UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue, Suite 155, 14-D12
Seattle, WA 98101-3144

REGIONAL
ADMINISTRATOR'S
DIVISION

August 29, 2022

Stephanie Rice, Project Manager
Bureau of Land Management
222 W 7th Avenue, Stop #13
Anchorage, Alaska 99513

Dear Stephanie Rice:

The U.S. Environmental Protection Agency has reviewed Bureau of Land Management's July 2022 Draft Supplemental Environmental Impact Statement for the Willow Master Development Plan (CEQ Number 20200166, EPA Project Number 18-0035-BLM). EPA has conducted its review pursuant to the National Environmental Policy Act and our review authority under Section 309 of the Clean Air Act. The CAA Section 309 role is unique to EPA and requires EPA to review and comment publicly on any proposed federal action subject to NEPA's environmental impact statement requirement.

The EIS analyzes the Willow Master Development Plan to construct infrastructure components to access oil and gas resources in the Willow prospect located on federal leases within the Bear Tooth Unit of the National Petroleum Reserve in Alaska. The project includes a central processing facility, an infrastructure pad, up to five drill sites, access and infield roads (including both gravel roads and ice roads), an airstrip, pipelines, and a gravel mine site. The Draft Supplemental EIS indicates that this project would include transportation of modules and construction materials to the North Slope and is anticipated to have a peak production of over 180,000 barrels of oil per day over its 30- to 31-year project lifespan, producing up to approximately 629 million total barrels of oil.

BLM published its Final EIS for the project in August 2020 and issued the Record of Decision in October 2020. BLM is preparing this Supplemental EIS to address deficiencies in the 2020 Final EIS and ROD[1] identified by the U.S. District Court for Alaska and to ensure compliance with applicable laws. The Draft Supplemental EIS includes an analysis of potential climate impacts associated with the Willow project.

EPA has been a Cooperating Agency on BLM's development of the Willow Master Development Plan EIS since May 22, 2018, providing written Draft EIS scoping comments,[2] Draft EIS comments,[3] Supplemental EIS comments,[4] and Final EIS comments[5] for this project. Most recently, EPA has been

[1] *Sovereign Iñupiat for a Living Arctic et al. v. Bureau of Land Management et al.*, 555 F.Supp.3d 739 (D. Alaska 2021).
[2] EPA letter dated 9-13-2018 to Ferris Couture, Project Manager, Bureau of Land Management from Molly Vaughan, NEPA Reviewer.
[3] EPA letter dated 10-29-2019 to Racheal Jones, Project Manager, Bureau of Land Management from Jill Nogi, Chief, Policy, and Environmental Review Branch.
[4] EPA letter dated 4-30-2020 to Racheal Jones, Project Manager, Bureau of Land Management from Andrew J. Baca, Director, Regional Administrators Division.
[5] EPA letter dated 9-9-2020 to Racheal Jones, Project Manager, Bureau of Land Management from Andrew J. Baca, Director, Regional Administrators Division.

supporting BLM on the development of this second Supplemental EIS, including by providing scoping comments on March 9, 2022.

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations,[6] requires "each Federal agency… make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effect of its programs, policies, and activities on minority populations and low-income populations in the United States… " EPA's NEPA comment letters have consistently described concerns and recommendations with regards to the environmental justice impacts of the project, especially on the Nuiqsut population.

Additionally, since the issuance of the Final EIS and ROD in 2020, the President issued Executive Order 13990 "Protecting Public Health and the Environment and Restoring the Science to Tackle the Climate Crisis" on January 20, 2021, directing "all executive departments and agencies... to immediately commence work to confront the climate crisis."[7]

In this review, EPA has identified that this proposed project has the potential to have significant environmental justice and climate impacts and EPA recommends such impacts be avoided or mitigated in the preferred alternative in the Final Supplemental EIS.

EPA's most significant recommendations for improving the NEPA analysis regarding climate change and environmental justice in the Final Supplemental EIS include:

Key Climate Change and Greenhouse Gas Emission Concerns and Recommendations:

- Prioritize addressing climate change and achieving environmental justice in the Final Supplemental EIS and continue efforts to identify means to further reduce greenhouse gas (GHG) emissions from the proposed project.
- Include in the Final Supplemental EIS summary the estimated social cost of the project's climate impacts (currently estimated in the Draft Supplemental EIS to be $2 to $18 billion, depending on the discount rate).
- Reflect the national priority to confront climate change when identifying alternatives in the FSEIS (e.g., alternatives that have fewer climate effects); describing the selection of the Preferred Alternative for the project; describing and incorporating practicable mitigation measures to reduce net GHG emissions, including shortening the Plan's timeframe; and identifying commitments made to implement these mitigation measures.
- Discuss the project's GHG emissions over time in the context of actions necessary to achieve GHG emissions reduction goals at the national,[8] state,[9] and local levels.
- Transparently provide estimates of all direct and indirect GHG emissions (e.g. carbon dioxide, methane, and nitrous oxide), including emissions associated with oil production and emissions displaced by this project from energy sources or substitutes, ranging from other sources of oil to

[6] White House. Executive Order 12989. 2014. Accessible at: https://www.archives.gov/files/federal-register/executive-orders/pdf/12898.pdf.

[7] Executive Office of the President. Protecting Public Health and the Environment and Restoring the Science to Tackle the Climate Crisis. Accessible at: https://www.federalregister.gov/documents/2021/01/25/2021-01765/protecting-public-health-and-the-environment-and-restoring-science-to-tackle-the-climate-crisis.

[8] Paris Agreement target of 50 to 52 percent reduction in net GHG emissions by 2030.

[9] A. Steffen, S. A. Greenlaw, M. Biermann, and A. L. Lovecraft. Alaska's Climate Change Policy Development. Fairbanks: Center for Arctic Policy. 2021.
Studies. Accessible at: https://uaf.edu/caps/our-work/CAPS-alaskas-climate-policy-development-March2021-corrected.pdf

renewable sources. Displaced emissions result in a significant reduction in overall gross GHG emissions associated with the project and should be fully described in the Final Supplemental EIS.

Key Environmental Justice Analysis Recommendations:

- Ensure the NEPA process provides for the meaningful involvement[10] of communities with environmental justice concerns, which includes ensuring that: people have an opportunity to participate in decisions about activities that may affect their environment and/or health; the public's contribution can influence the regulatory agency's decision; community concerns are considered in the decision making process; and decision makers will seek out and facilitate the involvement of those potentially affected.
- Utilize the replacement cost method and describe the monetary cost of replacing subsistence foods that may be lost due to the proposed project.
- Analyze the potential loss or increase of subsistence resources resulting from the proposed project. Describe the meaningful engagement of the affected communities in identifying impacts and opportunities to mitigate those impacts, and describe measures incorporated in the Master Development Plan to avoid and mitigate those impacts.
- Include a focused Health Impact Analysis within the project area evaluating health impacts caused by changes to subsistence resources, sociocultural impacts, air quality, water quality, and cumulative impacts caused by climate change.
- Include more robust analysis of the Greater Willow 1 and 2, and West Willow oil prospects and the reasonably foreseeable actions association with these proposed projects, including cumulative impacts to the subsistence practices of the surrounding communities and any mitigation to address these impacts.
- Defer pad development in the Teshekpuk Lake Special Area to provide for additional consultation with stakeholders in the community of Nuiqsut to further address concerns some stakeholders have raised regarding potential impacts to caribou migration and subsistence hunting.

