Charles P. Nicholson, PhD
NEPA Compliance
Tennessee Valley Authority
400 W. Summit Hill Drive, WT 11D
Knoxville, TN 37902
cpnicholson@tva.gov

December 9, 2014

*Via electronic mail*

**Re: Shawnee Fossil Plant Units 1 and 4, Comments on the Draft Environmental Assessment**

Dear Mr. Nicholson:

Thank you for the opportunity to provide the following comments on the Draft Environmental Assessment ("Draft EA") TVA is undertaking pursuant to the National Environmental Policy Act ("NEPA") for Units 1 and 4 at TVA's Shawnee Fossil Plant located in West Paducah, Kentucky. On behalf of the Southern Alliance for Clean Energy, Earthjustice, Environmental Integrity Project and Sierra Club, we submit these comments, highlighting the following insufficiencies in the Draft EA:

(1) TVA fails to justify the purpose and need for the project;
(2) TVA fails to employ a proper baseline for environmental impacts;
(3) The Draft EA contains insufficient analysis of alternate replacement generation options, including clean energy resources and market purchases;
(4) Current analysis of the environmental impacts of the project fail to consider significant impacts to groundwater, surface water and air quality; and
(5) TVA fails to consider the economic benefits of retirement rather than the more costly retrofit of the units.

These insufficiencies arbitrarily skew the EA results towards continued operation of Shawnee units 1 and 4, at a cost of hundreds of millions of dollars to TVA's customers,

as well as significant impact on the environment and health of Kentuckians. As a result, the draft EA is fatally flawed and must be revised to address the serious concerns outlined in these comments. Additionally, because the Draft EA considers an unreasonably narrow range of alternatives, TVA proposes to select a highly expensive and highly polluting option without even acknowledging that other, less expensive and less polluting alternatives exist, or weighing the impacts of retrofitting against less harmful alternatives. TVA cannot summarily dismiss from further consideration reasonable alternatives such as replacement with energy efficiency or demand side management; replacement with natural gas; retirement of only one of the units; and replacement with power purchases. Therefore TVA must correct the flaws in the Draft EA and prepare an EIS that considers all impacts of the project including other reasonable alternatives.

## I. The Draft EA fails to justify the purpose and need of the project under NEPA.

TVA fails to adequately justify the "statement of purpose and need for action" contained in the Draft EA.[1] TVA acknowledges that Shawnee Units 1 and 4 are not needed for reliability purposes, and could be retired "without having to build or obtain replacement capacity to maintain reliable service in the Paducah area." Nevertheless, TVA cites an unspecified "growing demand for energy and capacity on the TVA system" as justification for recommending retrofitting the two units. TVA fails to justify its assumption that a "growing demand" will require retrofitting these units, rendering its claim speculative.

TVA claims that its "demand forecasts indicate that there will be a general need for more generation on the TVA system in the future," citing to its 2011 IRP.[2] However, there is no evidence in the record that supports such demand growth. Reliance on the 2011 IRP's demand forecasts is flawed. TVA has acknowledged that post-2011 market events affected electricity demand growth such that the 2011 forecasts represent a significant overestimate of current demand growth trends. In the 2011 IRP, for example, TVA projected a total energy demand of approximately 180,000MWhs in 2013 and more than 190,000MWhs by 2020.[3] In reality, however, TVA reported an expected fiscal year 2013 energy demand of around 165,000MWh at its August 2013 TVA board meeting.[4] TVA also stated that demand was projected to remain below 180,000MWhs through at least fiscal year 2024.[5] Similarly, the 2011 IRP projected peak energy demand of approximately 32,500MW in 2013 increasing to nearly 40,000MW by 2024.[6] But at the most recent board meeting, TVA reported that peak demand was expected to be around 30,000MW in fiscal year 2013 and to increase to 32,500MW by fiscal year 2024. In August 2013, TVA announced that it was increasing customers' rates to make up for declining

---

[1] TVA's statement of purpose and need for the proposed action is to "Comply with the USEPA Clean Air Act Agreements by reducing NOx and SO2 emissions from SHF Units 1 and 4" and to "Achieve and maintain a balanced portfolio of generation resources." Draft EA at 1-1.
[2] Draft EA at 2-8.
[3] 2011 TVA Integrated Resource Plan at 69.
[4] TVA Board Meeting – Fiscal Year 2014 Financial Plan – Finance, Rates, and Portfolio Committee (Aug. 22, 2013), at p. 46, *available at http://www.tva.gov/abouttva/board/pdf/aug-22-2013_public_board.pdf* (hereinafter "TVA Board Meeting").
[5] *Id.*
[6] 2011 TVA Integrated Resource Plan at 68.

energy sales.[7] These changed circumstances are precisely the reason that TVA expedited its next IRP planning process, which began in 2014. The final 2015 IRP is expected as soon as early summer 2015. The decision to retrofit based on "growing demand" is in direct contrast to TVA's previous statements that confirm a lack of demand growth.

TVA's previous actions further demonstrate how it is addressing a continued decrease in energy demand. On August 21, 2014, the TVA Board approved a 25% cut to its energy efficiency budget. At this same Board meeting, TVA Board Director Dr. Marilyn Brown acknowledged that a reduction in TVA's energy efficiency programs could result in a limit to consumer energy savings, forcing TVA to build new and more expensive generation in the future. If the demand growth relied upon in the EA consists of the false demand growth caused by the impact of its own energy efficiency budget cuts, this represents an improper circumvention of the alternative analysis required by NEPA.

Furthermore, TVA lost its largest customer in 2013 when the Department of Energy's USEC gaseous diffusion facility in Paducah, Kentucky closed its operations.[8] USEC's closure resulted in a loss of 8,200 GWhs of energy demand per year and a 4.6% decline in projected energy sales in fiscal year 2014 compared to fiscal year 2013.[9] The Shawnee plant was originally built to serve USEC's load and as such, would require significant transmission upgrades in order to wheel Shawnee's output into TVA larger system, if local demand is not procured.
TVA's significant decline in local and peak system demand combined with an overall decrease in energy sales argues against the preferred alternative and suggests that TVA could retire both units without need for replacement generation. Ultimately, TVA must re-evaluate the level of energy and capacity needed if both units are retired in light of recent changes in TVA's anticipated demand forecasts and present these evaluations for public review and comment.

## II. The Draft EA must use a consistent baseline for comparing environmental impacts.

The Draft EA impermissibly uses a different baseline depending on which alternative it is considering for comparison. This misguided comparison of environmental impacts between the two alternatives – retirement or the addition of emission controls –renders the environmental impact analysis in the EA meaningless.

The baseline for Alternative A is defined as "continued operation of Units 1 and 4 without controls" even though the Draft EA acknowledges that this is not a viable alternative under the Clean Air Agreements.[10] The environmental impacts of Alternative B (retirement) are considered equivalent to the baseline environmental impacts because – under either scenario – Units 1 and 4 must be retired by December 31, 2017.[11]

---

[7] Dave Flessner, TVA Rates Rise As Power Sales Decline in the Tennessee Valley, Chattanooga Times Free Press (Aug. 23, 2013), *available at http://timesfreepress.com/news/2013/aug/23/tva-rates-rise-power-sales-decline/.*
[8] Dave Flessner, TVA Suffers Blow, Loses Biggest Customer, Chattanooga Times Free Press (May 31, 2013), *available at http://www.timesfreepress.com/news/2013/may/31/tva-suffers-blow-loses-biggest-customer/*
[9] TVA Board Meeting at p. 50.
[10] Draft EA at 2-1.
[11] *See* Draft EA at table 2-1 and 3-5 (the impacts [of Alternative B] would be the same as those described under Alternative A, in that Units 1 and 4 would be retired and cease emitting air pollutants by December 31, 2017).

