA did not combine the emissions from each well into a single source when calculating the pollution threshold for triggering a PSD permit.

EPA has proposed to issue a single permit that can be used repeatedly to construct multiple exploration wells for an indefinite term. By permitting all of the Kulluk Drilling Operations at every drill site under the umbrella of one minor source permit, EPA endorses the interdependent nature of this project. If each drill site were actually a separate stationary source it would be given its own separate stationary source permit, and there would be no combined limit of 160 days of operation.

¹⁷ EPA proposed permit condition 15.2, Permit No.: R10OCS-AK-07-01 (Revised); "The permittee shall not have the Kulluk occupy Drill Sites, in aggregate, for more than 160 calendar days during a calendar year."

EPA relies on a single air pollution model to evaluate the combined pollution impacts from drilling multiple wells, but arbitrarily bases the type of permit merely on the emissions of one well.

NSB agrees that the pollution needs to be aggregated for purposes of air pollution modeling and cumulative emission impact assessment. EPA should apply the same reasoning to the PSD determination.

C. The record does not support EPA's 80-day operating limit for each "Exploratory Operation."

Although EPA's proposed 2008 air permit for the Kulluk Drillship defines an Exploratory Operation as "the collection of all OCS Source Activities to construct a single Planned Well and any of its associated Relief Well(s) and Replacement Well(s)," neither EPA nor Shell computed the air pollution associated with drilling a relief well and replacement well when computing the total air pollution from this project.

The proposed permit assumes that an exploration well, replacement well and relief well can all be drilled one after another within a period of 80 days, using the same drilling rig (the Kulluk). Neither EPA nor Shell provided any information to show how this could physically or technically be accomplished.

Shell's 2007 permit application explained that drilling a "Planned Well" for the Sivulluq Prospect alone could take 60-75 days. The Sivulluq Prospect at 7000-8000 feet in total vertical depth is not the deepest prospect that Shell may ultimately drill in the Beaufort Sea. Deeper wells in the 11,000-12,000-foot depth may be drilled in the future under this permit and could take longer to complete. If the Planned Well had a blowout, Shell might not have time under its permit to start relief well drilling. This is reason enough to require a major source permit for each Planned Well and its associated relief and replacement wells. Adequate time must be allocated for air pollution associated with a relief well, since this is a necessity in the event of a blowout.

If the permit is to remain a minor source permit, the time for "Planned Well" operations would need to be limited to leave adequate time to drill a relief well. The proposed permit does not include a limit on the number of days for a Planned Well, to ensure there is adequate time to construct a Relief Well (if needed). The time to drill a relief well with the Kulluk Drill Ship in the Beaufort Sea has been estimated at 47 days.¹⁸ Neither Shell or EPA have provided any information in the record to technically support the number of days a relief well would take, anywhere in the Beaufort Sea; therefore, relying on previous studies of this issue we conclude that at least 47 days of the 80 day cap needs to be specifically reserved for pollution associated with relief well drilling. This leaves 33 days of drilling for the Planned Well and Replacement Well, under EPA's proposed permit. These limits must be set in the permit to prevent an operator from using up the pollution cap, and not leaving a sufficient pollution reserve in the event a relief well is drilled. Minor permits, using owner requested limits, must include verifiable methods to attain and maintain the limit.

¹⁸ Exploration Plan Canvasback Prospect, Beaufort Sea Alaska, prepared by Harding and Lawson Associates for Chevron USA, July 1990 and Exploration Plan West Maktar Prospect, Beaufort Sea Alaska, prepared by Harding and Lawson Associates for Chevron USA, July 1990.

The permit application did not provide technical information to support the Kulluk's ability to drill its own relief well. If the Kulluk is damaged during a blowout, a second rig would need to be brought in to drill the relief well. The proposed permit does not permit a second rig to provide relief well capability, however. If the permit is to remain a minor source permit, Kulluk's ability to drill its own relief well should be examined, and the emissions associated with a relief well should be considered.

D. Stack testing data is available on the Kulluk drill ship and icebreakers and should be used in the revised permit.

EPA's 2007 permit and the revised 2008 permit both require Shell to conduct air pollution stack testing on the Kulluk Drill Ship, Vladimir Ignatjuk Icebreaker and the Tor Viking II Icebreaker to improve the NO_x emission factors for the main engines on each unit.¹⁹ On March 26, 2008, Shell informed the EPA and NSB it had tested the Kulluk Drill Ship and Vladimir Ignatjuk Icebreaker main engines for NO_x in 2007.²⁰ While Shell has obtained test data to more accurately estimate NO_x pollution, it did not use this data in its revised 2008 application and modeling. EPA was completely unaware that these units had even been tested, and that any new data existed. EPA learned of the existence of this data at the same time as NSB.