We believe our comments could reasonably be incorporated within the Final Supplemental EIS. We also believe that the Final Supplemental EIS and ROD should document commitments to all practicable mitigation measures. Thank you for the opportunity to provide comments for this project. We look forward to continuing to support you in the development of the Final Supplemental EIS. If you have questions about this review, please contact Lauren Boldrick of my staff at (907) 561-5097 and boldrick.lauren@epa.gov, or me, at (206) 553-1774 or at chu.rebecca@epa.gov.

Sincerely,

REBECCA CHU Digitally signed by REBECCA CHU
Date: 2022.08.29 12:11:32 -07'00'

Rebecca Chu, Chief
Policy and Environmental Review Branch

Enclosure

[10] Environmental Protection Agency. Learn About Environmental Justice. Accessible at: https://www.epa.gov/environmentaljustice/learn-about-environmental-justice#:~:text=President%20Clinton%20signing%20the%20EJ,environmental%20laws%2C%20regulations%20and%20policies. Accessed on 8-11-2022.

Climate Science and Policy

Executive Order (EO) 13990 "directs all executive departments and agencies… to immediately commence work to confront the climate crisis."[11] Responding effectively to the climate crisis will require both significant short-term global reductions in greenhouse gas (GHG) emissions and net-zero global emissions by mid-century or before. These and other policies reflect science based GHG emissions reduction goals to avoid the worst impacts of climate change. The most recent scientific reports by the Intergovernmental Panel on Climate Change (IPCC) reinforce the urgent need to take climate action.

Considering the extensive scientific information about the climate crisis, the climate impacts to Alaska, and information on how oil and gas development impacts GHG emissions, EPA recommends the Final Supplemental EIS (FSEIS) prioritize the EO 13990 directive to immediately confront the climate crisis and apply continued effort to identify means to further reduce GHG emissions from the proposed project. EPA recommends the FSEIS reflect the national priority to confront climate change in:

- Identifying alternatives (e.g., alternatives which have fewer climate effects).
- The selection of the Preferred Alternative for the project.
- Describing available mitigation measures to reduce GHG emissions.
- Incorporating all practicable mitigation into the Master Development Plan and identifying the commitments made to implement mitigation measures.

EPA believes that the FSEIS and Record of Decision should document commitments to all practicable mitigation measures. Mitigation measures could include enhanced energy efficiency, renewable energy generation and energy storage, lower-GHG-emitting technology, carbon capture and sequestration at the central processing facility (or capture-ready facility design), sustainable land management practices, and capturing or beneficially using GHG emissions such as methane. EPA also strongly encourages BLM to consider mitigation measures to reduce the total projected GHG emissions, such as limiting the operation of the proposed project for a term less than the estimated 30-year useful project life, not to exceed twenty years. Further, we recommend that the climate change analysis be periodically reviewed and validated, perhaps every five years, for accuracy of facts and circumstances. For example, the Inflation Reduction Act is expected to have a significant influence on long-term energy demand and economics. Additionally, EPA recommends that Section 3.2.4 be modified to clarify that mitigation measures could help avoid, reduce, or minimize GHG emissions and climate change impacts from the Project.[12]

[11] Executive Order 13990: Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis (January 20, 2021). Section 1. Accessible at: https://www.whitehouse.gov/briefing-room/presidential-actions/2021/01/27/executive-order-on-tackling-the-climate-crisis-at-home-and-abroad/.

[12] Currently Section 3.2.4 states that "Project GHG emissions and their contribution to cumulative GHG levels and climate change are unavoidable and irretrievable throughout the life of the Project."

The Draft Supplemental EIS (DSEIS), the IPCC,[13] the Energy Information Administration (EIA),[14] and International Energy Agency (IEA)[15] reports all concur that observed increases in GHG concentrations since the 1750s are unequivocally caused by human activities (e.g., the burning of fossil fuels). The Earth acts as a closed system for matter: the atmosphere, biosphere, cryosphere, lithosphere, and hydrosphere interact physically, chemically, and biologically, with many different processes occurring simultaneously. Extracting subsurface oil and gas from deep within the lithosphere, then eventually combusting these fuels, causes the release of these emissions, particularly carbon dioxide (CO_2), nitrous oxide (N_2O), and methane (CH_4). These gases substantially disrupt the natural processes of the atmosphere and alter the processes of the biosphere, cryosphere, and hydrosphere.

The IPCC has reported that reaching and sustaining net zero global anthropogenic CO_2 emissions and declining net non-CO_2 radiative forcing would help abate anthropogenic global warming. To prevent further warming, the IEA determined the science is clear that no new oil, gas, or coal development is permissible if the world is to reach net zero carbon emissions by 2050.[16] The IPCC reported the impacts and risks associated with climate change "are becoming increasingly complex and more difficult to manage," "resulting in compounding overall risk and risks cascading across sectors and regions."[17]

Greenhouse Gases and Climate Change

EPA recommends the FSEIS discuss the project-level GHG emissions over time in the context of GHG emissions reduction goals, including the U.S. economy-wide target under the Paris Agreement to achieve a 50 to 52 percent reduction from 2005 levels by 2030.[18] EPA also recommends the FSEIS evaluate the alternatives by discussing measures to better align the project with the national 2050 net-zero GHG emissions goal, consistent with the *Long-Term Strategy of the United States*.[19] EPA recommends the FSEIS discuss carbon lock-in concerns and challenges the project poses for achieving climate policy goals, as well as opportunities to advance these goals. Considering science-driven GHG emission reduction policies is necessary to provide the public and decision-makers with critical context regarding the project locking in long-term GHG emissions, and essential emissions reduction policies to avoid the worst impacts of climate change.

This is all the more important given the reasonably foreseeable, large-scale GHG emissions associated with proposed future developments of West Willow and Greater Willow 1 and 2. These developments are relevant to the discussion of the proposed plan's alignment with GHG emission reduction policies and should also be discussed in detail as part of the SEIS cumulative impacts analysis. Specifically, EPA

[13] Intergovernmental Panel on Climate Change, United Nations, *Summary for Policymakers* of Climate Change 2021: The Physical Science Basis SPM–5 (Valerie Masson Delmotte et al. eds.) (2021). Accessible at: https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_SPM.pdf.

[14] Energy Information Agency. Annual Energy Outlook (AEO). 2022. Accessible at: https://www.eia.gov/outlooks/aeo/pdf/AEO2022_Narrative.pdf.

[15] International Energy Authority. Net Zero by 2050: A Roadmap for the Global Energy Sector. May 2021. Accessible at: https://iea.blob.core.windows.net/assets/deebef5d-0c34-4539-9d0c-10b13d840027/NetZeroby2050-ARoadmapfortheGlobalEnergySector_CORR.pdf.

[16] International Energy Authority. Net Zero by 2050: A Roadmap for the Global Energy Sector. May 2021. Accessible at: https://iea.blob.core.windows.net/assets/deebef5d-0c34-4539-9d0c-10b13d840027/NetZeroby2050-ARoadmapfortheGlobalEnergySector_CORR.pdf.

[17] Intergovernmental Panel on Climate Change, United Nations, Summary for Policymakers of Climate Change 2022: Impacts, Adaptation and Vulnerability. April 2022. Accessible at: https://report.ipcc.ch/ar6wg2/pdf/IPCC_AR6_WGII_SummaryForPolicymakers.pdf.

[18] See U.S. Nationally Determined Contribution (April 20, 2021).

