COLUMBIA LAW SCHOOL

SABIN CENTER FOR CLIMATE CHANGE LAW

May 30, 2018

Ms. Patricia LaFramboise
Chief, Leasing Section
Bureau of Ocean Energy Management
Alaska OCS Region
3801 Centerpoint Drive, Suite 500
Anchorage, AK 99503

Re: Call for Information and Nominations for Proposed 2019 Lease Sale in the Beaufort Sea Planning Area, Docket IDs BOEM-2017-0063, MMAA104000

Dear Ms. LaFramboise:

Thank you for this opportunity to comment on the Call for Information and Nominations for Proposed 2019 Lease Sale in the Beaufort Sea Planning Area. The Sabin Center for Climate Change Law (Sabin Center) submits the following recommendations in regards to the proposed lease sale:

1. BOEM should not allow leasing in previously protected areas, nor consider Beaufort Sea lease sales before completing their plan and environmental review for the 2019-2024 Outer Continental Shelf (OCS) Oil and Gas Leasing Program.
2. BOEM should consider whether there is a compelling purpose and need for lease sales in the Beaufort Sea Planning Area.
3. As part of its environmental review, BOEM should carefully evaluate potential greenhouse gas emissions generated from the production, transportation, and combustion of oil and gas produced from any leasing activity in the Beaufort Sea Planning Area. BOEM's analysis of emissions should be thorough and transparent.
4. As part of its environmental review, BOEM should analyze how climate change impacts will affect leasing activities.

1. BOEM Should Not Allow Leasing in Previously Protected Areas, Nor Consider Beaufort Sea Lease Sales Before Completing Their Plan and Environmental Review for the 2019-2024 Outer Continental Shelf (OCS) Oil and Gas Leasing Program.

The 2017-2022 Proposed Final Program determined leasing was not appropriate in the Chukchi and Beaufort Sea regions, finding these environments were highly sensitive and industry had shown little previous interest in leasing these areas.[1] As climate change continues it will further

[1] U.S. Dept. of Interior, 2017-2022 Outer Continental Shelf Oil and Gas Leasing Final Proposed Program, at S-1—S-11 (Nov. 2016), *available at* https://www.boem.gov/National-OCS-Program/; *see also* U.S. Dept. of Interior, 2017-2022 Outer Continental Shelf Oil and Gas Leasing Final Programmatic EIS, Chapter 4: Affected Environment

impact these delicate ecosystems[2] as well as the endangered species[3] and subsistence lifestyles[4] dependent on them. In recognition of the importance of protecting these ecosystems, species, and subsistence practices, President Obama withdrew these areas from future leasing.[5] The Trump Administration lacks the legal authority to lease these areas subsequent to the withdrawals.[6]

Further, it is inappropriate for BOEM to continue planning for a lease sale in the Beaufort Sea when it has not yet completed the programmatic environmental review for or finalized the 2019-2024 Outer Continental Shelf (OCS) Oil and Gas Leasing Program. Conducting assessment for leasing sales in the Beaufort Sea Planning Area prior to completion of the OCS five-year oil and gas leasing program is contrary to the intent of the Outer Continental Shelf Lands Act (OCSLA) which requires the Secretary to "select the timing and location" of leasing for the entire OCS program in light of several factors including potential for environmental damage.[7]

& Impact Assessment 4-1—4-166, Appendix C: Supporting Information for Chapter 4: the Affected Environment (Nov. 2016)[hereinafter "2017-2022 OCS LEASING Final PEIS"], *available at* https://www.boem.gov/National-OCS-Program/.

[2] *Id*.; U.S. Global Change Research Program, 2014: Climate Change Impacts in the United States: The Third National Climate Assessment (Melillo, Jerry M. et al., eds., 2014) [hereinafter "The Third National Climate Assessment"], at 515-522 (describing impacts of climate change on Alaska).

