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June 17, 2025

Via U.S. Certified Mail – Return Receipt Requested

Elon Musk
CEO
X.AI Corp. d/b/a xAI
1450 Page Mill Road
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Brent Mayo
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CTC Property LLC
2110 Ranch Road 620 S, Unit 341886
Lakeway, TX 78734

CTC Holding LLC
2110 Ranch Road 620 S, Unit 341886
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Dan Rowland
Representative
CTC Property LLC
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Registered Agent for CTC Property LLC;
x.AI Corp. d/b/a xAI; and CTC Holding LLC
Registered Agent Solutions, Inc.
992 Davidson Drive, Suite B
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RE: Notice of Intent to Sue for Violations of the Clean Air Act

Dear Mr. Musk, Mr. Mayo, Mr. Rowland, and Registered Agent:

This letter provides notice that the National Association for the Advancement of Colored People ("NAACP") intend to file suit against CTC Property LLC, CTC Holding LLC, and X.AI Corp. (hereafter and jointly, "xAI") for past and ongoing violations of the federal Clean Air Act occurring at the Colossus data center located at 3231 Paul R. Lowry Road, Memphis, TN 38109.

Over the past year, xAI has installed and operated at least 35 combustion turbines and other sources of air pollution at the Colossus site without ever obtaining the necessary preconstruction or operating air permits, actions which have resulted in numerous and significant violations of the Clean Air Act, as set forth herein. These turbines have the potential to emit more than 2,000 tons of smog-forming nitrogen oxides ("NOx") per year and numerous other harmful pollutants, worsening Memphis' already poor air quality.

Unless the violations detailed below are fully addressed, the NAACP intends to file suit under Section 304 of the Clean Air Act, 42 U.S.C. § 7604, on behalf of itself and its adversely impacted members, in the United States District Court for the Western District of Tennessee after the applicable notice period has expired. NAACP will seek injunctive relief, civil penalties, fees and costs of litigation, and such other relief as the Court deems appropriate to address the ongoing violations described below.

If you would like to discuss any factual or legal issues set forth in this letter, or a possible resolution of this matter during the notice period, please contact the undersigned attorneys.

SUMMARY OF VIOLATIONS

xAI has violated and continues to violate Section 165 of the Clean Air Act, which mandates that "[n]o major emitting facility . . . may be constructed . . . unless a [Prevention of Significant Deterioration ("PSD")] permit has been issued for such proposed facility." 42 U.S.C. 7475(a)(1). By installing and operating 35 combustion turbines and other sources of air pollution, xAI has illegally constructed and continues to operate a major source without obtaining a preconstruction PSD permit. In addition to failing to obtain a PSD permit, xAI has operated and continues to operate these turbines without utilizing Best Available Control Technology, a distinct and ongoing violation of Section 165 of the Act.[1]

xAI is also operating in violation of the Shelby County Local Implementation Plan, which independently requires new sources to obtain preconstruction and operating permits, none of which xAI obtained for the data center or its turbines.

Finally, xAI has violated and continues to violate Section 112 of the Clean Air Act[2] and its implementing regulations,[3] which set out requirements for sources of Hazardous Air Pollutants ("HAPs"). In particular, xAI has constructed a major source of HAPs without complying with preconstruction approval requirements set forth in Section 112, *see* 42 U.S.C. § 7412(g)(2)(B); 40 C.F.R. §§ 63.1–63.16, and without complying with the operating, monitoring, recordkeeping, and reporting requirements of 40 C.F.R. Part 63, Subpart YYYY (National Emission Standards for Hazardous Air Pollutants for Stationary Combustion Turbines).

I. Persons Responsible for Violations.

CTC Property LLC, CTC Holding LLC,[4] and X.AI Corp. (d/b/a xAI) are the parties responsible for the violations listed herein and referred to collectively as xAI for purposes of this notice. Per the January 2025 air permit application for certain combustion turbines at the site,[5] CTC Property LLC is currently operating the turbines in Shelby County located at 3231 Paul R. Lowry Road, Memphis, Tennessee. CTC Property LLC and CTC Holding LLC are close affiliates of xAI, and xAI is the corporate entity ultimately driving the operations.[6]

[1] 42 U.S.C. § 7475(a)(4).
[2] 42 U.S.C. § 7412.
[3] *See* 40 C.F.R. Part 63.
[4] CTC Holding LLC is a Tennessee limited liability company formed in October 2024 that shares the same principal office address as CTC Property LLC (2110 Ranch Road 620 S, Unit 341886, Lakeway, TX 78734).
[5] Trinity Consultants, CTC Property LLC, Synthetic Minor Operating Permit Application at 1-1 (Jan. 2025).
[6] Sarah Emerson, *Inside Elon Musk's Mad Dash to Build a Giant xAI Supercomputer*, FORBES (July 18, 2024), https://perma.cc/Z8LK-K2RH.

II. Factual Background.

A. Memphis' Existing Air Pollution Problem.

Even before xAI came to Memphis, the city had some of the worst air quality in the region. For example, the past four years of ambient air monitoring data show that concentrations of ground-level ozone—also known as smog—exceed the applicable federal air quality standard for ozone (the National Ambient Air Quality Standards, or "NAAQS").[7] Among other harmful health effects, smog irritates people's lungs and causes asthma attacks.[8] In 2024, Memphis was deemed an asthma capital of the nation by the Asthma and Allergy Foundation of America due to high rates of emergency room visits and deaths from asthma.[9] That same year, Shelby County received an "F" for its ozone pollution from the American Lung Association.[10]

In fact, Memphis has been previously designated as a nonattainment area for ozone on several occasions,[11] but had worked to achieve attainment by implementing federal standards limiting emissions from vehicles, transportation fuels, and nonroad engines.[12] Unfortunately, since falling back into nonattainment in recent years, Memphis' ozone levels have continued to increase rather than decrease, as shown by the chart below:

[7] EPA has not yet redesignated Shelby County as a nonattainment area, although groups have recently filed a formal petition requesting that EPA do so. *See* Petition to Redesignate the Memphis Metropolitan Statistical Area as in Nonattainment, S. ENV'T LAW CTR. ET AL. (June 5, 2025), https://southernenvironment.sharefile.com/d-s68dc2f0359be481ea534b0b1059792dc ("Ozone Petition").
[8] *Health Effects of Ozone Pollution*, U.S. ENV'T PROT. AGENCY, https://perma.cc/LN7X-22DX.
[9] ASTHMA & ALLERGY FOUND. OF AM., 2024 ASTHMA CAPITALS, THE MOST CHALLENGING PLACES TO LIVE WITH ASTHMA 6–7, 12–13 (2024), https://perma.cc/CK5S-54PH.
[10] *Tennessee: Shelby*, AM. LUNG ASS'N (2025), https://perma.cc/4UF2-MP8Q.
[11] *See* Air Quality Designations for the 2008 Ozone National Ambient Air Quality Standards, 77 Fed. Reg. 30,088, 30,146 (May 21, 2012); Determination of Nonattainment and Reclassification of the Memphis, TN/Crittenden County, AR 8-Hour Ozone Nonattainment Area, 73 Fed. Reg. 16,547, 16,550 (Mar. 28, 2008); Air Quality Designations and Classifications for the 8-Hour Ozone National Ambient Air Quality Standards; Early Action Compact Areas with Deferred Effective Dates, 69 Fed. Reg. 23,858, 23,865–66 & tbl.3 (Apr. 30, 2004).
[12] *See* Air Plan Approval and Air Quality Designation; TN; Redesignation of the Shelby County 2008 8-Hour Ozone Nonattainment Area to Attainment, 81 Fed. Reg. 22,948, 22,954–55 (proposed Apr. 19, 2016) (to be codified at 40 C.F.R. pts. 52, 81) (describing "federal measures that have been implemented" and "resulted in permanent emission reductions"); Air Plan Approval and Air Quality Designation; TN; Redesignation of the Shelby County 2008 8-Hour Ozone Nonattainment Area to Attainment, 81 Fed. Reg. 40,816, 40,817 (June 23, 2016) (revising the area's "legal designation" to attainment in final rule).

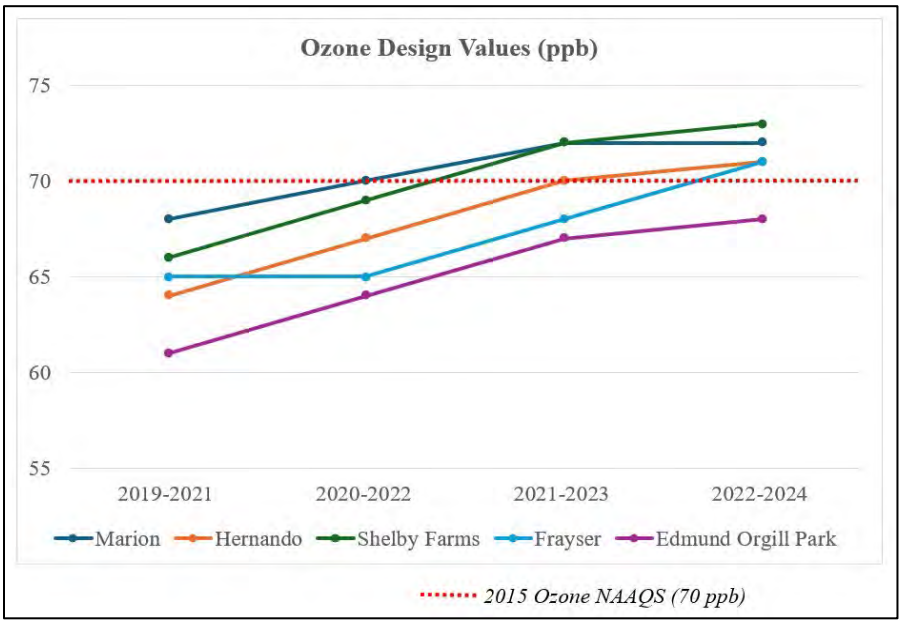

Figure 1: Memphis MSA Ozone Design Values Over Time at Local Monitoring Sites.[13]

Smog in areas like Memphis is primarily driven by nitrogen oxide ("NOx") emissions from combusting fossil fuels, and xAI's turbines are collectively one of the largest, or potentially *the* largest, industrial source of NOx in Shelby County.[14]

B. xAI Installs Unpermitted Turbines.

On June 5th, 2024, the Greater Memphis Chamber issued a press release revealing that xAI would construct the world's largest data center in Memphis.[15] Recognizing the massive energy demand from such a facility, community members in Memphis began inquiring with regulatory agencies as to whether the facility had plans to apply for an air permit for any emission sources at the facility. In response to a records request covering this period, however, the Shelby County Health Department ("SCHD"), the entity in charge of air permitting in Shelby County, stated that it had no records relating to xAI.[16]

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[13] Ozone Petition, *supra* note 7, at 22 (citing Env't Prot. Agency, *Ozone Design Values, 2023 (xlxs)* at tbl.5 (June 4, 2024), https://www.epa.gov/system/files/documents/2024-06/o3_designvalues_2021_2023_final_06_04_24.xlsx; Env't Prot. Agency, *Ozone Design Values, 2024 (xlxs)* at tbl.5 (May 29, 2025), https://www.epa.gov/system/files/documents/2025-05/o3_designvalues_2022_2024_final_05_28_25.xlsx.

[14] As discussed herein, xAI's turbines have the potential to emit NOx at rates in excess of 2,000 tons per year. According to EPA's most recent National Emissions Inventory, the largest source of NOx in Shelby County was the Memphis International Airport (1,077 tons of NOx), followed by the Draslovka chemical plant (743 tons of NOx), the Valero refinery (342 tons of NOx), and the TVA Allen power plant (230 tons of NOx). ENV'T. PROT. AGENCY, *2020 National Emissions Inventory (NEI) Data* (2020), https://www.epa.gov/air-emissions-inventories/2020-national-emissions-inventory-nei-data.

[15] *xAI Marks Its Spot in Memphis*, GREATER MEMPHIS CHAMBER (Jun. 5, 2024), https://memphischamber.com/economic-development/xai/.

[16] In response to a public records request from SELC regarding the xAI turbines, on August 1, 2024, a County

Shortly following the Chamber's announcement, the public learned through on-the-ground sources that xAI had already begun operating gas turbines at the site. In fact, a satellite image taken on June 12th, 2024, just a week after the Chamber's announcement, shows that xAI had already installed 16 gas turbines with a total generating capacity of 105 MW. These 16 turbines have the collective potential to emit 440 tons of NOx per year,[17] meaning these initial 16 turbines already qualified as a major new source of air pollution (the major source threshold is 250 tons per year), and one of largest sources of NOx emissions in Shelby County.

Soon thereafter, SCHD told reporters that xAI's turbines were exempt from permitting, although SCHD still had not disclosed publicly what xAI was operating on its site nor the legal basis for any such exemption.[18] On August 26, 2024, community groups sent a letter to SCHD setting out an analysis of the relevant laws (including SCHD's own regulations) that showed these turbines absolutely required pre-construction permits, and that xAI was therefore installing and operating these turbines illegally.[19]

Despite being warned that these turbines were illegal in August of 2024, xAI continued installing new turbines well into 2025.[20] Faced with a dearth of information about what was happening at the facility, SELC commissioned a flight over the facility on March 31st, 2025. Photographs taken during this flight revealed that by this date, xAI had installed 35 turbines:

Attorney relayed the following statement from SCHD: "In response to 'HARRELL, SAMI PRR-7/19/24 REQUESTING RECORDS RE: 3231 PAUL R. LOWRY', there are no construction or operating applications for the stated address. In addition there are no meeting notes pertaining to the xAI project." E-mail from John Marek, Assistant Cnty. Att'y, SCHD, to Sami Harrell, Assoc. Att'y, SELC (Aug. 1, 2024), **Att. 1.**

[17] Appendix A: Timeline of Turbine Installation & Emission Calculations.

