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VIA EMAIL

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RE: Comments on the Draft Environmental Assessment for Project Tundra
On Behalf of Sierra Club and CURE

Dear Ms. Fayish:

Sierra Club and CURE submit these comments on the draft Environmental Assessment (EA) for DOE/EA-2197: North Dakota CarbonSAFE: Project Tundra.

The Sierra Club is a national nonprofit organization with 67 chapters, including in North Dakota and Minnesota, and more than 832,000 members dedicated to exploring, enjoying, and protecting the wild places of the earth; to practicing and promoting the responsible use of the earth's ecosystems and resources; to educating and enlisting humanity to protect and restore the quality of the natural and human environment; and to using all lawful means to carry out these objectives. In North Dakota, we have nearly 3,000 members and supporters; in Minnesota, we have nearly 57,000. Our goals include restoring clean air and water, providing affordable clean energy, supporting family-sustaining jobs, and addressing inequities in our response to climate disruptions. A key component of meeting this goal is achieving 80% carbon pollution-free electricity by 2030.

CURE is rural-based, with staff across Minnesota. CURE knows rural people, lands, and ecosystems are vital to helping solve some of the biggest problems faced by Minnesota and the nation. We help to tell the story of a vibrant rural future, lift-up people to lead, and work for policies and laws to make a better future possible for everyone. CURE's work includes a long-term focus on rural electric cooperative governance and evolution to advance a clean, healthy, and sustainable energy future. Minnkota Power Cooperative serves member co-ops in North Dakota and Minnesota, providing electricity to the rural Minnesotans that CURE hears from and works with on a regular basis. It is of paramount importance to CURE that the Department of Energy not shortchange these Americans with an inadequate environmental review.

I. Introduction

Project Tundra "would be the world's largest post-combustion CO2 capture and geologic storage project," and includes a proposal to capture and permanently store CO2 emissions from Minnkota's existing Milton R. Young Station, a lignite coal-fired power plant in Oliver County, North Dakota.[1] The project consists of the carbon capture facility, a 0.5-mile-long CO2 flowline; injection and disposal wells; and sequestration. And yet, despite the project's scale and multiple self-evident impacts—from air pollution to water withdrawals—DOE's draft environmental assessment (EA) inappropriately failed to conclude that an environmental impact statement (EIS) is required. DOE defined the purpose and need statement so narrowly as to eliminate any alternatives from consideration, in contravention of NEPA. The EA also has mischaracterized the "no action" alternative by asserting, without basis, that without the DOE grant the Milton Young plant will continue to operate at current levels for the next 20 years. In fact, the evidence indicates that without the DOE funding, the plant would likely retire by 2035, resulting in a 100% reduction in its carbon emissions. When the "No Action" baseline is corrected, it is clear that the carbon emissions impacts of pursuing Project Tundra would be significant. The EA also overstates the project's efficacy. In fact, Project Tundra appears so poorly designed that it raises questions as to whether it meets DOE's purpose and need of advancing carbon reductions, and therefore should not even be considered a "feasible" alternative for NEPA purposes. The EA also neglects to sufficiently address impacts to the Missouri River and surrounding communities from the project's proposal to withdraw nearly 5 billion gallons of water. For all of these reasons, and as further discussed herein, we recommend that DOE find that the environmental impacts of Project Tundra would be significant, and therefore that an EIS is required before taking any further steps to advance this project. The EIS should address all of the issues identified in these comments.

II. The Agency Has Defined the Purpose and Need of This Project Too Narrowly, Blinding It to the Range of Appropriate Alternatives that Would be Better for the Environment.

The EA states that "[t]he purpose and need for DOE action is to advance the commercial readiness of CCUS by constructing a commercial-scale geologic storage complex and associated CO2 transport infrastructure" and to "further the development, deployment, and commercialization of technologies to capture and geologically store CO2 emissions securely in the subsurface." (1-3.) It further states that "Oliver County, North Dakota was proposed because a fully characterized storage complex: (1) is able to receive and safely store CO2 in sufficient quantities to meet the DOE goals of 50 million metric tons over a 30-year period; (2) is located in proximity to one or more CO2 sources that can supply those quantities; and (3) can be connected to the sources by a transport system that can be built and operated economically." This

[1] EA at 2-2.

purpose and need is so narrow and specific as to preclude from consideration all alternatives other than the Proposed Action, in contravention of NEPA requirements.[2]

First, the agency has constrained its analysis of better alternatives by limiting the purpose and need to the particular technology proposed by the applicant. While the agency must analyze the impacts for the proposed project, it does not need to fully constrain its analysis to one technology when the federal government is pursuing multiple pathways to advancing decarbonization.

Considering the broad purview of federal agencies' programs and policies to decarbonize the economy, it would be appropriate for DOE to expand its purpose and need statement to include analysis of any viable technology that would reduce carbon emissions from energy that would replace the current coal plant. As discussed further below, coal plants of similar age to Milton Young are increasingly uneconomic compared to portfolios of clean energy alternatives that can replace their energy, capacity and reliability benefits. DOE should consider whether incentivizing alternatives to Project Tundra would deliver far greater benefits for the amount of tax dollars spent.

This type of analysis of alternative generation sources would help inform both the agency and the public about better uses of federal funding under myriad other programs administered by DOE and other federal agencies, such as USDA. CEQ has stated that "Agencies have long considered myriad factors in developing a purpose and need statement. These include the agency's mission and the specifics of the agency decision, including statutory and regulatory requirements. Factors also may include national, agency, or other policy objectives applicable to a proposed action, such as a discretionary grant program targeted to achieve certain policy goals." CEQ Phase I regs, 2022.[3] But CEQ also makes clear that "There may be times when an agency identifies a reasonable range of alternatives that includes alternatives—other than the no action alternative—that are beyond the goals of the applicant or outside the agency's jurisdiction because the agency concludes that they are useful for the agency decision maker and the public to make an informed decision." *Id.* Here, it would be appropriate for DOE to adopt a broader purpose and need of advancing the goal of decarbonizing the economy in line with President Biden's commitments.

