UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
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June 30, 2022

Ms. Ashley Pilakowski
NEPA Specialist
Tennessee Valley Authority
400 West Summit Hill Drive
Knoxville, Tennessee 37902

Re: EPA Comments on the Draft Environmental Impact Statement for the Cumberland Fossil Plant Retirement, Stewart County, Tennessee; CEQ No: 20220059

Dear Ms. Pilakowski:

The U.S. Environmental Protection Agency reviewed the referenced document in accordance with Section 309 of the Clean Air Act (CAA) and Section 102(2)(C) of the National Environmental Policy Act (NEPA). The CAA Section 309 role is unique to EPA. Among other things, CAA Section 309 requires EPA to review and comment publicly on any proposed federal action subject to NEPA's environmental impact statement requirement.

The Tennessee Valley Authority issued a Draft Environmental Impact Statement (DEIS) to evaluate the impacts of the proposed retirement and demolition of two units of the Cumberland Fossil Plant (CUF) and the addition of replacement generation to recover the generation capacity lost from the retirement of one unit. The CUF is situated on a 2,388-acre reservation of the Cumberland River at its confluence with Wells Creek in Stewart County, Tennessee (TN). The two-unit, coal-fired steam-generating plant is the largest plant in the TVA coal fleet, with a summer net generating capacity of 2,470-megawatts (MW). According to the DEIS, the proposed action would retire the CUF plant and pursue an alternative power generation source to provide cost-effective replacement generation and would be consistent with TVA's 2019 Integrated Resource Plan (IRP) and near-term energy production goals.

TVA developed and analyzed in detail the proposed action, the no-action alternative, and two additional alternatives. TVA considered five additional resource alternatives, as well as alternative fuels, but eliminated them from further discussion. Under the No-Action Alternative, TVA would continue to maintain and operate coal fired boilers at CUF. TVA's other alternatives include:

- **Alternative A:** Retirement and demolition of CUF and construction and operation of a 1,450 MW capacity combined cycle combustion turbine (CC) natural gas plant at the same site, including a 32-mile natural gas pipeline extending through Stewart, Houston, and Dickson Counties, TN.
- **Alternative B:** Retirement and demolition of CUF and construction and operation of natural gas simple cycle combustion turbines (CT) at two alternate locations.
- **Alternative C:** Retirement and demolition of CUF and construction and operation of solar generation and energy storage facilities, at alternate locations primarily in middle Tennessee.

In the DEIS, TVA identifies Alternative A as the preferred alternative based on alignment with TVA's 2019 IRP plan; meeting engineering needs to retire the existing CUF plant; and, facilitating TVA's long-term plans to integrate renewable and distributed generation resources into its system. According to the DEIS, Alternative A provides baseload power as renewable sources are deployed.

Based on our review of the DEIS and described in our detailed comments, the EPA has developed recommendations for TVA that would reduce the environmental impacts of the proposed action and improve the EIS analysis by: 1) considering practicable mitigation to reduce greenhouse gas (GHG) emissions, 2) conducting a more robust alternatives analysis, and 3) addressing deficiencies in the disclosure of GHG emissions and their impacts. The recommendations focus on essential information that TVA needs to disclose and consider to fulfill its basic NEPA duty to take a "hard look" at the environmental impacts of the proposed action and reasonable alternatives, both for public awareness and to ensure its decision making is fully informed.[1]

The EPA is concerned that the analysis of the preferred alternative did not consider important, available mitigation options to reduce impacts from GHG emissions. The EPA recommends that the EIS discuss in detail options for significantly mitigating the environmental impacts of the proposed action, such as co-firing with and eventually moving to 100% clean hydrogen or installation of carbon capture equipment at the proposed power plant.[2] In its enclosed detailed comments, the EPA has provided a table of current examples being implemented. Incorporating mitigation would not only show leadership in line with the federal policy priority to reduce climate risks, but also reduce regulatory risks for TVA ratepayers.

The EPA also finds that the DEIS does not fully disclose modeling and underlying assumptions for the alternatives considered, nor those alternatives that were considered and eliminated from further discussion. The EPA recommends TVA transparently disclose its modeling methodologies and assumptions to better enable a comparison between the alternatives. Further, the EPA recommends that TVA identify and discuss in detail an alternative reflecting a hybrid approach—for example, combining a smaller natural gas plant with a portfolio of non-gas resources, including energy efficiency and demand management, renewable energy, energy storage, and other distributed energy resources. Such an alternative, or other alternatives, would better align with decarbonization pathways necessary to meet science-based targets for GHG reductions to avoid the worst impacts of climate change.[3]

In addition, the EPA identified that the DEIS does not fully quantify or adequately disclose the impacts of the GHG emissions from the proposed action and alternatives. The EPA recommends TVA include

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[1] See, e.g., *Robertson v. Methow Valley Citizens Council*, 490 U.S. 332 (1989) (NEPA's policy goals are realized through procedures requiring agencies take a 'hard look' at environmental consequences, citing to *Kleppe v. Sierra Club*, 427 US 390 (1976)).

[2] Two types of hydrogen production are referred to as "clean" hydrogen—blue and green. Blue hydrogen uses the Steam Methane Reformation process with the addition of carbon capture technology. Green hydrogen is an emerging technology that separates hydrogen from water molecules via electrolysis. As long as zero-emissions electricity is the power source, green hydrogen results in no direct emissions and is one of the cleanest forms of production. See Rhodium Group, "Clean Hydrogen: A Versatile Tool for Decarbonization" https://rhg.com/research/clean-hydrogen-decarbonization/

[3] Notably, the conclusions of Synapse Energy Economic Inc. report "Clean Portfolio Replacement at Tennessee Valley Authority: Economic and Emissions Benefits for TVA Customers" contradict the draft EIS conclusions. https://drive.google.com/file/d/1rgB3Apa3C-1PF0CyVMHqdq_t4NX85VCL/view The Synapse report transparently lays out important modeling approaches and cost, emissions and other input data. They also explore hybrid options that offer lower costs and better environmental results. Ideally, the Final EIS (FEIS) will be equally transparent so readers can compare input assumption and modeling results, including results about costs and environmental impacts.

quantified estimates of all indirect GHG emissions from each of the alternatives over their anticipated lifetime, including reasonably foreseeable emissions from the production, processing, and transportation of natural gas. Estimated indirect emissions, as with the direct emissions already estimated in the DEIS, provide essential information to the public and TVA decisionmakers. These emissions and more appropriate disclosure of their social cost are critical to disclosing the total climate impact of each alternative. These impacts include implications for climate justice, given that communities with environmental justice concerns and other underserved populations are disproportionately impacted by climate change.[4]

As discussed in the detailed comments, the EPA identified that Alternative A, the preferred alternative, would result in significant GHG emissions and associated environmental impacts. The EPA believes there are mitigation options and reasonable alternatives that were not analyzed in detail in the DEIS that would reduce GHG emissions. In addition, impacts were not sufficiently disclosed. As discussed in our detailed comments, the EPA strongly recommends the proposed action be modified or a different preferred alternative be selected in the Final EIS, and that the DEIS informational deficiencies be clearly remedied for the public and TVA decisionmakers.