[3] The Third National Climate Assessment, *supra* note 2, at 518 (noting impact of declining sea ice on endangered polar bears and walrus); 2017-2022 Final OCS Leasing Program, *supra* note 1, at S-8—S-9 (noting presence of endangered species and impacts of climate change on those species in regard to the decision to remove the Arctic OCS lease sales from the Proposed Final Program for 2017-2022). 2017-2022 OCS Leasing Final PEIS, *supra* note 1, Chapter 4: Affected Environment & Impact Assessment, Appendix C: Supporting Information for Chapter 4: the Affected Environment. Other federal entities already consider the impacts of climate change on endangered species whose habitat overlaps with offshore oil and gas leasing activity. The Supreme Court recently denied certiorari review of the Ninth Circuit's decisions that the National Marine Fisheries Service acted reasonably to protect two types of seal species under the Endangered Species Act because those species are likely to become endangered by the end of the century due to sea ice loss and other climate change impacts. Alaska Oil & Gas Ass'n v. Pritzker, 840 F.3d 671, 674 (9th Cir. 2016), *cert. denied sub nom*. Alaska v. Ross, No. 17-118, 2018 WL 491541 (U.S. Jan. 22, 2018), and *cert. denied sub nom*. Alaska Oil & Gas Ass'n v. Ross, No. 17-133, 2018 WL 491542 (U.S. Jan. 22, 2018).

[4] The Third National Climate Assessment, *supra* note 2, at 523 (describing effects of climate change on native communities in Alaska); *see also* 2017-2022 OCS Leasing Final PEIS, *supra* note 1, at 4-11—4-13, 4-76—478 (describing how climate change and OCS leasing activities affect Alaskan native communities' subsistence practices and health).

[5] Presidential Memorandum on Withdrawal of Certain Portions of the United States Arctic Outer Continental Shelf from Mineral Leasing (Dec. 20, 2016), *available at* https://www.gpo.gov/fdsys/pkg/DCPD-201600860/pdf/DCPD-201600860.pdf; Exec. Order No. 13754, 81 Fed. Reg. 90669, (Dec. 9, 2016), *available at* https://www.gpo.gov/fdsys/pkg/DCPD-201600836/pdf/DCPD-201600836.pdf (establishing a Northern Bering Sea Climate Resilience Area).

[6] League of Conservation Voters v. Trump, Docket No. 3:17-cv-00101, (D. Alaska May 3, 2017), *available at* http://climatecasechart.com/case/league-conservation-voters-v-trump/; s*ee also* Congressional Research Legal Sidebar WSLG1799, Trump's Executive Order on Offshore Energy: Can a Withdrawal be Withdrawn? (May 5, 2017), *available at* https://fas.org/sgp/crs/misc/IN10698.pdf (raising the question of whether Presidents have the authority to revoke a withdrawal under OCSLA Section 12(a)).

[7] 43 U.S.C. § 1344(a).

2. BOEM Should Consider Whether There is a Compelling Purpose and Need for the Project

Given the unique resource values in the Beaufort Sea ecosystem, the area should only be opened for oil and gas leasing if there is a compelling need for additional oil and gas resources from federal waters. Oil spills pose an extreme threat to marine life in this ecosystem especially because of the extreme difficulties associated with cleaning up an oil spill in the Arctic. Mechanical recovery of oil has not been suitable for a spill in the Beaufort Sea during 98% of the winter (from November to June).[8] The Minerals Management Service reported that oil spill recovery rates drop dramatically in broken ice conditions to between 1-20%.[9] Based on the most recent offshore spill exercises in the Beaufort Sea in 2000,[10] analysis found that while "the limit to mechanical recovery with containment booms and skimmers in ice-infested waters is generally considered to be 20-30% ice coverage," in the Alaska Beaufort Sea operating limits were closer to 10%.[11]

Current energy market forecasts do not show a compelling reason for this added oil and gas development, especially given the added hazards posed by oil spills in the Arctic. The U.S. Energy Information Agency (EIA) found that in nearly every scenario it examined, U.S. production of oil and gas will considerably outpace domestic demand for and consumption of oil and gas products.[12] For example, under the reference case, EIA predicts that U.S. natural gas production will be approximately 10 quadrillion Btu higher than consumption by 2050.[13] Notably, these projections do not account for the effect of federal policies aimed at mitigating climate change, such as the Clean Power Plan, which will further reduce the demand for fossil fuels if they are reinstated.[14]

It is also irrational to assume that global demand for fossil fuels will continue to increase in the coming decades when the nations of the world have committed to rapidly reducing greenhouse gas emissions to mitigate global climate change.[15] The United States and 175 other countries have ratified the Paris Agreement's commitment to a climate target "well below 2 °C" above

