January 19, 2024

Yanrong Zho
Program Supervisor
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, CA 91765

Re: Rule 1146.2 Initial Preliminary Draft of Rule 1146.2

Dear Ms. Zho:

On behalf of Bradford White Corporation (BWC), we would like to thank you for the opportunity to comment on South Coast Air Quality Management District's (SCAQMD) Initial Preliminary Draft of Rule 1146.2.

BWC is an American-owned, full-line manufacturer of residential, commercial, and industrial products for water heating, space heating, combination heating, and water storage. In Southern California, a significant number of individuals, families, and job providers rely on our products for their hot water and space heating needs. We have compiled our comments and questions to the Initial Preliminary Draft of Rule 1146.2 below:

General comments

BWC has participated in the District's five working groups related to Rule 1146.2 and has reviewed the preliminary rule language. We observe that the preliminary rule language and implementation timelines have deviated significantly from SCAQMD's 2022 Air Quality Management Plan (AQMP), where there was discussion of "infeasibility" and use of Low NOx alternatives. Specifically, C-CMB-01 stated "allow low NOx technologies as a transitional alternative when installing a zero-emission unit is determined to be infeasible." However, the Initial Preliminary Draft of Rule 1146.2 does not contain any provisions to address infeasibility of equipment, or use of Low NOx alternatives. Further, it proposes to push up the implementation timelines, as compared to the 2022 AQMP, for equipment phase out beginning in 2025, less than a year after the rule is scheduled to be adopted in April 2024.

BWC has also reviewed the staff analysis from the working group presentations, and we believe the conclusions drawn from these studies have been applied too broadly. We strongly recommend additional site evaluations are necessary to determine the market's readiness to transition to zero NOx. Water heating and boiler equipment is not limited in application to multifamily and hospitals as much of the staff analysis shows. A single commercial water heater or boiler model could be used in a wide variety of applications

ranging from hotels/motels, restaurants, office buildings, and gymnasiums. Keeping this in mind, each application has its own unique challenges that must be accounted for. While zero NOx replacements could be feasible, it comes with increased cost and installation challenges, many of which are significant. We have outlined a common example below:

Replacing a Commercial (100 Gallon, 199,999 Btu/hr) Gas-fired Storage Water Heater
This example shows how current commercially available electric water heater product(s) could be used in lieu of a commercial gas-fired storage water heater that matches the specifications in the above subject line. These products are commonly sold for use in smaller hotels/motels, restaurants, gymnasiums, and office buildings.

	Commercial gas-fired storage water heater	**Commercial ASME Tank Electric Water Heater**	**(2) Heavy Duty Commercial Tank Electric Water Heater**	**Medium Duty Commercial Tank Electric Water Heater plus 200-gallon storage tank**
Input	199,999 Btu/hr or 58.59 kW	81 kW	30 kW per unit	18 kW
Amperage Requirement	5.5A	98A	36A each	22A
Recovery (100°F Rise)	235 GPH	334 GPH	124 GPH each	74 GPH
Footprint (in)	77.63”H x 28.25” W	60.88”H x 32.5” W	50.44” H x 30.5” W per unit	63” H x 30.88”W plus 78”H x 32” W storage tank
Piping	Uses existing	Uses existing	Multiple units piped in reverse return	Commercial electric paired with storage tank
Installation Challenges compared to Gas		Equipment cost premium, potential cost to upgrade service,	Equipment cost premium, Increased footprint,	Equipment cost premium, Increased footprint,

	Commercial gas-fired storage water heater	**Commercial ASME Tank Electric Water Heater**	**(2) Heavy Duty Commercial Tank Electric Water Heater**	**Medium Duty Commercial Tank Electric Water Heater plus 200-gallon storage tank**
		panel, Increased footprint, requires ASME product, increased operation cost	Potential cost to upgrade service panel, additional labor and materials for piping, increased operation cost	ASME Product, Increased cost of piping, Recirculation pump (cost), Increased operation cost
Product Link	**EF120T199**	**CEA80-81kW**	**CEHD50-30kW**	**E32-120R-18kW plus 200 gallon storage tank**

While the example above highlights that commercially available electric products can be used to replace gas products or installed in new construction, this tradeoff comes at a premium cost for the equipment and will require additional cost and installation considerations to function properly.

In these common situations, using a heat pump water heater (HPWH) solution *may* benefit the operator by reducing the utility cost and possibly avoiding a costly upgrade to the electrical panel. However, the downside of using a HPWH is that it will require a much larger footprint, as more storage tank capacity is needed to compensate for slower recovery rates, and significant air volume is needed to transfer heat effectively. In many existing buildings, this expanded footprint can require widening doorways or closets; partially removing walls and/or ceilings; and running electrical wiring to the install area if needed. Additionally, commercial HPWHs[1] will be considerably more expensive than their gas-fired counterparts and will likely have availability concerns as these products often have longer lead times to manufacture, and may not be readily available at supply houses. These issues are especially concerning in emergency replacement situations.