The concerns raised herein are substantial in EPA's view, and we look forward to working collaboratively with TVA in the coming months to share our expertise with the goal of addressing them; as you know, in circumstances where deficiencies in an environmental impact statement prevent meaningful analysis, the remedy is supplementation to ensure adequate disclosure and analysis (please see 40 C.F.R. § 1502.9).

Our detailed comments also include important suggestions for further considering GHG reduction policies, climate resilience, air quality, environmental justice, and water resources issues. The EPA appreciates the opportunity to review the DEIS and looks forward to continued participation with the Cumberland CUF Retirement project. The EPA requests to be a cooperating agency to help address our comments. To discuss our technical recommendations further, please contact Mr. Douglas White of my staff at white.douglas@epa.gov or (404) 562-8586.

Sincerely,

MARK FITE Digitally signed by MARK FITE
Date: 2022.06.30 18:10:07 -04'00'

Mark J. Fite
Director
Strategic Programs Office

Enclosure

[4] See, *e.g.*, Climate Change and Social Vulnerability, EPA (2021). https://www.epa.gov/system/files/documents/2021-09/climate-vulnerability_september-2021_508.pdf

Enclosure
Detailed Technical Comments on the Draft Environmental Impact Statement (DEIS)
for the Cumberland Fossil Plant Retirement
CEQ No: 20220059

I. The EPA recommends TVA conform its EIS to the science-driven policy context.

The EPA believes it is essential for TVA to improve the proposed action and EIS because of the urgency of the climate crisis. Overlooked options for TVA to take meaningful, cost-effective action to reduce GHG emissions can help conform TVA's action to science-driven policy goals. The United States has established a Paris-agreement target to reduce net GHG emissions economy-wide by 50-52% below 2005 levels, consistent with a pathway to net-zero by 2050. Executive Order (EO) 14057 establishes a policy for the federal government to lead by example in order to achieve a carbon-pollution free electricity sector by 2035 and net-zero emissions economy-wide by no later than 2050.[5] These and other policies reflect science-based GHG reduction goals to avoid the worst impacts of climate change. The most recent scientific reports by the Intergovernmental Panel on Climate Change reinforce the urgent need to take climate action. TVA's proposal provides an important opportunity to do so.

The EPA recommends that the Final EIS (FEIS) include a discussion of whether and to what extent the estimated GHG emissions from the proposed alternatives are consistent with achieving science based national GHG reduction targets and any relevant state or local goals. Also, because the proposed action is consistent with the goals of the 2019 Integrated Resource Plan (IRP), TVA's analysis should include a discussion of how the proposed action and 2019 IRP will achieve GHG reduction targets. Additionally, the EPA recommends that the 2019 IRP should be updated to include the actions that TVA will take to align with its 2021 Strategic Intent and Guiding Principles and national science-based goals.

II. TVA should consider regulatory, policy, and energy transition trends that will affect new assets, as well as appropriate mitigations.

A variety of State and Federal regulations are likely to affect the power sector in the coming decades. In general, these regulatory efforts aim to reduce fossil fuel emissions. There are also forecasts of declining costs and increasing adoption of renewable generation as well as increased electricity demand from increased electrification. The EPA recommends thorough consideration of these trends, transitions, and risks in planning any large-scale power sector project.

Renewable energy technologies, such as wind and solar, are currently cost-competitive despite minimal subsidies and offer future opportunities for cost savings compared to coal and natural gas electric generating units (EGUs). The U.S. Energy Information Administration (EIA) projects inflation-adjusted US coal prices to remain at current levels over the next three decades, while natural gas prices are expected to slightly fall.[6] Coal and natural gas combustion are relatively mature technologies that have limited potential for further cost-saving innovations. Renewable energy may retain greater potential for

[5] Executive Order on Catalyzing Clean Energy Industries and Jobs Through Federal Sustainability https://www.whitehouse.gov/briefing-room/presidential-actions/2021/12/08/executive-order-on-catalyzing-clean-energy-industries-and-jobs-through-federal-sustainability/

[6] Total Energy: Production: Crude Oil and Lease Condensates, U.S. Energy Information Administration - EIA - Independent Statistics and Analysis

further cost reductions via innovation and learning-by-doing.[7] Similar remaining opportunities for further cost reductions in coal and natural gas technologies may be comparatively rare and expensive to exploit.

Multi-decade time horizons associated with new or refurbished fossil fuel EGUs present financial risks to TVA and its ratepayers. Many coal plants are already uneconomic. Natural gas plants could become similarly pressured in the face of stiff competition from renewable sources with lower climate risk and cost-reduction potential.[8] Many natural gas EGUs are over 30 years old with the capacity-weighted age of the current US natural gas fleet around 22 years.[9] Numerous coal-fired power plants have operated continuously for even longer periods, with the average age of operating US coal plants currently at 45 years.[10] Given that initial fixed costs represent a large share of total or levelized costs for these fossil fuel sources, locking them in risks locking in higher costs for TVA and its ratepayers.

In Alternatives A and B, the EPA recommends TVA consider the long-term financial liabilities associated with fuel price uncertainty, projections of falling technology costs, and how mitigation may reduce risk. Investing in long-lived combustion turbines due to inaccurate expectations about the costs of alternatives like solar may lead to higher overall costs. Moreover, long-lived fossil assets may become uneconomic faster than expected if alternatives and mitigation are not fully considered.