[8] Nuka Research and Planning Group, LLC, Estimating an Oil Spill Response Gap for the U.S. Arctic Ocean (Revised) at 30, 53 Tbl. 18 (June 2016).
[9] Minerals Management Service, Arctic Oil Spill Response Research and Development Program, A Decade of Achievement at 14 (2009).
[10] *See* T. L. Robertson & E. DeCola, Joint Agency Evaluation of the Spring and Fall 2000 North Slope Broken Ice Exercises (Dec. 18, 2000).
[11] Nuka Research & Planning Group, LLC, Oil Spill Response Mechanical Response Recovery Systems for Ice-Infested Waters: Examinations of Technologies for the Alaskan Beaufort Sea at 58 (June 2007).
[12] EIA, *Annual Energy Outlook 2018 with Projections to 2050* (2018) at 44, 62.
[13] *Id.* at 62.
[14] While the Clean Power Plan may not be reinstated in its original form, there is a very high likelihood that subsequent administrations will introduce policies aimed at reducing fossil fuel use, as this is a necessary policy response to the threat of climate change.
[15] *See* UNFCCC, Conference of the Parties on its Twenty-First Session, Adoption of the Paris Agreement, Decision 1/CP.21, U.N. Doc. FCCC/CP/2015/L.9/Rev.1 (Dec. 12, 2015).

pre-industrial levels and to pursue efforts to limit warming to 1.5°C.[16] The majority of countries, as well as many sub-national governments and private actors, remain committed to the Paris Agreement's targets. Scientists estimate that 68-80% of global fossil fuel reserves must remain in the ground to limit temperature rise to 2 °C (as based on a 1,000 GtCO2 carbon budget).[17] Given the high risks and high investment costs of Arctic drilling, it is logical that Arctic resources should be selected for non-extraction.[18]

In this context, the demand for fossil fuels will most likely decline – potentially quite sharply – in the decades ahead. This is not merely speculation on the part of environmental advocates or policymakers: even fossil fuel companies have recognized that demand for fossil fuels will sharply decline due to policies aimed at mitigating greenhouse gas emissions.[19]

In sum: energy market forecasts all indicate that there is not a compelling need for drilling in the Beaufort Sea. BOEM should therefore reconsider this proposal as well as other proposals to expand oil and gas offshore leasing.

3. BOEM Should Carefully Evaluate Potential Greenhouse Gas Emission Impacts in the Programmatic EIS for this Action, Including Indirect (Downstream) Emissions from the Transportation and Combustion of the Produced Oil and Gas.

As part of its environmental review, BOEM should thoroughly evaluate the direct and indirect greenhouse gas emissions that will be generated as a result drilling in the Beaufort Sea Planning Area. BOEM's emissions inventory should include direct emissions from drilling as well as downstream emissions from the transportation and combustion of produced oil and gas. Such analysis is required for NEPA proposals that involve fossil fuel extraction.[20] It is also consistent with BOEM's past NEPA analyses for the entire OCS leasing program.[21]

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[16] *Id.*; United Nations Treaty Collection, Status of the Paris Agreement, available at https://treaties.un.org/Pages/ViewDetails.aspx?src=TREATY&mtdsg_no=XXVII-7-d&chapter=27&clang=_en (accessed May 29, 2018).

[17] *See* Carbon Tracker Initiative, *Unburnable Carbon – Are the world's financial markets carrying a carbon bubble?* at 2 (2013); M. Raupach *et al.*, *Sharing a quota on cumulative carbon emissions*, 4 Nature Climate Change 873 (2014); Oil Change International, *The Sky's Limit: Why the Paris Climate Goals Require A Managed Decline of Fossil Fuel Production* at 6 (Sept. 2016).

[18] C. McGlade and P. Ekins, The geographical distribution of fossil fuels unused when limiting global warming to 2° C, 517 Nature 187, 190, 187 (2015)("[A]ll Arctic [oil and gas] resources should be classified as unburnable," because "development of [oil and gas] resources in the Arctic . . . [is] incommensurate with efforts to limit average global warming to 2 °C.").

[19] Ernest Scheyder, *Exxon Sees Global Oil Demand Plunging by 2040 Under Climate Regulations*, REUTERS (Feb 2, 2018), https://www.reuters.com/article/us-exxon-mobil-climate-report/exxon-sees-global-oil-demand-plunging-by-2040-under-climate-regulations-idUSKBN1FM2PP.