TVA uses a different analysis, however, when comparing the environmental impacts of Alternative C, installing and operating environmental controls. For Alternative C's analysis, the environmental impacts are compared to a baseline of continued operation of Units 1 and 4 without controls into perpetuity.[12] The Draft EA finds that adding the FGD and SCR controls to the units results in beneficial impacts on air quality and climate change and insignificant negative impacts on groundwater, surface water, and solid and hazardous waste storage and disposal. This analysis is flawed and must be revisited for two reasons.

First, continued operation of Units 1 and 4 with controls should not be compared against fictional scenarios not allowed under the Clean Air Agreements. Such a comparison skews the analysis of environmental impacts greatly, as Alternative C (continued operation with controls) would result in significantly more harmful impacts to the environment such as continued discharges of wastewater, continued contamination of groundwater, continued emissions of carbon dioxide and other hazardous air pollutants, etc. Second, NEPA requires consistent baselines for environmental impacts associated with alternate scenarios. If baselines were not consistent, comparison of environmental impacts become a pointless exercise.

By shifting the definition of the baseline so it is different depending on whether it is being compared to Alternative B or C, the Draft EA appears to allow TVA to have its cake and eat it, too. Retirement appears to have no beneficial environmental impact, while continued operation of the units with controls appears to have some beneficial impacts and minimal negative impacts. Both cannot be true. To illustrate the difference in results if TVA has used a consistent baseline, if the baseline for Alternative B (retirement of the units) was continued operation of Units 1 and 4 with controls – as it is in the Alternative C comparison – then Alternative B would have significantly more beneficial impacts than Alternative C. Continued operation of Units 1 and 4 with FGD and SCR will result in some beneficial impacts compared to its current operation, but it will have significant negative environmental impacts compared to retirement, which the Draft EA ignores completely. The EA must use a consistent baseline in order to comply with NEPA.

## III. The Draft EA fails to analyze all reasonable alternatives to the proposed retrofits.

In the draft EA, TVA fails to rigorously explore and objectively evaluate a full range of alternatives to retrofitting Shawnee Units 1 and/or 4. The draft EA compares the retrofit alternative only to retirement and the "no action" alternative. This ignores other practicable alternatives including replacing the units with renewable energy, replacing the units with market purchases or retrofitting only one of the two units. All of these alternatives are not only feasible, but are also likely far more cost effective than the retrofit alternative. TVA must conduct a proper alternatives analysis that considers the full range of feasible alternatives in order to comply with NEPA.

### *A. TVA should have considered the alternative of replacing the units with an existing plant or market purchases.*

[12] Draft EA at 3-6 and 3-7.

TVA failed to assess whether existing under-utilized natural gas plants and/or market purchases could replace some or all of the energy and capacity provided by the two Shawnee units. The cost of purchasing existing gas generation is significantly lower than greenfield construction. According to the Draft EA, the cost to install environmental controls on Units 1 and 4 is between $653 and $840 per kW.[13] These costs are substantially greater than reported costs for natural gas plant purchases over the past three years. The following list, while by no means comprehensive, indicates that the average price paid on the market is about $500/kW of capacity. In states within TVA's service territory, prices are even lower with the maximum value of $450/kW being paid by TVA for the Magnolia plant.

In other words, TVA could expect to purchase a combined cycle ranging in capacity from 400 to 600 MW for a significantly lower price than adding environmental upgrades to the two Shawnee units. Furthermore, TVA's purchase would remain a viable market asset. Similar transactions for underutilized coal assets are much harder to identify.

[13] The Draft EA states that the current total capital costs are estimated at $175 to $225 million. Draft EA at 2-7. Given that the two units provide 268 MW of capacity, *id.*, this amounts to between $653 and $840 on a per kW basis.

Table 1: Price Paid for Gas Plant Purchases[14]

| Sale Date | Plant | State | Type | ISD | Sold Cap | Price $mm | $/kW |
|---|---|---|---|---|---|---|---|
| 2Q2011 | Columbia | MO | GT | 2001 | 108 | 45 | 419 |
| 2Q2011 | Griffith | AZ | CC | 2002 | 572 | 450 | 787 |
| 2Q2011 | Arlington Valley | AZ | CC | 2002 | 579 | 456 | 787 |
| 2Q2011 | Bridgeport | CT | CC | 1998 | 520 | 355 | 683 |
| 2Q2011 | Hinds | MS | CC | 2001 | 520 | 206 | 396 |
| 2Q2011 | Hot Spring | AR | CC | 2002 | 620 | 253 | 408 |
| 3Q2011 | El Cajon | CA | GT | 2010 | 49 | 14 | 277 |
| 3Q2011 | Magnolia | MS | CC | 2003 | 968 | 436 | 450 |
| 3Q2011 | Odessa | TX | CC | 2001 | 1000 | 335 | 335 |
| 3Q2011 | Liberty Electric | PA | CC | 2002 | 575 | 560 | 974 |
| 4Q2011 | RISEC | RI | CC | 2002 | 550 | 346 | 629 |
| 2Q2012 | Riverside | WI | CC | 2004 | 600 | 393 | 655 |
| 3Q2012 | Brush 1,3,4 | CO | CC | 1990-9 | 267 | 75 | 281 |
| 3Q2012 | Dogwood | MO | CC | 2001 | 76 | 65 | 851 |
| 3Q2012 | Batesville | MS | CC | 2000 | 837 | 286 | 342 |
| 4Q2012 | Bosque | TX | CC | 2000 | 507 | 432 | 852 |
| 4Q2012 | Broad River | SC | GT | 2000 | 847 | 427 | 504 |
| 4Q2012 | Midland | TX | CC | 1989 | 1560 | 1300 | 833 |
| 4Q2012 | Mesquite | AZ | CC | 2003 | 1250 | 375 | 300 |
| 1Q2014 | Kinder-Jackson | MI | CC | 2002 | 540 | 155 | 287 |
| 1Q2014 | Sun Peak | NV | GT | 1991 | 222 | 11 | 50 |
| 2Q2014 | Calpine Deal | SE US | CC | 2003 | 3498 | 1570 | 449 |
| | | | | | | **Wtd Avg All** | **$525** |
| | | | | | | **Wtd Avg SE** | **$491** |

An even more reasonable benchmark for the cost of new generation is the incremental cost of TVA's investment in capacity at its Allen facility in Memphis, TN. In the final Allen Environmental Assessment, TVA explains that rather than limiting its new gas plant construction to the 600-800 MW of capacity needed to meet the "specific reliability needs of the Memphis area," it would build an additional 200-400 MW of capacity (for a total of 1,000 MW) "to meet system-wide needs."[15] TVA further noted "the cost of increasing the size of the proposed gas plant above the minimum amount required would be substantially less than adding comparable renewable energy resources because of the savings achieved by scaling up the plant size."[16] TVA staff has confirmed that the phrase "savings achieved by scaling up the plant size" reflects the finding that the incremental costs of the additional 200-400 MW were lower on a per kW basis than the initial 600-800 MW of capacity. Since TVA's stated "need" for considering the

[14] Source: Power Finance & Risk Generation Sale Database Reports for 2011-2014.
[15] Allen Fossil Plant Emission Control Project, Final Environmental Assessment at 199.
[16] *Id.*

environmental upgrades at Shawnee are similar to the additional 200-400 MW additional capacity at Allen, those costs (expressed on a per kW basis) represent an additional benchmark beyond the market price.