NSB requests that EPA obtain the 2007 test data from Shell, and require Shell to revise its permit application and air model to use this source specific test data. The revised permit, based on this more accurate test data, should be provided for public review and comment.

It is not in the public interest to allow companies to submit applications that do not include test data on their combustion sources. It is not clear why EPA did not request this data from Shell, nor is it clear why Shell withheld it. Regardless, EPA is now aware of this data, and has an obligation to obtain it and revise the permit to ensure its accuracy. Historically, EPA and the State of Alaska have always required an operator to use the best emission estimate data available to ensure permit accuracy. This permit should be no exception.

1. Shell's application is based on inaccurate AP-42 emission estimates rather than more current stack test data.

EPA required NO_x stack testing because Shell's application used AP-42 emission estimates (representative values that attempt to relate the quantity of a pollutant released to the atmosphere with an activity associated with the release of that pollutant). AP-42 emission estimates only provide a rough approximation of emissions, not an accurate assessment. NSB supports EPA's requirement for stack testing to ensure accurate emission factors are used to estimate air pollution.

In 2007, NSB requested that stack-testing data be obtained prior to EPA's approval of the air permit. Shell has obtained this data, yet has withheld it from the 2008 permit revision. EPA's

¹⁹ Condition 9, 2008 proposed air permit.

²⁰ Conversation between Paul Smith (Shell), Roger Steen (Shell's consultant), Susan Harvey (NSB Consultant) and Dan Meyer (EPA) at the March 26, 2008 Kaktovik Shell Air Permit Public Hearing.

use of AP-42 emission estimates when source-specific test data is available would contradict EPA policy on AP-42 factors. EPA's AP-42 document states:²¹

Use of [AP-42] factors as source-specific permit limits and/or as emission regulation compliance determinations is not recommended by EPA. . . . [A] permit limit using an AP-42 emission factor would result in half of the sources being in noncompliance. . . . source-specific tests or continuous emission monitors can determine the actual pollutant contribution from an existing source better than can emission factors. . . . when such information is not available, use of emission factors may be necessary as a last resort.

Given the availability of stack testing data, EPA should not allow the permit to be based on AP-42 factors.

2.

NO_x pollution will exceed the minor source threshold.

The 2008 permit is based on the assumption that Shell can operate below 250 tons per year of NO_x. Shell proposes release 245 tons of NO_x at each drill site, based on NO_x emissions calculated using inaccurate AP-42 emission factors. The NO_x limit of 245 tons per year equates to only a 2% margin of error. AP-42 emission factors are not accurate within 2%; therefore, EPA has not demonstrated that the proposed permit can achieve compliance with a NO_x emission cap of 250 tons.

EPA's own literature warns air quality engineers about the limitations of AP-42 data:²²

[S]ome emission factors are derived from tests that may vary by an order of magnitude or more. Even when the major process variables are accounted for, the emission factors developed may be the result of averaging source tests that differ by factors of five or more.

Before simply applying AP-42 emission factors to predict emissions from new or proposed sources, or to make other source-specific emission assessments, the user should review the latest literature and technology to be aware of circumstances that might cause such sources to exhibit emission characteristics different from those of other, typical existing sources.

Inaccurate emissions data make for inaccurate air modeling. Shell's air model, which allows for a 13% margin of error, is based on potentially inaccurate AP-42 NO_x emission estimates. EPA has not demonstrated that the proposed permit can achieve the NAAQS using this data.

Most of the equipment covered under this permit is several decades old. Age, maintenance, repair, and operating practices have a large influence on an engine's actual

²¹ AP-42 Fifth Edition, Compilation of Air Pollutant Emission Factors, Volume 1: Stationary Point and Area Sources.

²² AP-42 Fifth Edition, Compilation of Air Pollutant Emission Factors, Volume 1: Stationary Point and Area Sources.

pollution. Stack testing these older units is the only way to obtain accurate data. Since new data is available, EPA should consider it before issuing a permit.

E. The issuance of a minor permit ignores cumulative impacts.

During the March 25-27, 2008 public meetings, EPA and Shell argued that less pollution would be emitted under a minor air permit. They argued that a major permit would remove the air pollution cap of 250 tons of NO_x, thus leading to greater amounts of pollution. This conclusion is erroneous. The total amount of NO_x pollution would actually be lower under a major air permit. Best available control technology would reduce NO_x pollution by at least 30% from the Kulluk engines.