[20] *See* High Country Conservation Advocates v. United States Forest Serv., 52 F. Supp. 3d 1174 (D. Colo. 2014); Diné Citizens Against Ruining Our Env't v. United States Office of Surface Mining Reclamation & Enf't, 82 F. Supp. 3d 1201 (D. Colo. 2015); WildEarth Guardians v. United States Office of Surface Mining, Reclamation & Enf't, 104 F. Supp. 3d 1208, 1230 (D. Colo. 2015); Wildearth Guardians v. U.S. Office of Surface Mining, Reclamation & Enf't, No. CV 14-103- BLG-SPW, 2015 WL 6442724 (D. Mont. Oct. 23, 2015) report and recommendation adopted in part, rejected in part sub nom. Guardians v. U.S. Office of Surface Mining, Reclamation & Enf't, No. CV 14-103-BLG-SPW, 2016 WL 259285 (D. Mont. Jan. 21, 2016). *See also* Sierra Club v. FERC, No. 16-1329 (D.C. Cir. Aug. 22, 2017) (requiring consideration of downstream emissions for natural gas pipeline

BOEM's emissions analysis should be transparent and accessible to decision-makers and the public. For example, BOEM should provide readers with a table which compares the direct, indirect, and total emissions from the proposed action and reasonable alternatives, including the no action alternative. The analysis should be located in a single section of the EIS. If BOEM relies on supplemental reports to inform its emissions analysis, the key findings from those supplemental reports should be fully incorporated into and summarized in the EIS.

For the sake of transparency, BOEM should disclose its estimates of total direct and downstream emissions in addition to any estimates of incremental emissions (that is, the emissions from the production, transportation, and combustion of oil and gas from the Beaufort Sea Planning Area, minus the emissions from the production, transportation, and combustion of substitute energy sources). BOEM should also be transparent about exactly how it estimated those incremental emissions. This will allow readers to evaluate BOEM's methodology and confirm the accuracy of BOEM's findings.

In addition, when analyzing incremental emission impacts (e.g., impacts from Beaufort oil and gas minus impacts from substitute energy sources), BOEM should consider: (i) the most current market forecasts from the U.S. Energy Information Administration (EIA) and other authoritative sources, (ii) the effect of climate change policies, including greenhouse gas regulations in other countries, decarbonization policies, and mid-century strategies, on fossil fuel demand, and (iii) the possibility that renewable energy sources would serve as a substitute for Beaufort oil and gas if the proposed expansion is not approved.

Finally, in order to better understand the significance of the emission impacts, BOEM should use the Social Cost of Carbon, Methane and Nitrous Oxide, as calculated by the Interagency Working Group on the Social Greenhouse Gases, to estimate and disclose the potential costs associated with the emission impacts, both on an annual basis and over the lifetime of the project. Where there is uncertainty about the precise nature of a project's environmental effects (which is the case when evaluating the effects of a large quantity of greenhouse gas emissions released over many years), NEPA requires federal agencies to provide a "summary of existing credible scientific evidence which is relevant to evaluating the reasonably foreseeable significant adverse impacts on the human environment."[22] In this case, the Social Cost of Carbon, Methane, and Nitrous Oxide, despite being officially "rescinded" by President Trump, are scientifically credible estimates of the societal costs of greenhouse gas emissions, developed through a lengthy process of interagency consultation and peer review,[23] and that cost is absolutely relevant to

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review); Mid States Coalition for Progress v. Surface Transportation Board, 345 F.3d 520, 549 (8th Cir. 2003) (requiring consideration of downstream emissions for coal railway); N. Plains Res. Council, Inc. V. Surface Transportation Board, 668 F.3d 1067, 1080 (9th Cir. 2011) (requiring consideration of upstream emissions for coal railway).

[21] BOEM, Final Programmatic EIS for the 2017-2022 OCS Oil and Gas Leasing Program (2017).

[22] 40 C.F.R. § 1502.22(b)(1).