[18] Samuel Hardiman, *Permits Not Required for Temporary xAI Turbines*, DAILY MEMPHIAN (Aug. 10, 2024), https://dailymemphian.com/subscriber/article/45589/permits-not-required-for-temporary-xai-turbines.

[19] Letter from Patrick Anderson, Staff Att'y, SELC; et al., to Dr. Michelle Taylor, Dir. & Health Officer, SCHD (Aug. 26, 2024) (writing on behalf of community groups Memphis Community Against Pollution; Young, Gifted & Green; Sierra Club Chickasaw Group; and Sierra Club Tennessee Chapter), **Att. 2**.

[20] *See* Appendix A: Timeline of Turbine Installation & Emission Calculations.

Figure 2: Aerial Overview Images of xAI's 35 Turbines (Apr. 23, 2025; Steve Jones/SouthWings).

Images from this flight also allowed the public to identify, for the first time, the makes and models of all turbines at xAI, as summarized in the table below:

Make/Model	**Count**	**Turbine Capacity (MW)**	**Total Capacity (MW)**
GE Vernova 2500	4	34	136
Solar SMT-130	8	16.5	132
Solar/Caterpillar XQ5200	14	5.2	72.8
Solar SMT-60	8	5.7	45.6
Solaris GE LM2500+G4	1	35	35
		Total Generating Capacity:	**421.4**

An additional flight, conducted on April 23, 2025, utilized a thermal imaging camera to demonstrate that at least 33 of the 35 turbines were in operation that day:

Figure 3: Thermal Camera Overview Image of xAI (Apr. 23, 2025; Steve Jones/SouthWings).

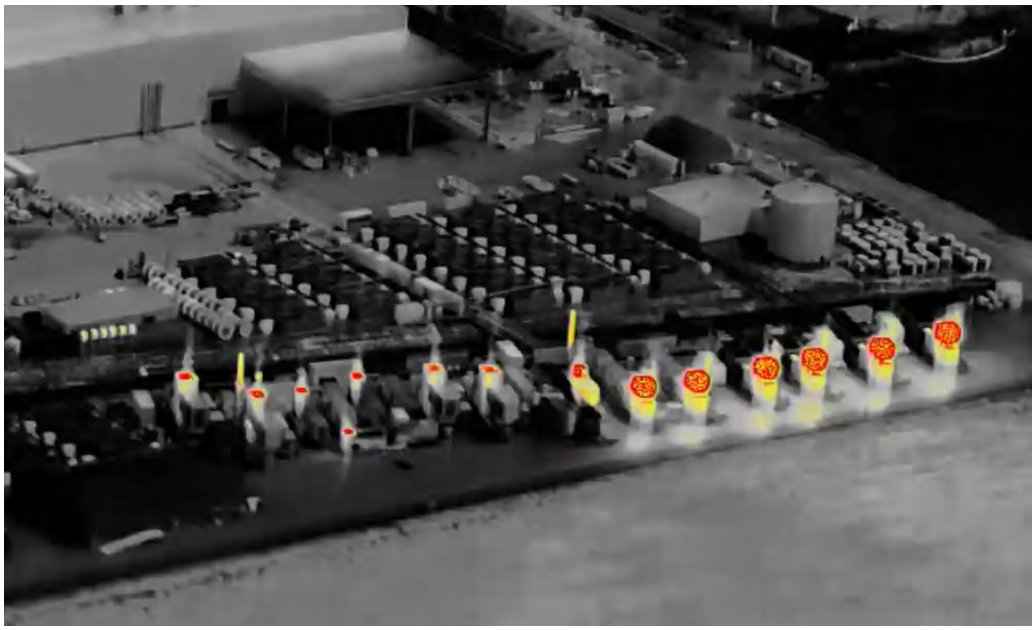

Figure 4: Thermal Image of xAI's South Turbines (Apr. 23, 2025; Steve Jones/SouthWings).

Figure 5: Thermal Image of xAI's North Turbines (Apr. 23, 2025; Steve Jones/SouthWings).

These images confirm ground-based observations that the turbines have been operating regularly since their installation.

Finally, although the Memphis Chamber recently stated that some turbines had been removed from the site in May,[21] as of June 15th, 2025, satellite images show at least 26 turbines are still present, including three new SMT-130 turbines installed since April 23, 2025.[22]

In total, the June 15th, 2025, satellite image shows the facility has eleven SMT-130 turbines (16.5 MW each), six SMT-60 turbines (5.7 MW each), four GE Vernova 2500 turbines (35 MW each), four Caterpillar XQ5200 turbines (5.2 MW each), and one Solaris GE 2500 turbine (35 MW). This totals about 407 MW of generating capacity, roughly in line with the capacity before any turbines were removed, and a total minimum emission rate of 1,010 tons of NOx per year.[23]

C. xAI's Air Permit Application.

Although SCHD had informed the public that xAI's turbines would be "temporary," this apparently was not accurate. In January 2025, xAI filed an air permit application for the permanent use of 15 SMT-130 turbines, each with a generating capacity of 16.5 MW.[24] At the time xAI filed this application, xAI was already operating at least six SMT-130 turbines; by

[21] *xAI Phase One Substation #63 Providing 150MW of Power to Facility*, GREATER MEMPHIS CHAMBER (May 7, 2025), https://perma.cc/437A-3K7N.
[22] Appendix A: Timeline of Turbine Installation & Emission Calculations.
[23] *Id.*
[24] CTC Property LLC, Synthetic Minor Operating Permit Application (Jan. 2025).

March 13th, 2025, xAI had installed a total of eight SMT-130 turbines.[25] The air permit application briefly mentioned that the facility is "currently operating a battery of mobile units" but did not set forth any details on the existing turbines (neither the existing SMT-130s that were already installed without a permit nor the numerous other unpermitted turbines at xAI).[26] The air permit application also did not provide any legal justification for their prior and ongoing installation and operation without an air permit, stating only that xAI was operating the turbines under an unspecified "exemption."[27]

Moreover, while the application contemplated that the 15 SMT-130 turbines described in the application would be equipped with add-on air pollution control technology known as Selective Catalytic Reduction ("SCR"), a consultant for xAI later confirmed that none of the xAI's currently installed SMT-130 turbines were operating SCR.[28] Based on analysis of images of the turbines, we further do not believe that any of the turbines at xAI are equipped with SCR or any other add-on emissions controls.

On March 31st, 2025, SCHD released a draft permit for the 15 SMT-130s turbines. Like xAI's application, the permit and permit record were totally devoid of any details pertaining to the existing turbines or any legal justification for their operation.[29] As of the date of this filing, SCHD has not issued an air permit for the permanent use of 15 SMT-130 turbines, and even if it had, it would not absolve xAI of the violations listed herein.

III. Legal Background.

The Clean Air Act is designed to "protect and enhance the quality of the Nation's air resources so as to promote the public health and welfare and productive capacity of its population." 42 U.S.C. § 7401(b)(1). The Act requires the Environmental Protection Agency (EPA) to establish primary and secondary national ambient air quality standards (or "NAAQS") for "criteria" pollutants–those for which EPA has issued air quality criteria. *Id.* §§ 7408, 7409. Ground-level ozone pollution results when airborne volatile organic compounds or nitrogen oxides react with sunlight—this is commonly referred to as smog. EPA has identified ozone as a "criteria" pollutant and promulgated a NAAQS for ozone. 40 C.F.R. §§ 50.9, 50.10, 50.19.

The Clean Air Act requires EPA to designate areas within each state based on whether the air quality is better or worse than the NAAQS. An area that meets the NAAQS for a particular pollutant is designated an "attainment" area and an area that does not meet the standard is designated a "nonattainment" area. 42 U.S.C. § 7407(d)(1)(A)(i)–(ii). The Clean Air

[25] *See* Appendix A: Timeline of Turbine Installation & Emission Calculations.
[26] Trinity Consultants, CTC Property LLC, Synthetic Minor Operating Permit Application at 1-1 (Jan. 2025).
[27] *Id.*
[28] Greater Memphis Chamber, "Asked & Answered: A Webinar About Turbines, the Aquifer, and Economic Development Moderated by Kontji Anthony," at 13:15 (Apr. 23, 2025), https://vimeo.com/1078109985?autoplay=1&muted=1&stream_id=Y2xpcHN8MjczOTM5OXxpZDpkZXNjfFtd.
[29] Instead, SCHD incorrectly stated that there were only 15 SMT-130 turbines operating at the site and that they were already equipped with SCR. SCHD, Construction Permit Application Evaluation and Regulatory Review (Permit No. 01156-01PC): Colossus Data Center, CTC Property LLC at 5 (Mar. 2025).

Act also requires each state or local jurisdiction to adopt and submit to EPA for approval a State or Local Implementation Plan, known as SIPs or LIPs. *See id.* § 7410. Through SIPs or LIPs, state and local agencies are responsible for ensuring compliance with federal air quality standards, *id.* §§ 7410(a)(2)(A), 7502(c)(6); EPA's role is to provide oversight of state and local agencies by approving or disapproving SIPs or LIPs and taking action when a SIP or LIP is found inadequate. *Id.* § 7410(k). Once approved by EPA, SIPs and LIPs are federally enforceable under the Clean Air Act. *See* 42 U.S.C. §§ 7413, 7604.

In Tennessee, several local cities and counties, including Shelby County and Memphis, have been authorized to implement Clean Air Act requirements in their respective jurisdictions through administration and enforcement of EPA-approved LIP provisions. In particular, EPA has approved the Memphis-Shelby County LIP,[30] meaning this LIP and the Clean Air Act are the applicable laws governing sources of air pollution in Memphis and Shelby County.

A. Permits Required Under the Clean Air Act and the Shelby County LIP.

With very few exceptions—none of which apply here—new sources of criteria and other air pollutants in Tennessee must obtain preconstruction approval in the form of an air permit as well as a permit to operate and emit pollutants. These permits are meant to ensure that emissions from new sources do not cause impairment of air quality, a violation of the NAAQS, or otherwise harm the public and the environment.

i. LIP Permit Requirements.

Under Shelby County's EPA-approved LIP, new stationary sources of air pollution must obtain a construction permit prior to commencing construction. In particular, Section 16-77 of the LIP incorporates Chapter 1200-3-9 of the Tennessee Air Pollution Control Regulations, including the Section stating that "no person shall begin the construction of a new air contaminant source or the modification of an air contaminant source which may result in the discharge of air contaminants without first having applied for and received from the Technical Secretary a construction permit."[31] Moreover, the word "construction" as used here also includes "installation."[32]

The LIP further imposes an ongoing obligation to retroactively obtain a construction permit if a source fails to do so before construction. Specifically, "[i]n the case where a source or modification was constructed without first obtaining a construction permit, a construction permit may be issued to the source or modification to establish as conditions of the permit, the necessary emission limits and requirements to assure that these regulatory requirements are met." Tenn. Comp. R. & Regs. 1200-3-9-.01(1)(e) (adopted by Memphis-Shelby County regulations at

[30] Approval and Promulgation of Implementation Plans, Tennessee; Revisions to the Memphis and Shelby County Portion of the State Implementation Plan, 54 Fed. Reg. 25,456, 25,458 (June 15, 1989) (codified at 40 C.F.R. pt. 52).
[31] Tenn. Comp. R. & Regs. 1200-3-9-.01(1)(a).
[32] Tenn. Comp. R. & Regs. 1200-3-2-.01(j).

Section 16-77).[33] As a federal court has recognized, this provision means that operating a source without obtaining the necessary construction permit is an ongoing violation.[34]

Additionally, the LIP also requires operating permits for air contaminant sources in operation. Section 16-77 of the LIP adopted Section 1200-3-9-.02 of the Tennessee Air Pollution Control Regulations, which lays out specific requirements for operating permits. *See* Tenn. Comp. R. & Regs. 1200-3-9-.02; 40 C.F.R. § 52.2220(c).

The foregoing permit requirements apply to both minor and major sources. Moreover, although the LIP provisions do make reference to certain permitting exemptions, none of those exemptions apply to these turbines. *See* Tenn. Comp. R. & Regs. 1200-3-9-.04 (adopted by Memphis-Shelby County regulations at Section 16-77).

ii. Major New Source Review Permit Requirements.

Under the Clean Air Act's New Source Review requirements, and as incorporated into Shelby County's LIP, a "major" source is defined to include a stationary source that "emits, or has the potential to emit" 250 tons per year or more of a regulated pollutant such as NOx. 40 C.F.R. § 51.166(b)(1)(i); *see* 42 U.S.C. § 7479(1).[35] New major sources must obtain preconstruction permitting approval; here, that permit is known as a Prevention of Significant Deterioration, or "PSD," permit. 40 U.S.C. § 7475(a).[36]

Under the Clean Air Act's Title I, Part C (Prevention of Significant Deterioration) provisions, "[n]o major emitting facility . . . may be constructed . . . unless . . . a permit has been issued for such proposed facility in accordance with this part." 42 U.S.C. § 7475(a)(1). Further, Title III of the Clean Air Act specifically authorizes citizen suits against "any person who proposes to construct or constructs any new or modified major emitting facility without a permit required under part C of [Title] I (relating to significant deterioration of air quality)." 42 U.S.C. § 7604(a)(3).