*B. TVA improperly eliminated the alternative of replacing the units with renewable energy.*

TVA fails to include analysis of a reasonable range of alternatives in the Draft EA. The Draft EA incorrectly dismisses reasonable replacement alternatives for retirement of Shawnee Units 1 and 4, including replacement with a mix of energy efficiency and renewable resources. Replacing any lost generation capacity with renewable energy and energy efficiency would meet the purpose and need of the proposed action since retiring the units complies with the Clean Air Agreements and would contribute to a balanced TVA generation portfolio.

The Draft EA's failure to consider an alternative consisting of retiring Shawnee Units 1 and 4 and replacing them with clean energy resources is inexplicable given one of the purposes of the proposed action is to "achieve and maintain a balanced portfolio of generation resources."[17] Given that TVA's current generation portfolio consists primarily of coal-fired units, it is difficult to see how retaining Shawnee Units 1 and 4, which are coal-fired, will achieve a balanced supply portfolio. On the other hand, retiring coal units and replacing them with EE and renewable generation would contribute to a more balanced supply portfolio. Yet the Draft EA fails to contain the very alternative—retiring Shawnee 1 and 4 and adding EE and renewables—that would actually satisfy the purpose and need of the proposed action.

TVA should examine a mix of different types of clean energy as part of an alternative under NEPA. To do otherwise would skew TVA's analysis by improperly discounting the viability of clean energy. For example, while immediately replacing all capacity retired at Shawnee entirely with onsite or near-site utility-scale solar may or may not be practicable, considering solar development in concert with energy efficiency initiatives, wind investment, and power purchase agreements would offer TVA a more full and accurate assessment of clean energy as an alternative. It is thus important that different types of clean energy be optimized, or at least analyzed as part of a basket approach, in TVA's NEPA analysis. This approach to the alternative analysis is essential under NEPA both because it allows for more accurate comparison of alternatives and because such an approach is a more realistic view of how clean energy is and will be integrated into TVA's larger system.

The TVA states have the potential to generate significantly more energy from renewables than they consume annually. In 2012, NREL did a GIS study of renewable potential by state that considered total energy and capacity afforded by source.[18] It found that, in aggregate, Alabama, Kentucky, Mississippi, and Tennessee had the potential to generate 15 million GWh from renewable sources. While there are technical, political, and economic barriers to realizing the full extent of this potential, the estimate is more than 45 times greater than the three hundred and

[17] Draft EA at 1-1.
[18] Lopez, A. et al. (2012). "U.S. Renewable Energy Technical Potentials: A GIS-Based Analysis." NREL/TP-6A20-51946. Golden, CO: National Renewable Energy Laboratory.

twenty thousand GWhs of retail sales in these four states in 2012.[19] Table 1 depicts the potential to generate renewable energy (in GWh) by source and state.

Table 2: Renewable Potential by Source and State

| | Alabama | Kentucky | Mississippi | Tennessee | Total | % of Total |
|---|---|---|---|---|---|---|
| **Conventional Renewables** | **3,762,551** | **1,867,206** | **5,018,444** | **2,302,428** | **12,950,629** | 86% |
| *Solar* | *3,758,165* | *1,862,803* | *5,016,233* | *2,295,918* | *12,933,120* | *86%* |
| *Wind* | *283* | *147* | *0* | *766* | *1,196* | *0%* |
| *Hydro* | *4,103* | *4,255* | *2,211* | *5,745* | *16,314* | *0%* |
| **Other Renewables** | **548,216** | **492,981** | **574,343** | **436,460** | **2,051,999** | 14% |
| *Biopower* | *12,727* | *8,322* | *15,287* | *8,080* | *44,415* | *0%* |
| *Enhanced Geothermal* | *535,490* | *484,659* | *559,056* | *428,380* | *2,007,584* | *13%* |
| **Total** | **4,310,767** | **2,360,187** | **5,592,787** | **2,738,888** | **15,002,629** | 100% |

The NREL GIS study indicates 3,725 MWs of potential hydro capacity in Alabama, Kentucky, Mississippi, and Tennessee. 67% of this potential can be reached by electrifying existing, unpowered dams. A 2012 study by NREL found that adding generation to currently non-powered dams could produce 2,486 MW.[20] The capacity at the existing dams could be developed more quickly and would have less environmental effect than the capacity that would require impoundments. The potential non-powered dam capacity in Kentucky is four and a half times greater than units one and four at Shawnee.

Solar photovoltaics are an important resource category in jurisdictions with much less sunshine than TVA's territory, including Ontario, Massachusetts, Vermont, Germany and more recently Minnesota and Wisconsin. Utilities around the country have taken advantage of the falling cost of utility-scale solar:

- Georgia Power recently contracted for 515 megawatts of PV capacity, planned for build-out in 2015 and 2016, at an average price of 6.5¢/kWh. Georgia Power received bids for 5,100 MW.
- In Texas, Austin Energy recently signed a PPA for 150 megawatts of solar for less than 5¢/kWh.

[19] 2012 EIA Form 861

[20] Hadjerioua, Boualem, Yaxing Wei and Shih-Chieh Kao. 2102. "An Assessment of Energy Potential at Non-Powered Dams in the United States." Washington: D.C.: U.S. DOE. at 25, Table 4.

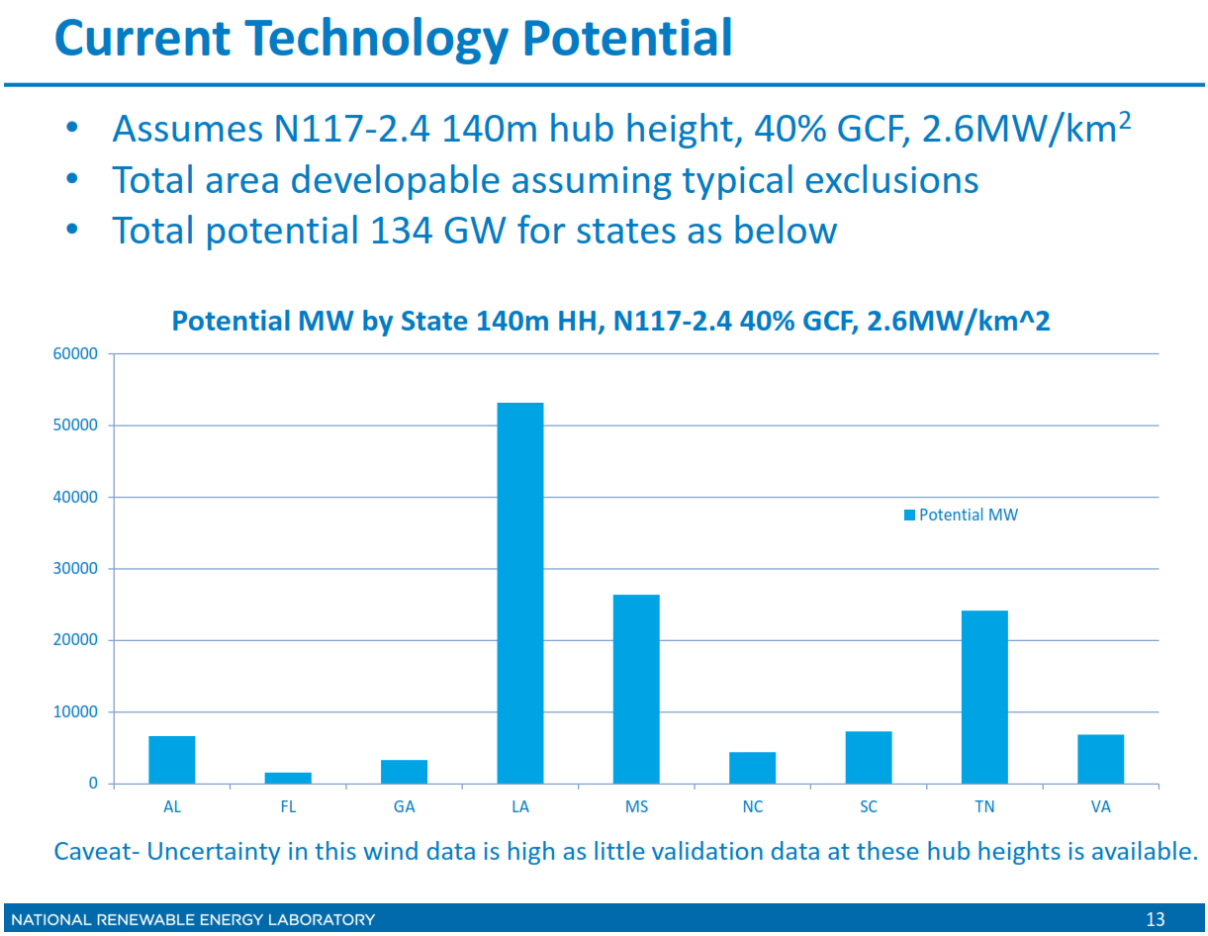
- In Colorado, Xcel Energy agreed to purchase 170 megawatts of solar power, after finding that solar was less expensive than building new natural gas plants.
- Xcel Energy Minnesota contracted for 187 MW of PV capacity for an expected levelized price of 7.3¢/kWh over 25 years.
- In Utah, Rocky Mountain Power has contracted for 400 MW of solar at prices below its estimates of avoided cost.