The EPA offers the following specific recommendations to consider and mitigate regulatory and energy transition risks:

a. *TVA should consider site characteristics that could promote or impede TVA responses to regulatory and technology developments.*

The EPA recommends that TVA consider the infrastructure and siting needs related to the need for future potential carbon mitigation measures at combustion turbines. TVA should also provide the total costs for these mitigation measures so that risks of financial impact are fully understood. TVA should assess: 1) space to locate carbon capture equipment or electrolyzers for clean hydrogen production; 2) pipeline routes and storage sites for potential CO_2 sequestration; and 3) any pipeline and/or storage needs associated with clean hydrogen.

b. *TVA should disclose why carbon mitigation options were not included or analyze those options in the FEIS.*

As TVA is aware, renewables and storage are not only projected to continue declining in cost over time while substantially reducing GHG and non-GHG pollution, but also to help stabilize domestic energy supply, e.g., renewable energy is less subject to global price fluctuations than natural gas.[11]

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[7] Ramasamy Vignesh, David Feldman, Jal Desai, and Robert Margolis. 2021. U.S. Solar Photovoltaic System and Energy Storage Cost Benchmarks: Q1 2021. Golden, CO: National Renewable Energy Laboratory. NREL/TP-7A40-80694. U.S. Solar Photovoltaic System and Energy Storage Cost Benchmarks: Q1 2021 (nrel.gov)

[8] https://rmi.org/report-release-headwinds-for-us-gas-power/

[9] U.S. utility-scale electric generating capacity by initial operating year (as of Dec 2016), U.S. Energy Information Administration - EIA - Independent Statistics and Analysis

[10] U.S. coal power plant capacity by initial operating year (1950-2021), U.S. Energy Information Administration - EIA - Independent Statistics and Analysis

[11] EPA. 2018. Quantifying the Multiple Benefits of Energy Efficiency and Renewable Energy: A Guide for State and Local Governments, EPA-430-R-18-00000

The FEIS should include a more detailed explanation of why options that included carbon mitigation were not more fully considered. Although TVA suggests it is considering transitioning the turbines built in Alternatives A or B to lower GHG emitting technologies, *e.g.*, hydrogen or carbon capture and storage (CCS), TVA neither commits to them, nor analyzes the potential resulting emissions reductions. For instance, in its site selection criteria, the DEIS does not consider access to clean hydrogen and or sequestration sites, nor sufficient room to add post combustion CCS or clean hydrogen. Further, the DEIS seems to have rejected considering those options in the short term. Given the trends noted above, the EIS should explain its choice not to consider them.

To help update the FEIS, TVA should review EPA's draft whitepaper on GHG measures for turbines.[12] For illustration, the EPA has included Table 1 containing a list of hydrogen and CCS projects currently under development with online dates in the 2025/2026 timeframe. The EPA recommends that TVA discuss its evaluation of these types of technologies as mitigation options, and whether TVA has any short or long-term plans to ensure there is a plan for reducing GHG emissions from new fossil assets like the turbines in alternatives A and B.

Table 1: Turbine projects with GHG mitigation technologies in development in 2026 timeframe

Type of Project	Location	Developer	Amount of Carbon Mitigation	Current Status	Next Expected Milestone	Projected On-line Date
Projects Where Construction Contract Has Been Awarded						
Hydrogen co-firing	Utah	Intermoun-tain Power[13]	30% Green Hydrogen Co-firing on day 1	Contracts Awarded for turbine/gen-erator – manufacture and construct	December 2022- Award hydrogen contract	July 2025
Projects On-line With Stated Commitment to Run on Green Hydrogen						
Hydrogen Co-firing	Ohio	Long Ridge Power Project[14]	Currently capable of burning 20% hydrogen	5% hydrogen Test Burn Completed – April 2022	Procure Green Energy	Currently on-line
Projects Where Decision To Build Is Expected Soon						
Oxy Combustion Turbine	Southern Ute Reservation, Colorado	Coyote Clean	100% Carbon Capture	February 2022 – Interconnect ion	Final Investment Decision	2025

[12] https://www.epa.gov/stationary-sources-air-pollution/white-paper-available-and-emerging-technologies-reducing
[13] https://www.ipautah.com/ipp-renewed/#
[14] https://www.longridgeenergy.com/news/2020-10-13-long-ridge-energy-terminal-partners-with-new-fortress-energy-and-ge-to-transition-power-plant-to-zero-carbon-hydrogen

Type of Project	Location	Developer	Amount of Carbon Mitigation	Current Status	Next Expected Milestone	Projected On-line Date
		Power[15], NET Power		application filed	Expected 2022	
Oxy Combustion Turbine	Illinois	ADM[16] – NET Power	100% Carbon Capture	April 2021 Agreement in principle	Final Investment Decision Expected 2022	2025
Oxy Combustion Turbine	UK	Sembcorp Energy – NET Power – Whitetail Energy[17]	100% Capture	July 2021 – project announced 2022 – Pre-FEED Study Completed	Regulatory Approval?	2025
Projects Considering Retro-fit CCS						
Retrofit CCS	Texas	Deer Park Energy Center[18]	95% capture	FEED study underway	TBD	TBD
Retrofit CCS	CA	Delta Energy Center[19]	95% capture	FEED study underway	TBD	TBD
Additional Hydrogen Turbine Projects Under Development						
Hydrogen Turbine	TX	Orange County Advanced Power Station[20]	30% hydrogen co-firing on day 1	Seeking PUC approval	Decision expected September 2022	May 2026
Electrolyzers Being Installed to Supply Green Hydrogen for Existing Turbine Project						
Electrolyzer	FL	Cavendish Next Gen Hydrogen Hub[21]	25 MW	Contract for Electrolyzer Awarded, Feb. 2022		

[15] https://www.prnewswire.com/news-releases/coyote-clean-power-begins-wapa-interconnection-301479049.html
[16] https://www.powermag.com/8-rivers-unveils-560-mw-of-allam-cycle-gas-fired-projects-for-colorado-illinois/ , https://www.prnewswire.com/news-releases/8-rivers-capital-adm-announce-intention-to-make-illinois-home-to-game-changing-zero-emissions-project-301269296.html
[17] https://energydigital.com/renewable-energy/whitetail-appoints-atkins-uks-first-net-zero-plant
[18] https://www.regulations.gov/comment/EPA-HQ-OAR-2022-0289-0016
[19] https://www.regulations.gov/comment/EPA-HQ-OAR-2022-0289-0016
[20] https://www.naturalgasintel.com/texas-combined-cycle-natural-gas-hydrogen-project-proposed-by-entergy/
[21] https://www.businesswire.com/news/home/20220228005567/en/FPL-Announces-Cummins-to-Supply-Electrolyzer-for-Florida%E2%80%99s-First-%E2%80%9CGreen%E2%80%9D-Hydrogen-Plant-%E2%80%93-Potential-Key-to-Carbon-Free-Electricity

c. TVA should consider and disclose potential fossil-fuel lock-in costs.

The EIS should analyze the potential for Alternatives A and B to lock-in fossil fuel use and production, along with the associated financial risks, when compared with energy resources with lower GHG emissions. The EIS should consider and disclose whether these alternatives—especially the preferred Alternative A's natural gas combined cycle unit and pipeline—could yield stranded assets due to market and policy factors that reduce demand for fossil-generated electricity.