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[2] The CEQ Phase I regulations further state: "It is contrary to NEPA for agencies to "contrive a purpose so slender as to define competing `reasonable alternatives' out of consideration (and even out of existence)." *Simmons* v. *U.S. Army Corps of Engineers,* 120 F.3d 664, 666 (7th Cir. 1997) (citing 42 U.S.C. 4332(2)(E)). Constricting the definition of the project's purpose could exclude "truly" reasonable alternatives, making an EIS incompatible with NEPA's requirements. *Id. See also, e.g., Nat'l Parks & Conservation Ass'n* v. *Bureau of Land Mgmt.,* 606 F.3d 1058, 1070 (9th Cir. 2010) ("Agencies enjoy `considerable discretion' to define the purpose and need of a project. However, `an agency cannot define its objectives in unreasonably narrow terms.'" (internal citations omitted)).

[3] Available at https://www.federalregister.gov/documents/2022/04/20/2022-08288/national-environmental-policy-act-implementing-regulations-revisions

Moreover, the EA's purpose and need statement is too narrow even within the scope of advancing commercially viable carbon storage and sequestration. The EA states that "[t]he purpose and need for DOE action is to advance the commercial readiness of CCUS by constructing a commercial-scale geologic storage complex and associated CO2 transport infrastructure," and to "further the development, deployment, and commercialization of technologies to capture and geologically store CO2 emissions securely in the subsurface." (EA at 1-3.) But there are likely many other geologic areas and sources that are worthy of consideration, and that are likely to deliver far greater benefits in terms of advancing commercialization of carbon sequestration and storage.

DOE's funding could be better used to achieve the objective of "advanc[ing] the commercial readiness of CCUS and "further[ing] the development, deployment, and commercialization of technologies to capture and geologically store CO2 emissions securely in the subsurface" by pursuing CCS at other sources. It is widely accepted that it does not make economic sense to put billions of new dollars into old coal plants like Milton Young that are near the end of their design life. Plants like Milton Young are already likely more expensive to operate than cleaner alternatives, even before installing a technology that will make it even costlier to operate. For that reason, research models designed to examine the most cost-effective decarbonization pathways, such as the Princeton REPEAT study, indicate that most coal plants of Young's age should be retired rather than retrofitted with CCS.[4] In contrast, there are other sectors of the economy that many experts believe will require use of CCS in order to achieve decarbonization, such as certain types of heavy industry. At minimum, then, DOE should have evaluated whether it could better serve the goal of advancing decarbonization by seeking projects at the types of sources that are more likely to deploy CCS on a widespread basis. The EA impermissibly excludes such sources from consideration by circumscribing the purpose and need so narrowly that only this specific geologic formation and Milton Young meet its criteria.

A broader statement of purpose and need is particularly needed here, where the proposed Project is so poorly-designed that it is unclear whether it would even advance the narrow goal stated by DOE at all. As discussed in section III.B.3.c, below, the Project Tundra design is so questionable and shoddy that it appears unlikely to advance DOE's larger goal of commercializing carbon capture at coal plants, as it likely will not meet IRS standards to gain the tax credits necessary to make it financially viable. The EA should fully assess the opportunity-cost of funding a weak project design, namely Project Tundra, over saving this scarce public funding for a better proposal from a more reliable applicant.

DOE's funding for demonstration projects should not be used to prop up uneconomic designs for carbon capture. Both the agency and Project Tundra's own consultants assume that it would not

[4] Study results available at https://repeatproject.org/results?comparison=benchmark&state=national&page=1&limit=25#data

be built without significant support from DOE at this stage.[5] DOE should broaden the purpose and need to consider other alternatives that would more cost-effectively advance decarbonization goals, such as replacing the Young plant with clean energy. At minimum, the purpose and need should be expanded to other sources and geologic sites.

III. Project Tundra Will Have Significant Impacts on the Environment, and So Further Consideration Requires a Full Environmental Impact Statement.

A. The EA mischaracterizes the "no action" or "baseline" alternative, resulting in a flawed analysis of Project Tundra's comparative environmental impacts.

The EA wrongly assumes the baseline "no action" alternative would result in Young continuing to emit its current levels of carbon emissions, uncontrolled, until 2048. This assertion is without basis and is unsupported by the record. Rather, the evidence indicates that the "no action" alternative would result in the Young plant's retirement (closure) by no later than 2032, at which point its carbon emissions and (many other environmental impacts) would be eliminated. It also asserts that Project Tundra will reduce carbon emissions, when in fact the evidence shows it might actually increase them—even under DOE's faulty assumption that the No Action alternative would include operating Young until 2048.

DOE wrongly asserts that if Project Tundra is not funded, the Milton Young coal-fired power plant will continue to operate at its current levels, with its carbon emissions unabated, until 2048. (EA 3-1 and 3-54.) This assertion is arbitrary and lacks any evidentiary support.

It is entirely unrealistic and irrational to assume, as the EA does, that a coal plant that is already 50 years old will continue to operate for another 25 years. The average age of a coal plant when it is retired is 50.[6] Moreover, experts widely agree that most coal plants of Young's age in the United States are uneconomic compared to portfolios of clean energy alternatives such as wind, solar, and battery storage, which are plentiful in North Dakota and the surrounding states.[7] In the

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[5] In a presentation last year to the National Association of Regulatory Utility Commissioners, Project Tundra consultant David Greeson said that "we're really counting on a demonstration grant from the Department of Energy." The DOE environmental assessment also found that Project Tundra likely "would not be constructed" without federal funding. https://www.youtube.com/watch?feature=shared&t=1258&v=gaZpKtEetNQ.