Solar is especially valuable in areas with existing or future transmission and distribution ("T&D") constraints to avoid need for additional facility investments. Some smaller utility-scale PV facilities can provide these benefits, as can most customer-sited solar installations. Between central and customer-sited solar installations, North Carolina added about 430 MW of solar in 2011–2013, and another 70 MW in the first half of 2014.[21] TVA's solar resource may even be superior to that of North Carolina, so TVA should be able to install a comparable amount, adjusted for load, by 2017.

Recent research and technology development indicates that the opportunity for wind power in TVA states is potentially much greater than previously thought. Although wind resources are better in the SPP Plains states, including Oklahoma and Texas, higher hub heights and optimized design for lower wind speeds have transformed the economics of the wind opportunity in the Southeast. As illustrated in Figure 1 over 60 GW of wind potential exists in TVA states.

[21] U.S. Solar Market Trends 2013, July 2014, at Table 4; U.S. Solar Market Trends 2010, June 2011, at Table 2; Solar Market Insight Report 2014 Q1 at Figure 2.2; U.S. Solar Market Insight Report 2014 Q2.

Figure 1: Wind Technology Potential in the Southeast[22]




Other cost-effective wind resources are available, as well. Newly proposed high voltage direct current transmission projects could substantially increase the amount of low-cost wind energy resources available to southern states. Two large-scale HVDC projects have been proposed to connect the Plains' strong wind resource to the South's strong energy demand. The Plains & Eastern Clean Line is an HVDC project designed to connect up to 3.5 gigawatts (GW) of wind energy from the plains to Tennessee and the South beyond.[23] The Southern Cross is an HVDC project designed to connect up to 3 GW of wind energy from Texas to northern Mississippi, and into other parts of the Southeast.[24] Due to the higher wind speeds, the cost of wind energy resources from these HVDC projects will be extremely cost competitive.

Further, several utilities throughout the Southeast have already purchased wind energy via existing transmission lines. These purchases are significant because none of the states listed in

[22] Roberts, J.O. Land-Based Wind Potential Changes in the Southeastern U.S., National Renewable Energy Laboratory, PR-5000-60381 *presentation to 2013 Southeastern Coastal Wind Conference* (September 2013).
[23] Clean Line Energy (2014). Plains & Eastern Clean Line. More information available at http://www.plainsandeasterncleanline.com/site/home
[24] Pattern Energy (2013). Southern Cross. More information available at http://www.southerncrosstransmission.com/overview.html

Table 3 require utilities to purchase renewable energy via renewable portfolio standards. Some utilities have made the wind energy purchases because costs are less than utility avoided costs. Wind power purchase agreements are typically secured for twenty years. Below is a list of utility companies in the south purchasing wind energy.

Table 3: Southern Utilities Purchasing Wind Energy

| **Utility** | **Year Delivered** | **Capacity** |
|---|---|---|
| Alabama Power | 2012 | 404 MW |
| Georgia Power | 2016 | 250 MW |
| Tennessee Valley Authority | 2010-2012 | 1,542 MW |
| Southwestern Electric Power Company | 2011-2013 | 469 MW |

Sources: Alabama Power[25], Georgia Power[26], Tennessee Valley Authority[27], Southwestern Electric Power Company[28]

In short, retiring Shawnee Units 1 and 4 and replacing some or all of their energy and capacity with energy efficiency and renewables would fulfill the purpose and need of the proposed action and is both technologically feasible and cost effective. TVA's usual assertion that fossil fuel generation is needed to provide voltage support is not applicable in this case as confirmed by TVA in the draft EA, making the failure to consider these options wholly unreasonable.[29] By failing to consider this reasonable alternative, the Draft EA violates NEPA's command to consider a reasonable range of alternatives.

*C. TVA must consider the alternative of retiring one of the units.*

TVA also failed to consider the option of retiring one of the units at Shawnee and retrofitting the other. That alternative would reduce the environmental impacts of the action by eliminating all greenhouse gas emissions (and other types of air and water pollution) from the retiring unit. TVA provides no justification for ignoring this alternative. Such an approach would, presumably, enable TVA to pursue a significantly smaller amount of replacement energy and capacity and reduce capital expenditures. Given the lack of need for the units for reliability purposes, and the failure to demonstrate that its overall load is likely to increase significantly, TVA should have included evaluation of retiring only one of the units. Failure to include analysis of this alternative renders the EA insufficient.

---

[25] Alabama Power (2014). Winds of Change. More information available at http://www.alabamapower.com/environment/news/chisholm-view-project-provides-low-cost-power.asp

[26] Williams, Dave (2014, May 20). Regulators OK Georgia Power wind energy purchase, Atlanta Business Chronicle. Available at http://www.bizjournals.com/atlanta/blog/capitol_vision/2014/05/regulators-ok-georgia-power-wind-energypurchase.html

[27] Tennessee Valley Authority (October 2013). Energy Purchases from Wind. More information available at http://www.tva.com/power/wind_purchases.htm

[28] Southwestern Electric Power Company (January 25, 2012). AEP SWEPCO Signs Wind Power Purchase Agreements for 359 Megawatts. More information available at https://www.swepco.com/info/news/ViewRelease.aspx?releaseID=1183

[29] Draft EA at 2-1, stating "Retiring SHF Units 1 and 4 would not require TVA to procure or build replacement energy resources in the Paducah area to maintain reliability."