III. The EPA recommends that TVA make specific updates to address all practicable mitigation measures.

The EPA recommends that TVA update Section 2.3, Identification of Mitigation Measures, to reflect all practicable mitigation measures. In Section 2.3 of the DEIS, the description of Air Quality and GHG mitigation does not adequately identify all practical mitigation measures for the proposed alternatives, does not address mitigation of GHG emissions, and does not include mitigation measures identified elsewhere in the DEIS. Further, the EPA recommends that the FEIS include any standard mitigations or Best Management Practices (BMPs) as a link or reference, if not included in the Appendix.

The EPA also recommends TVA adopt the proposal for the preferred alternative to use an electrified natural gas compressor. TVA should also adopt the recommendations of the EPA's Methane Challenge program to reduce potential GHG emissions attributable to the project. In addition, TVA should incorporate such mitigation measures into the proposed terms and conditions required as part of the pipeline contract.[22]

The EPA recommends that TVA consider the use of switchgears that are sulfur hexafluoride (SF_6) free for the proposed alternatives and system-wide as larger switchgears become available.[23] The DEIS indicates that small leaks of SF_6 are expected from gas-insulated switchgears. SF_6 is the most potent known GHG. Approximately 26,000 times more effective at trapping infrared radiation than carbon dioxide, SF_6 is also a very stable chemical, with an atmospheric lifetime of 3,200 years. Thus, a relatively small amount of SF_6 from each of the thousands of switchgears associated with the energy sector can have a significant impact. Emissions of SF_6 also come from the manufacture and recycling of SF_6, as well as charging, repairing, and decommissioning the switchgears. The EPA recommends that TVA consider the use of switchgears that are SF_6-free for the proposed alternatives, as well as system-wide, as larger switchgears become available.[24]

IV. TVA should include more meaningful consideration of emissions-reducing options in its alternatives analysis and craft an alternative that combines and blends energy resource measures.

The EPA recommends that TVA consider a blended alternative for formal analysis that combines the favorable aspects of the clean energy alternatives analyzed with other strategies TVA considered but did not further analyze. Such an approach would leverage energy efficiency and demand response measures to reduce summer and winter peak demand and implement a portfolio of alternatives—microgrids (*e.g.*, fuel cells in Nashville), rooftop and utility scale solar, and energy storage. A strategy that blends these

[22] https://www.epa.gov/natural-gas-star-program/recommended-technologies-reduce-methane-emissions
[23] https://www.epa.gov/eps-partnership
[25] https://www.epa.gov/eps-partnership

measures could be more cost-effective and mitigate the risks from GHG emissions, fuel price volatility, and technology uncertainty that accompany fossil fuels.

TVA may be able to lower or remove the need for 1,450 MW of capacity identified in Alternative A and meet its purpose and need on a more expedited timeline than Alternative C. To address one of TVA's core concerns, TVA may be able to reduce transmission upgrade costs associated with alternatives by targeting areas of transmission congestion with energy efficiency, demand response, distributed renewables, and energy storage measures.

Following these recommendations would both improve the EIS and be responsive to concerns from the House of Representatives Committee on Energy and Commerce that TVA has underinvested in energy efficiency and renewable energy to ratepayers' detriment.[25]

The EPA recommends that TVA consider the myriad benefits of incorporating energy efficiency and demand response into its proposed alternatives.

Energy efficiency and demand response would provide low-cost electricity and peak demand resources that could provide a significant portion of TVA's resource needs. Energy efficiency investment co-benefits include emissions reductions and local jobs and economic development.

Based on the performance of energy efficiency measures for other utilities in the Southeast region and nationally, TVA could improve overall system performance with energy efficiency measures. In 2019 and 2020, TVA's energy savings as a percentage of retail sales were 0.02% and 0.06%, respectively, while in 2020 the U.S. average was 0.72% and the southeastern utility average was 0.20%. TVA's regional peers, Duke Energy Carolinas and Duke Energy Progress achieved 0.8% or more each year from 2016 to 2020, more than 13x TVA's 2020 results.[26]

Further, consideration of the current cost, performance, and impacts of increased energy efficiency and demand response as a component of an additional alternative will help inform decision-makers and the public of the full range of reasonable alternatives to meet the project need. The TVA 2019 IRP did not provide information about the cost, performance, and impacts of increased energy efficiency and demand response program investment scenarios.

To underscore the value of this recommendation, TVA could yield meaningful annual savings with an alternative that includes energy efficiency measures. The EPA recommends that TVA evaluate as a component of a hybrid strategy a scenario where its current annual savings levels (0.06%) increase to 1% over a 5-year period, 2023-2027 (< 0.2% increase per year), and to 1.5% by 2030. Recent experience from other large utilities indicates that these levels are likely to be achievable and cost effective to TVA's customers. For example, 25 of the 52 largest electric utilities saved 1% or more according to a comprehensive assessment of utility efficiency performance.[27] In its most recent assessment, the Electric

[25] See, January 13, 2022 Letter from House Committee on Energy and Commerce to TVA https://energycommerce.house.gov/sites/democrats.energycommerce.house.gov/files/documents/TVA%20Letter%20re%20business%20practices%20and%20adherence%20to%20TVA%20Act.pdf.
[26] SACE. 2022. https://cleanenergy.org/wp-content/uploads/Energy-Efficiency-in-the-Southeast-Fourth-Annual-Report.pdf
[27] ACEEE. 2020. https://www.aceee.org/research-report/u2004

Power Research Institute has estimated state-level, economic energy efficiency potential of 16% of electricity demand in Tennessee by 2035.[28]

The EPA's Energy Savings and Impacts Scenarios Tool (ESIST) can be used to support this analysis by leveraging national data sets of energy efficiency program performance and impacts, and applying transparent and documented inputs.

V. The EPA recommends TVA disclose additional analysis regarding existing alternatives to better inform stakeholders.

The EPA recommends that TVA consider whether a reasonable range of alternatives would include additional renewable or non-gas alternatives beyond Alternative C, or that the EIS disclose additional analysis of why these alternatives were removed from consideration. For example, it would be helpful for TVA to provide additional information and analysis supporting the decision to dismiss wind energy from further consideration. As noted above, benefits of non-gas alternatives include not only GHG and non-GHG pollution emissions reduction, but also contributions to domestic energy stability, *e.g.*, renewables are less subject to global price fluctuations than oil and gas.[29]

The EPA recommends that TVA provide additional information on how timing considerations, including the requirement that resources be constructed and installed within a five-year timeframe, limited the alternatives options considered in the DEIS, including consideration of pumped water storage.