[6] *See, e.g.,* Energy Information Administration (EIA), December 2021. Of the operating U.S. coal-fired power plants, 28% plan to retire by 2035. "Since 2002, around 100 GW of coal capacity has retired in the United States; the capacity-weighted average age at retirement was 50 years." *Available online at https://www.eia.gov/todayinenergy/detail.php?id=50658*

[7] *See, e.g.,* Energy Innovation, "Coal Cost Cross-Over 3.0," at 1-2 ("This study finds 99 percent of all coal-fired power plants in the U.S. are more expensive to operate on a forward-looking basis than the all-in cost of replacement renewable energy projects, and 97 percent are more expensive than renewable energy projects sited within 45 kilometers (approximately 30 miles), a significant acceleration from our

last decade, the capacity factors of coal plants have fallen substantially as lower cost renewables have come online.[8] The value of having pure "baseload" facilities has dropped markedly, particularly in high wind regions, such as North Dakota. Coal plants like Milton Young are cycling offline on a more regular basis in response to these changing economics, and thus are trending towards lower capacity factors. Coal plants have high operating costs and are inflexible compared to more modern, cleaner alternatives like portfolios of wind, solar and battery storage. Indeed, the grid operator for North Dakota and Minnesota, the Midcontinent Independent System Operator (MISO), states that "as wind capacity continues to grow, this may place increasing pressure on older, uneconomic baseload resources to cycle off overnight. It also will increase the value of having dispatchable conventional resources that can cycle on and off for much shorter periods."[9]

DOE must support its assertion that Milton Young will continue to operate at its current levels until 2048 with evidence. This evidence should include standard public utility industry modeling demonstrating that the plant is cost-competitive with replacement alternatives (such as portfolios of clean energy) and can be expected to operate at current levels until 2048. Without such analysis, the most reasonable assumption is that, without DOE funding, the plant will retire in the near future. Retirement would avoid not only 100% of future carbon emissions, but also would eliminate all other criteria air pollutants;[10] would entirely avoid water consumption at the plant; and would also indirectly reduce the impacts of the lignite mine associated with the plant. The EA does not account for any of these benefits, which must be addressed in an EIS.

Moreover, under draft 111(d) rules promulgated by the Environmental Protection Agency, it would be illegal for the plant to maintain its current operations through 2048 without carbon emissions controls starting no later than 2030. Under EPA's 111(d) proposed rule for existing coal plants, Milton Young would not be able to operate after 2039 unless it installed CCS technology and began capturing more than 90 percent of its carbon pollution in 2030.[11] Furthermore, coal plants retiring between the end of 2031 and the end of 2039 would be

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two previous analyses. For more than three quarters of U.S. coal capacity, the all-in cost per MWh of the cheapest renewable option is at least a third cheaper than the going-forward costs for the coal it would replace."). Available online at https://energyinnovation.org/wp-content/uploads/2023/01/Coal-Cost-Crossover-3.0.pdf

[8] *See*, *e.g.*, Energy Information Administration (EIA), September 2020. As U.S. coal-fired capacity and utilization decline, operators consider seasonal operation. *Available online at* https://www.eia.gov/todayinenergy/detail.php?id=44976

[9] MISO. 2022 State of the Market Report, at 19. *Available online at* https://www.potomaceconomics.com/wp-content/uploads/2023/06/2022-MISO-SOM_Report_Body-Final.pdf

[10] See EA Table 3-2

[11] US EPA. Fact Sheet: Greenhouse Gas Standards and Guidelines for Fossil Fuel-Fired Power Plants, Proposed Rule. May, 2023. *Available online at* https://www.epa.gov/system/files/documents/2023-05/FS-OVERVIEW-GHG-for%20Power%20Plants%20FINAL%20CLEAN.pdf

obligated to start combusting at least 40 percent natural gas by heat input starting in 2030 unless they agree to limit their annual capacity factor to no more than 20% as of 2030, in which case they could operate at a business-as-usual emission rate through the end of 2034.

DOE admits that, without its funding, it is "likely" that "the commercial-scale CCUS project (Project Tundra) would not be constructed." (EA at 2-1.) At minimum, then, the baseline "no action" alternative should include retirement of Young no later than 2035 and a 20% capacity cap beginning in 2030, or retirement of Young no later than 2039 if the facility is willing to start burning at least 40% gas by 2030, which would entail substantially higher fuel costs for the facility and any necessary capital retrofits. DOE must revise the No Action alternative to reflect this.

Because the agency has misstated the baseline, it has wrongly concluded that Project Tundra will result in a significant reduction in carbon emissions compared to the "no action" alternative. When the baseline is corrected to assume retirement of Young by no later than 2035, it is apparent that the preferred alternative in fact would act as a life extension project and encourage more than a decade of additional carbon emissions (at a rate of at least 25-26 percent of the plant's carbon emissions, even if the technology works perfectly as designed) that would be avoided in the baseline scenario of earlier retirement. As discussed further in section III.B.2, below, this life extension can be expected to result in a net *increase* in emissions of between 9.4 and 12.7 million tonnes of CO2-equivalent, relative to closing the plant earlier.

Thus, the preferred alternative of funding Project Tundra will have significant impacts on the environment simply by increasing overall net carbon emissions in the atmosphere, requiring an EIS. The EA should be corrected to reflect an accurate baseline that is rooted in evidence and supported by analysis, and the environmental impacts should be updated to demonstrate the significant likely harms caused by the preferred alternative. This includes updating the calculations of the Project's social cost of greenhouse gas emissions to reflect the significant climate damages likely to result from the Project.

B. The EA makes clear that Project Tundra will not have the environmental benefits claimed by DOE and in fact will result in an emissions increase; the Project is also so deficient that it is unreasonable to even consider it a "feasible alternative."

A close review of the EA shows that Project Tundra is likely to result in a significant emissions *increase* compared to the No Action alternative. Moreover, the EA repeatedly overstates the amount of carbon the project is likely to capture: it is only designed to capture, at most, 73% of emissions. At such a low capture rate, the Project is unlikely to qualify for the lucrative tax credits that are necessary to make the Project financially viable. It is therefore unclear whether the Project even is a "feasible alternative" that would advance DOE's CarbonSAFE

programmatic goal. At minimum, the Project will result in a significant impact to the environment via increased carbon emissions compared to the status quo, and so an Environmental Impact Statement is required.