Operating under a major permit, Shell's vessels would travel the same distance, drill to the same depth, and engage in the same amount of ice breaking activity. In the minor permit situation, however, Shell could potentially emit more NO_x pollution when drilling a single well. This could occur if, during a given year, Shell approaches the 245-ton NO_x limit on the well. To avoid violating its minor source permit, Shell will need to temporarily plug the well, and return the next season. This is an inefficient operation. More pollution will be emitted as more ice will be broken and additional transit time will be required to access the same drilling site twice. Shell will generate additional pollution in re-opening the well and resuming operations. It will also cause additional disturbance to marine mammals and subsistence hunters.

During the March 25-27, 2008 public meetings, Shell argued that if it were required to obtain a major permit, it would not use low sulfur fuel or particulate traps to reduce oxides of sulfur (SO_x) and particulate matter (PM) emissions. There is nothing in the record to show that these pollution reduction measures would not exist with a major permit, for which the best available control technology (which may include low sulfur fuel and particulate traps) applies.

F. The ambient air modeling methods and analysis is flawed.

EPA's regulations require operators to obtain a year of meteorological data to support their model. This work has not been done for the Beaufort Sea.²³ During the March 25-27, 2008 trip, EPA said it was confident that the meteorological data for the proposed permit was conservative, but did not explain how the data used is appropriate for the proposed area of operation. How could EPA be confident that the data was conservative if no data was collected in the Beaufort Sea to use for comparison?

EPA has developed an Offshore and Coastal Dispersion Model (OCD) to determine the impact of offshore emissions from point, area or line sources on the air quality of coastal regions. OCD incorporates overwater plume transport and dispersion as well as changes that occur as the plume crosses the shoreline. This model evaluates differences between overwater and overland dispersion characteristics, the sea-land interface, and platform aerodynamic effects.²⁴ It uses hourly meteorological data from both offshore and onshore locations.

²³ See 40 CFR 52.21: "[C]ontinuous air quality monitoring data that is required shall have been gathered over a period of at least one year and shall represent at least the year preceding receipt of the application, except that, if the Administrator determines that a complete and adequate analysis can be accomplished with monitoring data gathered over a period shorter than one year (but not to be less than four months)."

During March 25-27, 2008 discussions, NSB questioned EPA about use of the OCD model. EPA responded it did not have adequate arctic meteorological data to run this model. The applicant's failure to obtain meteorological data to support this model's requirement should not be used as a basis for excluding a more accurate ambient air quality analysis. EPA's own website recommends the OCD model as a "preferred model" to model offshore pollution impacts.²⁵

Over the past few years, NSB has been working closely with the Bureau of Land Management (BLM) and the Alaska Department of Environmental Conservation (ADEC) to examine air pollution and human health impacts in the North Slope. ADEC's recent memo supports the need for improved air quality modeling to more accurately assess impacts.²⁶ ADEC expressed concern about "the ability of older air quality models to predict deposition given the North Slope's strong atmospheric stability, complex high latitude atmospheric chemistry, the secondary formation of pollutants trapped in mid to long distance transport, and deposition of air pollutants which can accumulate in the soil and vegetation." *Id.*

The proposed permit should have used the OCD Model to determined NAAQS impacts. The record does not support the exclusion of this model.

G. All air pollution sources must be included in the permit.

The record does not demonstrate that Shell has included all air pollution associated with its operation when computing PSD applicability. Neither EPA nor Shell computed the air pollution associated with drilling a relief well and replacement well when computing the total air pollution from this project. Emissions from gas flaring and/or gas venting were not included; nor were the full transit emissions from all vessels operating within a 25-mile radius.

Shell's application states that it does not plan to flare gas. This is inconsistent with previous applications made by ARCO and Chevron for the Kulluk, where use of the flare was included to safely combust gas produced during drilling and testing operations. For example, ARCO's application included flare volumes of 10 million standard cubic feet per day for 40 days.²⁷

If Shell does not plan to use a flare, it needs to adequately explain how it plans to safely handle gas produced during drilling and testing operations. Some amount of gas is vented and/or flared in every drilling and testing operation. Shell has not explained how it will handle

²⁴ Offshore and Coastal Dispersion Model, Volume I, User's Guide, Report Prepared for Minerals Management Service, November 1989.

²⁵ http://www.epa.gov/scram001/dispersion_prefrec.htm; EPA Preferred/Recommended Models: These refined dispersion models are listed in Appendix W and are required to be used for State Implementation Plan (SIP) revisions for existing sources and for New Source Review (NSR) and Prevention of Significant Deterioration (PSD) programs. The models in this section include the following: AERMOD Modeling System; CALPUFF Modeling System; BLP; CALINE3; CAL3QHC/CAL3QHCR; CTDMPPLUS; and OCD.