Amongst other requirements, PSD permits must impose emission limits based on the use of Best Available Control Technology ("BACT") and require a demonstration through ambient air modeling that the source's emissions will not cause or contribute to any exceedances of the NAAQS. 42 U.S.C. § 7475(a)(3)–(4); 40 C.F.R. § 51.166(b)(12), (j)(2), (k)(1).[37] BACT is, in turn, defined as "an emission limitation based on the maximum degree of reduction of each

[33] 40 C.F.R. § 52.2220(c) (identifying Shelby County Local Implementation Plan ("Shelby County LIP") in "Table 2—EPA-Approved Memphis-Shelby County Regulations").
[34] *See Nat'l Parks Conservation Ass'n v. Tenn. Valley Auth.*, 480 F.3d 410, 419 (6th Cir. 2007) ("[W]hile [Section] 1200-3-9-.01(1)(a) contains the Tennessee SIP's *pre* construction permitting requirement, [Section] 1200-3-9-.01(1)(e) establishes that the duty to obtain a construction permit containing the proper emissions limits is ongoing, even *post*-construction.").
[35] *See also* Tenn. Comp. R. & Regs. 1200-3-9-.01(4)(b)1.(ii).
[36] Tenn. Comp. R. & Regs. 1200-3-9-.01(4)(a)1., (4)(c). Although the Memphis area is currently failing to meet the National Ambient Air Quality Standards for ozone, as of June 17, 2025 it is still legally designated as an attainment area for ozone.
[37] Tenn. Comp. R. & Regs. 1200-3-9-.01(4)(e)1., (4)(j)2.

pollutant . . . which the permitting authority, on a case-by-case basis, taking into account energy, environmental, and economic impacts and other costs, determines is achievable for such facility." 42 U.S.C. § 7479(3).[38]

iii. Preconstruction and Operating Requirements for Hazardous Air Pollutants.

Hazardous Air Pollutants, or "HAPs," are some 180 chemicals designated by Congress and EPA that are especially toxic and/or carcinogenic even in very small concentrations and are regulated under Section 112 of the Clean Air Act. As with New Source Review, facilities are classified as minor (or "area" sources) or major sources of HAPs based on their actual or potential emissions; a major source is defined as one that emits or has the potential to emit at least 10 tons of any single HAP or 25 tons of total aggregate HAP emissions. 42 U.S.C. § 7412(a)(1); *see also* 40 C.F.R. § 63.2. Most major sources, in turn, are subject to EPA standards known as National Emission Standards for Hazardous Air Pollutants ("NESHAP"). NESHAP standards in turn set out requirements to utilize Maximum Achievable Control Technology and other operating, monitoring, recordkeeping, and reporting requirements. 42 U.S.C. § 7412(d)(2).

Critically, under the Clean Air Act's HAPs provisions, "no person may construct or reconstruct any major source of [HAPs], unless the [EPA] Administrator (or the State) determines that the maximum achievable control technology emissions limitation . . . for new sources will be met." 42 U.S.C. § 7412(g)(2)(B). Further, under the federal NESHAP rules, "no person may, without obtaining written approval in advance from the [EPA] Administrator . . . [c]onstruct a new affected source that is major-emitting." 40 C.F.R. § 63.5(b)(3)(i). Likewise, a source must submit an "application for approval of construction" prior to commencing construction of a new major source of HAPs. *Id.* § 63.5(d)(1)(i). Sources may also satisfy the foregoing requirements by obtaining state-level preconstruction approval if it is sufficiently similar to the federal requirements. *Id.* § 63.5(f).

As to xAI's turbines, meanwhile, gas turbines that are located at a major source of HAPs must comply with NESHAP Subpart YYYY, 40 C.F.R. §§ 63.6080–.6175. Subpart YYYY requires turbines to comply with a maximum achievable control technology emission limit for formaldehyde emissions, 40 C.F.R. § 63.100; Table 1 to Subpart YYYY, to conduct initial and periodic emissions testing, 40 C.F.R. § 63.6110, .6115, to continuously monitor operations, *id.* § 63.6125(a)–(b), and to make various reports and notifications and to undertake recordkeeping, *id.* § 63.6145, .6150, .6155, .6160.

Finally, we note that gas turbines located at a major source of HAPs are subject to Subpart YYYY even if they are portable. In key part, NESHAP Subpart YYYY defines stationary combustion turbines subject to the standard as such: "[s]tationary means that the combustion turbine is not self propelled or intended to be propelled while performing its function." 40 C.F.R. § 63.6175.

[38] Shelby County LIP, Sec. 16-46 (defining "best available control technology").

B. The Turbines Are Not Subject to the Nonroad Engine Exemption.

xAI has not set forth any legal authority for why the turbines could be installed and operated without the foregoing air permitting approvals, and SCHD has provided only vague references to the idea that the turbines could be operated for up to a year without any air permitting. This assertion is incorrect.

SCHD's mistaken belief appears to be a reference to the nonroad engine exemption from the Clean Air Act's definition of "Stationary Source," which in part allows for some portable internal combustion engines known as "nonroad engine[s]" to escape permitting requirements if they are operated at a given site for less than a year and meet certain other requirements. *See* 42 U.S.C. § 7602(z) (defining "stationary source" to "mean[] generally any source of an air pollutant except those emissions resulting directly from an internal combustion engine for transportation purposes or from a nonroad engine or nonroad vehicle as defined in [42 U.S.C. § 7550(10)–(11)]").

Critically, however, engines or turbines that are subject to regulations under Section 111 of the Clean Air Act (New Source Performance Standards, or "NSPS") are *not* nonroad engines for purposes of being excluded from the definition of Stationary Source under the Clean Air Act. *Id.* Specifically, the Clean Air Act defines "nonroad engine" as "an internal combustion engine . . . that is not used in a motor vehicle [or] **is not subject to standards promulgated under [42 U.S.C. §] 7411**," which is Section 111, or NSPS. 42 U.S.C. § 7550(10) (emphasis added); *see also* 40 C.F.R. § 1068.30 (excluding an "internal combustion engine" from the meaning of "nonroad engine" when it "is regulated under 40 C.F.R. part 60, (or otherwise regulated by a federal New Source Performance Standard promulgated under section 111 of the Clean Air Act (42 U.S.C. § 7411))").

In short, if an engine or turbine is subject to an NSPS standard, then it is a stationary source rather than a nonroad engine and must obtain an air permit prior to installation and operation under Shelby County's LIP. As relevant here, turbines with a heat-input capacity greater than 10 MMBtu/hr are subject to NSPS subpart KKKK, Standards of Performance for Stationary Combustion Turbines.[39] In other words, any turbine with a heat input greater than 10 MMBtu/hr is by definition a stationary source subject to a Section 111 standard and is therefore subject to air permitting requirements under the CAA and Shelby County's LIP. All of the turbines identified on site at the xAI facility have heat inputs that far exceed 10 MMBtu/hr. For instance, the smallest turbines, the 5.2 MW units, have a heat input of approximately 50 MMBtu/hr.

Finally, even if xAI's turbines were subject to the nonroad exemption, that exemption no longer applies once turbines are on site for more than a year, or, critically, once the operator

[39] 40 C.F.R. § 60.4305. Note that although the title of this subpart references "stationary" combustion turbines, the definition of "stationary combustion turbine" is clear that portable turbines are indeed subject to the subpart. *See id.* § 60.4420 ("Stationary means that the combustion turbine is not self propelled or intended to be propelled while performing its function. It may, however, be mounted on a vehicle for portability.").

makes the decision to keep the turbines on site for more than a year.[40] Under this scenario, the nonroad engines retroactively qualify as stationary sources from the date they were first installed at the given location.[41] As such, even if xAI's turbines were nonroad engines (and they are not), the nonroad exemption would not apply to the SMT-130 turbines that xAI intends to make permanent as well as any other turbines that have been on site for more than one year.[42]

IV. Specific Violations Alleged.

The legal and factual statements set out above are incorporated herein.

A. Claim 1: xAI Constructed and Is Operating a Major Source Without Obtaining a PSD Permit.

As set forth above and incorporated herein, under the Clean Air Act, "[n]o major emitting facility . . . may be constructed . . . unless . . . a permit has been issued for such proposed facility in accordance with this part [Prevention of Significant Deterioration]." 42 U.S.C. § 7475(a)(1).[43] A "major" source is defined as one that "emits, or has the potential to emit" regulated pollutants, including NOx, at rates greater than 250 tons per year. 40 C.F.R. § 51.166(b)(1)(i); *see also* 42 U.S.C. § 7479(1).[44] xAI has not applied for nor obtained a major source PSD permit, and, as established herein, the turbines readily emit and/or have the potential to emit NOx and other regulated pollutants in amounts greater than 250 tons per year.[45]

As of June 12, 2024, at the latest, xAI had installed a sufficient number of turbines to qualify as a major source. In particular, by that date, xAI had installed 14 5.2 MW Caterpillar XQ5200 turbines and two Solar SMT-130 turbines.[46] These sixteen turbines, based upon the most conservative (i.e., lowest-emitting) emission factors available from the respective manufacturers, collectively had the potential to emit NOx at a rate of 440 tons per year.[47]

As xAI continued adding additional turbines, the potential NOx emissions only increased. By March 2025, when the facility had installed 35 turbines, the unpermitted turbines collectively had the potential to emit at least 1,200 tons of NOx per year (again calculated based on the most conservative emission factors).[48]

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[40] 40 C.F.R. § 1068.31(e)(1) (stating that when "an engine will be or has been used in a single specific location for 12 months or longer, it ceased to be a nonroad engine when it was placed in that location.").
[41] *Id.*
[42] Based on the June 15th, 2025, satellite image, at minimum it appears that two SMT-130 turbines and four Caterpillar XQ5200 turbines have been on site for approximately one year, having been installed by June 12th, 2024, at the latest. *See* Appendix A: Timeline of Turbine Installation & Emission Calculations.
[43] Tenn. Comp. R. & Regs. 1200-3-9-.01(4)(a)1., 4(c).
[44] Tenn. Comp. R. & Regs. 1200-3-9-.01(4)(b)1.(ii).
[45] Based on emission factors in xAI's January 2025 air permit application, xAI's turbines also have the potential to emit at least carbon monoxide—in addition to NOx—at rates that far exceed 250 tons per year.
[46] Appendix A: Timeline of Turbine Installation & Emission Calculations.
[47] *Id.*
[48] *Id.*

Finally, xAI remains a major source as of at least June 15th, 2025. A satellite image from that date shows that although xAI apparently removed eleven of the smallest turbines (having removed 10 Caterpillar XQ2500s (5.2 MW each) and two SMT-60 turbine (5.7 MW)) at some point after April 23, 2025, it has also added three new, larger, 16.5 MW SMT-130 turbines.[49] In total, as of June 15th, 2025, xAI has 26 turbines with a total generating capacity of approximately 407 MW and the potential to emit more than 1,000 tons of NOx.[50]

These actions constitute a violation of Section 165 of the Clean Air Act, 42 U.S.C. § 7475(a)(1), and the implementing provisions of the Shelby County LIP because xAI has constructed a major source for purposes of PSD without having obtained a PSD permit. Moreover, under the Shelby County LIP, failure to obtain a major source preconstruction PSD permit is an ongoing violation, meaning each day xAI operates the turbines is a separate and distinct violation.[51]

B. Claim 2: xAI Has Operated and Continues to Operate the Turbines Without Utilizing Best Available Control Technology.

As set out above, major sources subject to PSD are also required to limit their emissions to levels that are achievable when using the Best Available Control Technology ("BACT"). 42 U.S.C. § 7475(a)(4); 40 C.F.R. § 51.166(j)(2).[52] BACT is, in turn, defined as "an emission limitation based on the maximum degree of reduction of each pollutant . . . which the permitting authority, on a case-by-case basis, taking into account energy, environmental, and economic impacts and other costs, determines is achievable for such facility." 42 U.S.C. § 7479(3).[53]

There is no dispute that, without obtaining a PSD permit, these turbines have not complied with the BACT requirement. More concretely, however, we note that BACT for these types of turbines would be an emission limit that is based on, at minimum, use of selective catalytic reduction ("SCR") and catalytic oxidation add-on pollution controls to reduce NOx, volatile organic compounds, and carbon monoxide emissions.

These BACT emission limits would vastly reduce emissions compared to the rates currently emitted by the unpermitted turbines operating without BACT-level controls. For instance, TVA's Allen Combined Cycle Plant, located across the street from the xAI facility, has

[49] *Id.*
[50] *Id.*
[51] The LIP imposes an ongoing obligation to obtain a retroactive construction permit if a source fails to do so before construction. *See* Tenn. Comp. R. & Regs. 1200-3-9-.01(1)(e) ("In the case where a source or modification was constructed without first obtaining a construction permit, a construction permit may be issued to the source or modification to establish as conditions of the permit, the necessary emissions limits and requirements to assure that these regulatory requirements are met."). As a federal court has recognized, this provision means that operating a source without obtaining the necessary construction permit is an ongoing violation. *See Nat'l Parks Conservation Ass'n v. Tenn. Valley Auth.*, 480 F.3d 410, 419 (6th Cir. 2007) ("[W]hile [Section] 1200-3-9-.01(1)(a) contains the Tennessee SIP's *pre* construction permitting requirement, [Section] 1200-3-9-.01(1)(e) establishes that the duty to obtain a construction permit containing the proper emissions limits is ongoing, even *post*-construction.").
[52] Tenn. Comp. R. & Regs. 1200-3-9-.01(4)(j)2.
[53] Shelby County LIP, Sec. 16-46 (defining "best available control technology").

recently applied for a major source PSD permit to add six GE Vernova 2500 turbines—xAI's operations include five of these same turbines. Notably, TVA has proposed installing SCR for NOx control on its new turbines, with a corresponding proposed BACT emission limit for NOx of 2.5 ppm, which is far lower than the 15 ppm emitted by these same turbines operating without SCR at xAI.[54] In fact, xAI itself concludes that the SMT-130 turbines it has included in its air permit application will emit NOx at a rate of no more than 2 ppm when they eventually install SCR.[55]

In other words, by failing to utilize BACT-level emission controls, xAI's existing turbines, which are emitting NOx at rates between 9 ppm and 25 ppm according to the manufacturer specification sheets (and potentially far higher[56]), are a far larger source of smog-forming NOx than they would be had they installed and operated SCR on each of the turbines. For instance, if all the 35 turbines operated by xAI were using SCR to achieve a NOx emission rate of 2 ppm, they would emit about 177 tons of NOx per year, as opposed to the 1,200 to 2,100 tons per year they currently emit.

As such, xAI's failure to comply with the BACT requirement is not only a Clean Air Act violation on paper, but also a significant and ongoing violation that is resulting in substantial amounts of harmful excess emissions.