[19] U.S. Department of State and U.S. Executive Office (November 2021). The Long-Term Strategy of the United States: Pathways to Net-Zero Greenhouse Gas Emissions by 2050. Accessible at: https://www.whitehouse.gov/wp-content/uploads/2021/10/US-Long-Term-Strategy.pdf.

recommends that the FSEIS include more robust analysis of the project proponent's adjacent oil prospects and the reasonably foreseeable actions related to these prospects, as ConocoPhillips envisions future developments of these prospects will be potential satellite locations that tie into the proposed Willow development. EPA notes there are 10 undrilled prospects west of the Willow reservoir, and that ConocoPhillips planned in 2019 to appraise the Greater Willow Area and optimize future development plans. ConocoPhillips stated that since the Willow discovery, it has discovered an additional 500 million barrels of oil equivalent (MMBOE) to 1.1 BBOE since 2016.[20]

Climate Change Analysis

Under section 102(2)(C) of NEPA, BLM must disclose and consider the environmental impacts of the proposed action, including whether and to what extent the proposed project and any of the alternatives would result in reasonably foreseeable GHG emissions that contribute to climate change.[21] Failure to fully disclose and consider impacts from GHG emissions increases the risk that a Court could find that the NEPA analysis is deficient.[22]

Consistent with prior EPA comments,[23] the GHG emissions from the proposed project are reasonably foreseeable direct and indirect effects of authorizing the project. We recommend the FSEIS evaluate the indirect effect, as well as the incremental impact, of the proposed action when added to other past, present, and reasonably foreseeable future actions.[24] EPA also recommends the FSEIS monetize the impacts and include a discussion of the "significance" of the social cost of these impacts when added to other past, present, and reasonably foreseeable future actions.[25]

EPA previously noted in its October 29, 2019, Draft EIS comment letter that the "[t]he Draft EIS projects that the annual average direct GHG emissions under Alternative B would be approximately 2% of the 2015 Alaska GHG inventory and would contribute to climate change impacts." EPA recommends that the FSEIS avoid expressing the overall project-level GHG emissions as a percentage of the state or national GHG emissions, as such comparisons tend to minimize project-level emissions impacts. Section 3.19.4 of the EIS indicates the cumulative annual average gross GHG emissions from the Project, the Coastal Plain, NPR-A, and other North Slope emissions would constitute approximately 3% of the U.S. net GHG emissions target for 2030 "and therefore cumulatively constitute a relatively small fraction of total impacts from U.S. GHG emissions." Given the current 30-year timeframe of the proposed Project and the challenge for all U.S. sectors to achieve economy-wide reductions aligning with the U.S. 2030 target and net-zero emissions by 2050, EPA recommends the FSEIS not characterize 3% of total U.S. emissions as being a relatively small fraction, and the FSEIS discuss how emissions beyond 2030 can be

---

[20] ConocoPhillips. North Slope Renaissance. September 2018. Accessible at: https://static.conocophillips.com/files/resources/jepsen-commonwealth-north.pdf.

[21] See 42 USC 4332(C).

[22] See, e.g., Ctr. for Biological Diversity v. Bernhardt, 982 F.3d 723, 740 (9th Cir. 2020) (finding the NEPA analysis of BOEM's approval of an offshore oil drilling and production facility was arbitrary and capricious when it failed to adequately consider GHG emissions associated with foreign oil consumption); Ctr. for Biological Diversity v. NHTSA, 538 F.3d 1172, 1217 (9th Cir. 2008) ("The impact of greenhouse gas emissions on climate change is precisely the kind of cumulative impacts analysis that NEPA requires agencies to conduct.").

[23] EPA's 9-13-2018 scoping comment letter "The EPA recommends that the Willow MDP EIS estimate the direct and indirect greenhouse gas emissions that would result from future oil and gas activities."

[24] Sierra Club v. FERC, 867 F.3d 1357, 1374 (D.C. Cir. 2017) ("[G]reenhouse-gas emissions are an indirect effect of authorizing this [natural gas pipeline], which FERC could reasonably foresee, and which the agency has legal authority to mitigate.").

[25] See 40 C.F.R. 1502.16(a)(1); 40 C.F.R. 1508.1(g)(3). See also Sierra Club v. FERC, 867 F.3d 1357 (D.C. Cir. 2017) ("The EIS accordingly needed to include a discussion of the 'significance' of this indirect effect… as well as 'the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions'.").

reconciled with a net-zero 2050 pathway. This "percentage" approach diminishes the significance of the notable climate damages caused by substantial project-scale GHG emissions and is misleading given the nature of the climate policy challenge to reduce incremental GHG emissions from a multitude of sources.

Climate Change in Alaska

EPA recommends the FSEIS also evaluate local Alaska climate policies and plans to determine appropriate opportunities to achieve GHG emission reduction and climate change goals. In Alaska, there are approximately 23 examples of local climate policies in the form of plans and assessments, as well as additional task forces, resolutions, and strategies.[26] Over 19 climate action efforts (i.e., plans and strategies) have emerged from Indigenous communities and seven were developed at the scale of Tribal government. Although these actions overwhelmingly focus on assessing and adapting to the current impacts of climate change that are already harming traditional Indigenous ways of life, inconsistencies with state or local policies aimed at addressing the causes or impacts of climate change should be considered.

As disclosed in the DSEIS, Arctic regions are already rapidly experiencing the effects of global climate change.[27] According to the document, Alaska's North Slope has experienced increased average temperatures, decreased sea ice and snow cover extent, an expanded growing season, and thawing permafrost. EPA recommends the FSEIS include additional discussions and references to case studies and lessons learned regarding actual documented incidents of climate change effects to North Slope oil and gas related infrastructure, and outline steps that will be taken to mitigate or avoid similar incidences from occurring for the lifetime of the Willow Project.

For example, a study led by a scientist at the American Association for the Advancement of Science and Technology quantified the economic impacts of climate change on Alaska public infrastructure. The cumulative estimated expenses from climate-related damage to infrastructure totaled $5.5 billion (2015 to 2099) without adaptation measures.[28] The study suggested that reducing GHG emissions could lessen damages by $1.3 billion. The largest damages were projected for the interior and southcentral Alaska, where the majority of the State's population lives. The largest source of damages resulted from road flooding caused by increased precipitation followed by damages to buildings associated with near-surface permafrost thaw.[29] Smaller damages were observed for airports, railroads, and pipelines. Costs associated with adaptation measures for permafrost thaw were not quantified since it would be more expensive than complete infrastructure replacement. This study suggests that climate damages to infrastructure will extend well beyond areas underlain by permafrost and that greater attention to future flooding risks is warranted.

Additionally, EPA recommends the FSEIS include a discussion on the potential impacts of stranded resources, including reserves, due to impeded access caused by thawing permafrost may be useful to the

---

[26] A. Steffen, S. A. Greenlaw, M. Biermann, and A. L. Lovecraft (2021). Alaska's Climate Change Policy Development. Fairbanks: Center for Arctic Policy Studies. Accessible at: https://uaf.edu/caps/our-work/CAPS-alaskas-climate-policy-development-March2021-corrected.pdf.

[27] See USGCRP, Fourth National Climate Assessment, Chapter 26: Alaska, available at https://nca2018.globalchange.gov/chapter/26/.

[28] A.M. Melvina et. al. (December 27, 2016). Climate change damages to Alaska public infrastructure and the economics of proactive adaptation. *Proceedings of the National Academy of Sciences*, 114, no. 2 (2017): E122-E131. Accessible at https://www.pnas.org/doi/full/10.1073/pnas.1611056113.

[29] University of Alaska Fairbanks. "Alaska infrastructure at risk of earlier failure." ScienceDaily. ScienceDaily, 24 June 2021. Accessible at: www.sciencedaily.com/releases/2021/06/210624161653.htm.

public's understanding of this project. EPA recommends the Purpose and Need discussion identify that the Supplemental EIS has been developed to address the environmental impacts associated with climate change.