## IV. The EA lacks full analysis of environmental impacts of the proposed alternatives and preferred alternative.

The EA must consider all of the environmental impacts associated with each alternative, including impacts to air, surface water, and groundwater, and impacts to both human health and the environment. The environmental impacts of Units 1 and 4 as they are currently operated are significant. In 2013, Shawnee Units 1 and 4 emitted over 1.8 million tons of $CO_2$, over 6,000 tons of $SO_2$, and nearly 3,000 tons of NOx.[30] These units also emit large quantities of particulate matter. In 2011, the most recent year with data from the National Emissions Inventory, the Shawnee plant as a whole emitted over 100 tons of fine particulate matter ($PM_{2.5}$)[31], which is known to cause increased mortality, heart attacks, asthma, and other illnesses.[32]

Units 1 and 4 generate large quantities of coal ash each year, and this waste stream creates significant impacts to surface water and groundwater. Shawnee's coal ash pond discharges over 42,000 pounds of aluminum and over 2,000 pounds of manganese into the Ohio River each year, along with hundreds of pounds of arsenic, chromium, lead, selenium and other toxic metals.[33]

The disposal of coal ash at Shawnee also has caused widespread and severe groundwater contamination. The majority of downgradient wells at Shawnee show unsafe levels of boron and manganese, both toxic pollutants known to be associated with coal ash. Boron concentrations are as high as 24 mg/L, eight times above the EPA health advisory of 3 mg/L, and manganese concentrations are as high as 69 mg/L, 200 times above the health advisory of 0.3 mg/L. Other coal ash pollutants present at unsafe levels in groundwater near the Shawnee ash disposal areas include aluminum, arsenic, cobalt, molybdenum, and sulfate.

The choices that TVA makes about pollution controls could exacerbate the groundwater contamination problem at Shawnee. For example, if TVA were to utilize Dry Sorbent Injection with a sodium-based sorbent at Units 1 and 4, more pollutants would leach out of the resulting ash. In a report focused specifically on the Shawnee plant, Dr. Ron Sahu noted that "trona [a sodium-based sorbent] injection for SO2 emission control greatly increased the fly ash solubility, pH, and leachability of anionic elements including fluoride, sulfate, chloride, and trace oxyanions of concern, especially As [arsenic] and Se [selenium]."[34] If TVA were to install Flue Gas Desulfurization equipment for Units 1 and 4, this would also change the nature of the ash being disposed of. The Draft EA does not indicate that TVA has assessed the risk that continued

---

[30] U.S. EPA, Clean Air Markets, Air Markets Program Data; query of Shawnee Fossil Plant data conducted Nov. 4, 2014.

[31] U.S. EPA, 2011 National Emissions Inventory, http://www.epa.gov/ttn/chief/net/2011inventory.html.

[32] *See, e.g.*, U.S. EPA, Particulate Matter, http://epa.gov/ncer/science/pm/; C. Arden Pope et al., Lung Cancer, Cardiopulmonary Mortality, and Long-Term Exposure to Fine Particulate Air Pollution, 287 JAMA 1132 (2002); Health Effects Institute, Extended Follow-Up and Spatial Analysis of the American Cancer Society Study Linking Particulate Air Pollution and Mortality, available at http://www.healtheffects.org/Pubs/RR140-Krewski.pdf; Francine Laden et al., Reduction in Fine Particulate Air Pollution and Mortality: Extended Follow-Up of the Harvard Six Cities Study, 173 AM J RESPIR CRIT CARE MED 667 (2006).

[33] TVA, Updated Application for Renewal of KPDES Permit No. KY0004219 (Sep. 13, 2010).

[34] Ranajit (Ron) Sahu, Technical Report on Dry Sorbent Injection (DSI) and Its Applicability to TVA's Shawnee Fossil Plant (SHF), 16 (Apr. 2013), available at http://www.cleanenergy.org/wp-content/uploads/Final_Sahu_DSI_Report.pdf

operation of these units, as well as the other units, could result in exacerbating existing problems enough to trigger a requirement that the existing impoundments be relocated to sites that do not pose a risk of groundwater or surface water contamination. This risk, and its associated costs, should be disclosed in the Draft EA.

If TVA were to retire Units 1 and 4, the coal ash problem would clearly decrease. It is therefore critically important that the EA consider the effects of each alternative on groundwater contamination in addition to impacts on air pollution and surface water discharges.

*A. The Draft EA Ignores Environmental Impacts from Continued GHG Pollution.*

On June 18, 2014, the Environmental Protection Agency ("EPA") proposed emission guidelines for states to follow in developing plans to address greenhouse gas emissions from existing fossil fuel-fired electric generating units. EPA proposed state-specific rate-based goals for carbon dioxide emissions from the power sector, as well as guidelines for states to follow in developing plans to achieve the state-specific goals. Under the proposal, Kentucky will need to reduce its carbon emission rate from 2,158 pounds of carbon dioxide per megawatt hour (lbs/MWh) in 2012 to 1,763 pound of carbon dioxide per mega watt hour in 2030 – a reduction of 18%. Since, 2012, Kentucky already has dropped to 1951 lbs/MWh, a decline of 10% from EPA's emission-rate 2012 baseline.

The Draft EA ignores the negative impacts from continued greenhouse gas emissions beyond the December 31, 2017, retirement date. Instead, the EA considers only the incremental increase of $CO_2$ emissions due to the energy required to operate the new emission controls. Further, the Draft EA relies on the predicted decrease in GHG emissions across the TVA system to discount the additional GHG emissions from continued operation of Shawnee Units 1 and 2. Instead, as discussed above, TVA must compare GHG emissions at Shawnee under the two alternatives using a consistent baseline to develop a true impacts analysis. TVA cannot discount the increase in GHG emissions by relying on decreases elsewhere in the TVA system due to retirements or for other reasons.

The Draft EA also fails to account for EPA's proposed emission guidelines for states to follow in developing plans to address greenhouse gas emissions from existing fossil fuel-fired electric generating units. EPA has proposed state-specific rate-based goals for carbon dioxide emissions from the power sector, as well as guidelines for states to follow in developing plans to achieve the state-specific goals. Under the proposal, Kentucky will need to reduce its carbon emission rate from 2,158 lbs/MWh in 2012 to 1,763 lbs/MWh in 2030 – a reduction of 18%. Since 2012, Kentucky already has dropped to 1951 lbs/MWh, a decline of 10% from EPA's 2012 emission-rate baseline. TVA should consider in its EA whether retirement of Shawnee Units 1 and 4, or Shawnee as a whole, is necessary for the state to meet its goals under the proposed plan.

*B. The Draft EA includes inadequate analysis of air quality impacts of the preferred alternative.*

The air pollution impacts of coal generation are clear. In 2013, Shawnee Units 1 and 4 emitted over 1.8 million tons of $CO_2$, over 6,000 tons of $SO_2$, and nearly 3,000 tons of NOx.[35] These units also emit large quantities of particulate matter. In 2011, the most recent year with data from the National Emissions Inventory, the Shawnee plant as a whole emitted over 100 tons of fine particulate matter ($PM_{2.5}$)[36], which is known to cause increased mortality, heart attacks, asthma, and other illnesses.[37]

The Draft EA claims that Alternative C will result in "substantial reductions" in the emission of acid gases, mercury, NOx, and SOx.[38] If Units 1 and 4 retire, they may operate for two years (2016 and 2017), after which they would cease to operate and emit air pollutants. For the post-2017 period, Alternative C will actually increase annual NOx emissions by roughly 300 tons and annual $SO_2$ emissions by roughly 240 tons;[39] will increase annual $CO_2$ emissions by at least 1.8 million tons;[40] and could increase annual $PM_{2.5}$ emissions by at least 100 tons compared to the appropriate baseline (retirement of the units).[41] Given these substantial increases in air pollution under Alternative C, TVA must closely evaluate the realistic air pollution impact in an EIS before going forward with this Alternative.