C. <u>Claim 3:</u> xAI Has Constructed, Operated, and Continues to Operate a New Air Contaminant Source in Violation of LIP Construction and Operating Permit Requirements.

As set forth above and incorporated herein, Shelby County's federally approved LIP requires issuance of a construction permit prior to commencing construction and a separate operating permit before operating that source.

i. xAI Violated and is Violating Shelby County's LIP By Constructing Without a Construction Permit (Claim 3-1).

Section 16-77 of the Shelby County LIP incorporates Chapter 1200-3-9 of the Tennessee Air Pollution Control Regulations, which states that "no person shall begin the construction of a new air contaminant source or the modification of an air contaminant source which may result in the discharge of air contaminants without first having applied for and received from the Technical Secretary a construction permit."[57] And although the LIP provisions do refer to certain

[54] SCHD, Draft PSD Construction Permit Application Evaluation and Review (Permit No.01280-03PC) for TVA – Allen Combined Cycle Plant (ACC) Allen Combustion Turbine (ACT) Project, at 13 (May 2025), https://southernenvironment.sharefile.com/d-s5d99ae9619144e288f6884dbc57f2d08.
[55] CTC Property LLC, Synthetic Minor Operating Permit Application, at 5-6 (Jan. 2025).
[56] Although we accept the manufacturer spec sheets for purposes of this notice letter, given that the turbines are not subject to any air permit or requisite emissions monitoring, there is no guarantee that they are meeting these emission rates.
[57] Tenn. Comp. R. & Regs. 1200-3-9-.01(1)(a).

permitting exemptions, none of those exemptions apply to these turbines. *See* Tenn. Comp. R. & Regs. 1200-3-9-.04 (adopted by Memphis-Shelby County regulations at Section 16-77).

In sum, in addition to failing to obtain a major source PSD permit as set out above, xAI has also violated the LIP by failing to obtain *any* preconstruction permit prior to beginning "the construction of a new air contaminant source" as prohibited by Section 16-77 of the Shelby County LIP, which adopted Section 1200-3-9-.01 of the Tennessee Air Pollution Control Regulations. As discussed above, by continuing to operate the turbines without having received a preconstruction permit, xAI continues to violate the LIP each day it operates the turbines.[58]

ii. xAI Violated and is Violating Shelby County's LIP By Operating Without an Operating Permit (Claim 3-2).

Shelby County's LIP also requires sources to obtain operating permits. Section 16-77 of the LIP incorporates Section 1200-3-9-.02 of the Tennessee Air Pollution Control Regulations, which lays out specific requirements for operating permits. *See* Tenn. Comp. R. & Regs. 1200-3-9-.02. In particular, under that provision, and as incorporated into the Shelby County LIP, "[n]o person shall operate an air contaminant source in Tennessee without first obtaining from the Technical Secretary an operating permit." *Id.* Again, while there are certain exemptions to this permitting requirement under the LIP, none are applicable to the turbines at xAI. xAI has therefore violated the operating permit requirements of the LIP each day that they have operated the unpermitted turbines.

D. <u>Claim 4:</u> xAI's Turbines Have Violated Numerous Hazardous Air Pollutant Requirements.

In addition to regulating emissions of pollutants like NOx to prevent degradation of air quality, the Clean Air Act also sets limits on Hazardous Air Pollutants, or "HAPs." These dangerous pollutants are commonly known as "air toxics," and they include some 180 pollutants that are toxic and/or carcinogenic, even in very small quantities. As with New Source Review, major sources of HAPs are subject to substantially more stringent emission limits (including use of the Maximum Achievable Control Technology ("MACT")) as well as operating, monitoring, and reporting requirements. A major source of HAPs is any facility that "emits or has the potential to emit" 10 tons or more of any single HAP or 25 tons or more of total HAPs.[59] These lower thresholds compared to New Source Review reflect the harmful nature of these pollutants at low exposure levels.

[58] Specifically, "In the case where a source or modification was constructed without first obtaining a construction permit, a construction permit may be issued to the source or modification to establish as conditions of the permit, the necessary emissions limits and requirements to assure that these regulatory requirements are met." *See* Tenn. Comp. R. & Regs. 1200-3-9-.01(1)(e).

[59] And as above with other portions of the Clean Air Act and implementing rules, the National Emissions Standards for Hazardous Pollutants ("NESHAP") for turbines explicitly applies to turbines even if they are portable. *See* 40 C.F.R. § 63.6085(a) (applying the standard to "stationary combustion turbines"). As the rule explains, "Stationary means that the combustion turbine is not self propelled or intended to be propelled while performing its function, although it may be mounted on a vehicle for portability or transportability." *Id.*

Gas turbines emit significant amounts of formaldehyde, which is regulated as a HAP because it is both carcinogenic and it causes acute respiratory inflammation. xAI itself, in its recent air permit application, calculated that the 15 turbines it says it will permanently operate at the site will emit 9.79 tons of formaldehyde per year, just 0.21 tons shy of the 10-ton major source threshold. Using xAI's same emissions data, we calculate that the 35 turbines operated at xAI from 2024 through late April 2025 had the potential to emit a total of 17.2 tons of formaldehyde,[60] readily classifying xAI as a major source of HAPs. Moreover, the 26 turbines currently at xAI as of June 15, 2025, still have the potential to emit more than 16 tons of formaldehyde, meaning xAI is still a major source of formaldehyde.[61]

xAI's installation and operation of these turbines has violated numerous provisions under the Clean Air Act and its implementing regulations. In particular:

i. Failure To Obtain Preconstruction Approval.

xAI has violated the Clean Air Act's prohibition on constructing a new major source without prior approval. Under Section 112 of the Act, "no person may construct or reconstruct any major source of [HAPs], unless the [EPA] Administrator (or the State) determines that the maximum achievable control technology emissions limitation . . . for new sources will be met." 42 U.S.C. 7412(g)(2)(B). Further, under the federal NESHAP rules, "no person may, without obtaining written approval in advance from the [EPA] Administrator . . . [c]onstruct a new affected source that is major-emitting." 40 C.F.R. § 63.5(b)(3)(i). Likewise, a source must submit an "application for approval of construction" prior to commencing construction of a new major source of HAPs. *Id.* § 63.5(d)(1)(i). xAI did not comply with and has violated each of these provisions by constructing a new major source of HAPs without preconstruction approval.

ii. Failure To Comply with Subpart YYYY Requirements.

Gas turbines that are located at a major source of HAPs must comply with NESHAP Subpart YYYY, 40 C.F.R. § 63.6080–.6175. As discussed above, xAI has constructed a major source of HAPs, and the turbines are therefore subject to Subpart YYYY.

Subpart YYYY requires turbines to comply with a maximum achievable control technology emission limit for formaldehyde emissions, 40 C.F.R. § 63.100; Table 1 to Subpart YYYY, to conduct initial and periodic emissions testing, 40 C.F.R. § 63.6110, .6115, to continuously monitor operations, *id.* § 63.6125(a)–(b), and to make various reports and notifications and to undertake recordkeeping, *id.* § 63.6145, .6150, .6155, .6160.

In particular, as a major source, xAI was required to conduct initial emissions testing for formaldehyde within 180 days of becoming a major source. 40 C.F.R. § 63.6100; Table 1 to Subpart YYYY. Based information and belief, xAI became a major source of formaldehyde by November 24, 2024 at the latest, at which point xAI's turbines had the potential to emit 11.3 tons

[60] *See* Appendix A: Timeline of Turbine Installation & Emission Calculations.
[61] *Id.*

of formaldehyde,[62] and this testing was therefore required by May 23, 2025 (180 days later) at the latest. Upon information and belief, xAI has not conducted this testing, and xAI's failure to conduct this testing is therefore a violation of Title 40, Section 63.6100 of the Code of Federal Regulations.

V. Authority to Bring Suit.

A. Authority for Claim 1 (Constructing and Operating Without a PSD Permit).

Under 42 U.S.C. § 7604(a)(3), "any person may commence a civil action . . . against any person who proposes to construct or constructs any new or modified major emitting facility without a permit required under part C of subchapter I (relating to significant deterioration of air quality [PSD])." *Id.* As set out above, xAI has constructed a new major emitting facility without obtaining a PSD permit, and this violation is therefore actionable under Section 304, 42 U.S.C. § 7504(a)(3). We note further that the Clean Air Act waives the requirement for prior notice of intent to sue for claims for construction without a permit required by the PSD program, 42 U.S.C. § 7604(a)(3). *See id.* § 7604(b)(2). We reserve the right to file suit on this claim at any time prior to the expiration of the 60-day notice period for the remaining claims.

B. Authority for Claim 2 (Operating Without BACT).

Under 42 U.S.C. § 7604(a)(1), "any person may commence a civil action . . . against any person . . . who is alleged to have violated (if there is evidence that the alleged violation has been repeated) or to be in violation of . . . an emission standard or limitation under this chapter." *Id.* The phrase "emission standard or limitation under this chapter" is further defined to include "a schedule or timetable of compliance, emission limitation, standard of performance or emission standard" as well as any "standard, limitation, or schedule established . . . under any applicable State implementation plan approved by the [EPA] Administrator." *Id.* § 7604(f)(1), (4). The requirement to limit emissions to levels that are achievable when utilizing Best Available Control Technology is an "emission limitation," "standard of performance," and an "emission standard" which is set forth under the Clean Air Act and in the federally approved Shelby County Local Implementation Plan. *See* Shelby County LIP, Sec. 16-77 (incorporating Tenn. Comp. R. & Regs. 1200-3-9-.01(4)(j)2.).[63]

C. Authority for Claims 3(i) & 3(ii) (Constructing and Operating Without Local Implementation Plan Permits).

Under 42 U.S.C. § 7604(a)(1), "any person may commence a civil action . . . against any person . . . who is alleged to have violated (if there is evidence that the alleged violation has been repeated) or to be in violation of . . . an emission standard or limitation under this chapter." *Id.* The phrase "emission standard or limitation under this chapter" is further defined to include "any requirement to obtain a permit" according to "any applicable State implementation plan

[62] *Id.*

[63] Approval and Promulgation of Implementation Plans, Tennessee; Revisions to the Memphis and Shelby County Portion of the State Implementation Plan, 54 Fed. Reg. 25,456, 25,458 (June 15, 1989).

approved by the [EPA] Administrator." 42 U.S.C. § 7604(f)(4). The Shelby County LIP requires both preconstruction and operating permits, *see* Shelby County LIP, Sec. 16-77 (incorporating Tenn. Comp. R. & Regs. 1200-3-9-.01 to .02), and these permitting requirements have been federally approved and incorporated into the implementation plan. 54 Fed. Reg. 25,456, 25,456–48 (June 15, 1989); 40 C.F.R. § 52.2220(c) tbl.2.

D. Authority for Claims 4(i) & 4(ii) (Failure to Comply With Major Source HAP Requirements).

Under 42 U.S.C. § 7604(a)(1), "any person may commence a civil action . . . against any person . . . who is alleged to have violated (if there is evidence that the alleged violation has been repeated) or to be in violation of . . . an emission standard or limitation under this chapter." *Id.* The phrase "emission standard or limitation under this chapter" is further defined to include "any requirement under [42 U.S.C. §§ 7411–7412] (without regard to whether such requirement is expressed as an emission standard or otherwise)." *Id.* § 7604(f)(3). The violations set forth under Claim 4 all arise from violations of Clean Air Act Section 112, 42 U.S.C. § 7412, listing requirements for major sources of HAPs.

VI. Persons and Parties Giving Notice.

This letter provides notice of intent to sue on behalf the National Association for the Advancement of Colored People (NAACP).

VII. Location of the Violations.

The violations set out above have all occurred at the xAI Colossus data center located at or near 3231 Paul R. Lowry Road, Memphis, TN 38109.

VIII. Dates of the Violations.

As to claims 1, 2, and 3, those violations began no later than June 12, 2024. These violations continued each day xAI has operated these turbines. It is our understanding and belief that xAI operates these turbines continuously, and each day of operation under each claim is a separate violation. As to claim 4, those claims began when xAI installed a sufficient number of turbines to become a major source of Hazardous Air Pollutants, which occurred by November 24th, 2024 at the latest, and have continued to the present date, and each day of operation is likewise a separate violation; relatedly, xAI's failure to conduct the requisite formaldehyde emissions testing occurred 180 days after becoming a major source, meaning this violation occurred on May 23rd, 2025 at the latest.

We note finally that xAI has access to specific dates of turbine installation and operations.

IX. Notice of Intent to Sue.

As described above, xAI has violated and continues to violate the Clean Air Act and Shelby County's federally-approved LIP by: (1) constructing and operating a major source without a PSD permit; (2) operating a major source without utilizing best available control technology; (3) constructing and operating a source of air pollution without obtaining requisite construction and operating permits as required under the LIP, and (4) constructing and operating a major source of hazardous air pollutants without complying with requirements under the National Emission Standards for Hazardous Air Pollutants. Unless these violations are fully redressed, NAACP intends to initiate a citizen suit against the listed parties.

If litigation is necessary, NAACP will seek redress for the violations described herein, including injunctive relief, costs, and attorneys' fees pursuant to 33 U.S.C. § 1365(a) and 42 U.S.C. § 6972(e), as well as civil penalties pursuant to 33 U.S.C. § 1319(d) and 42 U.S.C. § 6928(g).

During the relevant notice period, NAACP is willing to discuss the factual assertions set forth in this letter as well as effective remedies for the violations noted above. If you wish to pursue negotiations in the absence of litigation, you should initiate such negotiations within the next twenty (20) days so that they may be completed prior to completion of the notice period. NAACP has retained the assistance of the counsel listed below, and all responses to this Notice Letter should be directed to the undersigned counsel.

Thank you for your prompt attention to this matter.

Respectfully submitted,

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Enclosures: Appendix A; Attachments 1-7.