1. **The Project Tundra Environmental Assessment fails to disclose that the greenhouse gas emissions of the resulting project will be worse than existing natural gas power plants.**

The EA for Project Tundra indicates that "construction of the project would result in an estimated net reduction in CO2 emissions (emissions that would otherwise be released to the atmosphere in the status quo scenario) of 4.0 million tpy over the anticipated operating life of the project."[12] As discussed elsewhere, this statement mischaracterizes the status quo scenario over the proposed life of the project. But in addition, it fails to follow CEQ guidance that NEPA documentation "should disclose and provide context for GHG emissions."[13] A critical element of disclosure and comparison with respect to a carbon capture project on an energy generation facility would be an equivalency to known power generation options. Following CEQ guidance, the Draft EA should have clearly specified that as proposed, Milton Young coal plant, as retrofitted with Project Tundra, would have a net emissions rate worse than that of a standard gas-fired power plant. This context is critically important for decision makers, both in assessing the value of investing government dollars in the project, and in assessing emissions outcomes.

Information in the EA shows that the project proponents estimate that Milton Young will produce between 5.8 and 6.3 million tons of CO_2 every year,[14] and "capture up to 4 million tons of CO2 on an annual basis."[15] Information presented in the Front End Engineering and Design (FEED) study presentation from May 2023 indicates that an average of 40% of generation and heat input at Milton Young will be consumed by the carbon capture retrofit.[16] Assessing the emissions remaining after capture and the net generation after consumption by the CCS island

[12] Draft EA at 3-6
[13] 88 FR 1202
[14] Following information available in Appendix F, converting from lignite consumption using heat content and the CO_2 content of coal. Details provided later in these comments.
[15] Draft EA at 3-6
[16] Department of Energy. Front-End Engineering & Design: Project Tundra Carbon Capture System. Virtual Closeout Meeting; Project DE-FE0031845. May, 22, 2023, at 20. *Available online at* https://netl.doe.gov/projects/files/Front-End%20Engineering%20and%20Design%20Project%20Tundra%20Carbon%20Capture%20System.pdf. 83.3 MWe of energy for auxiliary electricity consumption, plus 37,124 MMBtu/day of steam load, at a heat rate of 11.47 MMBtu/MWh (derived from Appendix F) reveals that Project Tundra will consume about 1.9 million MWh per year, or 38-41% of generation.

reveals an average emissions rate of approximately 0.55-0.60 tCO_2/MWh[17]—or worse than the stack emissions of a gas-fired power plant.[18]

This form of context, comparing the net emissions of this project to a widely known alternative generation source—is the type of context that is required under NEPA. These emissions are significant, and require DOE to conduct a full environmental impact statement.

2. The EA mischaracterizes Project Tundra as capturing 95% of the entire flue stream from Milton Young, when it will in fact capture less than 75% of emissions.

The EA incorrectly states, multiple times, that Project Tundra has a "design specification of at least 95 percent CO2 capture from the processed MRY [Milton Young] Unit 1 (250 megawatts gross [MWg] owned by Minnkota) and Unit 2 (455 MWg owned by Square Butte Electric) flue gas."[19] In fact, Project Tundra has been designed to capture less than 75% of Milton Young's carbon dioxide emissions, according to the project sponsors and the EA itself.

According to the project's proponents, Project Tundra is actually designed to capture around 74% of Milton Young's emissions,[20] a number that can also be derived from the EA. According to the EA and the project proponents, Project Tundra is expected to capture approximately 4 million metric tonnes of emissions per year, or an average of 73 percent of its projected generated emissions from 2028 to 2043, according to Appendix E (life cycle assessment) of the EA. Appendix E provides projected annual coal consumption (from 4-4.4 million tons of lignite per year),[21] lignite heating values for both units (13.09 and 13.23 MMBtu/short tons), and an emissions factor for coal (217.74 lb/MMBtu). From these factors, we can assess that the Milton

[17] Draft EA Appendix F (pdf page 186) indicates 2028 expected generation of 4.8 million MWh, less 1.9 million MWh of expected Project Tundra auxiliary load and steam load, resulting in net generation to grid of 2.9 million MWh. Using the heat content and emissions factor for coal as provided on the same page indicates an expected emissions generation of 6.0 million short tCO_2, less 4.4 million tons of capture per year (*see* Draft EA at 3-6, conversion to short tons), results in net stack emissions of 2 million short tCO_2. Taken together, in 2028, Milton Young, with the Project Tundra retrofit, would have a net emissions rate of 0.55 short tCO_2/MWh. In other years, the net emissions rate rises as high as 0.60 short tCO_2/MWh.

[18] According to EPA Clean Air Markets Program Data, the average stack emission rate for natural gas-fired combined cycle power plants was 0.43 short tCO_2/MWh in 2022, from a total of 602.7 million tons CO_2 and a gross generation of 1.386 billion MWh.

[19] Draft EA at 2-2. A similar statement appears at 3-6, "an LCA demonstrates the potential environmental impacts of capturing a minimum of 95 percent of unit-wide CO_2 emissions and storing the captured CO_2 in secure subsurface geologic formations."

[20] Minnesota Public Utilities Commission, Public Meeting. August 24, 2023. Docket ET6/RP-22-312. At 39 minutes. "...on station as a whole basis, it's about 74% reduction of CO_2 off the baseline, is what the design indicates." Available online at https://minnesotapuc.granicus.com/player/clip/2153?meta_id=237764&redirect=true&h=4d1e97b59e6cc16eb5a4aa0467ee8058

[21] Draft EA, Appendix F, pdf page 186

Young units will generate between 5.8 and 6.3 million tons of CO_2 every year.[22] Capturing 4.0 million metric tonnes per year, or 4.4 million short tons, would indicate that Project Tundra is projected to only capture 73 percent of CO_2 emissions.