The EPA recommends the EIS include additional justification for why, in the context of the IRP, TVA has chosen the Cumberland site for the addition of combined cycle units. Given that the Cumberland site requires the construction of a 32-mile natural gas pipeline, it is unclear why an alternate site, such as Johnsonville, which has or will have natural gas capability would not meet TVA's purpose and need while significantly reducing environmental impact and expenditures associated with construction of a new pipeline. In relation, and as suggested above, TVA should disclose whether a diversified alternative of renewable energy resources that reduces capacity needs and transmission congestion could also reduce the need for a new pipeline.

The EIS should provide a more detailed cost breakout for each alternative and details on key assumptions that informed such costs. It should identify the fuel cost changes from each alternative and the total capital costs of building new generation and associated infrastructure like transmission upgrades. Such disclosures would highlight for TVA's ratepayers, other stakeholders, the public, and decisionmakers both the real cost drivers of the alternatives and the reasonableness of various assumptions that TVA makes in its analysis. The EPA appreciates TVA's duties with respect to least-cost planning under 16 USC 831m-1; pursuant to those provisions it would appear TVA is obligated to consider the full costs of its preferred alternative and renewable options, which may be the least cost supply. The EPA therefore recommends TVA be fully transparent with respect to any modeling of alternatives it conducts. For example, if TVA conducted modeling to evaluate reliability, costs, environmental performance, etc., it should make public its modeling assumptions (e.g., price of natural

[28] EPRI. 2017. https://www.energy.gov/sites/default/files/2017/05/f34/epri_state_level_electric_energy_efficiency_potential_estimates_0.pdf

[29] EPA. 2018. Quantifying the Multiple Benefits of Energy Efficiency and Renewable Energy: A Guide for State and Local Governments, EPA-430-R-18-00

gas, cost of battery storage) and the results of all model runs. The modeling should incorporate dynamic market trends and risks (e.g., climate transition risks), as well as examine appropriate policy-driven scenarios.

Since TVA signed a precedent agreement to purchase gas supply from Tennessee Gas Pipeline prior to issuing its DEIS preference for Alternative A, the EPA recommends TVA discuss how it maintains objectivity in the comparison of alternatives.

The EPA recommends discussing why the closely related, interdependent natural gas pipeline whose need is triggered by Alternative A is undergoing a separate and distinct NEPA review, rather than a joint NEPA document with Federal Energy Regulatory Commission (FERC) as provided by 40 CFR § 1501.9(e).

VI. The EPA recommends TVA disclose all direct and indirect GHG emissions for each alternative.

The EPA recommends disclosure and consideration of all direct and indirect project GHG emissions, including upstream and pipeline emissions. TVA should analyze GHG emissions in the context of national and state GHG reduction targets and policies. TVA's revised analysis should inform and improve TVA's consideration of mitigation measures and climate adaptation. Also, as recommended in detail below, this discussion should inform TVA's improved disclosure of climate impacts using the estimated social cost of GHGs (SC-GHG).

a. The EPA recommends TVA quantify and further consider all direct and indirect GHG emissions from each alternative.

The EPA recommends quantification of all reasonably foreseeable direct and indirect GHG emissions (*e.g.*, carbon dioxide (CO_2), methane, and nitrous oxide (NO_x)) attributable to the proposed action and alternatives. Quantification should include upstream emissions (exploration, extraction, processing, and pipeline transmission), plant and pipeline construction emissions, and combustion-related methane emissions. Upstream methane emissions from coalbeds and natural gas systems are likely to be substantial despite the increased regulation, improved practices, and new technologies mentioned in the DEIS. Research also suggests that these methane emissions are larger than previously expected.[30] Even though methane emissions may be smaller than CO_2 emissions, they still represent potentially substantial impacts on social welfare and the environment. EPA uses a Global Warming Potential (GWP) of 27-30 for methane over 100 years, indicating that one ton of methane has the same warming potential as 27-30 tons of CO_2. As TVA accounts for emissions of additional gases (including methane), the EPA recommends that the relevant SC-GHG be applied to the respective emissions of each gas. For example, the SC-CH_4 should be applied to methane emissions. It would be inappropriate to convert emissions to CO_2 equivalents and apply the SC-CO_2.

The EPA recommends the EIS provide further narrative explanation of the emissions trends in the GHG analysis presented in DEIS Tables 3.7-3 and 3.7-4 (pp. 191-192). Specifically, the EIS should explain why the No Action Alternative emissions generally decrease until 2034 and then increase thereafter. Additionally, the EPA recommends that the EIS explain why Alternative C (solar and storage) emissions

[30]Alvarez, R. A., et al. (2018). "Assessment of methane emissions from the U.S. oil and gas supply chain." Science 361(6398): 186-188

are higher than No Action Alternative emissions through 2024. The EPA also recommends an explanation of the similarity between Alternatives A, B, and C emissions in 2041.

In this context, given that there are substantial differences in the monetized costs of CO_2 emissions across the alternatives, the EPA recommends TVA address and justify its conclusion that, *"The SCC results for TVA system-wide effects essentially show that all the alternatives are very close regarding their overall GHG effects…" (p. 186).*

The EPA recommends the EIS explain why the GHG analysis considers a 20-year horizon to 2041 and whether this time horizon is sufficient to analyze trade-offs among emissions trajectories. Gas-powered combined cycle units had an average retirement age of 30 years in 2018, suggesting that a 20-year horizon is too short.[31] To address this issue and related analytical shortcomings, the EPA recommends comparing the proposed projects' long-term generation impacts with energy use trajectories consistent with achieving science-based targets for GHG reduction. For example, a new natural gas-fired generating station could replace electricity generation from an existing coal-fired generating station in the near term, but lock in fossil fuel consumption for decades, forcing future trade-offs between now-existing natural gas generation and future renewable energy generation. As discussed above, the EPA recommends the EIS discuss how TVA will manage existing natural gas generation to achieve critical GHG-reduction goals. For important context, the EPA also recommends further explanation of TVA's plans for replacing the remaining lost capacity from retiring the Cumberland coal plant.

The EPA recommends that TVA avoid expressing project-level GHG emissions as a percentage of national or state GHG emissions. The DEIS approach of comparing project-level emissions to national and state emissions diminishes the significance of substantial project-scale GHG emissions. This approach is also misleading given the nature of the climate policy challenge to reduce GHG emissions from a multitude of sources, each making relatively small individual contributions to overall GHG emissions. Instead, the EPA recommends that the FEIS include a discussion of whether and to what extent the estimated GHG emissions from the proposed alternatives are consistent with taking action to achieve science based national GHG reduction targets and any relevant state or local goals, as noted above. Since the proposed action tiers off the 2019 IRP, this analysis should include a discussion of how the proposed action and 2019 IRP will achieve GHG reduction targets.

b. The EPA recommends TVA provide details and assumptions underlying its system model.