Appendix A

APPENDIX A: Timeline and Emissions Calculations

Table 1: Timeline of Turbine Installation and Potential Emissions								
Satellite Image Date[1]	XQ5200	SMT-130	SMT-60	Solaris GE LM2500+G4	GE Vernova 2500	Generating Capacity (MW)	NOx PTE[2] (tons/year)	Formaldehyde PTE[3] (tons/year)
6/12/24	14	2				105.8	445	4.3
6/25/24	14	3				122.2	476	5.0
7/16/24	14	4				138.7	507	5.7
10/7/24	14	4	4	1		196.5	616	8.0
11/12/24	14	4	6	1		207.9	637	8.5
11/24/24	14	4	6	1	2	275.9	852	11.3
12/21/24	14	6	8	1	2	320.3	935	13.1
2/20/25	14	7	8	1	3	370.8	1073	15.1
2/26/25	14	7	8	1	4	404.8	1181	16.5
3/13/25	14	8	8	1	4	421.4	1212	17.2
6/5/25	4	11	7	1	4	413.0	1021	16.9
6/15/25	4	11	6	1	4	407.3	1010	16.6

NOTES

1. Each satellite image is available here: https://southernenvironment.sharefile.com/d-s46117ed4f7da44faadd5980e193d63b6.
2. NOx emission rates based on minimum NOx emissions factors from manufacturer spec sheets. Emissions calculated using the emission factors and other data set forth below in Table 2.
3. Formaldehyde emissions based on CTC Property LLC Air Permit Application emission factors. Emissions calculated using the emission factors and other data set forth below in Table 5.

APPENDIX A: Timeline and Emissions Calculations

Table 2: Minimum NOx Emission Rates at 35 Turbines									
Turbine	Count	Individual Capacity (MW/hr)	Total Capacity (MW/hr)	Lowest Manufacturer Emission Rate (ppm)[1]	Emission Factor (lb/MW)[2]	Individual Turbine Emissions (lb/hr)	Individual Turbine Emissions (tons/year)	Total Emissions (lb/hr)	Total Emissions (tons/year)
Solar SMT-130	8	16.5	132	9	0.43	7.1	31.1	56.8	248.6
Solar SMT-60	8	5.7	45.6	9	0.43	2.5	10.7	19.6	85.9
GE Vernova LM2500	4	34	136	15	0.72	24.5	107.2	97.9	428.9
Solaris GE LM2500+G4	1	35	35	9	0.43	15.1	66.0	15.1	65.9
Solar/Caterpillar XQ5200	14	5.2	72.8	25	1.2	6.2	27.3	87.4	382.6
							Total	276.7	1211.9

Table 3: Maximum NOx Emission Rates at 35 turbines									
Turbine	Count	Individual Capacity (MW/hr)	Total Capacity (MW/hr)	Highest Manufacturer Emission Rate (ppm)[1]	Emission Factor (lb/MW)[2]	Individual Turbine Emissions (lb/hr)	Individual Turbine Emissions (tons/year)	Total Emissions (lb/hr)	Total Emissions (tons/year)
Solar SMT-130	8	16.5	132	25	1.2	19.8	86.7	158.4	693.8
Solar SMT-60	8	5.7	45.6	25	1.2	6.8	30.0	54.7	239.7
GE Vernova LM2500	4	34	136	25	1.2	40.8	178.7	163.2	714.8
Solaris GE LM2500+G4	1	35	35	9	0.43	15.1	65.9	15.1	65.9
Solar/Caterpillar XQ5200	14	5.2	72.8	25	1.2	6.2	27.3	87.4	382.6
							Total	478.7	2096.8

NOTES

1. I.e., lowest or highest NOx emission rates listed in manufacturer data. Links to spec sheets are provided in the table below.
2. Emission factors derived from 40 CFR Appendix Table 1 to Subpart KKKK of Part 60 (listing equivalent emission limits of “25 ppm or 1.2 lb/MWh” and “15 ppm or 0.72 lb/MWh”). Based on these equivalent emission limits, we calculate that 9 ppm equates to an emission factor of 0.43 lb/MWh.

APPENDIX A: Timeline and Emissions Calculations

Table 4: Manufacturer Spec Sheets		
Solar SMT-130	https://www.solarturbines.com/en_US/solutions/oil-and-gas/solar-mobile-turbomachinery.html	Attachment 3
Solar SMT-60	https://www.solarturbines.com/en_US/solutions/oil-and-gas/solar-mobile-turbomachinery.html	Attachment 4
GE Vernova LM2500	https://www.gevernova.com/content/dam/gepower-new/global/en_US/downloads/gas-new-site/products/gas-turbines/gev-aero-fact-sheets/GEA35744-GEV-LM2500-Product-Factsheet.pdf	Attachment 5
Solaris GE LM2500+G4	https://irp.cdn-website.com/f809ccf0/files/uploaded/Solaris_35MW_Turbine_Power_-_Tech_Specs-83f9c921.pdf	Attachment 6
Solar/Caterpillar XQ5200	https://www.warrencat.com/content/uploads/2020/04/XQ5200_Specs.pdf	Attachment 7

Table 5: Formaldehyde Emissions at 35 turbines								
Turbine	Count	Capacity (MW/hr)	Total Generating Capacity (MW/hr)	Operations Emission Factor (lb/MW)[1]	Operating Emissions (lb/hr)	Operating Emissions (ton/year)	Startup & Shutdown Emissions (ton/year)	Total Emission (ton/year)
Solar SMT-130	8	16.5	132	7.88E-03	1.0	4.6	0.8	5.4
Solar SMT-60	8	5.7	45.6	7.88E-03	0.4	1.6	0.3	1.9
GE Vernova 2500	4	34	136	7.88E-03	1.1	4.7	0.9	5.6
Solaris GE LM2500+G4	1	35	35	7.88E-03	0.3	1.2	0.2	1.4
Solar/Caterpillar XQ5200	14	5.2	72.8	7.88E-03	0.6	2.5	0.5	3.0
				Totals:	3.3	14.5	2.7	17.2

NOTES

1. Emission factor based on xAI's January 2025 Air Permit Application (Appendix D), converted to lb/MWh by dividing hourly emission rate (0.13 lb/hr per turbine) by 16.5 MWh.
2. Startup and Shutdown emissions based on xAI's January 2025 Air Permit Application (Appendix D), which estimated 1.57 tons of formaldehyde from startup and shutdown across all 15 SMT-130 turbines (with a total capacity of 247 MW). Emission rates pro-rated based on generating capacity, i.e. 1.57 tons divided by 247 MW for an emission factor of 0.00635 tons/MW per year.

Attachment 1

From: Marek, John <John.Marek@shelbycountytn.gov>
Sent: Thursday, August 1, 2024 3:00 PM
To: Sami Harrell <sharrell@selctn.org>
Cc: HARRELLSAMIPRRZ2990730@shelbycountytn.filevinegov.com; Public.Records <PublicRecords@shelbycountytn.gov>
Subject: RE: HARRELL, SAMI PRR-7/19/24 REQUESTING RECORDS RE: 3231 PAUL R. LOWRY

Good afternoon,

There are no records responsive to your request. This is the exact language of the response from the SCHD:

"In response to 'HARRELL, SAMI PRR-7/19/24 REQUESTING RECORDS RE: 3231 PAUL R. LOWRY', there are no construction or operating applications for the stated address. In addition there are no meeting notes pertaining to the xAI project."

Thank you for your time,
John R. Marek, Esq.
Assistant County Attorney
Shelby County Attorney's Office
160 N. Main, Suite 950
Memphis, TN 38103
(Office) (901) 222-2100
(Direct) (901) 222-2144
John.Marek@shelbycountytn.gov

Attachment 2

SOUTHERN ENVIRONMENTAL LAW CENTER

1033 Demonbreun Street, Suite 205
Nashville, TN 37203

Telephone 615-921-9470
Facsimile 615-921-8011

August 26, 2024

Dr. Michelle Taylor, Health Officer
Via Electronic Mail: Michelle.Taylor@shelbycountytn.gov
Shelby County Health Department
814 Jefferson Avenue
Memphis, TN 38105

RE: xAI's Turbines Likely Require Air Permits

Dear Dr. Taylor:

We are writing on behalf of Memphis Community Against Pollution, Young, Gifted & Green, Sierra Club Chickasaw Group, and Sierra Club Tennessee Chapter to raise concern regarding xAI's potential violations of the Shelby County Code and Local Implementation Plan for failure to obtain required air permits.

Air quality monitoring data shows that levels of ground-level ozone, also known as smog, in Memphis once again exceeded the National Ambient Air Quality Standard in 2023—for the third year running—and that the metropolitan area is on track to exceed the standard once again in 2024.[1] In other words, Memphis residents currently breathe unhealthy air, and the problem is worsening.[2] Exposure to ozone pollution aggravates lung diseases such as asthma, emphysema, and chronic bronchitis and increases the frequency of asthma attacks.[3] Children are the most vulnerable to the harmful effects of ozone pollution.[4]

Against this background of untenable levels of smog, Elon Musk's artificial intelligence supercomputer project, xAI, recently sprung up in southwest Memphis. This plant requires an enormous amount of electricity. To meet its demand immediately, xAI has installed at least 18 gas combustion turbines over the last several months (with more potentially on the way[5]), including four 16 MW SMT-130 turbines from a company called Solar Turbines, as well as at

[1] Data from 2021 through 2023 is from Tennessee Department of Environment & Conservation's October 2023 presentation, showing that the 4th highest annual ozone reading has exceeded the 0.070 ppm NAAQS standard each year since 2021. Presentation of Michelle Owenby, Director, Tennessee Air Quality and Division Update, Tennessee Environmental Conference, 7 (Oct. 23-25, 2023) (Attachment A). 2024 preliminary data is from EPA's Interactive Map of Air Quality Monitors, showing the Marion monitor in Crittendon, Arkansas (within the Memphis MSA) reading 0.072 ppm.

[2] A graphic created based on ozone exceedance data from 2014 to 2023 demonstrates there were almost 20 ozone-exceedance days in Memphis in June of 2023, far higher than any previous month stretching back to at least 2014. Graphic Created by Rodney Cuevas, Air Quality Branch Manager, Miss. Dep't Envtl Quality (May 13, 2023) (Attachment B).

[3] EPA, *Health Effects of Ozone Pollution*, https://www.epa.gov/ground-level-ozone-pollution/health-effects-ozone-pollution (last updated Apr. 9, 2024).

[4] *Id.*

[5] It appears the company has three additional turbines on site that are not yet operating.

least 14 smaller gas turbines reportedly with 2.5 MW capacity each.[6] These turbines together have the capacity to emit about 130 tons of the ozone-precursor nitrogen oxides (NOx) per year, ranking the turbines as the 9th largest source of NOx in Shelby County.[7]

Despite installing nearly 20 gas turbines with a combined capacity of about 100 MW—enough electricity to power around 50,000 homes—xAI apparently has not applied for any air permits for these turbines.[8] As discussed below, it appears that, at minimum, the four 16 MW turbines absolutely require an air permit prior to installation and operation even if they are temporary, and we suspect the smaller turbines also trigger permitting requirements. We therefore call on Shelby County Health Department (SCHD) to verify that xAI is operating these turbines without the required air permit and bring an appropriate enforcement action for failing to obtain a permit. If xAI is indeed operating these turbines illegally without a permit, SCHD should order them to cease operations until they obtain a permit, as the agency has done as recently as 2021 for another source operating without a permit.[9]

I. xAI Failed to Obtain Required Air Permits for the Four SMT-130 Turbines Prior to Installation and Operation.

In a recent news story about xAI's turbines, a source close to xAI explained that "the facility was being allowed to operate the turbines by right for 364 days" without needing to obtain an air permit.[10] The source did not say *who* had authorized the turbine's operations, and it does not

[6] The make and model for the SMT-130 turbines is visible from xAI's property line. *See, e.g.*, Benjamin Naylor, photo accompanying article by Samuel Hardiman, *Permits not required for temporary xAI turbines*, the Daily Memphian (Aug. 10, 2024), https://dailymemphian.com/subscriber/article/45589/permits-not-required-for-temporary-xai-turbines (Attachment C). The number of turbines on the property is visible using subscription GIS satellite images available to SELC from Planet GIS (Attachment D). The make and model of the 14 smaller turbines, however, as well as their heat input capacity, are not clear. One report states that they are 2.5 MW turbines from a company known as VoltaGrid, but this was apparently sourced from satellite images from an X user unaffiliated with xAI. *See* Jowi Morales, *Elon Musk powers new 'World's Fastest AI Data Center" with gargantuan portable power generators to sidestep electricity supply constraints*, Yahoo!Tech, (July 24, 2024), https://www.yahoo.com/tech/elon-musk-powers-worlds-fastest.... Multiple attempts by SELC to obtain documentation regarding xAI's turbines did not result in relevant information.

[7] As compared to EPA's most recent National Emissions Inventory. NOx emissions calculated based on VoltaGrid's emissions guarantee of 0.155 lb/MW for the 14 smaller turbines and an air permit application for a comparable Solar Turbine 130 unit, *see* Atlantic Coast Pipeline, LLC, Marts Compressor Station Permit Application, at Attachment J, Emission Points Data Summary Sheet (Emission Point CT-01, Uncontrolled NOx emissions) (Oct. 2015). (Attachment E).

[8] In response to a public records request from SELC regarding the xAI turbines, on August 1, 2024, a County Attorney relayed the following statement from SCHD: "In response to 'HARRELL, SAMI PRR-7/19/24 REQUESTING RECORDS RE: 3231 PAUL R. LOWRY', there are no construction or operating applications for the stated address. In addition there are no meeting notes pertaining to the xAI project." *See also* Samuel Hardiman, *Permits not required for temporary xAI turbines*, the Daily Memphian (Aug. 10, 2024) (Attachment C).

[9] SCHD, Public Health Order – Immediate Cessation of Operations for Planter's Gin Company, Inc. (Dec. 20, 2021). (Attachment F).