Even from a design standpoint, the EA indicates that the carbon capture project at Milton Young is only designed to capture around 72 percent of emissions. Table 3-2 in the EA shows several different configurations of Project Tundra, where the first two cases indicate full capture on one unit, and partial capture on the other unit.[23] Assuming both units are fully operational, the cases show that Project Tundra could capture, at most, 73 percent of emissions.[24]

DOE has therefore overstated the carbon emissions reduction benefits of the proposed action—and in fact, the Project is likely to result in a significant net *increase* in carbon emissions. As discussed in section III.A above, the project will effectively be extending the life of the Milton Young coal-fired power plant past its owners' assumed 2042 end-of-life (and beyond a likely 2035 retirement) until 2048. The emissions impact of this life extension with 73% carbon capture is entirely absent from the EA. By 2042, it is reasonable to assume that any replacement energy and capacity of Milton Young would be largely renewable and non-emitting. Therefore, if the EA were correct that with Project Tundra, Milton Young will operate until 2048 rather than 2042, then Project Tundra will result in an additional 13 million tons of CO_2 between 2043 and 2048, even if the CCS were operating at the expected level in the Draft EA.[25] Under the more reasonable assumption that the No Action alternative would result in Milton Young's retirement by 2035 and a 20% capacity factor between 2030-2035, the Proposed Action—and CCS operation through 2048—would result in a net emissions increase of 9.4 million tons relative to the No Action alternative.[26] Either way, the Proposed Action would result in a significant impact to the environment and requires an EIS. The EIS must correct the baseline No Action alternative to account for the likelihood of an earlier retirement date for the plant, and address the range of likely *increased* carbon emissions from moving forward with funding Project Tundra based on a capture rate of no more than 73 percent.

[22] For example, in 2023, 4.376 million tons of lignite represent a heat input of 57.68 million MMBtu, and therefore emissions of 6.28 million short tons CO_2.
[23] Draft EA at Table 3-2: Comparison of Air Quality Concentrations with Ambient Air Quality Standards
[24] Refer to "Case 1 - All U2 [Milton Young Unit 2] Partial U1 (25%)", or proportionally to the instantaneous output of each unit, 455 MW (U2) + 25% * 250 MW (U1) = 517 MW of flue gas of a 705 MW total plant is 73% of total output.
[25] From 2043 to 2048, assuming 3.5 million metric tons of capture per year (*see* Draft EA, Appendix F at 7), project Tundra would release approximately 2.1 million short tCO_2 per year, or 13 million tons over a 6 year period.
[26] The EA also includes a life cycle analysis that determined that "[t]here is an expected 3.23 kg of CO_2e emitted per kg of CO_2 stored." This point alone is a significant impact that requires an EIS.

3. The EA fails to account for the impact of the 45Q tax credit on Project Tundra's carbon capture lifetime, on the project's net greenhouse gas emissions, and on the Project's overall feasibility.

Fundamental to Project Tundra's financial viability is its ability to harvest a lucrative tax incentive, the 45Q tax credit for carbon dioxide sequestration.[27] And while the proponents are clearly aware of the importance of the tax credit to financing the project,[28] the EA fails to incorporate reasonable expectations about the impacts of that tax credit on the operations and lifetime emissions of the project. The EA also fails to assess the impact of carbon capture tax credits on increased operations at the coal plant, and fails to consider whether the project is appropriately designed to meet the statutory requirements of carbon capture tax credits that would allow the project to achieve operations.

a. <u>The EA misstates the likely carbon capture lifetime of Project Tundra, mischaracterizing the project's greenhouse gas emissions reduction benefit.</u>

The EA states that the proposed project will result in reduced greenhouse gas emissions, using multiple different assessments of the emissions reductions achieved. None of the assumptions are correct. The EA states that the life of the project will be 20 years,[29] from 2028 to 2048,[30] and that over that time period the project will either sequester 77.5 million tons[31] or 80 million tons.[32] The calculations are both based on faulty premises, and are inconsistent with the business

[27] Project Tundra. April 1, 2022. Virtual Briefing on Project Tundra. Provided to National Association of Regulatory Utility Commissioners (NARUC). *Available online at* https://www.youtube.com/watch?v=gaZpKtEetNQ. David Greeson, Development Lead for Project Tundra at 9:29. "In project tundra this one's a little simpler. We're going to be storing the CO_2, not using it in enhanced oil recovery. We're going to be depending on 45Q tax credits for a revenue stream, and the capture system is really the main thing that we're doing." *See also* at 18:33. "It's interesting to note that for 4 million metric tons per year when the tax credit gets to $50 that'll be $200 million a year of tax credits, and there's also some non-operating losses that the storage company can monetize for us and those add up to another $20-$30 million. So it's a lot of money just for one project; a lot of money changing hands here, but it's a structure that we think will work and allow us to raise the capital needed to move forward."

[28] *See* Project Tundra web site at https://www.projecttundrand.com/progress. "The project is currently seeking financial partners to help utilize existing 45Q federal tax credits, which are currently $85 per ton of CO_2 that is captured and stored in a geologic formation deep underground."

[29] Draft EA at Appendix F, page 1: "Project Tundra proposes 20 years of operation and the secure geologic storage of an approximate cumulative total of 77.5 MMt of carbon dioxide (CO_2) over the course of the
20 years of injection into two saline aquifer reservoirs."

[30] Draft EA at 3-54. "Therefore, this analysis calculates the SC-GHG from 2028 to 2048 (analysis lifespan).

[31] Draft EA at Appendix F, page 1.

[32] Draft EA at 3-6: "construction of the project would result in an estimated net reduction in CO_2 emissions (emissions that would otherwise be released to the atmosphere in the status quo scenario) of 4.0 million tpy over the anticipated operating life of the project." Over 20 years, 4.0 million tons per year results in 80 million tons sequestered.

proposition of Project Tundra, because they assume the project will operate continuously for 20 years.