[23] See Interagency Working Group on the Social Cost of Greenhouse Gases, Technical Support Document: Technical Update of the Social Cost of Carbon for Regulatory Impact Analysis Under Executive Order 12866 (May 2013, Revised August 2016); Interagency Working Group on the Social Cost of Greenhouse Gases, Addendum to Technical Support Document on Social Cost of Carbon for Regulatory Impact Analysis Under Executive Order

assessing the nature and significance of the proposed program's environmental consequences. By contrast, the estimate utilized by the U.S. Environmental Protection Agency in its Regulatory Impact Analysis for the Repeal of the Clean Power Plan is highly susceptible to legal challenge because it inflates compliance costs,[24] confines the Social Cost of Carbon to a "domestic" boundary without legal authorization,[25] and deflates the public health benefits from reductions in co-pollutants.[26] The emissions analysis conducted by BOEM in the EIS should inform BOEM's analysis of the proposed project's social and environmental costs.

4. BOEM's Environmental Assessment Should Analyze the Environmental Effects of Climate Change Impacts on Lease Program Activities and the Potential for Adaptation Measures to Mitigate those Effects

Pursuant to its obligations under NEPA, BOEM must consider the potential for significant adverse environmental effects of sea level rise, storm surge, and changing Arctic conditions—including thawing permafrost, increased coastal erosion, and increased frequency and intensity of fall and autumn storms—on oil and gas activities resulting from BOEM's lease sales. These climate-related impacts will result in direct, indirect, and cumulative environmental effects and affect baseline conditions.[27] NEPA's implementing regulations provide that agencies must consider significant and reasonably foreseeable indirect and cumulative environmental impacts.[28] Agencies must define an appropriate baseline for considering projected environmental impacts; such a baseline should incorporate anticipated environmental conditions.[29] Several federal courts have confirmed that NEPA regulations require federal agencies to evaluate the impacts of a changing climate on their actions.[30] Consideration of climate change impacts has accordingly

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12866: Application of the Methodology to Estimate the Social Cost of Methane and the Social Cost of Nitrous Oxide (Aug. 2016).

[24] *See e.g.*, Richard Revesz & Jack Lienke, The E.P.A.'s Smoke and Mirrors on Climate Change, New York Times (Oct. 9, 2017); https://www.nytimes.com/2017/10/09/opinion/environmental-protection-obama-pruitt.html; Rama Zakaria, The Four Accounting Tricks Pruitt Used to Justify EPA's Clean Power Plan Repeal, Environmental Defense Fund Blog (Oct. 11, 2017), https://www.edf.org/blog/2017/10/11/4-accounting-tricks-pruitt-used-justify-epas-cleanpower-plan-repeal.

[25] Peter Howard, Jason Schwartz, Think Global: International Reciprocity As Justification for A Global Social Cost of Carbon, 42 Colum. J. Envtl. L. 203 (2017) at 247-248.

[26] *See e.g.*, Alan J. Krupnick & Amelia Keyes, Hazy Treatment of Health Benefits: The Case of the Clean Power Plan, Resources for the Future Blog (Oct. 13, 2017), http://www.rff.org/blog/2017/hazy-treatment-health-benefitscase-clean-power-plan.

[27] *See e.g., infra* Parts 3.A-3.B.

[28] *See* 40 C.F.R. §§ 1508.7 (defining "cumulative impact"), 1508.8 (defining "effects" as including direct and reasonably foreseeable indirect effects), 1508.25(c) (providing that EISs must consider direct, indirect, and cumulative impacts); *see also* CEQ, *Considering Cumulative Effects under the National Environmental Policy Act* (1997) [hereinafter "Considering Cumulative Effects under NEPA"], *available at* http://1.usa.gov/JLkM2I.

[29] *See* Considering Cumulative Effects under NEPA, *supra* note 28, at 41; 40 C.F.R. 1502.15 (defining "affected environment").

[30] AquaAlliance, et al., v. U.S. Bureau of Reclamation, No. 1:15-CV-754-LJO-BAM, 2018 WL 903746, at *38-*39 (E.D. Cal. Feb. 15, 2018) (finding that the Bureau failed to adequately account for effects of climate change on water management project); Idaho Rivers United v. United States Army Corps of Engineers, No. C14-1800JLR, 2016 WL 498911, at *17 (W.D. Wash. Feb. 9, 2016) (finding the USACE analysis of the effect of climate change on sediment disposition was adequate); Kunaknana v. U.S. Army Corps of Engineers, No. 3:13-CV-00044-SLG, 2015 WL 3397150, at *10-*12 (D. Alaska May 26, 2015) (finding the USACE reasonably concluded, based on a supplemental information report, that a supplemental EIS was not necessary); Kunaknana v. U.S. Army Corps of

become an integral part of the NEPA process.[31] Furthermore, the withdrawal of the CEQ guidelines does not affect judicially upheld obligations as was explicitly noted in the withdrawal notice.[32]