*C. TVA must include full analysis of surface water impacts in its Final EA.*

Units 1 and 4 also generate large quantities of coal ash each year, and this waste stream creates significant impacts to surface water and groundwater. Shawnee's coal ash pond discharges over 42,000 pounds of aluminum and over 2,000 pounds of manganese into the Ohio River each year, along with hundreds of pounds of arsenic, chromium, lead, selenium and other toxic metals.[42] The Draft EA predicts how the ash pond effluent will change after Unit 10 discharges are subtracted and FGD waste streams are added in Table 3-6. This table raises two concerns:

---

[35] U.S. EPA, Clean Air Markets, Air Markets Program Data; query of Shawnee Fossil Plant data conducted Nov. 4, 2014; *see also* Draft EA at 3-3 – 3-5 (presenting comparable figures for 2013).
[36] U.S. EPA, 2011 National Emissions Inventory, http://www.epa.gov/ttn/chief/net/2011inventory.html.
[37] *See, e.g.*, U.S. EPA, Particulate Matter, http://epa.gov/ncer/science/pm/; C. Arden Pope et al., Lung Cancer, Cardiopulmonary Mortality, and Long-Term Exposure to Fine Particulate Air Pollution, 287 JAMA 1132 (2002); Health Effects Institute, Extended Follow-Up and Spatial Analysis of the American Cancer Society Study Linking Particulate Air Pollution and Mortality, available at http://www.healtheffects.org/Pubs/RR140-Krewski.pdf; Francine Laden et al., Reduction in Fine Particulate Air Pollution and Mortality: Extended Follow-Up of the Harvard Six Cities Study, 173 AM J RESPIR CRIT CARE MED 667 (2006).
[38] Draft EA at 3-6.
[39] This starts with the 2013 emission rates described above and reduces them by 90% (NOx) and 96% ($SO_2$), as assumed in the Draft EA at page 3-6.
[40] Assuming, as the Draft EA assumes, that $CO_2$ emissions will increase under Alternative C (page 3-7).
[41] The Draft EA seems to say that PM emissions will increase due to the operation of dry sorbent injection (page 3-3) and additional fugitive emissions from material handling (page 3-7). The Draft EA does not evaluate changes in PM emissions caused by the operation of new SCR and FGD systems, so the total net change in PM emissions cannot be estimated.
[42] TVA, Updated Application for Renewal of KPDES Permit No. KY0004219 (Sep. 13, 2010).

First, Table 3-6 omits most of the important information for this outfall. It does not analyze the pollutant with the highest loading from Outfall 001, aluminum (42,500 lbs/yr), nor does it analyze iron (roughly 29,000 lbs/yr) or manganese (roughly 2,000 lbs/yr).[43] Nor does it analyze boron, a key coal ash indicator pollutant that has been measured at elevated concentrations in Little Bayou Creek, adjacent to the Shawnee ash disposal area.[44]

Second, Table 3-6 shows that loadings of certain key pollutants from Outfall 001 are expected to increase. Comparing "Ash Pond Loading" to "Projected loading at DSN 001," and converting from pounds per day to pounds per year, one sees the following:

Table 4: Outfall 001 Pollutant Loading[45]

| Element | Ash Pond Loading (lbs/yr) | Projected loading at Outfall 001 (lbs/yr) | Change (lbs/yr) |
|---|---|---|---|
| Antimony | 157.0 | 155.1 | (1.8) |
| Arsenic | 157.0 | 155.5 | (1.5) |
| Barium | 3,493.1 | 3,493.1 | - |
| Beryllium | 157.0 | 155.1 | (1.8) |
| Cadmium | 157.0 | 155.5 | (1.5) |
| **Chromium** | **233.6** | **365.0** | **131.4** |
| Copper | 310.3 | 299.7 | (10.6) |
| Lead | 157.0 | 154.8 | (2.2) |
| Mercury | - | - | - |
| **Nickel** | **157.0** | **161.0** | **4.0** |
| **Selenium** | **157.0** | **173.0** | **16.1** |
| Silver | 157.0 | 155.1 | (1.8) |
| Thallium | 157.0 | 155.1 | (1.8) |
| Zinc | 854.1 | 851.2 | (2.9) |
| **Total pounds per year** | **6,303.6** | **6,429.1** | **125.5** |

Selenium, which is known to be toxic to aquatic species, would increase by about 10%, or 16 pounds per year. Chromium would increase by more than 50%, with 130 additional pounds each year discharged through Outfall 001. Although other pollutants are expected to see a decline, these declines are relatively modest. Overall, and keeping in mind that Table 3-6 is only a partial inventory of pollutants, TVA predicts an increase of over 100 pounds per year in the discharge of total metals.

It is clear, then, that even when TVA uses an inappropriate baseline, it predicts significant increases in surface water pollution under Alternative C. When compared to the appropriate

[43] *Id.*
[44] TVA, *Groundwater and Surface Water Sample Data Reporting Form, Shawnee Fossil Plant*, 1st half 2012 (July 31, 2012); Environ. Integrity Project, *TVA's Toxic Legacy: Groundwater Contaminated by Tennessee Valley Authority Coal Ash*, 140 (Nov. 2013).
[45] Draft EA at Table 3-6.

baseline of Alternative B, the increased surface water pollution impacts are even more egregious. Again, these substantial impacts call for a full EIS.

*D. The Draft EA fails to adequately analyze and characterize groundwater impacts.*

The disposal of coal ash at Shawnee also has caused widespread and severe groundwater contamination. TVA's treatment of groundwater contamination in the Draft EA is brazenly dishonest. The Draft EA attributes all contamination to natural sources, "turbidity," and the adjacent DOE facility.[46] This stands in stark contrast to TVA's own groundwater monitoring reports. For example, in the February 2014 report for the Shawnee plant, TVA stated that:

> Statistical exceedances were determined for: boron, molybdenum, pH, specific conductance, sulfate, vanadium, and total dissolved solids from the sampling. The exceedances were reported to KDWM via email on April 8, 2014. No confirmation sampling was performed following the monitoring event because statistical exceptions were similar to those previously observed . . . **[S]tatistical findings indicate coal-combustion by-product effects on groundwater beneath and downgradient of the Special Waste landfill.**[47]

In fact, the groundwater contamination at Shawnee is severe and is undeniably caused by leachate from the coal ash disposal units.[48] The majority of downgradient wells at Shawnee show unsafe levels of boron and manganese, both toxic pollutants known to be associated with coal ash. Boron concentrations are as high as 24 mg/L, eight times above the EPA health advisory of 3 mg/L, and manganese concentrations are as high as 69 mg/L, 200 times above the health advisory of 0.3 mg/L. Other coal ash pollutants present at unsafe levels in groundwater near the Shawnee ash disposal areas include aluminum, arsenic, cobalt, molybdenum, and sulfate. Comparisons between up- and downgradient wells show an unmistakable pattern of contamination emanating from Shawnee's ash disposal area. As an example, the following table, extracted from the Environmental Integrity Project's 2013 report on TVA groundwater contamination, shows this pattern for boron:

---

[46] *See* Draft EA at 3-12.

[47] TVA, letter to Deborah DeLong, Kentucky Division of Waste Management, transmitting February 2014 quarterly groundwater report for Shawnee Fossil Plant Special Waste Landfill (Apr. 25, 2014) (emphasis added).

[48] *See generally*, Environmental Integrity Project, *TVA's Toxic Legacy: Groundwater Contaminated by Tennessee Valley Authority Coal Ash* (Nov. 2013).