[10] Samuel Hardiman, *Permits not required for temporary xAI turbines*, the Daily Memphian (Aug. 10, 2024) (Attachment C).

appear that Shelby County Health Department has made any such approval.[11] The source's statement appears to be a reference to the nonroad engine exemption from the Clean Air Act's definition of "Stationary Source," which in part allows for some turbines and other engines to escape permitting requirements if they are operated at a given site for less than a year and meet certain other requirements.[12]

Critically, however, engines or turbines that are subject to regulations under Section 111 of the Clean Air Act (New Source Performance Standards, or "NSPS") are *not* nonroad engines for purposes of being excluded from the definition of Stationary Source under the Clean Air Act.[13] Specifically, the Clean Air Act defines "nonroad engine" as "an internal combustion engine . . . that is not used in a motor vehicle [or] **is not subject to standards promulgated under section 7411** [aka Section 111, or NSPS]."[14]

In short, if an engine or turbine is subject to an NSPS standard, then it is a stationary source rather than a nonroad engine and must obtain an air permit prior to installation and operation under Shelby County's EPA-approved Local Implementation Plan (LIP).[15] As relevant here, turbines with a heat-input capacity greater than 10 MMBtu/hr are subject to NSPS subpart KKKK, Standards of Performance for Stationary Combustion Turbines.[16] In other words, any

[11] SCHD has stated that it has no written records related to these turbines. *See id.*
[12] 42 U.S.C. § 7602(z) ("The term "stationary source" means generally any source of an air pollutant except those emissions resulting directly from an internal combustion engine for transportation purposes or from a nonroad engine or nonroad vehicle as defined in section 7550 of this title.").
[13] *Id.*, citing to the definition of nonroad engine in section 7550.
[14] 42 U.S.C. § 7550(10) (emphasis added); *see also* 40 CFR § 1068.30 ("An internal combustion engine is not a nonroad engine if it meets any of the following criteria . . . The engine is regulated under 40 CFR part 60, (or otherwise regulated by a federal New Source Performance Standard promulgated under section 111 of the Clean Air Act (42 U.S.C. § 7411)).").
[15] The LIP incorporates Chapter 1200-3-9 of the Tennessee Air Pollution Control Regulations (*see* Memphis-Shelby Cnty. LIP §16-77), which states "no person shall begin the construction [and "construction" includes installation, see Tenn. Comp. R. & Regs. 1200-03-02-.01(j)] of a new air contaminant source or the modification of an air contaminant source which may result in the discharge of air contaminants without first having applied for and received from the Technical Secretary a construction permit." *See also*, SHELBY CNTY. AIR CODE § 3-5. Although the Tennessee provision does make reference to certain exemptions listed at Rule 1200-3-9-.04 of the Tennessee State Implementation Plan, none of those exemptions apply to these turbines. Finally, the LIP also incorporates Chapter 1200-3-9-.02, which says "[n]o person shall operate an air contaminant source in Tennessee without first obtaining an operating permit." The Memphis Code has gone through multiple reorganizations since it was originally incorporated into the LIP. The language of the regulations remain the same, but the numbering has changed. Memphis Code 16-77 before the reorganization in 1985 is Shelby County Code 3-5, which is the same as current Memphis Code as listed at 9-12-14. *See* Memphis Code Compar. tbl 1985 Code; Code Compar. tbl.1967 Code; *see also*, *Air Pollution Control Code*, Shelby Cnty. Health Dep't, (last visited Aug. 21, 2024), https://www.shelbytnhealth.com/169/Air-Pollution-Control-Code.
[16] 40 C.F.R. § 60.4305. Note that although the title of this subpart references "stationary" combustion turbines, the definition of "stationary combustion turbine" is clear that portable turbines are indeed subject to the subpart. *See* 40 CFR § 60.4420 ("Stationary means that the combustion turbine is not self propelled or intended to be propelled while performing its function. It may, however, be mounted on a vehicle for portability.").

turbine with a heat input greater than 10 MMBtu/hr is subject to a Part 111 standard and is therefore subject to air permitting requirements under the CAA and Shelby County's LIP.

Each 16 MW SMT-130 turbine has a heat input capacity of about 155 MMBtu/hr,[17] well above the 10 MMBtu/hr threshold. It is indisputable, therefore, that these turbines are subject to NSPS Subpart KKKK. A recent air permit application for this same turbine model in West Virginia confirms both the heat input capacity and that it is subject to NSPS subpart KKKK.[18]

In sum, the four SMT-130 turbines are not nonroad engines that could be installed on a temporary basis without an air permit. They are instead stationary sources, and Shelby County's LIP does not elsewhere contain any exemption for temporary stationary sources that would allow their operation without a permit.

II. The 14 Smaller Turbines Also Appear to Require a Pre-Construction Permit.

As to the 14 smaller turbines, we are not able to confirm their heat inputs because their make and model have not been publicly verified.[19] If they are indeed 2.5 MW VoltaGrid turbines as has been reported,[20] it appears that their heat input also exceeds the 10 MMBtu/hr threshold that would require a permit (as discussed above). For instance, we estimate their heat input at about 25 MMBtu/hr,[21] which is consistent with other, smaller turbines—Solar Turbine's 1.2 MW and 3.5 MW generators, for example, have heat inputs of 17 and 43 MMBtu/hr, respectively.[22] Another company that sells similar-sized turbines, meanwhile, calculates that its 1.6 MW turbine has a heat input of 25.7 MMBtu/hr.[23] Unless xAI's 14 turbines are considerably smaller than these turbines, which is unlikely given their physical size compared to the SMT-130s as well as the facility's substantial electricity demand, the 14 turbines are also subject to NSPS Subpart KKKK and therefore do not qualify as permit-exempt nonroad engines.

---

[17] Solar Turbines, SMT130 Datasheet. (Attachment G). The Datasheet lists a heat input of 9,630 Btu/kWe-hr, and an output power of 16,000 kWe-hr (or 16 MW). We therefore calculate the total heat input as 154 MMBtu/hr, which is consistent with Solar Turbine's data on the Titan 130 turbine (the SMT-130 is the portable version of the Titan 130, which the company lists as 158 MMBtu/hr. *See* Solar Turbines, Product Handbook for Power Generation, at 4. (Attachment H).

[18] Atlantic Coast Pipeline, LLC, Marts Compressor Station Permit Application, at 15 (Oct. 2015) (Attachment E) ("The proposed Solar combustion turbines will be subject to the requirements of this subpart [NSPS subpart KKKK]. Subpart KKKK specifies several subcategories of turbines, each with different NOx emissions limitations. The proposed turbines fall within the "medium sized" (> 50MMBtu/hr, < 850 MMBtu/hr) category for natural gas turbines."). The application also lists the heat input for the Solar Turbine Titan 130 turbine (the non-mobile version of the SMT-130) as having a specific heat input of 170 MMBtu/hr. *Id.* at Attachment L (pdf page 63).

[19] *See supra*, note 6.

[20] *Id.*

[21] This is calculated by scaling the ratio of MW-to-MMBtu from the SMT-130 Solar Turbine, i.e. the SMT-130 has a 9.7 MMBtu per MW, which as applied to 2.5 MWs results in 24.2 MMBtu/hr.

[22] Solar Turbines, Product Handbook for Power Generation, at 4. (Attachment H).

[23] Destinus Energy, Data Sheet for OP16, at 3. (Attachment I).

III. Shelby County Health Department Should Investigate and Bring an Appropriate Enforcement Action.

Given that these turbines are substantial sources of NOx and Shelby County is continuing to violate EPA's smog standards, SCHD should investigate and bring an appropriate enforcement action against xAI for constructing and operating a significant source of air pollution without a permit. We note that Shelby County Air Code requires that "[w]henever evidence has been obtained or received establishing that a violation of this code has been committed, the Health Officer **shall** issue a notice to correct the violation."[24] Moreover, if the "violation is not corrected . . . the Health Officer shall have the power and authority to issue an order requiring the violator to cease or suspend operation."[25] SCHD should therefore require the turbines to cease operating until xAI obtains the required air permit (unless xAI agrees to cease operations voluntarily), as the agency has done in the past for other sources operating without a permit.[26]

To the extent that SCHD believes we have misinterpreted the facts or the relevant permitting requirements, we are happy to discuss.

Respectfully submitted,

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Memphis Community Against Pollution
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Founder, CEO, and President
Young, Gifted & Green
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[24] SHELBY CNTY. AIR CODE § 3-2 (emphasis added); *see also*, Memphis-Shelby Cnty. LIP § 16-56.
[25] *Id.*
[26] See, e.g., SCHD, Public Health Order – Immediate Cessation of Operations for Planter's Gin Company, Inc. (Dec. 20, 2021). (Attachment F).

CC, by Electronic Mail:

Brad Akers, Air Permitting Section Manager, EPA Region IV, Akers.Brad@epa.gov

Travis Green, Deputy Director, Shelby County Health Department, TDG@shelbycountytn.gov

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Michelle Owenby, Director, Air Pollution Control Division, Tennessee Department of Environment and Conservation, Michelle.B.Walker@tn.gov

Jimmy Johnston, Deputy Director, Air Pollution Control Division, Tennessee Department of Environment and Conservation, james.johnston@tn.gov

Attachment 3

Solar® Turbines
A Caterpillar Company

SOLAR® MOBILE TURBOMACHINERY
SMT130 – Powered by Titan™ 130

Powering the Future Through Sustainable, Innovative Energy Solutions

The SMT130 is the economic and sustainable solution for mobile and rapid deployment power generation. The 16 MWe complete power plant is designed around the proven Titan™ 130 gas turbine for quick setup, global transportability and reliable operation. The SMT130 is ready to go anywhere, anytime.

COMPLETE SOLUTION

- Fully-Integrated Mobile Power Plant
- 13.8KV/12.47KV (60 Hz) Generator
- Dual Fuel System (Natural Gas and Diesel #2)
- Low Emissions SoLoNOx™ Combustion System
- Lightweight, Dual Frame Design with Separate Air Filtration Module
- Compact Footprint for High Power Density
- Low-Profile Modular Design to Minimize Installed Height
- Easily Relocatable via Highway or Rugged Terrain
- Transcontinental Transportability by Ocean Freight
- World-Class Global Customer Support Network

PARK, PLUG AND POWER

- Quick and Innovative Setup – Less Than 12 Hours
- No Concrete Foundation Required
- No Crane Lifts Required at Site
- Hydraulic Leveling System
- Rapid Alignment Technology

STANDARD FEATURES

- Wide Fuel Flexibility (Field Gas, CNG, LPG, etc.)
- Temperature Range from -18°C to 49°C (0°F to 120°F)
- Complete Electrical Equipment Compartment with Motor Control Center and HVAC
- Utility Grade Switchgear and Protective Relay Module
- Compact Medium Voltage Compartment
- Internal 120V Outlet
- Optional Sound Attenuation System
- Add-On Option for Multi-Unit Power Management and Microgrid Control with Solar® StationEdge
- InSight™ Platform Compatible
- Digital Load Sharing Capability Across Solar Fleet
- Standard Offering at 25 PPM NOx with Optional Configurations Down to 15 and 9 PPM NOx

SMT 130

Attachment 4

Solar® Turbines
A Caterpillar Company

SOLAR® MOBILE TURBOMACHINERY
SMT60 – Powered by Taurus™ 60

Powering the Future Through Sustainable, Innovative Energy Solutions

The SMT60 is the answer for short-term generating capacity which is both economical and environmentally friendly. The SMT60 is designed for projects where fast setup and reliable operation are critical. This solution is based on the 5.7 MWe Taurus™ 60 gas turbine generator set – a proven industry standard.

COMPLETE SOLUTION

- Fully-Integrated Mobile Power Plant
- 13.8KV/12.47KV (60 Hz) Generator
- Dual Fuel System (Natural Gas and Diesel #2)
- Low Emissions SoLoNOx™ Combustion System
- Lightweight, Single Frame Design
- Compact Footprint for High Power Density
- Low-Profile Modular Design to Minimize Installed Height
- Easily Relocatable via Highway or Rugged Terrain
- Transcontinental Transportability by Ocean Freight
- World-Class Global Customer Support Network

PARK, PLUG AND POWER

- Quick and Innovative Setup – Less Than Four Hours
- No Concrete Foundation Required
- No Crane Lifts Required at Site
- Hydraulic Leveling System
- Lockable Low-Speed Coupling Minimizing Alignment

STANDARD FEATURES

- Wide Fuel Flexibility (Field Gas, CNG, LPG, etc.)
- Temperature Range from -18°C to 49°C (0°F to 120°F)
- Complete Electrical Equipment Compartment with Motor Control Center and HVAC
- Utility Grade Switchgear and Protective Relay Module
- Compact Medium Voltage Compartment
- Internal 120V Outlet; Optional External 120V Outlet
- Optional Sound Attenuation
- Add-On Option for Multi-Unit Power Management and Microgrid Control with Solar® StationEdge
- InSight™ Platform Compatible
- Digital Load Sharing Capability Across Solar Fleet
- Standard Offering at 25 PPM NOx with Optional Configurations Down to 15 and 9 PPM NOx

