

# **Exhibit 6**

AR-EPA-FFF-8

U.S. Environmental Protection Agency Region 10,  
Supplemental Environmental Justice Analysis for proposed Outer  
Continental Shelf PSD Permit No. R10OCS/PSD-AK-2010-01 &  
Permit No. R10OCS/PSD-AK-09-01  
(undated)

**Supplemental Environmental Justice Analysis  
for proposed Outer Continental Shelf PSD  
Permit No. R10OCS/PSD-AK-2010-01 &  
Permit No. R10OCS/PSD-AK-09-01**

The Environmental Protection Agency (EPA) Region 10 is supplementing its Environmental Justice Analysis for two Clean Air Act (CAA) permits authorizing exploratory drilling in the Outer Continental Shelf (OCS) in the Chukchi and Beaufort Seas. On March 31, 2010, pursuant to CAA section 328, 42 U.S.C. § 7627, Region 10 issued an OCS Prevention of Significant Deterioration (PSD) Permit to Construct to Shell Gulf of Mexico, Inc. (SGMOI) for operations in the Chukchi Sea (2010 Chukchi Permit). On April 9, 2010, Region 10 issued another OCS PSD Permit to Construct (2010 Beaufort Permit) to Shell Offshore, Inc. (SOI)<sup>1</sup> for operations in the Beaufort Sea.

Following petitions for review to the Environmental Appeals Board (EAB or Board), the Board remanded the 2010 Chukchi Permit and the 2010 Beaufort Permit (2010 Permits) back to Region 10 for further consideration of several issues, including Region 10's environmental justice analysis. See *In re: Shell Gulf of Mexico, Inc. and Shell Offshore, Inc.*, OCS Appeal Nos. 10-1 to 10-4, Slip Op. at 63-4, Order Denying Review in Part and Remanding Permits (EAB December 30, 2010) (Remand Order I). See also Order on Motions for Reconsideration and/or Clarification (EAB February 10, 2011) (Clarification Order), and Order on Four Additional Issues (March 14, 2011) (Remand Order II).<sup>2</sup> The orders will be collectively referred to as the "EAB Orders."

Region 10 is now proposing revisions to the 2010 Permits to address the EAB Orders. This Supplemental Environmental Justice Analysis supplements the analysis conducted to support the 2010 Permits and together with other documents in the administrative record, provides support for the revised draft permits Region 10 is proposing in response to the EAB Orders and changes requested by Shell. It is important to note that the extent of an Environmental Justice Analysis will vary according to the unique circumstances of each case. The scope of the analysis conducted in this case was shaped by the fact that Region 10's previous Environmental Justice

---

<sup>1</sup> SOI and SOGMI will be collectively referred to as Shell. This Supplemental Environmental Justice Analysis addresses both revised draft permits authorizing operation in the Chukchi and Beaufort Seas, respectively.

<sup>2</sup> The petitions, briefs, and motions filed by the parties, as well as the orders of the Board relating to the 2010 Permits are available on the EAB Website at [http://yosemite.epa.gov/oa/EAB\\_Web\\_Docket.nsf/77355bee1a56a5aa8525711400542d23/de2e53f0c6b155f085257719005ba945!OpenDocument](http://yosemite.epa.gov/oa/EAB_Web_Docket.nsf/77355bee1a56a5aa8525711400542d23/de2e53f0c6b155f085257719005ba945!OpenDocument), Shell Gulf of Mexico, Inc and Shell Offshore, Inc., Frontier Discoverer Drilling Units, OCS Appeal Nos. 10-01 through 10-04. For ease of reference in this document, filings in the EAB proceedings will be referred to by the title and date of the document and will not repeat the case name and number.

that, although each permit authorizes 120 days of OCS operation between July 1 and November 30, 2011, both permits require the use of the same drillship (the Discoverer) in both the Chukchi and Beaufort Seas.

In the Chukchi Sea, the leases include all of Shell's leases from lease sale 193. In the Beaufort Sea, leases to be authorized under the permit include certain identified Shell leases from lease sales 195 and 202.