The DEIS indicated that a system-wide model was used to generate the assumptions for displacement of higher emitting alternative fuels and the calculations of GHG emissions associated with each alternative, but the DEIS does not provide specific details on this model. The EPA recommends that the details of the displacement modeling be fully specified and explained in the FEIS so that the underlying uncertainty and assumptions are clear. For instance, the GHGs in the No Action Alternative that are being displaced should be quantified and monetized using the SC-GHG. It is not clear how this modeling comports with broader TVA system plans that include additional renewables in later years, or whether the costs of keeping coal operating are reflected in the analysis. Where possible, peer reviewed methods should be used for modeling.

[31] "Average age of US power plant fleet flat for 4th-straight year in 2018", S&P Global https://www.spglobal.com/marketintelligence/en/news-insights/trending/gfjqeFt8GTPYNK4WX57z9g2

The EPA recommends that TVA reach out to the National Renewable Energy Lab, (NREL) for a consultation on grid integration. NREL can perform studies to address reliability under high-renewable energy scenarios.

c. The EPA recommends that TVA should align its baseline model in the No Action Alternative with the planned retirement dates of the CUF EGUs. In the alternative, TVA should provide a detailed explanation and justification for keeping a baseline model that assumes continued operation of EGUs planned for retirement.

Both Cumberland coal-fired units have already filed a Notice of Planned Participation to comply with the EPA's 2020 Steam Electric Effluent Guideline rule (ELG rule), which indicates that that TVA will permanently cease coal combustion by 2028 at both units.[32] In addition, Unit 2 has an indicated retirement date of 2026 in the EPA's NEEDS database, which is compiled using public filings, such as Energy Information Administration's Form-860. However, the DEIS considers the benchmark counterfactual to be a No Action Alternative where both units operate past 2040. TVA should explain these varying representations. Presumably there are additional costs associated with keeping the coal operating and it is not clear whether this is accounted for in the DEIS, along with other potential conflicts. Such costs should be disclosed in detail. To ensure consistency, the EPA recommends that TVA align the modeling for GHG calculations with the other plans in the document.

The EPA recommends that the FEIS consider how each alternative compares with scenarios consistent with achieving science based GHG reduction goals, rather than solely against a "business as usual" baseline of high fossil fuel use. The DEIS compares the alternatives with a No Action baseline of continued operation of two coal-fired generation units, rather than evaluating how these alternatives compare with actions the United States must take in order to meet GHG reduction goals. If TVA continues to use the No Action Alternative, TVA should address the likelihood that the plant would still need to be replaced within the planning horizon and/or would be required to address its substantial GHG emissions. The EPA recommends accounting for the potentially substantial costs associated with both complying with the ELG rule and with other operation and maintenance needed to keep the plant running.

VII. TVA should update its SC-GHG analysis to accurately reflect the alternatives' monetized cost, incorporating climate impacts from both direct and indirect GHG emissions.

The EPA strongly recommends that TVA apply estimates of the SC-GHG to monetize the societal value of the direct and indirect GHG emissions resulting from the proposed project. The fact that the SC-GHG estimates do not provide a basis to designate a particular monetized value as significant does not diminish their usefulness. Valuing these emissions separately discloses the different environmental impacts associated with emissions of each of the GHGs.[33]

The EPA recommends the February 2021 interim SC-GHG estimates developed by the Interagency Working Group (IWG) on the SC-GHGs as the most appropriate current estimates for use in policy analysis until an improved estimate of the impacts of climate change can be developed based on the best available science and economics taking into consideration recommendations from the National

[32] Steam Electric Reconsideration Rule, 85 Fed. Reg. 64670-01 (Oct. 13, 2020)
[33] EPA also has additional information at https://www.epa.gov/global-mitigation-non-co2-greenhouse-gases

Academies of Sciences, Engineering, and Medicine (National Academies 2017).[34] When applying SC-GHG estimates, TVA should disclose the associated assumptions (*e.g.*, discount rates) and uncertainties, which are lacking in the current application in the DEIS. Furthermore, the EPA recommends against characterizing any SC-GHG estimates as an "upper bound" of climate change impacts in the FEIS. The IWG's 2021 Technical Support Document presents a range of estimates and discount rates and discusses the uncertainties and the many categories of damages that are not yet reflected in existing SC-GHG estimates. Data and modeling limitations therefore naturally limit the SC-GHG estimates to be a partial accounting of climate change impacts, making it incorrect to assert an upper bound using only one of the SC-GHG estimates.

To clarify a legal point TVA raises in the DEIS, the EPA does not agree that there is "legal uncertainty" regarding SC-GHG values. EO 13990 directed the IWG to publish the interim SC-GHG estimates for agencies to use "when monetizing the value of changes in GHG emissions resulting from regulations and other relevant agency actions until final values are published."[35] Estimates of the social cost of carbon (SC-CO_2) have been published in peer reviewed academic literature for decades, and the SC-GHG metric has been regularly incorporated into federal policy analysis since the late 2000s, following a 2008 Ninth Circuit Court of Appeals remand of a rule for failing to monetize the benefits of reducing CO_2 emissions.[36] While the interim estimates proposed by the IWG have been the subject of litigation, there are currently no legal constraints on the use of these estimates, which were developed under a robust and transparent process, represent the best available science and economics, and provide essential impact information to the public and decisionmakers.

The EPA also recommends against applying the SC-GHG estimates developed under EO 13783 (revoked),[37] because the full impact of GHG emissions is not reflected in multiple ways. First, those estimates fail to capture many climate impacts that can affect the welfare of U.S. citizens and residents. Examples of affected interests include direct effects on U.S. citizens and assets located abroad, international trade, tourism, and spillover pathways such as economic and political destabilization and global migration that can lead to adverse impacts on U.S. national security, public health, and humanitarian concerns. Assessing the benefits of U.S. GHG mitigation should also incorporate how those actions may affect mitigation activities by other countries, as those international actions will benefit U.S. citizens and residents. Scientific and economic experts have emphasized reciprocity as support for considering global damages of GHG emissions. Using a global estimate of damages in U.S. analyses allows the U.S. to continue to actively encourage other nations, including emerging major economies, to take significant steps to reduce emissions.