SMT 60

Solar® Turbines
A Caterpillar Company

SOLAR® MOBILE TURBOMACHINERY
SMT60 – Powered by Taurus™ 60

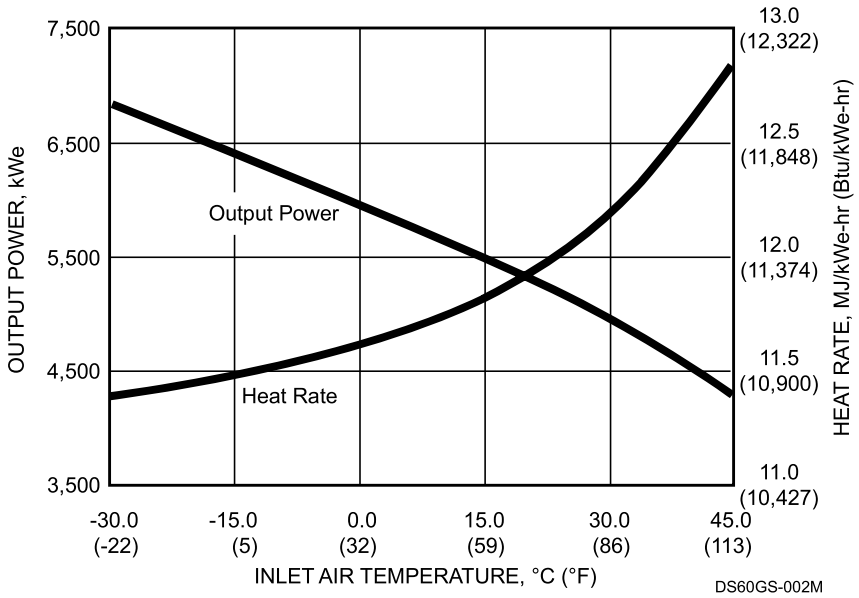
Powering the Future Through Sustainable, Innovative Energy Solutions

PERFORMANCE*

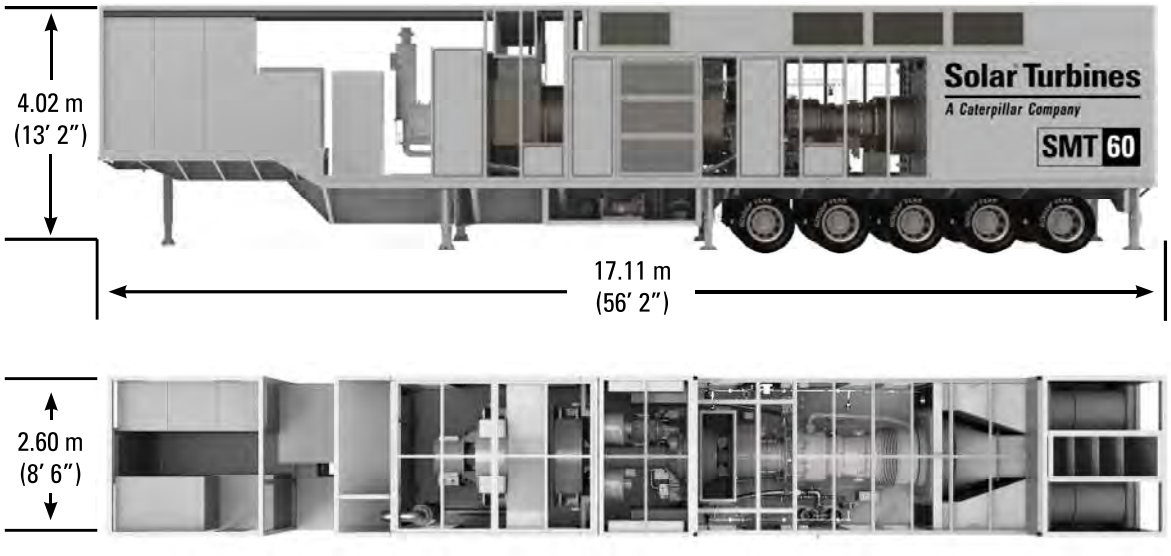
Output Power	5670 kWe
Heat Rate	11 430 kJ/kWe-hr (10,830 Btu/kWe-hr)

*ISO: 15°C (59°F), sea level

AVAILABLE POWER*



PACKAGE LAYOUT AND DIMENSIONS



Package weight without tractor: 50 330 kg (110,960 lbs)

DSSMT60/0724/EO

Additional Information:
Web: **www.solarturbines.com**
Email: **infocorp@solarturbines.com**
Phone: **+1-619-544-5352**

Attachment 5

FACTSHEET

LM2500

AERODERIVATIVE GAS TURBINE

>34 MW
SIMPLE CYCLE OUTPUT

>39%
SIMPLE CYCLE EFFICIENCY

50/60
Hz

UP TO
85%
HYDROGEN CAPABILITY

IDEAL FOR PEAKING AND CHP APPLICATIONS, THE LM2500 DELIVERS POWER WITH RELIABILITY GREATER THAN 99 PERCENT AND AVAILABILITY GREATER THAN 98 PERCENT.

The LM2500's high efficiency helps reduce operating costs, plant emissions, and reliance on the local grid. With its dual fuel capability, including singular annular combustor (SAC) or DLE technology, the LM2500 delivers performance with low emissions in a variety of situations and water availability scenarios. It features high reliability with control system redundancy, along with multiple options for configuration, making it a great choice for customers who need a more tailored power generation solution. The LM2500's cycling capability allows multiple daily starts and stops, providing a strong solution for grids with penetration of renewable generation. Its open configuration allows for faster accessibility, easier maintenance, and increased speed of engine removal/ replacement.

		LM2500+DLE (15ppm NOx)	LM2500+G4 SAC	LM2500+G4 DLE U PT
SC PLANT PERFORMANCE	SC Net Output (MW)	30.6/31.8††	34.3/36.8††	34.2/34.3††
	SC Net Heat Rate (Btu/kWh, LHV)	9299/8911††	9870/9407††	8707/8584††
	SC Net Heat Rate (kJ/kWh, LHV)	9811/9401††	10413/9923††	9186/9057††
	SC Net Efficiency (%, LHV)	36.7%/38.3%††	34.6%/36.3%††	39.0%/39.6%††
	Fast Start Capability (Minutes)	5	5	5
1X CC PLANT PERFORMANCE	CC Net Output (MW)	44.5/44.9††	49.3/51.6††	47.9/47.7††
	CC Net Heat Rate (Btu/kWh, LHV)	6402/6302††	6856/6710††	6221/6178††
	CC Net Heat Rate (kJ/kWh, LHV)	6674/6649††	7233/7080††	6564/6518††
	CC Net Efficiency (%, LHV)	53.3%/54.1%††	49.8%/50.9%††	54.9%/55.2%††
	Plant Turndown – Minimum Load (%)	35%	35%	35%
	Ramp Rate (MW/min)	30	30	30
	Startup Time (RR Hot†, Minutes)	30	30	30
2X CC PLANT PERFORMANCE	CC Net Output (MW)	89.7/90.7††	99.5/103.5††	96.6/96.2††
	CC Net Heat Rate (Btu/kWh, LHV)	6402/6248††	6800/6676††	6173/6127††
	CC Net Heat Rate (kJ/kWh, LHV)	6755/6592††	7174/7043††	6513/6464††
	CC Net Efficiency (%, LHV)	53.3%/54.6%††	50.2%/51.1%††	55.3%/55.7%††
	Plant Turndown – Minimum Load (%)	35%	35%	35%
	Ramp Rate (MW/min)	60	60	60
	Startup Time (RR Hot†, Minutes)	30	30	30

NOTE: Net Plant ratings are based on ISO conditions, natural gas, inlet and exhaust losses included and balance of plant equipment excluded. Actual performance will vary with project specific conditions, fuel and ambient conditions.
2PNRH = Two pressure, non-reheat.
† Rapid Response/Hot Start, †† 50 Hz/60 Hz

GE VERNOVA

TO LEARN MORE ABOUT THIS OFFERING, CONTACT YOUR SALES REPRESENTATIVE OR VISIT

gevernova.com

GEA35744 (03/2025)

Attachment 6

35 MW Turbine Power

Powered by GE® LM2500+G4

Application

With a compact configuration and faster install time, Solaris 35 MW Turbine Power Solution provides increased modularity and fewer interconnects for when speed of power is critical. Its high efficiency helps reduce operating costs and reliance on the local grid, delivering performance with low emissions in a variety of situations.

Features and Benefits

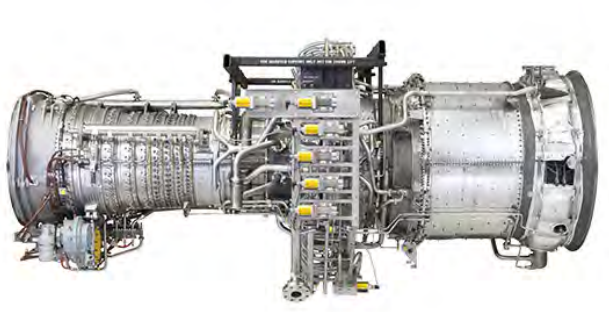
- 12-hour set up time
- Scalable with compact footprint for quick install
- 13.8 kV (60Hz) or 11.5 kV (50Hz) convertible design
- Fuel capabilities for natural gas, CNG, LNG, diesel #2, water injection for NOx control
- Low voltage transformer on board for 480 VAC power
- Switchgear and protective relays for power motor control centers
- Trailers capable of off-road service, air-ride suspension, steerable axles
- Minimal connections between trailers
- DOT compliant

SOLARIS™ ENERGY INFRASTRUCTURE

35 MW Turbine Power

System Performance

Power Output	35 MW
Voltages Output	13.8 kV
Efficiency	37.2%
Fuel Consumption - Natural Gas	9.15 scf/kW-hr
Noise (5 ft.)	85 dBA
Emission NOx	9 ppm
Emission CO	<2 ppm
Emission VOC	<2 ppm



Case#	1	2	3	4	5
Ambient Conditions					
Dry Bulb, °F	32.0	59.0	86.0	104.0	122.0
RH, %	60.0	60.0	28.0	25.0	30.0
Altitude, ft	0.0	0.0	0.0	0.0	0.0
Pressure Losses					
kW, Gen Terms	36565	35625	29943	25558	22001
Est. Btu/kW-hr, LHV	9189	9281	9535	9876	10262

Engine: LM2500+ G4 6 Stage (RC) with Flow Enhancer

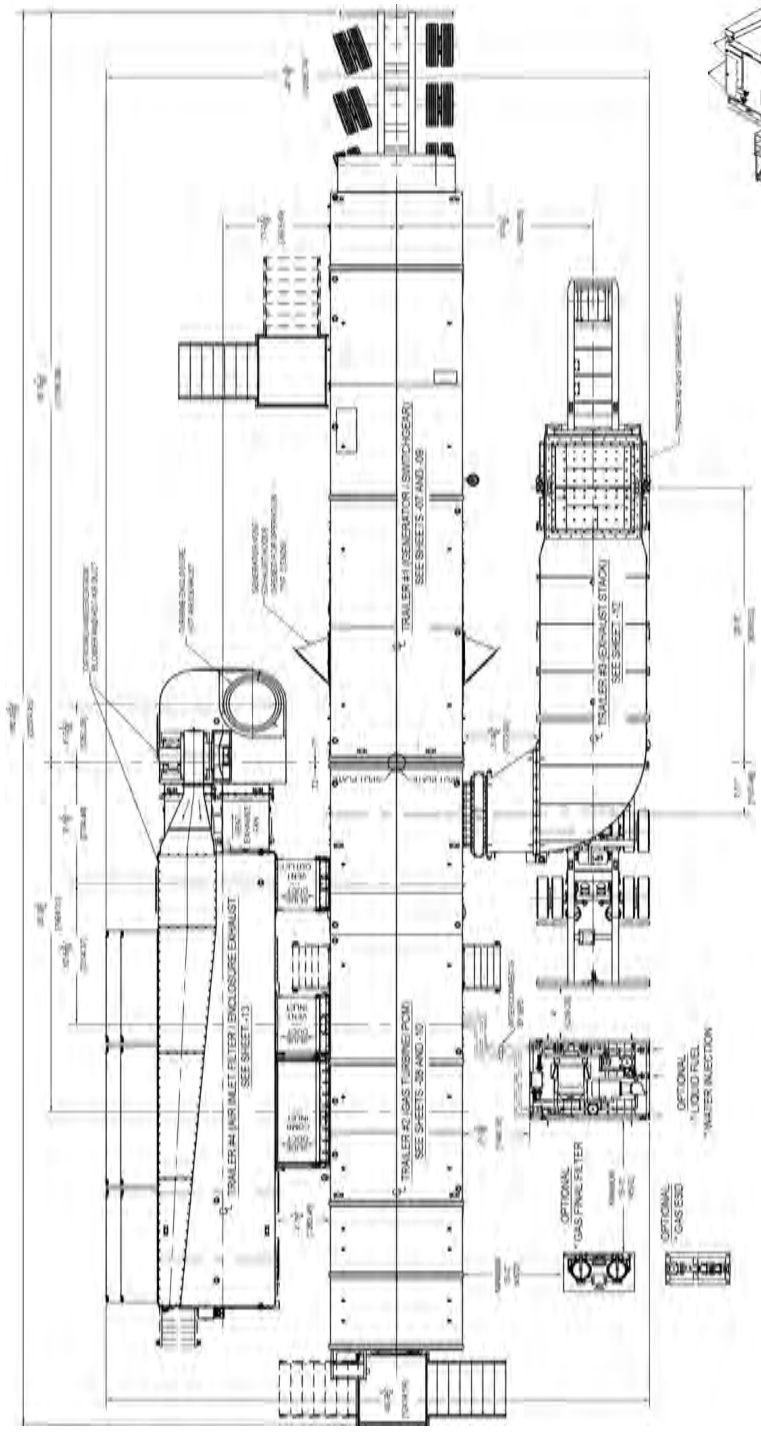
Generator: BDAX 71-193ER 60Hz, 13.8kV, 0.9PF (16294)