As provided in the applicable permitting program (PSD, 40 CFR § 52.21), the emission units on board the Discoverer drillship will be required to meet emission limits that represent Best Available Control Technology (BACT). This will be accomplished through the use of selective catalytic reduction (SCR) and oxidation catalyst (OxyCat) on the Discoverer's main generator engines to reduce nitrogen dioxide (NO<sub>x</sub>), carbon monoxide (CO), volatile organic compounds (VOC), and particulate matter (PM); the use of Tier 3 engines or engines equipped with Catalytic Diesel Particulate Filters (CDPF) for other engines on the Discoverer to reduce CO, VOC, and PM; and the use of ultra low sulfur diesel fuel (ULSD) to reduce emissions of sulfur dioxide (SO<sub>2</sub>) and sulfuric acid mist (H<sub>2</sub>SO<sub>4</sub>). To further reduce impacts on the ambient air, the Associated Fleet will be subject to operational restrictions and some emissions units will be equipped with controls, including the use of ULSD in all of the Associated Fleet and SCR and/or OxyCat on the propulsion engines and main generator engines on the icebreakers. Emissions from the Associated Fleet when located within 25 miles of the Discoverer, together with emissions from the Discoverer, are considered in conducting an ambient air quality analysis to determine whether emissions from the project will cause or contribute to a violation of the NAAQS or applicable increments.

Note that, as discussed in the Supplemental Statement of Basis, emissions authorized under the 2011 Revised Draft Permits are greatly reduced in comparison to the 2010 Permits due to the installation of SCR and OxyCat on the propulsion and generator engines on the Icebreaker #1 and a reduction in the total authorized operating days from 168 to 120 days.

### **Northern Inupiat Communities<sup>3</sup>**

---

<sup>3</sup> The demographic and health factors discussed in this section have been chosen because the EPA commonly associates them with vulnerability or susceptibility to adverse health effects from air pollution. According to the Primary National Ambient Air Quality Standards for Nitrogen Dioxide (NO<sub>2</sub>) Final Rule 75 Fed Reg 6481, (Feb. 9, 2010) "The term susceptibility generally encompasses innate (*e.g.*, genetic or developmental) and/or acquired (*e.g.*, age or disease) factors that make individuals more likely to experience effects with exposure to pollutants. The severity of health effects experienced by a susceptible subgroup may be much greater than that experienced by the population at large. Factors that may influence susceptibility to the effects of air pollution include age (*e.g.*, infants, children, elderly); gender; race/ethnicity; genetic factors; and preexisting disease/condition (*e.g.*, obesity, diabetes, respiratory disease, asthma, chronic obstructive pulmonary disease (COPD), cardiovascular disease, airway hyperresponsiveness, respiratory infection, adverse birth outcome) (ISA, sections 4.3.1, 4.3.5, and 5.3.2.8). Factors that may influence susceptibility and vulnerability to air pollution include socioeconomic status (SES), education level, air conditioning use, proximity to roadways, geographic location, level of physical activity, and work

The North Slope is bordered by the Arctic Ocean to the north and the Brooks Mountain Range to the south. In all it encompasses approximately 89,000 square miles of northern Alaska. The incorporated villages of the North Slope Borough (NSB) include Point Hope, Point Lay, Wainwright, Atkasuk, Barrow, Nuiqsut, Kaktovik and Anaktuvuk Pass. These communities are situated completely above the Arctic Circle and are considered remote villages, with no roads between them. Most of the communities are coastal villages located near the Chukchi and Beaufort Seas. The nearest towns or villages to Shell's exploratory operations in the Chukchi Sea are Point Lay and Wainwright, located 99 and 105 kilometers (61 and 65 miles), respectively, from the closest lease block in the Chukchi Sea. According to the 2011 Exploration Plan submitted by Shell to BOEMRE, Shell plans to drill approximately six wells beginning in 2012 in the Burger Prospect, which is located approximately 160 and 144 kilometers (100 and 90 miles) from Point Lay and Wainwright, respectively.<sup>4</sup>

The nearest towns or villages to Shell's exploratory operations in the Beaufort Sea are Kaktovik, Deadhorse, and Nuiqsut, which are located 14, 84, and 193 kilometers (8, 52, and 120 miles), respectively, from the closest lease block in the Beaufort Sea. According to the 2011 Exploration Plan submitted by Shell to BOEMRE for the Beaufort Sea, Shell plans to drill four wells on three OCS lease blocks in an area lying east of Point Thompson near Camden Bay of the Beaufort Sea beginning in the summer of 2012, two wells each in the Sivulliq and Torpedo prospects.<sup>5</sup> These prospects are located approximately 96, 88, and 193 kilometers (60, 55, and 120 miles) from Kaktovik, Deadhorse and Nuiqsut, respectively. Figure 1 shows the location of the Shell leases with reference to the shoreline and the nearest towns and villages.

As discussed below, a review of demographic characteristics shows that these communities have a significantly high percentage of Alaska Natives, who are considered a minority under EO 12898, and a significant percentage of individuals who speak a language other than English at home.