²⁶ State of Alaska, Department of Environmental Conservation. 2007. *In* State of Alaska, Department of Natural Resources. 2007. Comments on the Northeast NPR-A Draft Supplemental Amended Integrated Activity Plan/Environmental Impact Statement. Submitted November 7, 2007.

²⁷ OCS Air Quality Permit Application and Review Documents for Exploration in the Beaufort Sea, Alaska OCS, Prepared for Arco Alaska, Inc. by Woodward-Clyde Consultants, February 1993, p. 3-3.

formation gas. Even ADEC questioned the lack of flaring or gas venting emission estimates in the potential-to-emit calculation during the appeal to the Board.²⁸

To be consistent with Alaska Statutes and Regulations, the applications and permits need to include all emission units, and their associated emissions. The applicant certification of the permit application must show that all emission source were included and used to calculate the stationary source's potential to emit (PTE). This application does not include all permitted sources... The owner or operator's certification of the permit application includes that all emission units were included and used to calculate the stationary source's PTE. The emission units noted must include, but are not limited to crude oil flares, gas flares, crude vents, gas vents or from liquid fuel storage tanks. These items did not appear to be included in the application, therefore the full PTE for all emission units for all pollutants, was possibly not calculated.

During March 25-27, 2008 discussions, NSB asked Shell if the flare still physically existed and was operational on the Kulluk drill ship, and how formation gas would safely be handled from the well. Although six Shell exploration staff and air permit consultants were in attendance, none knew if a flare stack still existed or its condition or how formation gas would be handled. EPA should request this data from Shell, add a permit requirement preventing flare use, and include the emissions from venting.

EPA has not included 100% of the air pollution emitted during transit to and from a drill site in the emission calculation for purposes of PSD applicability. This violates 40 CFR 55.2, which states:

Pursuant to section 328 of the Act, emissions from vessels servicing or associated with an OCS source shall be considered direct emissions from such a source while at the source, and while enroute to or from the source when within 25 miles of the source, and shall be included in the "potential to emit" for an OCS source.

EPA's proposed Condition 8.1 includes only half of the transit emissions in the 250-ton NO_x cap; whereas the regulations require 100% of the pollution within 25 miles to be attributed to the stationary source. Each stationary source should be burdened with the full impact of the transit emissions.

H. The permit does not adequately protect human health.

In its Order at 66-67, the Board considered whether EPA had adequately complied with Executive Order (EO) 12, 898, "Federal Actions to Address Environmental Justice," 59 Fed. Reg. 7629. EO 12,898 instructs federal agencies to address, as appropriate, "disproportionately high and adverse human health and environmental effects of [their] programs, policies, and activities on minority and low-income populations. The Board found that, under the deferential

²⁸ Order at 52, footnote 53: "ADEC's only comment on SOI's compliance with the requirements for obtaining an ORL was whether all emissions sources (specifically, crude oil flares, gas flares, crude vents, and gas vents) had been included in the permit applications. ADEC Comments at 2."

standard accorded to agency decision-making, EPA has complied with the executive order in issuing the 2007 permit. In light of the new information that has emerged with respect to the 2008 permit, NSB asks EPA to revisit the issue.

NSB, with the assistance Dr. Aaron Wernham (a physician for the Alaska Inter-Tribal Council), has advocated for a human health impact assessment and more thorough ambient air modeling, and baseline emission assessment to ensure Iñupiaq human health is protected. BLM and ADEC have supported the need for this work.

In EPA's 2007 Responses to Comments, it contends that because the permit complies with the Clean Air Act, NAAQS standards will not be exceeded.²⁹ We are not confident this is correct, because the air modeling is based on inaccurate AP-42 emission factors and on meteorological data that is not representative of the Beaufort Sea, and based on a model that was not designed for offshore arctic conditions. EPA's record on NAAQS compliance is incomplete, and EPA's conclusion that Iñupiaq human health will be protected is incorrect.

EPA itself has acknowledged that the current NAAQS standards still allow for significant excess burden of illness, lost work productivity, and mortality as compared with more stringent standards.³⁰ NAAQS were designed only to protect communities from the direct biophysical effects of inhaling pollution. Other health effects are not considered under NAAQS, but may be significant nonetheless. In its analysis, EPA fails to acknowledge the abundant public health data demonstrating that high mortality rates accrue disproportionately to vulnerable populations such as those in the North Slope Borough, which has an extremely high baseline prevalence of chronic pulmonary disease.³¹

The Iñupiaq people live in isolated areas, enjoy a lifestyle and diet that is radically different from other United States populations, have markedly higher rates of pulmonary disease than the general U.S. population (and therefore are substantially more vulnerable to morbidity and mortality from air pollution), and may have genetic predispositions to disease that differ from other U.S. populations. Thus, further assessment of their health risks is needed.