Other federal agencies have already begun to incorporate climate change adaptation concerns into their environmental review process. For instance, FERC required consideration of climate change impacts in connection with a proposed LNG export facility in flood-prone coastal Louisiana (the "Mississippi River LNG Project").[33] After the applicant for the Mississippi River LNG Project submitted draft resource reports to the Commission, FERC directed the applicant to supplement the reports with information regarding potential impacts of sea level rise and storm impacts for the design life of the facility.[34] Similarly, FERC's Environmental Assessments for the Dominion Cove Point LNG export facility on the Chesapeake Bay and the Cameron LNG facility in coastal Louisiana both consider several implications of climate change for their respective facilities.[35]

BOEM should analyze climate change impacts to oil and gas infrastructure during environmental review. Below is a summary of several climate change impacts and the risk that they pose to oil and gas infrastructure.

Engineers, 23 F. Supp. 3d 1063, 1092-98 (D. Alaska 2014) (determining that USACE should consider whether to prepare supplemental EIS for issuance of § 404 permit in light of new information on climate change).

[31] *See e.g.*, *AquaAlliance*2018 WL 903746 at *38-*39 ("Nonetheless, the FEIS/R fails to address or otherwise explain how this information about the potential impacts of climate change can be reconciled with the ultimate conclusion that climate change impacts to the Project will be less than significant: . . [T]this amounts to a 'failure to consider an important aspect of the problem'. . .") (internal citation omitted).

[32] Withdrawal of Final Guidance for Federal Departments and Agencies on Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in National Environmental Policy Act Reviews, 82 Fed. Reg. 16576 (April 5, 2017), *available at* https://www.federalregister.gov/documents/2017/04/05/2017-06770/withdrawal-of-final-guidance-for-federal-departments-and-agencies-on-consideration-of-greenhouse-gas ("The withdrawal of the guidance does not change any law, regulation, or other legally binding requirement.").

[33] Louisiana LNG Energy, LLC, Proposed Mississippi River LNG Project (PF14-17-000).

[34] Letter to Louisiana LNG Energy, LLC providing comments on Draft Resource Reports 2 through 9 re the Mississippi River LNG Project under PF14-17 (Nov. 24, 2014).

[35] *See* FERC, Environmental Assessment for the Cove Point Liquefaction Project, Dominion Cove Point LNG, LP Docket No. CP13-113-000, at 40, 169–171 (May 2014), http://bit.ly/1k5fNM0 ("Climate change in the northeast region could have two effects that may cause increased storm surges: temperature increase of the Chesapeake Bay waters, which would increase storm intensity; and a rising sea level. The final grade elevation of the Liquefaction Facilities Project site would range between 70 and 130 feet above mean sea level. Therefore, even with increased sea levels due to climate change and increased storm surge, the Project facilities would not be vulnerable to even a 100-year climate change-enhanced storm surge because of its significant elevation above sea level."); FERC, Environmental Assessment for the Cameron LNG Expansion Project, Cameron LNG, LLC Docket No. CP15-560-000, at 115 (Feb. 2016), https://perma.cc/7MA8-DW2W ("Climate change in the region would have two effects that may cause increased storm surges, increased temperatures of Gulf waters, which would increase storm intensity, and a rising sea level. In Louisiana, relative sea level changes have been estimated by the NOAA to be about 14 inches by 2050. This is greater than the global average because of regional ground subsidence. The Cameron LNG Terminal is designed for a 500-year storm surge elevation level of 12.4 feet amsl. Given that the Expansion Project's process equipment minimum elevation point of support would be 12.5 feet amsl and the LNG storage tank (T-205) would be 14.0 amsl at top of the elevated pile cap, climate change-enhanced sea level rise and subsidence are considered adequately addressed in the Expansion Project design.").