The operations of Project Tundra are premised entirely on the continuous ability to receive the lucrative 45Q carbon capture credit, at $85 per metric tonne CO_2 captured and sequestered, over that 20 year period. However, the 45 Q credit is only available for a 12-year period.[33] After the exhaustion of that 12-year period and the expiration of the 45Q tax credit, capturing the carbon is so costly that continued operation is no longer financially viable at the plant. Of the expected $80.60/t$CO_2$ cost of capture,[34] at least $20.57/t$CO_2$ are incremental operational costs incurred to operate the carbon capture equipment.[35] Without the monetary incentive of the $85 per metric tonne CO_2 45Q credit, no rational operator would continue to incur excess costs not otherwise required by law or for safety and reliability. And since there is no evidence that Milton Young is needed for reliability or safety, it is unreasonable for DOE to assume the plant will continue to operate after the expiration of the tax credit.

In sum, even assuming that the project works flawlessly, it will result in just 12 years of carbon capture and sequestration, or from 2028 to 2040. Out of the 19 years of projected remaining life for the host power plant, through 2042,[36] Project Tundra would—at best—support 12 years of sequestration. DOE should revise its carbon capture estimates to reflect this.

b. <u>The EA ignores the way in which the carbon capture tax credits will in fact incentivize *increased* operations (and emissions) at the Milton Young coal plant.</u>

For purposes of calculating the amount of emissions the Project is likely to capture over 20 years, the EA assumes that Milton Young will maintain its current levels of operation.[37] This fails to account for how the lucrative 45Q tax credits will perversely incentivize an increase in the operations of the coal units at Milton Young, and must be corrected in DOE's analysis.

The 45Q tax credit is designed to help carbon capture projects both pay down the capital cost of expensive carbon capture projects, as well as subsidize the cost of operating the equipment. It is designed such that a producer is theoretically incentivized to capture as much as feasible, but is formulated as a production credit: a tax credit is awarded for the production of, and then capture and sequestration of, carbon dioxide. Because the tax credit is designed to pay down initial capital costs, it is a very large credit, and when applied to production costs, acts as an enormous incentive to increase operations. Accounting for the auxiliary (or parasitic) load requirements of

[33] 26 U.S. Code § 45Q(a)
[34] Department of Energy. Front-End Engineering & Design: Project Tundra Carbon Capture System. Virtual Closeout Meeting; Project DE-FE0031845. May, 22, 2023, at 11. *Available online at* https://netl.doe.gov/projects/files/Front-End%20Engineering%20and%20Design%20Project%20Tundra%20Carbon%20Capture%20System.pdf
[35] *Id*, at 35.
[36] *Id*, at 34.
[37] Draft EA at Appendix E, pdf page 186

carbon capture, a 90% capture facility awarded \$85/tCO_2 will generate nearly \$120 per megawatt-hour (MWh) of generation at a coal-fired power plant. For most coal plants, including Milton Young, the operational costs (even accounting for the carbon capture equipment) are far less than \$120/MWh, and thus the resulting net operating cost of the power plant falls to zero, or even well below zero. Accordingly, a coal-fired power plant with carbon capture equipment is incentivized to operate as often as feasible, a dynamic that is not accounted for in the Project Tundra EA.

This dynamic can be illustrated by looking at the operations of the Milton Young plant in 2022. In 2022, the two Milton Young units emitted 4.965 million short tons of CO_2 from their stacks,[38] of which Project Tundra would theoretically be able to capture 4.745 million tons, or 13,000 short tons CO_2 ($stCO_2$) per day.[39] However, in most days of 2022, Milton Young emitted far more than 13,000 $stCO_2$/d; if the project worked flawlessly, and Milton Young continued to operate exactly like it did in 2022, Project Tundra would have captured 3.917 million $stCO_2$.

But it is highly unlikely that Milton Young would operate as it did in 2022 if equipped with carbon capture—rather, Milton Young can be expected to operate *more* post-CCS installation. In 2022, Milton Young had 135 days (37% of the year) where it emitted <u>less</u> than 13,000 $stCO_2$ per day. In each of those days, operations post-installation of carbon capture would be financially inefficient, because the project owners would collect less tax credit than is optimal. The operators would be incentivized to minimize the number of days in which less than 13,000 tons of emissions were generated (in order to capture them), which would <u>increase</u> the operations of Milton Young relative to its already high output in 2022. The operators of the coal plant would also seek to reduce any days on which either unit of Milton Young was not operating in order to ensure that there was a continuous supply of carbon dioxide to the capture unit. This kind of increase in operations would result in a gross emissions increase, to which the 73% capture rate should then be applied. Increased operations can also be expected to increase emissions of co-pollutants like nitrogen oxide, sulfur dioxide and particulate matter, effluent, and toxic coal ash wastes while also increasing water consumption. The EA fails to account for any of these increases.

In addition, the EA assumes that in baseline conditions, the operations of Milton Young will remain high enough for the entirety of the analysis period that capture at the plant offsets any increased operations. In other words, the EA's assumption of an emissions benefit only makes sense if in the baseline, Milton Young is assumed to continue to exist <u>and</u> operate at an extraordinarily high level of output even if it were not retrofitted with carbon capture.

As discussed in section III.A above, this is an unreasonable and unjustified assumption. It is more reasonable to assume that under the No Action alternative, Milton Young will be retired by

[38] US EPA, Clean Air Markets Program Database. Hourly Emissions, 2022.
[39] Draft EA at 2-2 "The project would be designed to capture up to 13,000 short tons per day (STPD) of CO_2."

2042 at the latest, but more likely by 2035 (with its capacity factor reduced to 20% between 2030-2035). In comparison, the Proposed Alternative of implementing carbon capture could further result in a net increase in emissions, particularly once the incentive to increase operations from the 45Q tax credit is accounted for. This phenomenon is discussed at length in comments by energy analysts in comments on 45Q, and must be addressed by DOE in its analysis.[40]

c. The EA ignores serious design problems with Project Tundra that call into question its financial viability and therefore its feasibility as an alternative.