Table 5: Boron Concentrations in Shawnee Groundwater Monitoring Wells 2008-2012[49]
(upgradient data are in blue, downgradient data are in black)

| Aquifer | Well | Mean (ug/L) | Range (ug/L) | N |
|---|---|---|---|---|
| Alluvium | *D-77 (upgradient)* | *240* | *<50 – 410* | *13* |
| | D-11 | 200 | <200 – 220 | 9 |
| | D-33A | 2,510 | 2,300 – 2,600 | 9 |
| | D-30A | 5,020 | 990 – 12,000 | 10 |
| | D-74A | 7,560 | 4,700 – 10,000 | 10 |
| UCD | *D-19 (upgradient)* | *<200* | *<200* | *13* |
| | D-75A | 7,430 | 6,800 – 8,200 | 10 |
| | D-76A | 19,800 | 15,000 – 24,000 | 10 |
| Upper RGA | *D-27 (upgradient)* | *<200* | *<200* | *13* |
| | D-8A | 217 | <200 – 280 | 10 |
| | D-11B | 2,522 | 2,100 – 2,800 | 9 |
| | D-30B | 4,290 | 500 – 6,600 | 10 |
| | D-74B | 9,020 | 6,300 – 11,000 | 10 |
| | D-75B | 5,875 | 5,000 – 6,700 | 10 |

The contribution of Units 1 and 4 to the ongoing groundwater contamination at Shawnee is an additional environmental impact under Alternative C. The full impact of Alternative C could be even greater in light of new pollution controls. For example, the use of Dry Sorbent Injection with a sodium-based sorbent is likely to increase pollution leachability. In a report focused specifically on the Shawnee plant, Dr. Ron Sahu noted that "trona [a sodium-based sorbent] injection for $SO_2$ emission control greatly increased the fly ash solubility, pH, and leachability of anionic elements including fluoride, sulfate, chloride, and trace oxyanions of concern, especially As [arsenic] and Se [selenium]."[50] Flue Gas Desulfurization under Alternative A would also change the nature of the ash being disposed of; TVA partially analyzed this change in its discussion of surface water impacts, but not in its discussion of groundwater impacts. Since Alternative C will create a substantial, additional groundwater contamination source over the correct baseline (retirement of Units 1 and 4), TVA must make a detailed assessment of this environmental impact in a full EIS.

Looking beyond Units 1 and 4, the Draft EA should be revised to also include any and all impacts associated with its decision to install DSI on the other seven Shawnee units. Continued operation of the other Shawnee units will necessarily be affected by the decisions made on Units 1 and 4 (e.g. increased capacity and reliance on remaining units if Units 1 and 4 are retired; impacts of pollution controls on Units 1 and 4 on effectiveness of pollution controls on other Shawnee units). Therefore, TVA must include cumulative impacts of its decisions related to Units 1 and 4 as well as its decisions related to the continued operation of the remaining 7 Shawnee units.

[49] *Id.*
[50] Sahu, Technical Report on Dry Sorbent Injection (DSI) and Its Applicability to TVA's Shawnee Fossil Plant.

*E. The Draft EA Fails to Properly Consider the Environmental Impacts to Listed Species.*

The Draft EA notes that the United States Fish and Wildlife Service raised concerns about potential impacts to endangered and threatened species, to wildlife using the ash pond and other water bodies associated with SHF, to aquatic resources, and to fish- and wildlife-related activities. TVA failed to consider any of the concerns raised by the agency and ignored listed species impacts in its environmental impacts analysis with the conclusory statement that none of the alternative actions would affect these species. In fact, retirement of the units would likely benefit the listed species and aquatic resources, and those beneficial impacts should be considered along with the likely negative impacts of continued operation of the units and generation of coal combustion residuals.

## V. Economic Analysis in the Draft EA is insufficient to meet NEPA requirements.

*A. TVA cannot expect to recover the costs of the retrofits unless the units run far beyond their anticipated lives.*

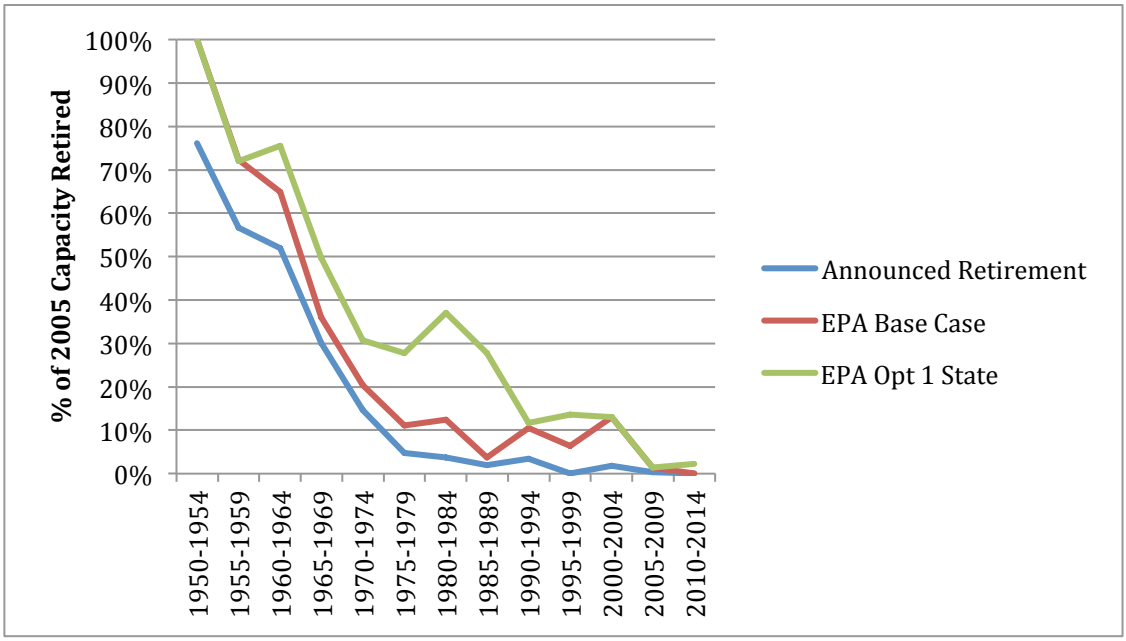
Shawnee Units 1 and 4 became operational in 1953 and 1954, respectively, making them each over sixty years old. This meets, if not exceeds, the average design life of a coal-fired power plant—and yet TVA now proposes to spend $175-225 million to keep the units operating beyond 2017. It does not make economic sense to spend any dollars on units of this age, let alone a sum that could take decades to recover. Most coal-fired plants of early 1950s' vintage have either already retired, announced retirement, or are projected to retire by 2025. As shown in the figure below, 76% of plants built between 1950 and 1954 (the same vintage as Shawnee) have already announced retirement. Moreover, in its modeling underlying its proposed Clean Power Plan, EPA has projected that all of the capacity from this era will be retired by 2025 in model runs. The table below depicts, by vintage, the amount of capacity that was operational in 2005, as well as the percentage of that capacity expected to be retired by 2025 according to different forecasts.[51]

[51] 2005 online coal capacity was the calculated by adding "Operable" plants found in the EIA's 2012 Form-860, along with the EIA list of 2005-2012 "Retired" units. For the years 2006-2012 retirements, we used EIA-860 data; for 2013-2015, we used Sourcewatch data on announced retirements; and for 2016 and following, we used EPA projections and announced retirements.