A. Impacts of Climate Change

As anthropogenic greenhouse gas emissions warm the planet, causing glaciers and ice sheets to melt and oceans to absorb increasing volumes of heat, global sea levels will continue to rise, and will do so at increasing rates.[36] In the next several decades, storm surges and high tides will combine with sea level rise to increase flooding, threatening coastal communities and industries.[37] The effects of oil and gas activities on species in conjunction with climate change impacts; such as ocean acidification, decline of sea-ice ecosystems, and various resulting species responses should also be considered as part of environmental review.

Many sources provide current and credible data regarding sea level rise, storm surge, and Arctic changes. As relevant examples, the Sabin Center points the BOEM's attention to:

- Intergovernmental Panel on Climate Change ("IPCC"), Chapter 2.2.3 Ocean, cryosphere and sea level. In Climate Change 2014 Synthesis Report, Fifth Assessment Report, at 65, *available at* http://www.ipcc.ch/pdf/assessment-report/ar5/syr/SYR_AR5_LONGERREPORT_Corr2.pdf. [38]

- IPCC, Chapters 5.3.3.1 Severe Storms and 5.3.3.2 Extreme Sea Levels. In Climate Change 2014: Impacts, Adaptation, and Vulnerability, *available at* http://www.ipcc.ch/pdf/assessment-report/ar5/wg2/WGIIAR5-Chap5_FINAL.pdf.[39]

- U.S. Global Change Research Program. Alaska. 2014: Climate Change Impacts in the United States: The Third National Climate Assessment, at 514-536, *available at* http://nca2014.globalchange.gov/.[40]

- U.S. Global Change Research Program, Arctic Changes and their Effects on Alaska and the Rest of the United States. In Climate Science Special Report: Fourth National

[36] Walsh et al., *Ch. 2: Our Changing Climate*, in Climate Change Impacts in the United States: The Third National Climate Assessment at 44 (J. M. Melillo et al., eds., U.S. Global Change Research Program, 2014) [hereinafter "Third National Climate Assessment Chapter 2"]; *See also* Wuebbles, D.J.,et al., 2017: Executive summary, in Climate Science Special Report: Fourth National Climate Assessment, Volume I 12-34 (Wuebbles, D.J., et al. eds., U.S. Global Change Research Program, 2017).

[37] Third National Climate Assessment Chapter 2, *supra* note 36, at 45; Kate Gordon et al., The Risky Business Project, *Risky Business: The Economic Risks of Climate Change in the United States* at 20 (2014) [hereinafter "Risky Business"], *available at* http://bit.ly/1GxEdZc.

[38] J. A. Church et al., *Sea Level Change*, in CLIMATE CHANGE 2013: THE PHYSICAL SCIENCE BASIS. CONTRIBUTION OF WORKING GROUP I TO THE FIFTH ASSESSMENT REPORT OF THE INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE [T.F. Stocker et al., eds., Cambridge University Press 2013).

[39] P. P. Wong et al., *Coastal systems and low-lying areas*, in CLIMATE CHANGE 2014: IMPACTS, ADAPTATION, AND VULNERABILITY. PART A: GLOBAL AND SECTORAL ASPECTS, Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change 361-409 (C. B. Field et al. eds., Cambridge University Press 2014).

[40] U.S. Global Change Research Program, 2014: Climate Change Impacts in the United States: The Third National Climate Assessment (Melillo, Jerry M. et al., eds., 2014) [hereinafter "The Third National Climate Assessment"].

Climate Assessment, Volume I, at 303-332, *available at* https://science2017.globalchange.gov/.[41]

- Institute of Marine Science, University of Alaska, Arctic Ocean Synthesis: Analysis of Climate Change Impacts in the Chukchi and Beaufort Seas with Strategies for Future Research, *available at* http://www.arcodiv.org/news/NPRB_report2_final.pdf.[42]

- U.S. Geological Survey, Chapter 4. Climate Considerations. In An Evaluation of the Science Needs to Inform Decisions on Outer Continental Shelf Energy Development in the Chukchi and Beaufort Seas, Alaska: U.S. Geological Survey Circular 1370, at 81-108, *available at* http://www.arlis.org/docs/vol1/C/757761414.pdf.[43]

- Climate Central, Surging Seas: Sea Level Rise Analysis, *available at* http://sealevel.climatecentral.org; Climate Central, Surging Seas: Sea level rise, storms & global warming's threat to the US coast (2012), *available at* http://slr.s3.amazonaws.com/SurgingSeas.pdf;

