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Submitted via e-mail

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**Re: Technical Information Regarding BART Limits for White Bluff
and Reasonable Progress Limits for Independence**

Earthjustice, National Parks Conservation Association, and Sierra Club (collectively, the “Conservation Organizations”) respectfully submit this technical information regarding a potential state implementation plan (“SIP”) revision regarding the best available retrofit technology (“BART”) determination for sulfur dioxide (“SO₂”) for White Bluff Units 1 and 2 and reasonable progress limits for SO₂ for Independence Units 1 and 2. We fully support the FIP’s White Bluff and Independence SO₂ limits, which are based on the use of new scrubbers at the facilities. *See* 81 Fed. Reg. 66,332 (Sept. 27, 2016).

During the development of the Arkansas haze plan, ADEQ, Entergy, and EPA have all stated that SO₂ BART for White Bluff Units 1 and 2 should be based on the use of new scrubbers. *See* 80 Fed. Reg. 18,944, 18,970 (Apr. 8, 2015) (“In its 2008 RH SIP Arkansas evaluated FGD controls (both wet and dry scrubbers) and determined that SO₂ BART for White Bluff Units 1 and 2 is the presumptive emission limit of 0.15 lb/MMBtu based on the installation of FGD controls.”); Trinity Consultants, BART Five Factor Analysis White Bluff Steam Electric Station Redfield Arkansas at 5-13 (Feb. 2013) (“Entergy is proposing that the SO₂ BART emission level for SN-01 and SN-02 be 0.06 lb/MMBtu based on the installation and operation of a semi-dry scrubber or whatever technology may become available to achieve that level of control.”); 81 Fed. Reg. at 66,343 (“[W]e are finalizing our determination that BART for SO₂ for White Bluff Units 1 and 2 is an emission limit of 0.06 lb/MMBtu on a 30 boiler- operating-day rolling average, consistent with the installation and operation of dry FGD or another control technology that achieves that level of control.”). Thus, the backdrop to any SIP revision is that, in the absence of new, material information, SO₂ BART limits for White Bluff Units 1 and 2 must be based on the use of new scrubbers.

However, we are aware that Entergy has previously submitted comments to EPA urging the use of a shorter remaining useful life for White Bluff based on retirement of the facility. Only if it made enforceable, could a specific retirement date (*i.e.*, a shorter remaining useful life under 42 U.S.C. § 7491(g)(2)) mean that the installation of scrubbers at the units is no longer

cost-effective as BART for White Bluff, given the significant visibility benefits of such controls.¹ While Entergy has not submitted an analysis to EPA containing a shorter remaining useful life for Independence, we believe that the same general principles apply to Independence: the FIP properly requires Independence to meet emission limits based on the use of scrubbers, but if Independence commits to an enforceable retirement date, the shorter remaining useful life may render scrubbers not cost-effective.²

The information presented below contains an analysis of the cost-effectiveness of scrubbers over a range of remaining useful life values for White Bluff and Independence.

I. Remaining Useful Life Analysis for White Bluff Units 1-2 and Independence Units 1-2

A. Results

Our analysis indicates that a new scrubber remains cost-effective for White Bluff Unit 1 so long as Unit 1 retires after June 5, 2027, and a new scrubber remains cost-effective at White Bluff Unit 2 if Unit 2 retires after December 10, 2026. Thus, a proper BART determination would need to include an enforceable requirement that White Bluff Unit 1 retire no later than June 5, 2027, and White Bluff Unit 2 retire no later than December 10, 2026, in order to conclude that BART limits should not be based on the installation and operation of scrubbers.³

Likewise, a new scrubber remains cost-effective for Independence Unit 1 so long as it retires after July 1, 2028, and for Independence Unit 2 if it retires after September 1, 2027. Thus, a proper reasonable progress determination would need to include an enforceable requirement that Independence Unit 1 retire no later than July 1, 2028, and Independence Unit 2 retire no

¹ EPA's BART Guidelines provide that where shutdown of a unit affects the BART determination, the shutdown date must be assured by a federally or state-enforceable restriction preventing further operation. *See* 40 C.F.R. pt. 51 App. Y § (IV)(D)(4)(k).

² The Reasonable Progress Guidance recommends relying on the BART Guidelines to analyze the remaining useful life of stationary sources. EPA, Guidance for Setting Reasonable Progress Goals Under the Regional Haze Program at 5-3 (2007), *available at* https://www3.epa.gov/ttn/naaqs/aqmguide/collection/cp2/20070601_wehrum_reasonable_progress_goals_reghaze.pdf. As mentioned above, *supra* note 1, the BART Guidelines require that a shutdown be legally enforceable in order to use a remaining useful life based on a unit shutting down.