Subsistence foods from traditional practices such as hunting (marine mammals, terrestrial and birds), fishing, and whaling are an important component of the Iñupiat diet.<sup>6</sup> In 2004, the Alaska Department of Fish and Game reported that over a 25 year period residents in the North Slope Borough harvested an average of 434 pounds of subsistence food per capita.<sup>7</sup>

---

environment (*e.g.*, indoor versus outdoor) (ISA, section 4.3.5)"  
<http://www.epa.gov/ttnnaqs/standards/nox/fr/20100209.pdf>

<sup>4</sup> 2012 Outer Continental Shelf Lease Camden Bay Exploration Plan, and associated Oil Discharge Prevention and Contingency Plan (ODPCP), May 4, 2011.

<sup>5</sup> Revised Outer Continental Shelf Lease Exploration Plan and associated Oil Discharge Prevention and Contingency Plan (ODPCP), Chukchi Sea, Alaska, May 12, 2011.

<sup>6</sup> Wernham, Inupiat Health and Proposed Alaskan Oil Development: Results of the First Intergrated Health Impact Assessment/Environmental Impact Statement for Proposed Oil Development on Alaska's North Slope, 2007.

Subsistence activities also play an important cultural role. In the words of the Environmental Director of the Iñupiat Community of the Arctic Slope (ICAS), speaking at the Environmental Justice Session held during the 2011 Alaska Forum on the Environment, “For thousands of years, our people have depended on a subsistence lifestyle for a large majority of our food, and also for our cultural and spiritual health. Through the subsistence hunt, we not only provide food for our families, but we also carry on the ancient traditions that have been passed down to us by our parents and grandparents. Our subsistence activities define who we are and bind us together as a community. We therefore depend on the land and sea for our survival and we hold the deepest and most profound respect for the natural resources that have sustained us for so many years. Our very survival as a people depends on our ability to safeguard and protect the resources that have provided for us for thousands of years.”

Figure 1 depicts Shell’s lease block in the Chukchi and Beaufort Seas overlaid with an outline of onshore and offshore subsistence use areas. Nuiqsut residents have reported traveling up to 96 kilometers (60 miles) offshore to the north and as far east as Camden Bay to hunt for bowhead whale. Subsistence use areas extend to the west to Cape Halkett for seal. Kaktovik residents reported offshore subsistence use of 56 kilometers (35 miles) out for bowhead and walrus; along the coast their use extends as far east as the Mackenzie River Delta in Canada (fish and waterfowl) and to the west as far as the Return Islands near the Kuparuk River Delta (waterfowl).<sup>8</sup>

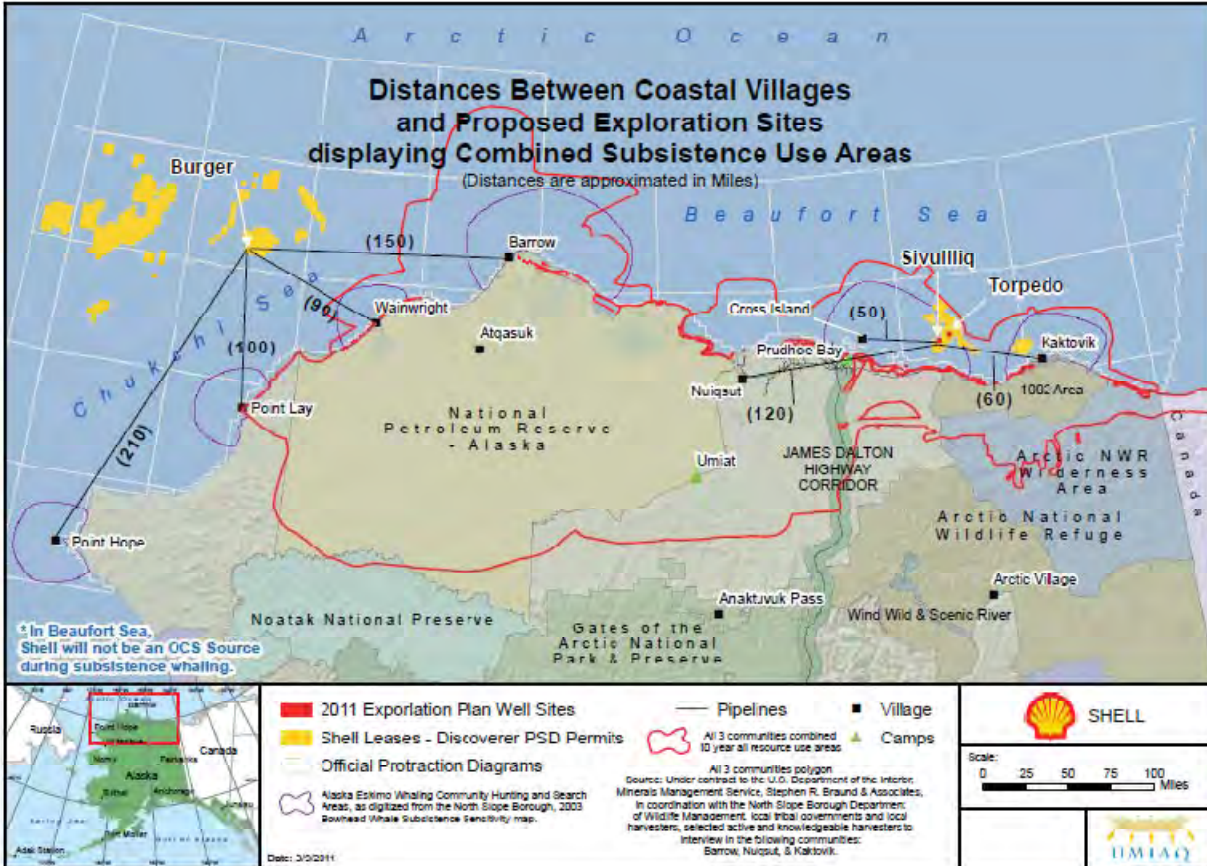
As discussed in more detail below, available information and analysis of the emissions from the Discoverer and the Associated Fleet, in conjunction with background air quality data, show that the NAAQS will continue to be met in all areas more than 500 meters from the Discoverer drillship, and will be well below the NAAQS in the on-shore communities in both the Beaufort and Chukchi Seas.