- Risky Business: The Economic Risks of Climate Change in the United States, *available at* https://perma.cc/U62D-KRVG.[44]

B. Risks to Oil & Gas Infrastructure

There is little question that climate change presents significant risks to infrastructure associated with oil and gas exploration and production activities in the OCS and the transport of extracted resources to coastal communities.[45] In the Beaufort and Chukchi Seas in Alaska, artificial islands and causeways built for offshore energy development are expected to become increasingly vulnerable to inundation from sea level rise and damage from storm surges.[46] BOEM should

[41] Taylor, P.C., W. Maslowski, J. Perlwitz, and D.J. Wuebbles, *Arctic Changes and their Effects on Alaska and the Rest of the United States* in 2017: Climate Science Special Report: Fourth National Climate Assessment, Volume I 303-332 (Wuebbles et al. eds.).

[42] Institute of Marine Science, University of Alaska, Arctic Ocean Synthesis: Analysis of Climate Change Impacts in the Chukchi and Beaufort Seas with Strategies for Future Research (Hopcroft, R. at al. eds. 2008), *available at* http://www.arcodiv.org/news/NPRB_report2_final.pdf.

[43] U.S. Geological Survey, An Evaluation of the Science Needs to Inform Decisions on Outer Continental Shelf Energy Development in the Chukchi and Beaufort Seas, U.S. Geological Survey Circular 1370, 102 (Leslie Holland-Bartels & Brenda Pierce eds., 2011). Clow, G. et al. Chapter 4. Climate Considerations, in USGS Science Needs for Arctic OCS Energy Development Report at 81-108.

[44] Kate Gordon et al., The Risky Business Project, *Risky Business: The Economic Risks of Climate Change in the United States* at 20 (2014).

[45] V. Burkett, *Global Climate Change Implications for Coastal and Offshore Oil and Gas Development*, 39 ENERGY POLICY 7719 (2011); U.S. ENERGY SECTOR VULNERABILITIES TO CLIMATE CHANGE AND EXTREME WEATHER, U.S. Department of Energy, 28-29 (Craig Zamuda et al., 2013) [hereinafter "DOE U.S. Energy Sector Vulnerabilities"]; see also U.S. Geological Survey, An Evaluation of the Science Needs to Inform Decisions on Outer Continental Shelf Energy Development in the Chukchi and Beaufort Seas, Alaska: U.S. Geological Survey Circular 1370, (Holland-Bartels, Leslie, and Pierce, Brenda, eds. 2011) 278 p. [hereinafter "USGS Science Needs for Arctic OCS Energy Development Report"].

[46] U.S. Geological Survey, An Evaluation of the Science Needs to Inform Decisions on Outer Continental Shelf Energy Eevelopment in the Chukchi and Beaufort Seas, U.S. Geological Survey Circular 1370, 102 (Leslie Holland-Bartels & Brenda Pierce eds., 2011). Clow, G. et al. Chapter 4. Climate Considerations, in USGS Science Needs for

assess the projected range of sea level rise and storm surge, and the projected likelihood of severe storms, throughout the life of the oil and gas infrastructure that will be built as a result of new lease sales, assess the costs of those risks, and identify ways to prepare for climate change-related risks.

BOEM has not analyzed the potential impacts of climate change on oil and gas infrastructure and the potential environmental effects that could result as part of its Programmatic Environmental Impact Statement (PEIS) for the OCS 5-year leasing program. As part of environmental review for the Beaufort Sea Planning Area, BOEM should specifically discuss potential adverse impacts on the oil and gas activities likely to be performed under new leases issued by BOEM. For example, it should address whether sea level rise and severe storms will damage platforms or disrupt transportation networks.[47]

In sum, sea level rise, increased storm surge, and severe storm events due to climate change pose foreseeable risks to the oil and gas infrastructure that will be built as a result of BOEM's lease sales. BOEM must consider such impacts to adequately protect the infrastructure built as a result of oil and gas lease sales from future climate change impacts and to fulfill its obligations under NEPA.

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Thank you for the opportunity to submit these comments. Please feel free to contact the Sabin Center with any questions.

Sincerely,

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Arctic OCS Energy Development Report at 81-108, available at *available at* http://www.arlis.org/docs/vol1/C/757761414.pdf.

[47] *See* Burkett, *supra* note 45.