Greenhouse Gas Emissions

The analysis calculates the net GHG emissions from the proposal and each action alternative when compared to a no-action baseline and discloses the impacts of the net emissions applying SC-GHG for each project, separating it into several different categories. However, EPA has concerns with the DSEIS's approach, particularly in terms of its replicability and transparency.[30]

The SC-GHG analysis contains two tables with monetized impacts across the different alternatives. Each is separated into direct and indirect emissions, foreign emissions, and "energy sources displaced by project." The analysis does not present annual emissions of each GHG (CO_2, CH_4, and N_2O) for the 30- or 31-year project time period. EPA found annual average emissions in Appendix E.2A for the gross direct and indirect emissions of each GHG for each alternative. Using the estimates from Appendix E2 of direct and indirect emissions, EPA got similar, but not identical, estimates of the SC-GHG at each discount rate presented in Table 3.2.7 and 3.2.8. EPA was unable to find the estimates of foreign GHG emissions displaced from other energy sources; Tables 3.2.2, 3.2.3, and 3.2.4 in the main contain the gross and net CO_2 equivalent (CO2e) totals over the life of the project but not estimates of individual GHG emissions.

Section 3.2.2.2 states "The BLM EnergySub Report (Appendix E.2B, The BLM Energy Substitution Model) presents an estimate of the amount of the project's crude oil production that would be substituted by replacement ("displaced substitute") energy sources in the No Action Alternative." That information is not in Appendix E.2B.

EPA recommends including information and data regarding the displaced emissions estimates, as well as the foreign estimates. While Appendix E.2B contains an explanation of the methodology used in the energy modelling, it does not contain anything about the outputs of that exercise. The results only appear as monetized impacts in the final tables, with no previous details. While several types of upstream emissions are quantified with the Bureau of Ocean Energy Management's Greenhouse Gas Life Cycle Energy Emissions Model (GLEEM) model, such as those associated with refining, transport, and usage, it is not clear if emissions associated with production are also quantified. Without this information, it is difficult to verify the accuracy of the estimates and inform decisions about the project.

Importantly, the executive summary of the DSEIS summarizes the impact of the project's GHG emissions using emissions totals without disclosing the impacts of those emissions.[31] The SC-GHG is the appropriate tool for this disclosure and the executive summary of the FSEIS should include the impact of the net emissions as estimated by the SC-GHG. The DSEIS currently calculates the social costs caused by the project to be $2 to $18 billion.[32] Information on impacts is required by NEPA and essential for BLM decision makers and the public.[33] EPA further recommends the FSEIS remove references to GHG emissions as a proxy or surrogate for the effects or impacts of the project on climate

[30] See 40 C.F.R. 1502.23 ((requiring identification of any methodologies used and explicit reference to the scientific and other sources relied upon for conclusions in an EIS).
[31] See, e.g., Draft EIS at p. 37 ("Direct and indirect GHG emissions due to the Project are assessed as a proxy for understanding the potential effects of the Project on climate change").
[32] Depending on the discount rate.
[33] See 42 USC 4332(C).

change,[34] as the SC-GHGs included in the analysis are a more appropriate estimate of climate damages.[35] In addition, EPA recommends the FSEIS include net emissions estimates not only based on market analysis reflecting business as usual inputs, but also a scenario that assumes GHG-reduction policies are achieved —the analysis should take into account, as well, the effect of the recently passed Inflation Reduction Act, which is projected to result in development of substantial new clean energy and storage over the life of the proposed project. This is necessary to reflect both the effect on the project of federal policies that will reduce demand for fossil fuels and the impact of the Project in the context of urgent and necessary actions currently being undertaken by the federal government to avoid the worse consequences of climate change.

To improve overall transparency and replicability, EPA recommends presenting a more accurate time path of emissions for each GHG; more details about assumptions (including on Net Present Value calculations); and a description of individual GHG emissions from energy sources displaced by the Project.

Environmental Justice

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations,[36] requires "each Federal agency… make achieving environmental justice part of its mission by identify and addressing, as appropriate, disproportionately high, and adverse human health or environmental effect of its programs, policies and activities on minority populations and low-income populations in the United States." EPA has consistently commented regarding the proposed project's impacts on the community of Nuiqsut, as the DSEIS identifies the proposed project "would result in disproportionately high and adverse environmental effects to the minority community of Nuiqsut." EPA identifies the following concerns and recommendations for addressing environmental justice impacts of the proposed project in the FSEIS.

Range of Reasonable Alternatives

EPA is concerned that BLM has eliminated potential alternatives for analysis that include reducing the number and/or size of drill pads within the Teshekpuk Lake Special Area (TSLA) due to the significant restriction of Nuiqsut subsistence uses (according to the Section 810 analysis) and strongly recommends that the FSEIS include an alternative or mitigation measure that does so. Given the data available now in the DSEIS and the high potential of technological advancements over the project life, EPA recommends that FSEIS consider deferring pad development in the TSLA. This deferral could allow the project proponent to undertake additional consultation with stakeholders in the community of Nuiqsut to further address concerns some stakeholders have raised regarding potential impacts to caribou migration and subsistence hunting, while also addressing recent litigation regarding development in the TSLA.

The recent decision by the U.S. District Court for the District of Alaska found that BLM leases "do not grant the lessee the unfettered right to drill wherever it chooses or categorically preclude BLM from considering alternative development scenarios" and that BLM is compelled to "mitigate reasonably foreseeable and significantly adverse effects on the surface resources of the National Petroleum Reserve in Alaska"[37] per 42 U.S.C. 6506a(b). The TSLA is a productive and unique wetland complex that

[34] See Sections 3.2.2 and 3.19.4.
[35] See Section 5 of Executive Order 13990 ("It is essential that agencies capture the full costs of greenhouse gas emissions as accurately as possible, including by taking global damages into account.").
[36] White House. Executive Order 12898. 1994. Accessible at: https://www.archives.gov/files/federal-register/executive-orders/pdf/12898.pdf.
[37] *Sovereign Iñupiat for a Living Arctic et al. v. Bureau of Land Management et al.*, 555 F.Supp.3d 739, 768 (D. Alaska 2021).

provides high-value habitat and calving grounds for the Teshekpuk Lake caribou herd which Nuiqsut resident may utilize for subsistence.[38] While Arctic wetlands typically have thinner soils and store less carbon than their temperate counterparts, their carbon sequestration rates range between 19 and 603 mass of carbon per unit area per year. Biological carbon sequestration is a valuable wetland function, especially considering the climate crisis. Over the proposed life of the project, this indicates that up to 40,361 tons of carbon would not be sequestered by wetlands as a result of proposed development.[39] This number does not account for the temporal lag of the wetlands to resume carbon sequestration associated with the abandonment and reclamation of the developed sites after the project has ended.

EPA recommends the FSEIS disclose additional analysis regarding existing alternatives on the "demonstrated development potential" of the Willow reservoir (e.g., the geologic analysis that validates the locations of the drill sites based on the production potential).

Public Engagement

Meaningful participation is based on the proposition that people should have a say in the decisions that affect their lives in a significant way. EPA recommends the NEPA process for the proposed project ensure the meaningful involvement[40] of communities with environmental justice concerns, which includes: ensuring that people have an opportunity to participate in decisions about activities that may affect their environment and/or health; the public's contribution can influence the regulatory agency's decision; community concerns be considered in the decision making process; and decision makers will seek out and facilitate the involvement of those potentially affected. EPA also recommends including an environmental justice specialist with experience in addressing public participation on the project review team.