Given the importance of the 45Q tax credit to the viability of Project Tundra, and therefore to the project's likelihood of leading to the transport and sequestration of CO_2, it is imperative for DOE to consider whether the project would even be eligible for this tax credit under the statutory requirements of 45Q. Using government funds to advance a project that will be financially infeasible based on its design specifications today is a waste of valuable taxpayer dollars.

At present, it appears questionable whether Project Tundra would actually meet the statutory requirements for 45Q eligibility. Under 26 USC §45Q(d)(2)(B)(ii), a 'qualified facility' (i.e. a carbon capture project) at an electricity generating facility must capture at least 18,750 metric tons of CO_2 per year and be designed to capture at least **75 percent** of historic (or 'baseline') emissions at the unit for which it was designed. Specifically, the text reads that "with respect to any carbon capture equipment for the applicable electric generating unit at such facility," the unit must have "a capture design capacity of not less than 75 percent of the baseline carbon oxide production of such unit."[41]

As described in section B2 above, it is clear that the project would achieve a total capture rate that does not meet this 75% statutory minimum. On August 18, 2023, Shannon Mikula, Special Projects Counsel for Minnkota, in response to a question from the Minnesota Public Utilities Commission, stated that "on a station as a whole basis, it's about a 74% reduction of CO_2 off the baseline, is what the design indicates." This statement, issued during the design phase of Project Tundra, would indicate that the capture design capacity of Project Tundra is less than the carbon oxide production of the electrical generating units to which it is attached - i.e., Milton Young coal plant. Such a failure at the design stage provides credible doubt that the project would qualify for the 45Q tax credit, and thus likely would be financially infeasible.

The proponents appear to argue that Project Tundra is designed to capture more than the statutory minimum of one unit, thereby providing it access to the tax credit, and the option to monetize additional capture. In proceedings before the Minnesota PUC, Minnkota argued that Project Tundra was designed around just one of Milton Young's coal units, and its ability to capture more than that unit's emissions provides the option to capture from either, or both, coal

[40] Treasury Docket IRS-2022-0028-0001. December 5, 2022. Comment from Synapse Energy Economics. https://www.regulations.gov/comment/IRS-2022-0028-0027
[41] 26 USC §45Q(d)(2)(B)(ii)

units. The Draft EA confirms this in Table 3-2, which shows several different possible configurations of Project Tundra. In one configuration (Case 1), Project Tundra would capture "all" of the emissions of the 455 MW Unit 2, and just 25% of the emissions of the 250 MW Unit 1; under a second configuration (Case 2), the project would capture "all" of Unit 1, and just 57% of Unit 2.

It is highly questionable whether the sizing and configuration proposed by the project proponents would actually meet statutory requirements of 45Q. Under one reading, the CCS equipment was clearly designed to capture emissions from both units, and therefore fails to capture the statutory minimum. Under a second reading, the CCS equipment, designed only to capture emissions from one unit, may not qualify for the 45Q credit for emissions captured from the second unit for which it was not designed.

Providing federal funding for a project that is only designed to capture a small fraction of a flue stream (the emissions from the second unit, at either 25% or 57% capture) is simply bad policy, both for Treasury and DOE. Because 45Q offers a substantial operational subsidy, the second unit from which CO_2 is captured would be heavily incentivized to operate, even under suboptimal market conditions, in order to generate the maximum 45Q subsidy. But a unit that only achieves 25% or 57% capture while incentivizing additional output is—under a wide variety of conditions—a net contribution of emissions, rather than a reduction of emissions. Taking into account the substantial parasitic load required to operate CCS equipment and the additional operations of the second coal unit, partial capture achieves little or no climate benefit, and would also result in substantial additional emissions of sulfur dioxide, oxides of nitrogen, heat and waste effluent, and coal ash. Such a configuration should not be subsidized by DOE. The EA fails to account for the expected net increase in carbon emissions and other criteria pollutant emissions from the second unit. These emissions impacts are significant and require conducting an EIS.

C. The EA overstates the environmental impacts of the No Action Alternative.

The EA asserts that under the No Action alternative, "Consequently, the commercial-scale geologic storage complex would not be constructed, and the risks would not be reduced for future storage complexes." (2-1.) But it does not follow that the failure of one bad proposal would doom either geologic storage of carbon in North Dakota or elsewhere. If not this project, perhaps one will come later that has better design or supportive policies, but there is no proof here that the failure of this project leads to a permanent failure of this technology or its use at this location.

Further, there is no evidence in the EA or elsewhere that this project's failure would negatively impact carbon emissions in the United States. Indeed, it is irrational for the EA to state that without the Project "[t]he President's goals of 50 to 52 percent reduction in GHG emissions from 2005 levels by 2030, a carbon pollution free power sector by 2035, and achieving a net-zero

GHG emissions economy by 2050 would not be advanced." (2-1.) Deciding not to fund the Project makes it more likely that this uneconomic coal plant will retire sooner, which would advance the President's overall GHG goals far more than installing a partly-functional capture system on it and continuing coal combustion and carbon emissions for decades down the road at the Project site.

D. The Impacts of Project Tundra on the Missouri River are Significant and Require an EIS, Particularly in Light of Significant Environmental Justice Concerns.

The project's impacts on water availability are significant. As the EA states, "A new water appropriation of 15,000 acre-feet from the Missouri River has been approved by the North Dakota State Water Commission to supply the water needs." (2-8) This is nearly **5 billion gallons** (specifically, 4,887,771,428.6 gallons) of water being drawn from the longest river in the United States, in an arid region that is frequently impacted by drought and other natural disasters.[42] Currently, about half of North Dakota is experiencing abnormally dry to extreme drought conditions,[43] but recent years have seen drought conditions worse than the Dust Bowl with untold negative impacts on the agricultural economy and natural resources.[44] Furthermore, ongoing multi-year drought in neighboring states[45] within the Missouri River watershed necessitates a full review of how this project's large new appropriation of water will affect the regional agricultural economy and downriver natural resources.[46] This review must consider the likelihood of worsening drought conditions in the region due to climate change. Considering the importance of continued access to the Missouri for agricultural and human uses, it is arbitrary and capricious to propose removing another 4.9 billion gallons of water from the river system without fully analyzing how this will affect other users.