The proposed disaggregation of Shell's planned activities to avoid the more stringent evaluation and mitigation requirements for a major source has resulted in considerable stress and concern in the North Slope. The current and proposed exploration of the OCS is unprecedented. A cautious, scientific approach that examines the best available control technologies is needed to ensure that our communities and resources are protected.

²⁹ See, e.g., EPA's June 12, 2007 Response to Comments on the Kulluk and Discoverer Permits at 89: "EPA analysis indicates that this project, as regulated by the terms and conditions in the final permit, will not cause or contribute to a NAAQS violation. Since NAAQS are established to protect public health, the project will not have an adverse impact upon public health."

³⁰ For example, EPA has chosen to set the standard for fine particulate matter levels at 15 PPM (parts per million or mcg per cubic meter). A 1 mcg per cubic meter reduction in fine particulate from 15 to 14 would result in a nearly 50% reduction in mortality, and up to 35% reduction in a range of non-fatal illnesses and lost workdays. EPA's recently adopted 8-hour ozone standard of 0.075 parts per million likewise results in substantially higher mortality, morbidity, and lost workdays than a standard of 0.065 or 0.070 parts per million. EPA should explicitly acknowledge these risk/benefit data, rather than inaccurately stating that compliance with NAAQS protects health.

³¹ See U.S. EPA. 2006. Regulatory Impact Analysis for Particulate Matter, Executive Summary, page ES-8. Online at <http://www.epa.gov/ttnecas1/regdata/RIAs/Executive%20Summary.pdf>; Ostro B. et al. 2006. Fine Particulate Air Pollution in Nine California Counties: Results from CALFINE. Environmental Health Perspectives. 114: 29-33.

I. The permit term must be limited to 18 months from the start of construction on each well.

If a minor source air pollution permit were to be issued in spite of the above reasoning, the permit must clarify that EPA's approval to construct an exploration well will become invalid if construction is not commenced within 18 months of permit issuance, or if construction is discontinued for a period of 18 months or more. *See* EPA's regulations at 40 CFR 55.6(b)(4):

An approval to construct shall become invalid if construction is not commenced within 18 months after receipt of such approval, if construction is discontinued for a period of 18 months or more, or if construction is not completed within a reasonable time. The 18-month period may be extended upon a showing satisfactory to the Administrator or the delegated agency that an extension is justified. Sources obtaining extensions are subject to all new or interim requirements and a reassessment of the applicable control technology when the extension is granted.

EPA has defined each well as a single, separate construction project to avoid combining wells into a single stationary source for purposes of PSD applicability. *See* 2008 Proposed Permit at Section 1.6, defining an "exploration operation" as the "collection of all OCS Source Activities undertaken to construct a single Planned Well and any of its associated Relief Well(s) and Replacement Wells(s)." Thus, not only must Shell commence³² construction of its first exploration well within 18 months of permit issuance, it must constructed any additional wells within 18 months to prevent the permit from becoming invalid. Any lapse in construction for more than 18 months must invalidate this permit.

NSB asks EPA to clarify that any extension it grants would require an application by Shell and a formal public review and comment period. EPA should explain what would constitute a satisfactory showing that an extension is justified in this case.

³² 40 CFR 52.21(b)(9) defines "commence" as actual construction of the source where "a continuous program of actual on-site construction of the source" occurs. 40 CFR 52.21(b)(11) defines "begin actual construction" as initiation of physical on-site construction activities such as laying underground pipework. Construction of a well requires digging a hole in the earth and laying underground pipework (commonly called well casing).

J. Public hearings did not adequately provide for participation by NSB residents.

NSB appreciates EPA's attempts to reach out to NSB communities affected by this permitting action. There were a number of coordination and communication problems that adversely impacted public turnout and participation, however. Last year EPA committed to develop a written communication protocol and review it with NSB. Almost a year later, there is no written protocol that could have been used to improve this public participation process.

On March 1, 2008, the NSB Planning Director requested that EPA contact the mayor and native village leaders of each community to ensure that this hearing schedule would work for them. The hearings were nevertheless scheduled on the same days as the Elders and Youth Conference (a significant annual cultural event), a Barrow Whaling Captains' meeting, a Subsistence Food Workshop, and NSB Assembly workshops. Because of these scheduling conflicts, many of the village elders and leaders in the communities of Barrow, Kaktovik and Nuiqsut were not available. While NSB personnel just barely had the capacity to cover all these events, concerned individuals in the villages and tribes did not. EPA should have been aware of these conflicts during early communications with these communities, and should have re-scheduled these meetings.