During the August 8, 2022, public meeting on the second DEIS, it was noted the Native Village of Nuiqsut had requested an extension of the public comment period on June 6, 2022, as the public comment period overlaps with their residents' subsistence fall caribou hunting season. As noted in EPA's prior Final EIS comments on September 9, 2020, Nuiqsut residence expressed key concerns for public health during the development of the 2020 Draft EIS and 2022 DSEIS. The community is now expressing grave concerns with the public participation process for the second DEIS, and the proposed project's impacts to the village and their livelihoods. EPA is providing as a resource our Public Participation Guide provides tools for public participation and public outreach in environmental decision-making.[41] EPA also recommends the Guidance for Incorporating Environmental Justice Concerns in EPA's NEPA Compliance Analysis[42] as a resource describing mechanisms of achieving meaningful engagement.

---

[38] Bureau of Land Management. Record of Decision, National Petroleum Reserve in Alaska Integrated Activity Plan. Pg 11. 2022. Accessible at: https://eplanning.blm.gov/public_projects/117408/200284263/20058238/250064420/2022_NPRA_IAP_ROD_508.pdf.

[39] Ward, R. D. (2020). Carbon sequestration and storage in Norwegian Arctic coastal wetlands: Impacts of climate change. Science of the Total Environment, 748, 141343.

[40] Environmental Protection Agency. Learn About Environmental Justice. Accessible at: https://www.epa.gov/environmentaljustice/learn-about-environmental-justice#:~:text=President%20Clinton%20signing%20the%20EJ,environmental%20laws%2C%20regulations%20and%20policies. Accessed on 8-11-2022.

[41] Environmental Protection Agency. Public Participation Guide. 2022. Accessible at: https://www.epa.gov/international-cooperation/public-participation-guide.

[42] Environmental Protection Agency. Guidance for Incorporating Environmental Justice Concerns in EPA's NEPA Compliance Analysis, Page 47, Exhibit 4.

Effective public involvement strategies have four common characteristics: inclusiveness, representation, parity, and communication. Inclusiveness refers to the representation and involvement of all affected communities and stakeholders in the decision-making process. Representation refers to people who represent a specific community or stakeholder group and truly reflect that community's or stakeholder's views, values, and norms. Parity involves all stakeholder groups having equal opportunity and capacity to provide input and full participation, as well as an equal voice in the decision-making process. Finally, an effective communications strategy recognizes, respects, and values cultural diversity of communities and stakeholders that represent a specific race, ethnic group, gender, age, geographic region, and a host of other characteristics.[43]

Air Quality

EPA recommends the FSEIS consider the cumulative health impacts caused by total life-of-project emissions modeled for each alternative to be environmental justice concerns, as they have the potential to exacerbate existing negative health outcomes that disproportionately effect certain residents. The 2020 Record of Decision (ROD) recognized, "The project would increase air and noise emissions and human activity in Nuiqsut's subsistence use area. This could increase stress in some Nuiqsut residents and lead to or exacerbate mental health issues such as anxiety and depression."[44] Section 3.17.1 could be more robust to better address the air quality impacts that will affect Nuiqsut residents.

Subsistence

EPA recommends the FSEIS detail the magnitude of impacts from the proposed project, including infrastructure such as roads, on subsistence caribou harvesting practices vital to the Nuiqsut and other communities in the North Slope.[45] EPA is concerned the document did not include the magnitude of impacts from CD5, GMT-1 and GMT-2 roads on Nuiqsut caribou harvest.[46] The DSEIS describes how Nuiqsut is on the periphery of the two caribou herds which they rely upon and that they are particularly vulnerable to small changes in overall herd distribution or migration. The existing baselines of impacts is already substantial and adverse, as shown in the analysis – subsistence users have decreased their use of their traditional hunting grounds and shifted away from hunting in the Prudhoe Bay development area. Residents report they are unable to harvest caribou near developed areas because of the safety considerations of shooting near infrastructure, thus limiting their harvest abilities[47]. Appendix G of the DSEIS reports that Nuiqsut subsistence users have stated the roads pose both a physical and visual barrier to the caribou and have observed changes in caribou distribution and behavior around roads, including decreased availability of caribou closer to the community, indicating the proposed project will have similar adverse impacts as compared to the established development areas. The village of Nuiqsut is bound by oil production facilities in many directions, and EPA finds the additional infrastructure described in the project will further impede the access to subsistence resources needed by the village.

EPA recommends the FSEIS utilize the replacement cost method (RCM) and describe the monetary cost of replacing subsistence foods that may be lost due to the proposed project. RCM is a standard technique for evaluating the dollar value of ecosystem services. Project infrastructure has the potential to cause loss of access to subsistence areas, as stated in the DSEIS. When subsistence foods are not available,

---

[43] R. Bullard. Guidance for Incorporating Environmental Justice Concerns in EPA's NEPA Compliance Analysis. Clark Atlanta University, Atlanta, Georgia.

[44] Bureau of Land Management. 2020 Willow MDP Record of Decision. Accessible at: https://eplanning.blm.gov/public_projects/109410/200258032/20029172/250035373/2020-10-27_ROD_508.pdf.

[45] https://eplanning.blm.gov/public_projects/109410/200258032/20061719/250067901/ANCSA_Tribes%20Public%20Scoping%20Comments.pdf.

[46] 2022 Draft SEIS, Appendix G ANILCA Section 810 Analysis. Page 24.

[47] Appendix G ANILCA Section 810 Analysis Page 22.

nutritionally comparable substitutes must be purchased, placing a direct financial burden on subsistence users in the form of lost harvest, as well as an indirect burden from stranded assets that users purchase for harvest activities (e.g., ammunition, fuel, snow machines).

The DSEIS notes that given the demographics of communities living in the project area, barriers to subsistence harvests represent environmental justice concerns. EPA recommends FSEIS analyze the potential loss or increase of subsistence resources resulting from the proposed project, describe the meaningful engagement of the affected communities in identifying impacts and opportunities to mitigate those impacts, and describe measures to avoid and mitigate these impacts.

Employment

EPA recommends the FSEIS consider and identify any mitigation measures that preferentially direct benefits associated with increased employment to local residents, to ensure the speculative benefits from the development would be actualized for local residents.

Climate Resilience

The rapid pace of rising temperatures, melting sea ice, and thawing permafrost in Alaska is having a significant negative impact on critical infrastructure and traditional livelihoods, including access to foods, of Alaska Natives on the Alaska North Slope. Fare such as vegetation (e.g., berries), fish, terrestrial mammals, and marine mammals have provided sustenance as well as cultural, economic, medicinal, and community health since time immemorial.[48] Climate change is believed to be one of the key factors in causing 56% decline in populations of migratory caribou, a critical subsistence resource, in the Arctic over the last two decades.[49] Caribou select for specific location and forage characteristics within their range to correlate to support different stages of reproduction and rearing of their young. Climate change, specifically warmer temperatures and earlier snowmelt is affecting wildlife by changing the seasonal timing (impacts of insect avoidance),[50] forage availability, and habitats.[51] Existing infrastructure has caused deflections or delays of caribou movement from roads and associated ground traffic and human activity have been documented both by active harvesters, reported in annual studies from 2010-2021, and during behavioral studies on caribou.[52] The DSEIS reports these delays are likely to continue to occur in association with the project and may increase in frequency and duration. These delays could result in reduced resource availability particularly during the fall hunting season when residents wait for caribou to migrate into hunting grounds to the west of the community.[53] The Alaska Native Tribal Health Consortium reported that 53% of households in Nuiqsut were unable to get enough subsistence foods.[54]The DSEIS accurately shows that subsistence users have observed drastic changes in their subsistence resources in several compounding ways. A key uncertainty is how Indigenous people will adapt to climate change, given their reliance on local, wild foods and the geographic isolation of some communities, like Nuiqsut. Given the potential disproportionate adverse impacts of the project to communities with environmental justice concerns described in the DSEIS,[55] EPA recommends the FSEIS include a focused Health Impact Analysis within the project area evaluating health impacts

[48] U.S. Climate Resilience Toolkit. Tribal Nations. Accessible at: https://toolkit.climate.gov/topics/tribal-nations.
[49] Draft SEIS, Chapter 3.19, Page 333.
[50] Draft SEIS, Chapter 3.12, Page 192.
[51] Draft SEIS, Chapter 3.19, Page 332.
[52] Draft SEIS, Chapter 3.16, Page 279.
[53] Draft SEIS, Chapter 3.12, Page 192.
[54] Alaska Native Tribal Health Consortium, Center for Climate and Health. Climate Change in Nuiqsut, Alaska Strategies for Community Health. 2013. Accessible at: https://anthc.org/wp-content/uploads/2016/01/CCH_AR_072014_Climate-Change-in-Nuiqsut.pdf.
[55] Draft SEIS, Section 3.16.2.3.2.1.

caused by changes to subsistence, sociocultural impacts, air quality, water quality, and cumulative impacts caused by climate change.