- Retired Units (2006-2015) and Announced Retirements (2016-2025)
- Retired Units (2006-2015) and EPA CPP Base-Case Model Run (2016-2025)
- Retired Units (2006-2015) and EPA CPP Option 1, State Compliance Model Run (2016-2025)

The CPP Base Case is the EPAs best estimate of what will happen between now and 2025 given no change in rules. Retirements are for economic reasons rather than new environmental regulation. The Option 1 State Level Compliance run projects retirements given stringent new carbon regulation; this is the model run that sees the largest amount of capacity retired.

Figure 2: Operational Coal-Fired Units
(by Age)




In order to recover the hundreds of millions of dollars it would cost to retrofit these two aged units, TVA would likely have to maintain them for several more decades—an assumption that is manifestly unreasonable in light of their age. Older plants are susceptible to catastrophic events, and TVA must account for the strong risk that the units become inoperable long before the costs of the scrubbers fully recovered.

In evaluating the cost of the environmental upgrades to new or market capacity purchases, TVA should amortize the investments over the respective lifetimes of each different resource. These lifetimes should not assume any action by TVA not evaluated in the EA. For example, if it is not viable to maintain Units 1 and 4 in the absence of the other 7 units at Shawnee, then TVA should not use a lifetime that extends beyond the likely date that the other 7 units are anticipated to require a major investment or retrofit.

*B. The Draft EA does not provide a reasonable estimate of retrofit costs.*

The draft EA claims that the cost of the proposed retrofits is $175 to $225 million. Draft EA at 2-11. A review of EPA data, however, indicates that TVA may be understating the costs of the retrofits by 20 to 40 percent.

TVA's cost estimates are significantly lower than other compliance projections, like those from the EPA's Integrated Planning Model. In 2013, the EPA updated its cost estimates for various kinds of emission control technologies.[52] EPA projects that the capital costs, fixed O&M, and variable O&M for adding controls to coal power plants at a range of capacities (100 MW to 1,000 MW) and heat rates are approximately $1,035 to $1,176 per kW. For the Shawnee units,

[52] See Exhibit 1 (attached via email), EPA IPM v5.13, available at http://www.epa.gov/powersectormodeling/

this translates to $270-310 million, significantly more than TVA estimates.[53] A proper alternatives analysis should examine what other energy resources TVA could purchase for that sum of money.

Moreover, TVA's cost estimate is limited to capital costs, and does not account for the impact of environmental compliance costs on the dispatch of Shawnee Units 1 and 4. The draft EA claims that installing a scrubber and SCR on Units 1 and 4 would "help meet the growing demand for energy and capacity on the TVA system." Draft EA at 1-3. But Shawnee units 1 and 4 will help meet TVA's energy needs only if they actually produce energy that serves customers, which requires that the units be economic to operate. The EA fails to address the critical question of the cost to operate Shawnee units 1 and 4 once the scrubber and SCR systems are operating, to say nothing of the costs to operate additional controls to comply with future environmental rules such as the Clean Power Plan, the Effluent Limitations Guidelines ("ELG Rule"), and the Coal Combustion Residuals Rule ("CCR Rule"). These costs are potentially significant, and TVA's failure to account for them is unreasonable.

A fundamental flaw of the draft EA is the failure to consider the variable costs of operating the pollution controls in Option C. The draft EA estimates the capital cost of the proposed SCR and scrubber, but does not discuss the cost to operate the controls. As a result of ignoring the variable costs of the SCR and scrubber systems, the draft EA assumes that Shawnee units 1 and 4 will generate the same amount of electricity when operating scrubber and SCR systems as prior to operating scrubber and SCR systems. This assumption has no basis in the record and is unrealistic.

Operating scrubber and SCR systems will increase the variable operation and maintenance costs at Shawnee Units 1 and 4, which will affect the dispatch of the units. We used data from EPA's Integrated Planning Model ("IPM") to estimate fixed and variable O&M costs for two 132 MW coal units with heat rates of 10,600 Btu/KWh.[54] Based on our analysis, operating the scrubber and SCR systems at Shawnee Units 1 and 4 will increase variable O&M costs by approximately $7-8 million per year (and will increase fixed costs by approximately $4.5-5 million per year). *See* Attached Exhibit 1.

[53] Based on weighted average costs using a heat rate of 10,600 Btu/kWh – the 2013 value from EIA 923 data. *See also* Exhibit 1.
[54] EPA IPM v5.13, available at http://www.epa.gov/powersectormodeling/

Table 6: Fixed and Variable Costs to Operate & Maintain FGD and SCR Systems
(2017 Dollars)

| | Capital Cost | Fixed O&M | Variable O&M |
|---|---|---|---|
| | 2017$ | 2017$/Year | 2017$/Year |
| SCR | $104,127,717 | $452,575 | $2,545,113 |
| LSD Scrubber | $206,472,032 | $4,715,641 | $5,479,217 |
| **Total** | **$310,599,750** | **$5,168,216** | **$8,024,330** |

Furthermore, the scrubber and SCR systems would consume electricity, and therefore decrease the amount of generation available to serve customers. Yet the draft EA does not disclose the parasitic load of the SCR and scrubber systems, nor does the draft EA disclose the heat rate penalty or derate from operating the proposed controls.

Finally, the draft EA does not consider other reasonably foreseeable compliance costs that Shawnee Units 1 and 4 will face in the near future. It is reasonably foreseeable that the units will incur additional capital and O&M costs to comply with pending environmental rules such as the Clean Power Plan, the CCR Rule, and the ELG Rule. These rules may further increase the variable O&M costs at the units, which will in turn impact their dispatch.

In sum, the draft EA claims that one of the key reasons to select Alternative C is that Shawnee Units 1 and 4 would help meet TVA customers' needs for energy and capacity. The draft EA assumes that the units will produce the same amount of electricity for customers after the scrubber and SCR systems are installed as before they were installed. Yet the draft EA contains neither the data nor even a description of the analysis used to support this critical assumption. Moreover, because scrubber and SCR systems increase variable O&M costs and consume electricity, it should be expected that such controls will affect the dispatch of units and the amount of electricity they generate to serve load. The final EA should contain an analysis of the variable cost of the scrubber and SCR systems and how such variable costs will impact the amount of electricity generated by Shawnee Units 1 and 4 that is available to serve load.

## CONCLUSION

The problems with the EA outlined above collectively skew TVA's analysis towards the decision to retrofit Shawnee Units 1 and 4, in contravention of NEPA mandates. This decision has serious consequences to the environment, as it will lock in continued operation of two major sources of greenhouse gas and other types of pollution. To fulfill its obligation to fully analyze the environmental impacts of its proposed action, TVA must complete a full EIS addressing each of the issues outline above, in order to fulfill NEPA requirements. Thank you for taking the time to consider these comments.

Respectfully submitted,

/s/ Mary Whittle
Mary Whittle
Matthew Gerhart
Attorneys for Earthjustice
1617 John F. Kennedy Blvd., Suite 1675
Philadelphia, PA 19103
mwhittle@earthjustice.org

/s/ Angela Garrone
Southeast Energy Research Attorney
Southern Alliance for Clean Energy
P.O. Box 1842
Knoxville, TN 37901
angela@cleanenergy.org

/s/ Laurie Williams
Laurie Williams
Zack Fabish
Attorneys for the Sierra Club
50 F. Street, NW – 8th Floor
Washington, DC 20001
zachary.fabish@sierraclub.org
laurie.williams@sierraclub.org

/s/ Abel Russ
Attorney
Environmental Integrity Project
1000 Vermont Avenue, NW, Suite 1100
Washington, DC 20005
aruss@environmentalintegrity.org