Notice of the events was only published for a single day in the Anchorage Daily News, which is not widely available or read in the North Slope. The events were not announced on the public radio station, and no notices were posted on bulletin boards around the villages. The teleconference number was made available only for the Barrow event, and it did not work. EPA declined NSB's offer to use its teleconferencing facilities.

EPA did not provide adequate translations of its presentations. NSB's March 1, 2008 letter requested simultaneous translation. While a translator was present at the Barrow hearing, there was no official EPA translator at the Kaktovik meeting. When translation was provided, it was not conducted simultaneously. EPA made no effort to make use of NSB's offer of translation equipment. Lack of simultaneous translation doubled the length of the Nuiqsut meeting time, extending the meeting well into the midnight hour.

Because of the low turnout and teleconferencing problems at the Barrow meeting, the NSB Planning Department contacted the Kaktovik and Nuiqsut Mayors' offices on March 26, 2008. These offices were unaware of the scheduled hearings. NSB attempted to spread the word in the communities over the next two days by calling residents, and putting word out on the CB radio, but there was considerable confusion about this meeting. No notices were found in town, and residents told NSB staff that they heard Shell had canceled the meetings.

The material presented at the meetings was technical and difficult for the average resident to understand. The use of technical jargon, acronyms, and permitting terms was confusing. Many residents did not understand the material EPA was asking them to comment on. The material should have been presented in laymen's terms and in a way that the average resident could understand the proposed permit and the impact to their health and way of life.

We recommend that EPA address the numerous concerns raised in this letter, revise the permit, and reissue it for a 60 day public comment period, to ensure that those disenfranchised during this public process have an opportunity to participate on this permit. Since EPA

transcribed these meetings, we request that a copy of the hearing transcript be mailed to my office, and to Barrett Ristroph at the NSB Law Department, as soon as possible.

Conclusion

NSB is disappointed with EPA's proposal to grant Shall a permit with almost no change from the previously rejected permit, and EPA's and Shell's failure to consider the health and concerns of the Iñupiat people who will be affected by the permit. Unlike Shell, EPA is a federal entity accountable to the public. The people of the North Slope depend on EPA to provide them with a fair process that *does* consider public input, for public health, and the most timely, accurate data. We urge EPA to reconsider the proposed 2008 permit based on these concerns.

Mayor

Attachment: Declaration of Ms. Susan Harvey

Cc: Johnny Aiken, NSB Planning Director
Harold Curran, NSB CAO
Andy Mack, NSB Mayor's Office
Taquik Hepa, NSB Wildlife Department
Bessie O'Rourke, NSB Law Department
Susan Harvey, Harvey Consulting, LLC.
Fredricka Stalker, President Native Village of Pt. Lay
Steve Oomittuk, Mayor, City of Pt. Hope
Mike Stotts, Mayor, City of Barrow
Freddie Aishanna, Mayor, City of Kaktovik
Joseph Ahmaogak, Mayor, City of Nuiqsut
Alaska Eskimo Whaling Commission
Inupiat Community of Arctic Slope (ICAS)
Native Village of Barrow
Native Village of Nuiqsut
Native Village of Kaktovik
Native Village of Point Hope
Richard Albright, EPA Region 10

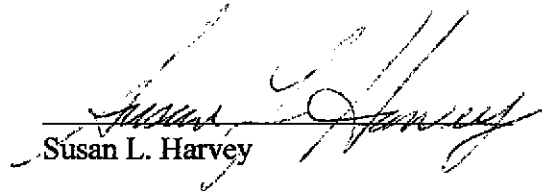
AFFIDAVIT

I, Susan Harvey, state the following based on my personal knowledge of petroleum engineering practices in the Arctic:

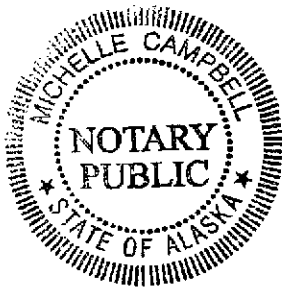
1. I have twenty years of experience in the Alaska Oil and Gas Industry, and hold a Bachelor's of Science in Petroleum Engineering and a Master's of Science in Environmental Engineering.
2. I currently own Harvey Consulting, LLC, a consulting firm providing oil and gas, environmental, and regulatory compliance training to clients in Alaska. Prior to this I served as the Industry Preparedness and Pipeline Program Manager in the Alaska Department of Environmental Conservation, Division of Spill Prevention and Response, and held engineering and supervisory positions at both Arco Alaska, Inc. and BP Exploration (Alaska), Inc.
3. I have experience designing and drilling wells in the Beaufort Sea, including exploration wells, delineation wells and production wells. I was an engineer for BP on the Endicott Project planning and executing drilling plans to delineate the Endicott Oil Field. I was involved with the first several dozen wells drilled at Endicott. My experience also includes engineering and management positions in the Prudhoe Bay oil field. At Arco, I was the Prudhoe Bay Waterflood and Enhanced Oil Recovery Engineering Supervisor, with the responsibility for a team of engineers which designed, optimized and managed the production over 120,000 barrels of oil per day from approximately 400 wells and nine drill sites. I also served as the Satellite Oil Field Development Program Manager. In this position, I lead a multidisciplinary team of Engineers, Environmental Scientists, Facility Engineers, Business Analysts, Geoscientists, Land, Tax, Legal, and Accounting staff to explore for new satellite oil fields that could be piped back into existing facilities. My team was responsible for finding the Midnight Sun, Sambucca, Aurora, and S-Pad Satellite reservoirs. At BP, I was an engineer on the Sag Delta North Satellite project which was produced through the Endicott facility. I was an engineer on the original Northstar and Badami Conceptual and Preliminary Engineering design teams. I have specific expertise in reservoir engineering, production engineering, drilling engineering, and in arctic exploration and production operations.
4. The North Slope Borough has asked me to provide my opinion on three specific questions related to the proposed 2008 Shell Air Permit. Appendix 1 to this declaration contains my response.

I declare that the above statements are true.

Signed on this 31st day of March 2008 in Eagle River Alaska


Susan L. Harvey

On March 31, 2008, Susan Harvey, appeared before me, a notary, and signed the above statement after showing proof of her identity.




Notary Public

My commission expires: March 20, 2010

APPENDIX 1

A. Would the data collected from the first exploration well at the Sivulliq Prospect be used by the Shell Exploration Team at subsequent exploration wells at the Sivulliq Prospect?

International oil and gas exploration companies such as Shell have been successful in finding oil and gas because they use a highly trained, fully integrated team of exploration staff including, managers, engineers, geologists, geophysicists, commercial analysts, well-logging engineers, etc. to develop an exploration well plan, and then carefully monitor the exploration well plan execution around the clock, adapting and modifying the exploration well plan in response to the wellbore conditions and data collected.

Each piece of data collected is evaluated as fast as possible to not only determine what actions to take in the next few hours in that same wellbore, but how the data may affect their understanding of the prospect's hydrocarbon accumulation, and how this data may impact the decisions on upcoming exploratory wells. As this data is collected and processed, the exploration team updates its understanding of the prospect's subsurface geology. This is an ongoing process that continues throughout exploratory and delineation drilling on a prospect.

Refinement of a subsurface geological model is the collective goal behind drilling multiple delineation wells on a prospect. While a complete revision to the geologic model may take months, geologists will be assessing the new well data in real-time and determining whether it supports their current model, or whether it will require revision. Every effort is made to rapidly update the geological understanding of a prospect, because this information is critical to inform short-term decisions about whether, how, and where to drill subsequent delineation wells on that same prospect. Geologists and geophysicists will be asked by their management to provide daily updates on how the well data either confirms or causes revisions to the current geologic/reservoir model. Successful exploration teams are regarded for their ability to rapidly assess and react to exploration well data, and make important decisions on whether to continue drilling a well, to go deeper, to collect more data, or to abandon an unsuccessful well and cut their losses.

Prior to drilling an exploration well, a company will develop a drilling and data collection plan, which is typically called a "well plan." The well plan is typically funded up to a maximum cost. Exploration managers are given the job of drilling the well and collecting the data under that maximum cost. Exploration managers are also given the responsibility of constantly reassessing the well plan during the drilling and data collection process. Managers may decide to collect less data, or request additional funding authorization to collect more data, if conditions require. Managers may decide to alter the route of the well, abandon the well prior to reaching

the target depth, or drill deeper if conditions warrant. The data gained from the well at issue, as well as data gained from previous wells on the prospect inform these decisions.

In this case, Shell is proposing to drill three exploration wells into the Sivulliq Prospect to further delineate the lateral and horizontal extent of the hydrocarbon reservoir(s) to appropriately size an offshore production platform and pipeline system. The Sivulliq wells are multi-million dollar wells, which require careful initial planning and consideration and then equally careful reconsideration during the drilling process to ensure the best business plan is executed. These are not distant, unrelated wildcat wells, where data sharing would be much less likely. They are delineation wells that will be used to assess whether a single oil field can be economically developed.¹ The data from these wells will aid Shell in determining whether it can book additional reserves and sanction development of this project. These wells were selected for drilling based on the results of previous seismic exploration and exploratory drilling on the Sivulliq prospect.