EPA recommends the FSEIS analyze a mitigation measure that would help ensure the preservation of the highly valued subsistence foods following harvest practices in each of the impacted villages[56] analyzed in the DSEIS. The U.S. Climate Resiliency Toolkit[57] reports that warming conditions can also cause traditional underground ice cellars to melt. These cellars are cut directly into the permafrost to store food. When the permafrost melts, the caribou, seal, and other meat stored in these cellars can rot and become unusable. The Toolkit offers three potential adaptive solutions that offer a practical way to mitigate the potential impacts of climate change to the villages that utilize the subsistence resources that could be impacted by the project:

- Improving the storage environment in existing cellars.
- Establishing new cellars in a location with a more conducive environment.
- Developing alternative methods for food storage.

One factor to consider is that traditional Alaskan subsistence has been relatively independent of the global market and thus less vulnerable to disruptions. Replacing traditional technologies with energy intensive, active refrigeration may undermine long term food security and should be considered an additional measure while simultaneously bolstering traditional food storage methods, not replacing it.

Climate Adaptation

EPA recommends that the FSEIS analyze a mitigation measure to address food security issues in Nuiqsut, such as the construction of a public greenhouse. Mitigation measures to address food insecurity would allow impacted communities better adapt to the future climate by mitigating the difficulty and expense of purchasing produce in a geographically isolated community. The establishment of local fresh food production corresponds to known need of the residents of Nuiqsut; a 2013 Health Impact Assessment studying the impacts of climate change determined that food security is an issue in Nuiqsut. Approximately a third of households (38%) were not able to get enough healthy food to meet their needs and 25% percent of households reported that at times they did not have enough food to eat.[58] As discussed above, Nuiqsut will be profoundly impacted by the Project by impeding access to, and the availability of, their traditional food sources and increasing their food insecurity. Climate change is impacting these same resources concurrently, creating a greater burden on the residents of Nuiqsut.

Cumulative Impacts and Environmental Justice

EPA has significant concerns the cumulative impacts of this project and the proposed future developments of West Willow and Greater Willow 1 and 2 could have significant potential disproportionate adverse impacts on communities with environmental justice concerns. As noted above, EPA recommends that the FSEIS include more robust analysis of the project proponent's adjacent oil prospects and the reasonably foreseeable actions related to these prospects, as ConocoPhillips envisions future developments of these prospects will be potential satellite locations that tie into the proposed Willow development. EPA notes there are 10 undrilled prospects west of the Willow reservoir, and that ConocoPhillips planned in 2019 to appraise the Greater Willow Area and optimize future development

[56] Utqiaġvik, Atqasuk, Nuiqsut, Anaktuvuk Pass, Point Lay, Wainwright.
[57] U.S. Climate Resilience Toolkit. Iñupiat Work to Preserve Food and Traditions on Alaska's North Slope. Accessible at: https://toolkit.climate.gov/case-studies/i%C3%B1upiat-work-preserve-food-and-traditions-alaskas-north-slope.
[58] Alaska Native Tribal Health Consortium, Center for Climate and Health. Climate Change in Nuiqsut, Alaska Strategies for Community Health. 2013. Accessible at: https://anthc.org/wp-content/uploads/2016/01/CCH_AR_072014_Climate-Change-in-Nuiqsut.pdf.

plans. ConocoPhillips stated that since the Willow discovery, it has discovered an additional 500 million barrels of oil equivalent (MMBOE) to 1.1 BBOE since 2016.[59]

EPA is concerned these future developments will further exacerbate the indirect impacts on the availability of caribou, as these projects would result in additional significant infrastructure that would further block or divert caribou movement into residents' hunting areas west of the community.[60] Including this information in the cumulative impacts can be applied to better understand the cumulative impacts to the TLSA, caribou that use this resource, and impacts to subsistence users of Nuiqsut, as well as identifying mitigation measures from these potential cumulative impacts, including moratoria on further development to avoid destruction of irreplaceable cultural resources.

Consultation with Tribal Governments
EPA encourages BLM to consult with the Tribes and incorporate feedback from the Tribes when making decisions regarding the project. EPA recommends the FSEIS describe the issues raised during the consultation and how those issues were addressed.

Module Transfer Islands
EPA recommends that BLM clarify the text regarding Options 1 and 2 Module Transfer Islands to explain how the road access associated with these facilities are minimized to protect the TSLA. We note these locations are not within Bear Tooth Lease Unit where the applicant has the right to access with conditions. However, they are both located immediately adjacent to and would require extensive roads crossing out of the lease area and into the TLSA. Activities within the TLSA are to "be conducted in a manner which will assure the maximum protection of such surface values to the extent consistent with the requirements of this Act for the exploration of the reserve" (42 U.S.C. § 6504(a); 43 C.F.R. § 2361.0-5(f); 42 Fed. Reg. 28,723 (June 3, 1977) ("The purpose of this publication is to give notice of the designation of the Utukok River Uplands, Teshekpuk Lake, and Colville River as special areas within the" NPR-A.); see also 43 CFR § 3131.3.).

Protection of Wetlands
Protection of wetlands has been a key concern for EPA regarding the proposed project and provides the following recommendations to address our ongoing concerns. EPA recommends that FSEIS evaluate the impacts due to the loss of wetland functions, including but not limited to, carbon storage and sequestration, water quality improvement, biodiversity, and ecosystem services. In particular, wetlands in the Arctic can also be a source of GHG emissions, which should be discussed and estimated in the FSEIS.[61]

Infrastructure
EPA recommends the FSEIS aligns with the regulatory requirements for the Clean Water Act Section 404 in identifying alternatives that represent the least environmentally damaging practicable alternative.

EPA is concerned about the environmental impacts associated with constructing up to two separate airstrips in the project area, given the existing availability of the Alpine airstrip that is not within a special protection area. The text of the DSEIS has not demonstrated why extending and improving the

[59] ConocoPhillips. North Slope Renaissance. September 2018. Accessible at: https://static.conocophillips.com/files/resources/jepsen-commonwealth-north.pdf.
[60] Draft SEIS, Section 3.16.2.3.2.1.
[61] Bruhwiler, L., Parmentier, FJ.W., Crill, P. *et al.* The Arctic Carbon Cycle and Its Response to Changing Climate. *Curr Clim Change Rep* **7**, 14–34 (2021). https://doi.org/10.1007/s40641-020-00169-5.

applicant's existing airstrip is not a practicable alternative to the alternative of constructing up to two separate airstrips that would represent up to 87 acres of fill and impact to the existing landscape, including Waters of the United States (WOTUS). Impacts to wetlands, including WOTUS, would be limited by expanding and updating an existing facility. EPA notes there are discrepancies between the reported driving time in Table D.3.3. between the existing Alpine airport and the Willow development area (Google directions estimated drive time is about an hour (~31 miles); Table D.3.3 describes a 2-hour drive time).