The SC-GHG estimates based on a 7% discount rate (to approximate the social rate of return on capital) inappropriately underestimate the impacts of climate change when discounting the future benefits of reducing GHG emissions. Consistent with the findings of the National Academies, the economic literature and the IWG, the EPA agrees with the assessment that the consumption rate of interest is the theoretically appropriate discount rate in an intergenerational context, and that discount rate uncertainty and relevant aspects of intergenerational ethical considerations be accounted for in selecting future discount rates. Furthermore, the impacts of climate change are measured in consumption-equivalent

[34] February 2021 Technical Support Document (TSD), Social Cost of Carbon, Methane, and Nitrous Oxide Interim Estimates under Executive Order 13990

[35] Executive Order 13990: Protecting Public Health and the Environment and Restoring Science To Tackle the Climate Crisis (January 20, 2021).

[36] *CBD v. NHTSA*, 538 F.3d 1172 (9th Cir. 2008)

[37] Revoked on January 20, 2021, via E.O. 13990.

terms in the models used to estimate SC-GHG, so it is appropriate to use the consumption discount rate to calculate the SC-GHG.

The EPA recommends several additional corrections and clarifications related to the SC-GHG discussion and the analysis presented in Tables 3.7-3 and 3.7-4 of the DEIS (pp. 191-192):

- Following best practice with benefit cost analysis, the EPA recommends discounting nominal values using nominal discount rates. The EPA recommends that the nominal discount rate should be the real discount rate plus the inflation rate. Alternatively, the values in these tables could be presented as real values (using the same base year dollars, unadjusted for inflation) rather than nominal values. Undiscounted sums (Table 3.7-3) should also be avoided.
- The EPA recommends using internally consistent discount rates for SC-GHG and Net Present Value (NPV) calculations. In particular, DEIS Table 3.7-3 (p. 191) uses a 7% discount rate for NPV calculations, while the SC-GHGs were calculated using a 3% discount rate.
- The EPA recommends that the TVA clarify the characterization that the SC-GHG "does not measure the actual incremental effects of an individual project." TVA states: *"The SCC metric does not measure the actual incremental effects of an individual project due to both scale and complexity." (p. 186).* GHGs are globally mixed, so the SC-GHG is well suited to measure the effect of individual projects. The SC-GHG is an estimate of the marginal social cost of emissions, which is the correct estimate to be applied to the scenarios considered in this DEIS.
- The EPA recommends revising the definition of the SC-GHG to clarify that the SC-GHG collectively refers to the SC-CO_2 and other GHGs (including, for example, the social cost of methane (SC-CH_4) and social cost of nitrous oxide (SC-N_2O)). The EPA also recommends the FEIS use "SC-GHG" and "SC-CO_2" as appropriate rather than "SCC." The definition should also clarify that in practice what is reflected in SC-GHG estimates is limited by data and available modeling methods. We recommend the following revision: "The SC-GHG is the monetary value of the net harm to society associated with adding a small amount of that GHG to the atmosphere in a given year. In principle, it includes the value of all climate change impacts (both negative and positive), including (but not limited to) changes in net agricultural productivity, human health effects, property damage from increased flood risk and natural disasters, disruption of energy systems, risk of conflict, environmental migration, and the value of ecosystem services. In practice, estimates of the SC-GHG are unable to include all of the important physical, ecological, and economic impacts of climate change due to data and modeling limitations."
- The EPA recommends a consistent use of both the terms "social cost" and "social benefits." For projects that decrease emissions, the decrease multiplied by the SC-GHG can be either labeled as a negative cost or a positive benefit. The term "social cost benefit" is confusing and unclear. It may be confused with the term "social cost-benefit" or "social cost and benefit," which both refer to a complete assessment of the costs and benefits. For example, DEIS Table 3.7-6 is labeled *"Social Cost Benefit of GHG Operational Emissions Reductions."* However, this table is only presenting the social benefits (or negative costs). Furthermore, this table labels columns as the "Net SCC Benefit" and list benefits (or negative costs) as a negative value. The term "Social Cost of Carbon (SCC) Benefits" is unclear as to its meaning.
- The EPA recommends the SC-GHG be applied to the incremental emissions from the proposed Alternatives, as opposed to TVA-wide emissions. For example, to describe the emission benefits of Alternative C, the SC-GHG may be applied to the difference in emissions between Alternatives A and C. Alternatively, TVA could choose some plausible reference case for the system-wide modeling (*e.g.,* a preferred scenario TVA uses in its IRPs and other long-term

planning). TVA could then apply the SC-GHG to the incremental emissions from each Alternative relative to the reference case emissions. Applying the SC-GHG to total TVA-wide emissions under each Alternative obscures the relative impacts of the Alternatives. On a percentage basis, the differences in TVA-wide emissions may be relatively small across Alternatives, which can suggest the problematic conclusion that emissions across Alternatives are "similar." Although the DEIS only includes a time path for carbon emissions, we were able to apply the SC-GHGs to the carbon emissions in Table 3.7-3. Our estimates show that the difference between the monetized value of carbon between alternative A and alternative C is $1.1 billion dollars (in net present value out to 2041), when using the SC-GHG value in 2021 real dollars). That does not include the monetized impacts of methane or N_2O, which will drive that value larger. Furthermore, while the DEIS does not specify the size of the pipeline for Alternative A or its volume per day, Page 19 of the document states "Preliminary estimates indicate that approximately 250,000,000 standard cubic feet per day of natural gas would be required for the CC plant." Based on estimates from EPA's Inventory of US GHG Emissions and Sinks, that natural gas will yield total upstream emissions of approximately 487,601 metric tons of CO_2, 11,518 metric tons of CH_4, and 1.1 tons of N_2O. Using a 3% rate for the SC-GHG, that yields an additional $817 million dollars in net present value (2021 dollars).

VIII. The EPA recommends that TVA consider and disclose climate resilience and adaptation planning in project design.

The EPA recommends that the EIS consider and disclose climate resilience and adaption planning in project design, including measures to ensure resilience to protect infrastructure investments from the effects of climate change on the project. By considering potential climate change impacts, TVA would help ensure that investments made today continue to function and provide benefits, even as the climate changes. This would also help TVA avoid making infrastructure investments in vulnerable locations, along with unintended impacts to local communities.

- Section 3.7.2.3.1 of the DEIS discusses the potential climate impacts from increases in ambient temperature on combustion turbine operational efficiency and potential impacts of flooding on the project. The DEIS also indicates that TVA has developed a Climate Action Adaptation and Resiliency Plan to identify risks associated with and plan for climate change effects. We recommend that the FEIS specifically reference or provide a link to this plan, as well as refer, in the climate section, to the flood mitigation measures that are included elsewhere the document.
- The EPA also recommends that the FEIS address whether and to what extent each of the alternatives is resilient or vulnerable to outages, with the expectation that climate change will increase impacts that could affect risks to reliability. If TVA plans to cite reliability as a concern related to Alternative C, the EPA recommends that TVA detail the modeling scenarios that produce electricity supply shortfalls.