Typically, more than one well is drilled to develop a model of a prospect's hydrocarbon accumulation(s). Shell is planning to drill three wells within a few miles of each other for the purpose of delineating the Sivulliq prospect. If each of these wells were not necessary to delineate the prospect and develop a useable model of the hydrocarbon accumulation, it is doubtful that Shell would invest millions of dollars to drill them. Fully delineating the prospect is essential to properly designing an efficient system for producing the prospect and justifying the project cost. Data collected in the first of the three Sivulliq delineation wells may provide important information to the Shell exploration team to determine how to proceed with the next two wells into that same prospect area. For example, if the first well is dry, or has unexpected stratigraphy, this could result in changes to the subsequent well plans. The second well may not be drilled if the risk level increases based on data obtained from the first well. The well route may be altered, the well may be drilled deeper, or additional data may be obtained (coring, fluid testing, additional well logs, etc.). If the first and second wells were dry-holes, it would likely cause serious reconsideration before drilling the third delineation well. The discovery of unexpected hydrocarbon accumulations, high pressure, or unstable well conditions, would also likely cause modification of subsequent well plans. The ability to quickly adapt and respond to exploration well data is a prized skill, characteristic of a high performing exploration team. The same principles discussed above apply to the drilling of multiple wells on any prospect, not just Sivulliq.

In 2008, I attended several meetings between Shell and NSB. In these meetings Shell explained that its main goal was to delineate the Sivulliq Prospect, for the purpose of collecting additional information for Shell engineers to use in the design of the offshore production

¹ Drilling subsequent wells after an initial exploration discovery is referred to as delineation drilling.

platform. Shell engineers have already started on conceptual facility design. Shell showed NSB some of its early development concepts during a February 2008 tour of Shell's Gulf of Mexico operations. During that tour, Shell introduced key members of its exploration team, and explained how exploration data collected from the three Sivulliq wells would be integrated by the team. Shell showed NSB its sophisticated remote, real-time monitoring systems for drilling operations and its ability to rapidly assess drilling data in real time. Shell explained that its highly integrated exploration teams maximizes safety by having several different experts examine the drilling data to identify risky situations and recommend immediate remedies. For example, an unexpected high pressure zone (or a "thief zone" identified in the first Sivulliq delineation well) would cause revision to the risk profile and the well plan for subsequent wells in the Sivulliq Prospect, to ensure that high pressure risks or drilling fluid loss potentials are known and addressed. This is the type of integrated professional well planning a highly trained company would perform when drilling multiple wells into the same prospect.

B. Are the Sivulliq wells interdependent in other ways?

Yes, the Sivulliq wells are economically interdependent. A single drill ship that is used to drill multiple wells in one exploration season provides an economy of scale that links all of the wells. The costs associated with mobilizing the rig, the support systems (supply ships, spill response), demobilizing the rig, and the team of Shell personnel overseeing the operations are all shared by these wells.

C. Can Shell can meet the 80 days per drill site limit in the permit if it has to drill a replacement or relief well?

In 1985, Union Oil drilled the "Hammerhead" exploration well into hydrocarbon reservoir, which has now been renamed Sivulliq by Shell. MMS records show that this well took 45 days to drill. Unocal drilled the second Hammerhead well 1987 for a period of 14 days. Thus, it would be reasonable to conclude an upper limit of 45 days based on these two previous exploration wells. Shell's 2007 exploration plan called for 60 days per well, however. Using an upper limit of 60 days per well would leave sufficient time within an 80 day window to complete the initial exploration well, but would leave little time to drill a replacement well or relief well. The choice to drill a replacement well would be discretionary, and could be done if there were sufficient time remaining. The choice to drill a relief well would not be discretionary in the event of a well blowout, however. Shell's well blowout plan assumes that the Kulluk would not be damaged in the blowout, and would be moved off the well blowout to a safe location to start drilling its own relief well.

Depending on the magnitude of the blowout and the depth, however, drilling a relief well can take weeks to months before the original well is under control. If 60 days are used, only 20 days would be left to complete a relief well. There is no information in the EPA or Shell records to show that a relief well could be drilled in 20 days to control these types of wells, at the depths

planned. More recently, Shell has said it may just drill the top-hole section of three Sivulliq wells and return in 2009 to complete them.

Overall, there is insufficient information in the record to show that all the wells planned to be drilled by Shell over this 5-year permit period, and their relief well, could be completed within 80 days.