EPA strongly encourages BLM to consider the selection of an alternative that either integrates airstrips with roads or uses existing airstrips to reduce impacts to surface resources.

Temporal scale impacts of construction and infrastructure-related activities can occur long after reclamation, depending on which BMPs are put in place prior to and during the project. Removal of the infrastructure does not necessarily eliminate impacts caused by the structures after they are gone. EPA recommends the FSEIS fully describe the extended temporal scale of impacts to water resources after construction and infrastructure-removal have been completed.

Watershed Health

EPA remains concerned with the use of the impervious cover model to predict watershed degradation due to wetland losses within vast HUC 10 watersheds, as this tool is designed to predict water quality impacts, primarily to streams not wetlands, at much smaller scales. Watershed health is a distinct concept from impact analysis. If a watershed remains healthy because impacts are below a certain threshold, that does not mean there are no impacts. Specifically, Schueler et al (2009) found the impervious cover model "does not appear to be the best metric to predict stream quality indicators below 10%." EPA continues to recommend the FSEIS include analysis of the impacts to aquatic resource functions and values at the site-specific scale, which will help to inform decisions regarding appropriate mitigation.

Mitigation

EPA recommends the FSEIS aligns with the regulatory requirements for the Clean Water Act Section 404 and provides EPA's previous comments to the Army Corps of Engineers[62] regarding the final Compensatory Mitigation Plan as a resource.

Adaptive Management

EPA recommends the FSEIS identify and describe adaptive management plans in the event surrounding waterbodies do not return to baseline within an acceptable time limit.

Alternatives

EPA remains concerned about the proposed level of reclamation activities proposed for future abandonment and requests more information to demonstrate the selected alternative complies with CWA 404(b)(1) guidelines. EPA recommends the FSEIS include consideration of additional mitigation measures to clearly validate compliance with these guidelines.

Protection of Surface Water Resources

Given the current status of climate change impacts to Arctic Alaska, EPA recommends the FSEIS consider the potential impacts of this proposed project to the long-term stability of the surface value resources in the TSLA. To maximize protection the surface values TLSA, we recommend the FSEIS

[62] EPA R10 letter to USACE, November 17, 2020.

include an adaptive management plan "that provides detail regarding how any unanticipated surface water flow blockages would be identified and corrected as quickly as possible, to avoid lasting environmental impacts" for monitoring and mitigation of potential surface water flow impacts throughout the project area. Although outside of the TLSA, EPA supports the inclusion of a measure to prepare and utilize an adaptive management plan for the Colville River crossing at Ocean Point as well to holistically minimize these types of impacts across the project area.

The DSEIS identified eight potential floodplain impacts where gravel roads, pads, or boat ramps block or restrict the flow of surface water during spring break up. The primary goal of an adaptive management plan is to detect and correct such unanticipated blockages before they result in further environmental degradation. EPA recommends the adaptive management plan also address how the potential negative impacts identified in Section 3.8.2.3.3 might be measured; what degree of change would trigger the requirement for rehabilitation; and potential methods and standards for rehabilitation.

EPA recommend mitigation for impacts to surface water resources in the project area also include collection of stage monitoring for both Willow Creek 3 and Lake M0015 during ice-free periods for the constructed freshwater reservoir. This will ensure adequate water levels are maintained.

Monitoring and Mitigation of Thaw and Thermokarst Impacts

In EPA's September 9, 2020, Final EIS comment letter, EPA recommended that the ROD include an adaptive management plan for monitoring and mitigation of potential thawing and thermokarst impacts for all project structures, including roads, pads, and the constructed freshwater reservoir.

Consistent with that prior recommendation, EPA recommends the FSEIS include an adaptive management plan responsive to the anticipated impacts of climate change for monitoring and mitigating potential thawing and thermokarst impacts for all project structures, including roads, pads, and the constructed freshwater reservoir to further protect the TLSA.

The DSEIS discloses the potential for permafrost thaw and thermokarst impacts due to gravel roads and pads, other project infrastructure, dust deposition, and compaction due to ice roads and pads. We support the many project design features intended to reduce these impacts, as well as the additional suggested mitigation measure to "monitor thermokarsting, the depth of the active layer, and the compression of soil and vegetation in the annual resupply ice road footprint, for footprints that are used consecutively each year."

Geological Information

General

EPA recommends the FSEIS include a section specific to the geological analysis of the Willow reservoir. EPA is concerned the "demonstrated development potential" of the Willow reservoir is not demonstrated in the DSEIS as the project proponent's interest via leasing and development does not scientifically substantiate the development potential of the Willow reservoir. The document does not include a section dedicated to the geological analysis of the Willow reservoir, which is the most impacted environmental resource; instead, portions of this discussion are fragmented throughout the document and appendices. Several critical aspects of the assessments tier from this data, but it is not presented clearly for the public's understanding. The document discusses how additional characterization of the target reservoir and further engineering refinements have been completed, but a summary of this data is not provided. We recommend that FSEIS include a separate section dedicated to

this discussion.

EPA notes the exploration well data for the Willow play is currently held by the Alaska Oil and Gas Commission, the state agency that permitted the wells in the reserve, and the project proponent has instigated litigation to keep that data proprietary. Other data, such as geophysical analysis derived from seismic investigations are not summarized in the DSEIS. EPA finds inclusion of this data crucial to distinguish production estimates from the Willow reservoir discussed in the DSEIS, from data that will support the cumulative impacts analysis for the West Willow and Greater Willow 1 and 2 prospects.

EPA has previously, and continues, to advise more robust analysis. We previously advised the BLM mirror discussion provided in the Bull Mountain Master Development Plan EIS, which includes a dedicated section for the discussion of the regional physiography, geologic history, hydrocarbon source rocks, and geologic hazards. EPA recommends that the FSEIS include a(n):

- Description and figures showing the geophysical data used to evaluate the shallow geological hazards, existing or potential (e.g., similar to the Alpine incident).
- Discussion and figures showing the location, stratigraphy, and structure of the hydrocarbon resource(s).
- Description of the predicted rate profile for oil, water, and gas with the corresponding rate of injection for water and gas.
- Description of the reservoir rock properties, reservoir fluid properties and an estimate of the recoverable resources supported by information within the document.
- Description of the subsurface depletion plan including well count, well placement, well profiles, well depth and bottom hole locations.
- Analysis of surface and subsurface conditions that may present hazards to rig set down, construction, drilling operations, production and processing operations, pipeline construction, and/or pipeline operation.

Analysis

EPA recommends the FSEIS analyze the published high bound of the proposed Willow project, which is 800 MMBOE. In September 2018, ConocoPhillips estimated the gross discovered resources were estimated to range from 450 – 750 million barrels of oil equivalent (MMBOE) [63]. Appraisal analysis was based on geophysical data and exploration wells and indicated additional resources available on trend to the north and south. Additional data was collected in 2019, and ConocoPhillips increased the upper bound to 800 MMBOE.[64]

Technological Advances

EPA recommends the FSEIS include a regional assessment of how technological advances have changed the amount of petroleum hydrocarbon extracted from the North Slope by reviewing the initially estimated recoverable reserves, compared the current production values. This analysis may assist in developing a significance determination for the GHG emissions, to better validate a comprehension understanding of production through time, and between projects.

Technological improvements continue to reshape oil and gas production (e.g., green well completions, vapor recovery units, engine upgrades for non-road vehicles, and closed loop drilling fluid systems).