³ If scrubbers – the most effective control – are not required, other technically feasible controls or limits must be analyzed further, including coal blending, dry sorbent injection, and limit tightening to reflect existing emissions.

later than September 1, 2027, in order to conclude that BART limits should not be based on the installation and operation of scrubbers.⁴

B. Methodology

To calculate the cost-effectiveness of a new scrubber at each of the units over a range of remaining useful life values, we used the cost and emissions estimates, parameters, and methodology for new scrubbers contained in EPA's final FIP, but changed the remaining useful life.⁵ We believe that EPA's cost-effectiveness calculations in the FIP are well-justified, and that any revised remaining useful life analysis should use the inputs and methodology which EPA used in the final FIP. In accordance with EPA's Control Cost Manual and the BART Guidelines,⁶ the capital costs are amortized over the remaining useful life of a unit, which is typically the lifetime of the pollution control in question. The remaining useful life is calculated as running from October 27, 2021 until the date the unit retires; October 27, 2021 is five years from the effective date of EPA's FIP, meaning that it is the date in the FIP by which scrubbers must be installed, 81 Fed. Reg. 68,319 (Oct. 4, 2016) (correcting 81 Fed. Reg. at 66,332 to read "This final rule is effective on October 27, 2016.")⁷

⁴ As with White Bluff, if scrubbers – the most effective control – are not required for Independence, other technically feasible controls or limits must be analyzed further, including coal blending, dry sorbent injection, and limit tightening to reflect existing emissions.

⁵ See EPA Docket ID No. EPA-R06-OAR-2015-0189-0205, "White Bluff R6 cost revisions2-revised.xlsx."

⁶ See 40 C.F.R. pt. 51 App. Y § (IV)(D)(4)(k).

⁷ In re-analyzing the cost-effectiveness of installing controls on units after BART determinations have already been finalized, states and EPA have used the date on which the unit would otherwise be required to install pollution controls as the starting date for calculating the remaining useful life. See 81 Fed. Reg. 46,852, 46,856 (July 19, 2016) (calculating the remaining useful life of Cholla Units 3 and 4 as running from December 5, 2017, which would be 5 years after the effective date of EPA's original FIP, until 2037, based on burning coal for 8 years and then converting to and burning natural gas for 12 years) and 82 Fed. Reg. 15,139 (reassessing BART at Cholla Units 3 and 4 based on the years following December 5, 2017, which would be 5 years after the effective date of the haze plan); 78 Fed. Reg. 51,686, 51,691 (Aug. 21, 2013) (calculating the cost-effectiveness of DSI for the Northeast Power Station using a 10-year amortization period and remaining useful life, beginning with installation of DSI in 2016 and ending in 2026 when the unit would shut down) and 79 Fed. Reg. 12,944 (Mar. 7, 2014) (calculating the remaining useful life of Northeastern Power Station as beginning on April 16, 2016, roughly 4 years after the effective date of the haze plan, based on the installation of the interim control of DSI).