IX. TVA should more broadly consider the Environmental Justice impacts of its alternatives.

TVA evaluated demographic data of the population near the CUF reservation, along the proposed pipeline corridor, and contiguous counties. Four census block groups were found to have significant populations of residents living in poverty. Generally, the DEIS discussions of environmental justice impacts appear to assume that various environmental impacts are not anticipated to be disproportionate on the identified environmental justice populations because similar effects would occur to other

populations in the area. Although similar impacts may occur in the general population, these effects may be amplified in some communities with environmental justice concerns due to health, socioeconomic, or cultural vulnerabilities. CEQ's environmental justice guidance states that Agencies should recognize the interrelated cultural, social, occupational, historical, or economic factors that may amplify the natural and physical environmental effects of the proposed agency action. For example, if the residents living in poverty rely more heavily on fishing or hunting for subsistence, they will be more adversely affected by impacts to aquatic and wildlife resources. Similarly, temporary or permanent effects to prime farmland relied on by low-income farmers could potentially be more severe than to the general population.

- The EPA recommends that the EIS identify and disclose reasonably available information from affected communities and other appropriate sources about susceptibilities or vulnerabilities that could potentially amplify the environmental justice impacts discussed in the DEIS. This information should be taken into account in concluding that the proposed project's environmental impacts on environmental justice populations are the same as those on other populations in the area.
- TVA should also account for impacts resulting from the construction and operation of the natural gas pipeline that is required to operate the preferred alternative. The EPA notes that the pipeline contractor has begun coordination with landowners for the purchase of easements and coordination with local governments and federal agencies for required permits. Though there is a separate process for permitting pipelines administered through FERC and a separate NEPA analysis is planned to specifically analyze the pipeline, any reasonably foreseeable disproportionate impacts to communities with environmental justice concerns should be identified and addressed, consistent with EO 12898. This would include not only potential air quality and other impacts on these communities, but also ensuring equitable use of eminent domain and consideration of possible pipeline failures. This analysis should also include consideration of the cumulative pollution and non-pollution burdens on the communities with environmental justice concerns, which can make those communities more susceptible or vulnerable to environmental impacts.
- The EPA also recommends that the discussion of climate change and GHGs acknowledge the disproportionate impact that GHG emissions have on already overburdened and vulnerable communities. See, *e.g.*, *Climate Change and Social Vulnerability in the United States*, EPA (2021). Similarly, the alternatives discussion should recognize the differences in the GHG emission impacts of each alternative on those vulnerable communities. Also, the environmental justice analysis of non-GHG stressors should include ongoing and projected climate-related impacts, consistent with section 219 of EO 14008.

X. EPA recommends TVA mitigate for unavoidable losses to streams and wetlands.

CUF contains several wetlands and tributaries to the Cumberland River. The proposed pipeline corridor parallels an existing transmission line corridor that crosses interspersed creeks and wetlands. TVA will potentially impact 7,239-Linear Feet (LF) of streams and 29.4-acres of wetlands at the power plant site, and 11,620-LF of streams along the pipeline corridor. Additional impacts from in-water work along the Cumberland River may result from planned upgrades to existing piers. The EPA understands that TVA is coordinating with the U.S. Army Corps of Engineers (USACE) regarding impacts to Waters of the United States (WOTUS). TVA regulations additionally require a 50-foot buffer around streams, wetlands, and ponds.

- The EPA recommends continued coordination with USACE to acquire mitigation credits within the Cumberland and Tennessee River watersheds.

XI. TVA should monitor stormwater discharges and maintain best management practices.

The DEIS indicates TVA will acquire a National Pollutant Discharge Elimination System construction stormwater general permit and implement a stormwater pollution prevention plan to mitigate effects from the temporary disturbance of soils during construction. BMPs, as described in TVA's BMP manual and the Tennessee Department of Environment and Conservation Erosion and Sediment Control Handbook will be used to avoid contaminating surface waters near and downstream of construction sites.

- The EPA recommends continuous monitoring of surface water discharges in accordance with TVA's industrial stormwater and construction stormwater permits, and maintenance of BMPs, to ensure pollutants do not enter WOTUS. The Proposed Action Alternative will create impervious surfaces that should be managed with attenuation features to maintain existing stormwater runoff profiles.

XII. TVA should manage and contain hazardous materials.

CUF is currently a small-quantity generator of hazardous wastes and produces approximately 1.2-million tons of solid coal burning byproducts annually. Demolition of CUF, that is analyzed under all three proposed actions, will temporarily produce large quantities of several regulated wastes including asbestos, lead, mercury, polychlorinated biphenyls, and volatile organic compounds.

- For the protection of drinking water resources, WOTUS, and as required by the Clean Water Act, the EPA recommends the use of secondary containment where storage and handling of Petroleum, Oils, and Lubricants (POL) will take place. Where secondary containment is not directly practicable, spill ponds and oil water separators should be constructed downstream of POL related activities. Construction and operation in support of the project should ensure that Resource Conservation and Recovery Act-regulated solid wastes generated are disposed of in accordance with federal regulations.

XIII. TVA should continue coordination with the Service on impacts to biological resources.

The EPA understands the CUF reservation is primarily industrialized, while the proposed pipeline corridor consists mostly of forest and grassy fields. Section 3.8.2.1.2.2 states that plant and wildlife surveys of the proposed pipeline corridor are being conducted by the contractor as part of the separate permitting process administered by FERC.

- The EPA notes that the proposed natural gas pipeline is related to the proposed action alternative and associated impacts should be analyzed as a whole. The EPA principally defers to the U.S. Fish and Wildlife Service (FWS) regarding compliance with the Endangered Species Act and recommends early coordination. Results of FWS consultation should be included in the FEIS.

XIV. Floodplain analysis should inform site design.

Section 3.4.2 of the DEIS indicates that portions of the proposed power plant site and gas pipeline will be within the 100-year floodplain and TVA is developing plans to address siting infrastructure within the floodplain and requirements of relevant executive orders. The DEIS indicates that critical powerplant components will be constructed outside of the floodplain. Response measures for flooding during construction are identified in section 3.5.2.3.3.1.

- The EPA recommends evaluating long term site planning and water requirements of proposed energy sources alongside projected river flows and water availability throughout the sources proposed service life. The EPA understands that the proposed alternative will primarily use air cooling for turbines and be somewhat resilient to decreased flows of the Cumberland River. However, a reversal of trends in this river basin could elevate the existing floodplain and present future climate-based challenges to energy resiliency.