[63] https://static.conocophillips.com/files/resources/fact-sheet-willow-final.pdf.
[64] ConocoPhillips. Willow Fact Sheet. Accessible at: https://static.conocophillips.com/files/resources/fact-sheet-willow-final.pdf.

Some innovative approaches tend to generate greater environmental impacts than those associated with conventional production techniques, i.e., increased surface usage and associated dischargers. Although horizontal drilling techniques have emerged to connect more reservoir surface to the wellbore, unconventional development on a cumulative basis appears to be expanding the oil and gas industry's environmental footprint.

Reserve Growth

In our DSEIS scoping letters, EPA encouraged BLM to include a mitigation measure that requires a NEPA adequacy review be completed if the barrels per day gross annual average is greater than 10% of the original barrels per day production target (disclosed in the development's most recent NEPA document) over a two-year period; or when the cumulative recovered reserves is greater than 10% of the original estimated recoverable reserves (disclosed in the development's most recent NEPA document).

EPA continues to recommend this mitigation measure be included in the FSEIS as the DSEIS does not discuss reserve growth. Reserve (or field) growth, which is an appreciation of total ultimate reserves through time, is a well-recognized phenomenon, particularly in mature petroleum provinces.[65] Factors that contribute to the reserve growth of fields can be grouped into three categories that are not independent of each other: revisions of reserve calculations, improvements in recovery percentage, and delineation of additional in-place oil and gas.

Once production begins, reserves (the oil and gas yet to be produced) are commonly classified into the following groups:

- Gross reserves: total reserves (disregarding the economic interest breakdown).
- Net reserves: the portion of the gross reserves attributable to the interests owned by the project proponent after deducting royalties and interests owned by others.
- Indicated additional reserves: reserves which cannot yet be considered "proved"[66] but are expected to be recoverable where improved recovery techniques effects are utilized, or additional reservoir infield information is made available.

United States Geological Survey found the estimate of remaining reserves (and thus of field size, which equals cumulative production plus remaining reserves) is more likely to be too low than too high when surveying oil and gas production sites nationally. In other words, as years pass, successive estimates of field size tend to increase. This phenomenon is referred to as reserve growth (also known as field growth, reserves appreciation, or oil-field reserve appreciation). Factors that contribute to reserve growth include delineation of additional oil and gas in-place, through areal extensions of fields and development of new pools and reservoirs within fields, higher recovery percentages of the oil and gas in-place, resulting from infill drilling and the application of improved technology and advanced engineering methods.

Revisions of reserve calculations (commonly upward) are based on experience gained in the course of developing and operating a field. Reserve-growth patterns of individual U.S. fields are highly variable, however, for U.S. fields taken as a whole, however, reserve growth is strongly positive and is a major

[65] Using the Alpine Development as the analytical model, it was planned to produce about 430 million barrels of recoverable reserves over its design life; however, it was reported in 2021 that the combined pool has produced 504.4 million barrels of oil cumulatively since operations began. EPA used the AOGCC reported combined pool production value. We note that production is ongoing.

[66] The amount of oil or natural resources contained under a piece of land with a 90% or greater probability of profitable extraction.

component of remaining U.S. petroleum resources. Assessments of the remaining oil and gas potential of the U.S. and of the world are strongly affected by the assessor's models and forecasts of future reserve growth.[67]

Extended Reach Drilling

EPA understands that ConocoPhillips developed its drill pad locations to provide maximum accessibility to the resources based on existing extended-reach drilling technology and reservoir location and characteristics. ConocoPhillips' recently evolved abilities (announced May 2022) to use extended reach technology to access 60 percent more acreage from a single pad. EPA recommends the FSEIS include a reevaluation of the drilling site locations in consideration of the new extended reach technology which may provide for meeting production goals and reducing impacts to environmentally sensitive areas.[68]

Cumulative Impacts

EPA recommends that FSEIS include more robust analysis of the West Willow, and Greater Willow 1 and 2 oil prospects, as ConocoPhillips envisions future developments of these prospects will be potential satellite locations that tie into the proposed Willow development. EPA notes there are 10 undrilled prospects west of the Willow reservoir, and that ConocoPhillips planned in 2019 to appraise the Greater Willow Area and optimize future development plans. ConocoPhillips stated that since the Willow discovery, it has discovered an additional 500 MMBOE to 1.1 BBOE since 2016.[69]

It is important to understand the cumulative impacts to the TLSA, and caribou that use this resource, as well as identifying mitigation measures from these potential cumulative impacts to subsistence users of Nuiqsut, including restricting or prohibiting additional drilling.

Permafrost

EPA appreciates BLM's discussion of the March 2022 natural gas leak that occurred at the Alpine Development Central Facility in the Colville River Unit. This facility is located on state land, about eight miles from the Native Village of Nuiqsut. Approximately 7.2 million cubic feet of natural gas was released through the gravel from one of its drill pads, known as CD-1. Approximately 300 employees were evacuated, prompting 20 families from the nearby community of Nuiqsut to leave. Investigation of the incident revealed that the gas leak was likely caused by thawed permafrost areas surrounding each wellbore that coalesced into a single large zone referred to as the "thaw bulb." Modelling indicated that permafrost will re-freeze around the wellbore after a well is shut in. Continued freeze and thaw cycles at the surface likely caused cracks and fractures in the permafrost soil directly below the CD-1 pad, providing a pathway for gas to migrate to the surface.[70]

EPA recommends the FSEIS extend the analysis area for permafrost impacts to 500 feet of the proposed drill sites. The Alpine incident report shows that the natural gas from a shallow gas formation at about 3,000 feet subsurface flowed upwards along the wellbore before permeating the permafrost zone at

---

[67] US Geological Survey. Survey Bulletin 21-72-A: Introduction to Aspects of Reserve Growth. 2001. Accessible at: https://pubs.usgs.gov/bul/b2172-a/b2172-a.pdf.

[68] Y. Rosen. (May 24, 2022). "ConocoPhillips starts production at new Alpine satellite field". Accessible at: https://alaskapublic.org/2022/05/24/conocophillips-starts-production-at-new-alpine-satellite-field/.

[69] ConocoPhillips. North Slope Renaissance. September 2018. Accessible at: https://static.conocophillips.com/files/resources/jepsen-commonwealth-north.pdf.

[70] ConocoPhillips (May 3, 2022). Incident Investigation Report for the Alpine CD-1 Gas Release. Accessible at: https://static.conocophillips.com/files/resources/attachment-a-incident-investigation-report.pdf.

1,500 feet subsurface, then migrating laterally upwards (through the permafrost thaw bulb) until it escaped into the atmosphere about 375 feet away from the WD-03 OA wellbore at the CD-1 site.[71]

We recommend the FSEIS discussion include analysis of the drill site thaw bulbs, and their potential impacts to operations or the amount of methane that may be released from the degradation of the permafrost. Analysis and mitigation measures that have been derived as "lessons learned" from the Alpine incident should be directly identified.

Air Quality

EPA appreciates BLM comprehensively responded to comments from our preliminary draft review that we provided as a Cooperating Agency. We note that in one part of the analysis shows that some impacts would be slightly above the short-term National Ambient Air Quality Standards (NAAQS) for nitrogen dioxide (NO_2). EPA finds the DSEIS used a highly conservative screening evaluation to estimate the effects of raising road speed limits from 25mph to 35mph; therefore, the analysis is so conservative that we anticipate the true impacts will not exceed the NAAQS.

[71] ConocoPhillips. Incident Investigation Report. May 2022. Accessible at: https://static.conocophillips.com/files/resources/attachment-a-incident-investigation-report.pdf.