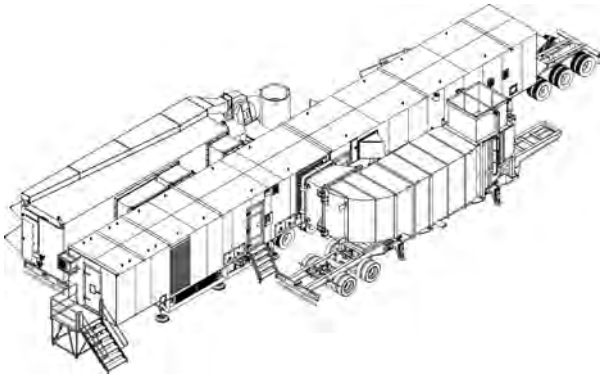
Fuel: Gas Fuel #10-1, 19000 Btu/lb,LHV

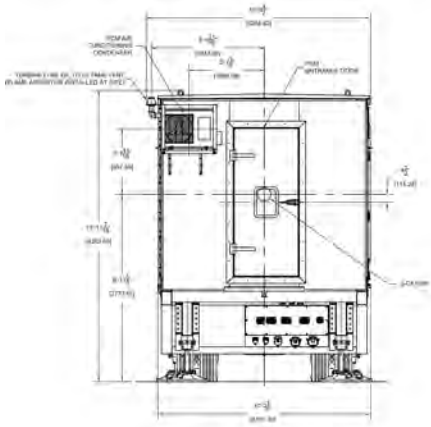
SOLARIS™ ENERGY INFRASTRUCTURE

35 MW Turbine Power

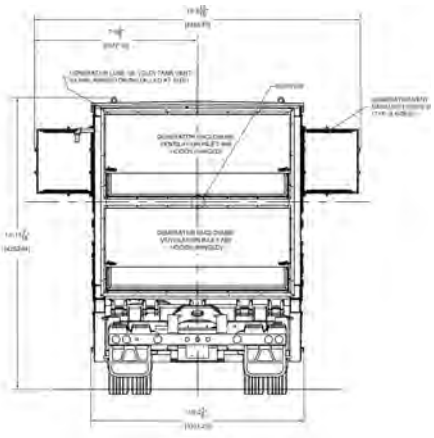
Layout and Dimensions







TRAILER #2
NORTH END ELEVATION



TRAILER #1
SOUTH END ELEVATION

SOLARIS™
ENERGY INFRASTRUCTURE

Attachment 7

XQ-5200 Solar T60
Gas Turbine-Generator
5,200 ekW Iso Conditions
13.8 kV

Index

1. Overview

The XQ5200 can operate on both natural gas and liquid fuels such as kerosene or #2 diesel. The mobile power plant is powered by Caterpillar's Solar Taurus 60 gas turbine power generation package. The Taurus 60 enjoys a stellar reputation with over 1100 units in service worldwide.

The XQ5200 is self-contained, sound attenuated, trailerized for easy delivery, and designed for quick connection and convenient servicing. Having the ability to produce 5200kW in a two-trailer arrangement, this package maintains a high power density. The XQ5200 mobile power plant is rated at 5200ekW 60 Hz (ISO) rating at 13 – 13.8 kV. Operating as one of the cleanest sources of power generation, the XQ5200 guarantees Not to Exceed 25 ppm NOx emissions' output while operating on Natural Gas and 96 ppm NOx while operating on #2 diesel. This full utility-grade Mobile Power Plant is capable of running stand-alone or infinitely parallel with the utility. On board the PCR (power control room) trailer, are all of the necessary controls, fire protection system, and associated switchgear. Included is the Beckwith model M-3425 relay package that provides the system protection requirements. Schemes are included for 21, 27, 32, 40, 46, 60FL, 51V, 50/27, 50N, 51N, 59/59N, 81, 87, 81G, 50/51B devices to assure complete protection. The XQ5200 ships as three (3) separate trailers and when completed on site, only two (2) trailers remain. Those being the power plant trailer, which houses the turbine generator and the PCR trailer. Both of these enclosures have been designed for minimal esthetic and sound impact to the area. These sound attenuated enclosures have sound levels of 85 dbA at three feet (3').

The assembled package takes approximately three (3) days to assemble. It has a peak height of twenty-six (26') and requires two-thousand five hundred pounds per square foot (2500psf) soil or deck loading capability.

2. Equipment

One (1) XQ-5200, Natural Gas Industrial Turbine, Taurus 60, 5.2 MW ISO Conditions, rated at 13.8 kV, 60 Hz with gearbox, generator, control system, fuel system, lubrication system, start system (require black start in Island Mode), and ancillary equipment included in the package.

3. Performance Data

ISO Conditions
The following ISO conditions have been assumed:

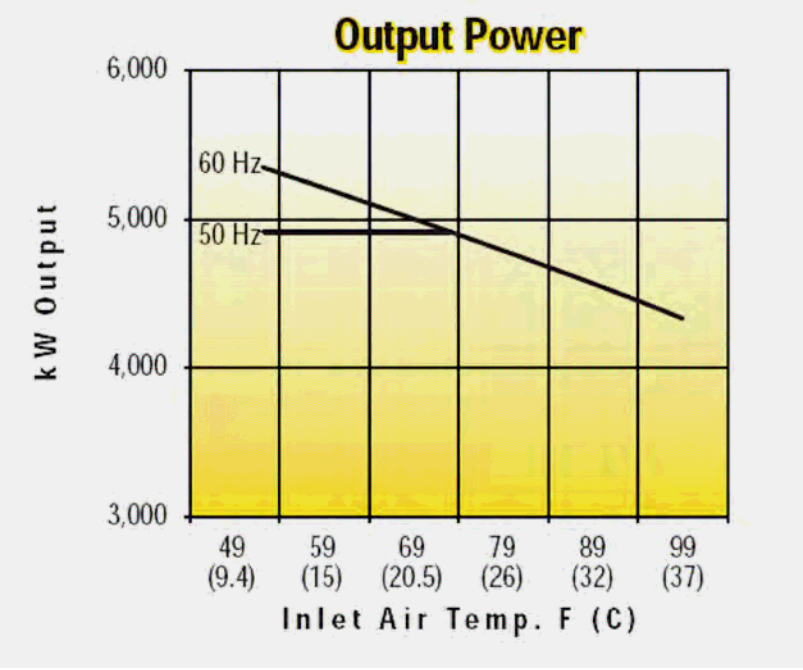
- Sea level
- 15 C Design Air Temperature

Estimated Plant Output
At the specified site conditions, the XQ-5200 Gas Turbine is able to perform as follows:

Item	Unit	Per Turbine
ISO Power – Turbine*	kW electric	5,200
Generator Voltage	kV	13.8
Fuel Type		Natural Gas

* Based on ISO 3046/1.

Solar T60 Performance Curve



Requirements for Gaseous Fuels:

Fuel Volume Ratio (1220/WOBBE Index*)	0.9 to 1.1
Fuel Mass ratio (21550/LHV Btu/lb)	<5
Hydrogen Content	<4% by volume
Carbon Monoxide Content**	<12.5% by volume
Ratio of Flammability Limits Upper flammability limit *** Lower flammability limit	 >2.2 for Saturn >2.8 for Centaur and Mars
Stoichiometric Flame Temperature with Air Temperature Equal to Compressor Discharge Temperature at Design Point	>3600°F (1980°C)
Total Particulates	<30 ppmw x (LHV/21500)
Maximum Particle Size	10 micron
Gas Supply Temperature (at inlet flange of package):	At least 50°F above dew point temp (both natural gas liquids and water) of the fuel at operating pressure (no liquids are allowed in the fuel gas), and shall not be lower than -40°F nor higher than the level specified for the project fuel system.

*WOBBE Index = Lower Heat Value (use ASTM 3588 or DIN 51850 for individual component heating values) in Btu/Scf divided by the square root of the relative density (specific gravity).

**If carbon monoxide is present in the fuel gas, precautions must be taken to detect leaks

***Flammability limits at 1 atm and 25°C as defined by M.G. Zabetakis, US Bureau of Mines Bulletin 627.

Note:

If the required fuel temperature is above ambient air temperature, adequate thermal insulation and heat tracing of fuel lines and fuel control system is required to avoid condensation. If condensates form during shutdown or are otherwise introduced, provisions should be made to drain fuel lines just before start up to ensure that gas fuel condensation is completely eliminated.

4. Gas Composition Requirement

4.1. Pipeline Quality Natural Gas is required for working in the Solar T60. Pipeline has shall be processed to remove the heavier hydrocarbons. Methane shall be the major constituent (>90%).

5. Availability

5.1. The XQ-5200 herein specified is currently available, can be shipped in three to four weeks. However, this is strictly subject to equipment availability at the time of award and receipt of down payment.

6. Installation Requirement

6.1. Natural Gas Fueled

	English	Metric
Gas Pressure	250 PSIG	**172 KPAG**
Maximum Gas Demand	1,400 SCFM	**39.6 M^3/MIN**

6.2. Foundation

	English	Metric
Gravel Compacted to	2,500 lbs/ft^2	**120 kPA**

6.3. Electrical Connections

Load Connection	**12.47 kV or 13.8 kV**
Black Start (if needed)	**480 V, 200 kW**

6.4. Estimated Setup Crew and Equipment Requirement for Installation

The customer shall be liable to install the XQ-5200 complete package, being the minimum setup crew and equipment requirement for the installation as follows:

6.4.1.1. 15-25 Ton Crane w/operator
6.4.1.2. All Terrain fork-lift or shooting boom rated 6,000 Lbs
6.4.1.3. Two (2) Laborers five days @ 12 hours per day
6.4.1.4. Two (2) Skilled Mechanics four days @ 12 hours per day
6.4.1.5. One (1) 13.8 kV high voltage electrician four days @ 12 hours per day
6.4.1.6. One (1) Electrician's assistant four days @ 12 hours per day
6.4.1.7. One (1) Relay Technician, 4-8 ma-hours/turbine

7. Technical Specification

The following outline describes the gas turbine generator set technical specification:

7.1. Basic Package

- Taurus 60 PG Generator Set
- 480 Volts / 60 Hz

7.2. Gearbox

- 1800 RPM 60 Hz

7.3. Generator

- Continuous Duty
- Open Drip Proof (ODP)
- 13,800 Volt, 60 Hz

7.4. Start System

- Direct Drive AC Motor

7.5. Fuel System

- Dual Fuel (Liquid & Natural Gas), Gas & Liquid Availability by Customer

7.6. Lube System

- Main Lube Oil Pump, Engine Driven
- Backup Lube Oil Pump, 120 VDC Motor Driven
- 3 Phase AC Lube Oil Tank Heater
- Lube Oil Mechanical Coalescer
- AC, Air/Oil Cooler, Simplex
- Package Configured for Petroleum Base, Viscosity Grade C46
- Simplex Lube Oil Filter

7.7. Control System

- On-skid control system

- Turbine and Main Reduction Drive Vibration Monitoring
- Turbine Thrust Bearing Temperature Monitoring
- Historical Trend Display Screen
- Auxiliary Desktop Video Display Unit
- ControlNet Redundant Media Supervisory Interface

7.8. Generator Control and Monitoring

- Individual Auto Synchronizer
- Motorized Voltage Adjust
- Vibration Monitoring System
- Generator Bearing and Stator Winding Temperature Monitoring
- Kilowatt Control
- KVAR / Power Factor Control

7.9. Accessory Equipment

- On-Crank/On-Line Turbine Compressor Cleaning System
- 120 Vdc, VRLA Batteries
- Portable Engine Cleaning System

7.10. Miscellaneous

- Alignment Tool
- Long Term Preservation
- Operation and Maintenance Manuals, English Language

7.11. Test and Quality Assurance

- Package Static Test
- Observe on Noninterference Basis
- Quality Control Documentation

7.12. Air Inlet System

- Static type filters
- Silencer

7.13. Exhaust System

- Exhaust Silencer, Floor Standing
- Exhaust Bellows
- Rain Protection Stack

7.14. Enclosure

- Enclose Complete Package, Single Turbine Compartment

- Combustible Gas Monitoring System - One Sensor in Enclosure Exhaust
- Inlet Ventilation Silencer - Elbow Type (Single Fan)
- Exhaust Ventilation Silencer - Elbow Type
- Dust Protection - Barrier Type Filters
- Fire Detection and Suppression System - CO2 System
- Fire CO2 Cylinder Cabinet
- Internal Equipment Handling Kit
- Note: Noise 85dBA @ 1m

7.15. Gas Turbine Generator Trailer XQ5200

- Tri-Axle Transport Trailer with Two Axle Pivoting Booster
- Trailer Length 48' + 14'1" Booster (removable at site)
- Width 8'6", 9'0" across trailer axles
- 133" Swing Clearance
- 49" 5th wheel Height (loaded)
- Air Ride Suspension and Air Raise and Lower Kit
- Steel Disc Wheels with 275/70R x 22.5 Tire
- Three Tail Light Package
- Landing Gear (2)
- 6 Additional Landing Gears with Soil Bearing Plates for Leveling/Stabilization at Site
- Overall transport height: 14'2"
- Approximate transport weight: 118,000 lbs (without tractor)

7.16. Power Control Module

- Power Control Room (PCR) mounted on Two Axle Transport Trailer
- Power Control Room HVAC system
- Generator Main Circuit Breaker. Single interface point to power grid
- Auxiliary Transformer Feeder Circuit Breaker
- Bus PTs, Feeder CTs, Metering CTs and PTs
- Beckwith M-3425 Protective Relay Module included
- Neutral Grounding

- Neutral Grounding Transformer
- Lightning Arrestor and Surge Capacitor
- Motor Control Center. Serves Turbine Generator Auxiliary Loads
- 120VDC Turbine Generator Battery System with Charger
- Dedicated 120VDC Switchgear Battery System with Charger
- Start Motor Variable Frequency Drive (VFD)
- DC Backup Lube Oil Pump Contactor
- Interior Lighting. Photocell Controlled Exterior Lighting at Access Doors
- CO2 Bottles
- Emergency Eyewash Station
- Two Axle Transport Trailer
- Trailer Length 46' Overall
- Width 8'6"
- 49" 5th wheel Height (loaded)
- Air Ride Suspension and Air Raise and Lower Kit
- Steel Disc Wheels with 255/70R x 22.5 Tires
- Three Tail Light Package
- Landing Gear
- 4 Additional Landing Gears with Soil Bearing Plates for Leveling/Stabilization at Site
- Overall Transport Height: 14'0"
- Approximate transport weight: 48,000 lbs. (without tractor)

8. Single Line Diagram