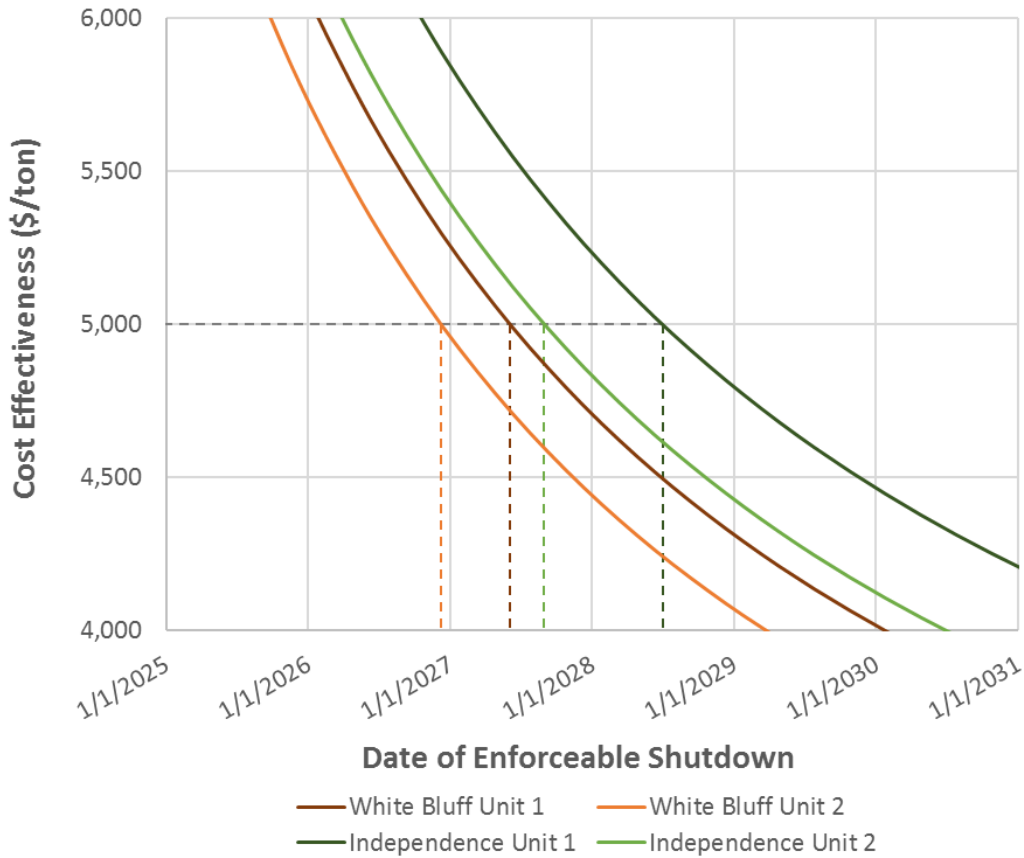
C. Discussion

On the following page, Figure 1 shows how cost-effectiveness for new scrubbers at White Bluff Units 1 and 2 and Independence Units 1 and 2 varies with the remaining useful life of each unit. Figure 1 highlights the point at which cost-effectiveness values for new scrubbers on each unit reach \$5,000/ton, which is a common informal threshold for cost-effectiveness in regional haze decision-making.⁸ For BART, cost-effectiveness cannot, of course, be evaluated in isolation. Here, given the substantial visibility benefits that would result from scrubbers, controls should be deemed cost-effective at \$5,000/ton, if not above.⁹

⁸ New add-on controls like scrubbers are often highly cost-effective over the full lifetime of the controls, as is the case at the White Bluff and Independence units. For that reason, the cost-effectiveness values relied on in many haze-related decisions are lower than \$5,000/ton; nonetheless, many are also at or above the \$5,000/ton benchmark. *See, e.g.*, 77 Fed. Reg. 61,478, 61,490 (Oct. 9, 2012) (finalizing a FIP requiring the use of 1% sulfur fuel oil at the Kanoelehua Hill Power Plant, the Puna Power Plant, and the Shipman Power Plant at a cost effectiveness of approximately \$5,600 per ton of SO₂ removed); Letter from Arizona Department of Environmental Quality to Steve Fry, EPA Region IX, Re: Consultation Regarding Best Available Retrofit Technology Analyses for the Four Corners Power Plant and Navajo Generating Station, May 12, 2008 (the state of Arizona has stated that a cost effectiveness value of more than \$4,489/ton of NO_x removed is cost effective); 77 Fed. Reg. 18,052, 18,064 (Mar. 26, 2012) (proposing to approve the NO_x BART determination for CENC Boiler 5 with a cost-effectiveness of \$4918 per ton) and 77 Fed. Reg. 76,871 (Dec. 31, 2012) (finalizing the approval of the NO_x BART determination for CENC Boiler 5); 79 Fed. Reg. 5032, 5039-40 (Jan. 30, 2014) (finalizing a FIP containing NO_x BART determinations for Laramie River Station Units 1-3 with cost-effectiveness values ranging from \$4375 to \$4461 per ton); 77 Fed. Reg. 18,052, 18,087 (Mar. 26, 2012) (proposing to approve the State's determination that reasonable progress requires Craig Unit 3 to install and operate SCNR, with a cost-effectiveness of \$4887/ton) and 77 Fed. Reg. 76,871, 76,880 (Dec. 31, 2012) (finalizing the approval of reasonable progress controls for Craig Unit 3 based on the use of SNCR). Note that these values have been reported without change to the dollar year.

⁹ For other Clean Air Act programs, states and EPA routinely require controls with cost-effectiveness values much higher than \$5,000/ton. For example, in 2001, EPA determined that \$10,000/ton was cost effective for BACT, which is equivalent to over \$14,000/ton in 2016. *See* Expert Report of Matt Haber - EPA, Best Available Control Technologies for the Baldwin Generating Station, Baldwin, Illinois, prepared for the United States in connection with *United States v. Illinois Power Company and Dynegy Midwest Generation, Inc.*, No. 99-883-MJR (S.D. Ill. 2002), at p. 17; Memorandum of John S. Seitz to Air Division Directors, BACT and LAER for emissions of nitrogen oxides and volatile organic compounds at Tier 2/Gasoline Sulfur Refinery Projects (Jan. 19, 2001), at 3. Cost escalation performed using the CEPCI index in 2001 (394.3) versus 2016 (556.8).

Cost-Effectiveness vs. Date of Enforceable Shutdown



Data Source: EPA-R06-OAR-2015-0189-0205.xlsx
 ("White Bluff_R6 cost revisions2-revised.xlsx"), "Cost Effectiveness" tab

Application of this threshold leads to the conclusion that scrubbers remain cost effective for the units in question unless there is a legally enforceable requirement for them to retire no later than the following dates:

| | |
|---------------------|-------------------|
| White Bluff Unit 1 | June 5, 2027 |
| White Bluff Unit 2 | December 10, 2026 |
| Independence Unit 1 | July 1, 2028 |
| Independence Unit 2 | September 1, 2027 |

Thank you for the opportunity to submit information regarding the Arkansas haze plan. Please do not hesitate to contact us with any questions.

Sincerely,

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