These significant water impacts also necessitate an environmental justice impact review. Both Bismark and Standing Rock are downriver communities on the Missouri River. The EA ignores

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[42] While potentially not as frequent of a disaster as drought, North Dakota also experiences significant flooding, which will occur more frequently due to climate change and will need to be discussed in the EA as regards how this plant and the water appropriation will function under such conditions. *See* https://www.weather.gov/safety/flood-states-nd.

[43] *See* North Dakota State University. Drought webpage and report. Last updated September 7, 2023. https://www.ndsu.edu/agriculture/ag-hub/ag-topics/disasters/drought

[44] National Public Radio. October 6, 2021. A mega-drought is hammering the U.S. In North Dakota, it's worse than the Dust Bowl. https://www.npr.org/2021/10/06/1043371973/a-mega-drought-is-hammering-the-us-in-north-dakota-its-worse-than-the-dust-bowl

[45] *See e.g.* Brownfield Agricultural News. December 12, 2022. Drought Still Top of Mind for Minnesota Cow/Calf Producers. https://brownfieldagnews.com/news/drought-still-top-of-mind-for-minnesota-cow-calf-producers/

[46] Minnesota farmers are experiencing severe drought and the overall watershed will not receive as much water as needed from Minnesota as a result of the ongoing multi-year drought. *See* Minnesota Public Radio. September 14, 2023. More than 5 million Minnesotans now live in the drought zone. https://www.mprnews.org/story/2023/09/14/over-5-million-minnesotans-now-live-in-the-drought-zone

the Project's impacts on water availability for downstream communities. The Summit pipeline, discussed below, is also proposed to cross the river. DOE must address the cumulative impacts of this project on the Missouri for downstream environmental justice communities.

E. The EA fails to account for the cumulative impacts from the Project's connection to the Summit Pipeline.

The EA fails to acknowledge significant impacts that would result from this project's planned connection to the Summit Carbon Solutions' Midwest Carbon Express CO_2 Pipeline Project (Summit pipeline). The EA states that the route for the Summit pipeline has a planned connection proximate to the Project Tundra sequestration site. The Summit pipeline is expected to be used to ship carbon dioxide to North Dakota for Enhanced Oil Recovery (EOR), a type of "carbon storage" that has significant impacts on the environment — namely, producing significantly more oil than would be available without carbon dioxide injection. North Dakota officials have made clear that they will not be able to continue producing oil without additional carbon dioxide pipelines such as the Summit pipeline, and that they need nearly ten times the currently-available carbon dioxide to continue EOR as planned.[47] Moreover, Summit's representatives, speaking in a regulatory proceeding in Iowa, recently confirmed that carbon dioxide shipped through the Summit pipeline can be used for EOR because Summit is merely a common carrier and it cannot prevent its shippers from using the material they ship for EOR.[48] As a result, the EA must address the high likelihood that this project's partnership with Summit will increase EOR in the state, and fully analyze the foreseeable impacts of that oil extraction. Additionally, to the extent that Project Tundra may accept or provide carbon dioxide for the Summit pipeline, the EA must further assess the anticipated land and water impacts of that pipeline, which will be made more likely to occur as a result of the funding that the agency proposes to provide here.

Secondly, the EA incorrectly describes Summit's application status before state regulators as having one "pending application" for the Summit pipeline in North Dakota. In reality, Summit has seen all of its applications (both for the pipeline and with local authorities regarding construction at injection well sites) rejected by the relevant authorities — the company has since

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[47] KFYR TV News. August 16, 2023. North Dakota Department of Mineral Resources warns more CO2 needed to sustain oil production long-term. https://www.kfyrtv.com/2023/08/16/north-dakota-department-mineral-resources-warns-more-co2-needed-sustain-oil-production-long-term/ ("State Department of Mineral Resources Director Lynn Helms . . . . said the state needs to get the gas from somewhere to help with enhanced oil recovery. The emerging technology uses CO_2 and other materials to help producers to take more oil than traditional methods. Helms said current CO_2 production only meets about 10 percent of what is needed for enhanced oil recovery.")

[48] Agweek News. September 5, 2023. Summit Carbon Solutions leaves open transporting CO_2 for oil wells https://www.agweek.com/news/policy/summit-carbon-solutions-leaves-open-transporting-co2-for-oil-wells

asked North Dakota's pipeline regulator to reconsider,[49] but it does not have a "pending" application at this point. It is more accurate to say that it was denied permits to operate and it is attempting to overturn those decisions. The fact that Project Tundra's apparent back-up plan for carbon shipping or sequestration/utilization increasing seems to have no viable project in North Dakota should be discussed and assessed in the EA. To the extent that the Summit pipeline is never built, the EA should assess the potential impacts of Project Tundra capturing large amounts of carbon dioxide with nowhere to go with it. Providing tens of millions of dollars in public funding for a project with no clear end point for injection is the definition of wasteful bureaucracy, and should be avoided through full and accurate analysis of the potential failure to obtain permits that is strongly suggested by the recent history of the Summit company in North Dakota.

IV. Conclusion

For the reasons identified herein, the impacts of Project Tundra would be significant, and DOE must conduct a full EIS before moving forward.

Respectfully submitted,

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[49] Agweek News. August 19, 2023. Summit Carbon Solutions asks North Dakota to reconsider pipeline route denial, seeks new path around Bismarck. https://www.agweek.com/news/policy/summit-carbon-solutions-asks-north-dakota-to-reconsider-pipeline-route-denial-seeks-new-path-around-bismarck