---

<sup>7</sup> Wolfe, R. J. 2004. Local traditions and subsistence: a synopsis of twenty-five years of research in Alaska. Technical Paper No. 284. Alaska Department of Fish and Game, Division of Subsistence, Juneau, Alaska.

<sup>8</sup> Stephen R. Braund & Associates. Report of Traditional Knowledge Workshops – Point Lay, Barrow, Nuiqsut, and Kaktovik. Chukchi and Beaufort Seas National Pollutant Discharge Elimination System Exploration General Permits Reissuance. 2011.

Figure 1 Subsistence Use Areas Mapped Over Exploration Sites



## Demographics<sup>9</sup>

In an effort to assess the potential for disproportionate impacts on minority and low-income populations potentially affected by the activities proposed to be authorized under the 2011 Revised Draft Permits, Region 10 has considered available demographic information for the North Slope Borough with respect to two reference populations--the state of Alaska and the United States of America.

**Table 1 Population, Age and Race**

Location	Total Population	Under 5	Over 65	American Indian or Alaska Native	Asian	White	African American	Hispanic or Latino
North Slope Borough	7,385	9.50%	4.20%	68.40%	5.90%	17.10%	0.70%	2.20%
State of Alaska	626,932	7.60%	5.70%	15.60%	4.00%	69.30%	3.50%	4.10%
United States	3.1B	6.80%	12.40%	0.90%	3.60%	75.10%	12.30%	12.50%

(2000 US Census)

In total, the eight villages in the North Slope Borough are comprised of 7,385 people. The populations range in size from 228 to 4,581 residents. In comparison to the rest of the Alaska, these eight villages have a slightly higher number of children under 5 yet a slightly lower number of people 65 and older. EPA's Final Report Integrated Science Assessment for Oxides of Nitrogen – Health Criteria (ISA) specifically identified children,<sup>10</sup> (defined here as under 18 years old) older adults (65+ years) and sensitive populations (such as those with preexisting respiratory problems) as being particularly vulnerable to NO<sub>2</sub> impacts.<sup>11</sup> Sixty-eight percent of

---

<sup>9</sup> Data was gathered from the 2000 US Census via American Fact Finder at [http://factfinder.census.gov/home/saff/main.html?\\_lang=en](http://factfinder.census.gov/home/saff/main.html?_lang=en)

<sup>10</sup> Children are particularly vulnerable to adverse health effects from air pollution because:

- Children's lungs are still developing. This period of growth and development of the lungs is a critical time period for health effects from exposure to air pollution. Exposures to air pollutants during this time can have life-long effects on the lungs, including lung capacity, the diameter of the airways, and the number and types of cells that line the airways. It is important to note that airways develop through adolescence.
- Children breathe in more air than adults compared to their body weight, leading to a higher dose of air pollution.
- Children's airways are narrower than adults, making them more susceptible to air pollution.
- 

<sup>11</sup> Integrated Science Assessment for Oxides of Nitrogen – Health Criteria (Final Report), Section 4.3, U.S. Environmental Protection Agency, Washington DC, EPA/600/R-08/071, 2008