Given the unique challenges water heating applications of this kind can present, BWC suggests District staff consider including rule provisions for project "infeasibility" as was originally presented in the 2022

[1] Microsoft Word - 2021 WA Code Change - Heat Pump Water Heating

AQMP. BWC submitted comments on the 2022 AQMP with a suggested definition for determining whether or not a zero NOx project was feasible and reiterate this recommendation below:

> "Where a project applicant can reasonably demonstrate that all parts and equipment required to retrofit an existing, mixed fuel building with a zero-emission water heater equipment is not:
> - Commercially available;
> - More costly than commercially available gas options (20% or more);
> - Able to fit in the footprint of existing equipment;
> - Able to meet the building/home water heating demand; and
> - Available from suppliers within the district to replace inoperative equipment on an emergency basis.
>
> In these cases, an exception shall be granted to use readily available gas Ultra Low NOx water heating equipment."

Product Labeling

The Initial Preliminary Draft of Rule 1146.2 proposes to require manufacturers to affix labels to equipment identifying the Unit as "not to be installed or sold for New Buildings." BWC believes the proposed labeling requirement is unnecessary to enforce the rule and will add significant cost and compliance complexity to regulated products.

SCAQMD currently maintains a qualified products list[2] for all manufacturer water heating and boiler models certified under Rule 1146.2. To enforce the proposed Zero NOx implementation dates, SCAQMD could simply modify their table to show models that are allowed in new construction and models that are only allowed in existing buildings. Secondly, new construction requires plans to be submitted to building jurisdictions to review, as well as Title 24 energy modeling. SCAQMD can work with building jurisdictions within their territory that review and approve project plans to enforce the use of Zero NOx water heating and boiler equipment. Lastly, new construction projects are permitted and require building inspectors to approve the construction. If a non-compliant product were to be installed, it could ultimately be flagged for removal by the building inspector.

For the reasons outlined above, BWC strongly urges staff to remove the labeling requirement as it will not aid in enforcement and will simply add cost and complexity to the manufacturing process.

Useful Life and Repairs

The Initial Preliminary Draft of Rule 1146.2 proposes to establish effective useful lives for equipment. While BWC questions how the District arrived at the stated useful lives for each product, we also have questions regarding the enforcement of useful lives. We respectfully request feedback to the following questions:

- How will SCAQMD enforce equipment operating beyond its deemed useful life?
- If affected products are still in proper working order, will the owner be required to remove and replace the product with a zero NOx product?
    - If so, will there be a timeline given? Will there be an exception process?
- What analysis did SCAQMD conduct to determine the established useful lives are appropriate?
    - Will that analysis be made available, in full, for stakeholders to review and comment on?

[2] Rule 1146.2 - Emissions of Oxides of Nitrogen from Large Water Heaters and Small Boilers and Process Heaters (aqmd.gov)

- How will repairs be enforced?

As Rule 1146.2 is currently written, our understanding is an owner would be responsible for ensuring that any repair completed on a regulated water heater or boiler product burner after the zero NOx compliance date would be required to meet the new zero NOx standard.

For instance, consider a situation where a Type 1 water heater was installed on December 1, 2028, and suffered a burner failure in April 2029. Unless there was a zero NOx retrofit kit available, the owner would be compelled to replace the entire unit. Apart from potential safety concerns, attempting to retrofit an existing water heater or boiler to meet zero NOx emissions would often require significant modifications to the appliance's venting system. These modifications, such as the addition of a catalytic converter, may not be feasible in all existing buildings if the necessary zero NOx burner is incompatible with the unit. If modifications are possible, they will often represent a significant cost to the building owner if they are.

This poses an undue and significant cost to the building owner as well as other concerns. BWC recommends that unless a water heater or boiler failure results in a leaking tank, repairs to burner and other components be allowed if the equipment is within its deemed useful life, as defined in Table 2 of the rule.

Implementation Timelines

BWC recommends that SCAQMD align all new construction timelines with California Energy Commission (CEC) Title 24 Energy Code cycles. For Instance, the 2025 Energy Code is currently under development and is expected to be adopted by January 1, 2025. The code does not take effect until January 1, 2026. Similarly, the following code cycle for the 2028 Energy Code, will not take effect until January 1, 2029. This change would help align SCAQMD compliance dates with changes occurring at the statewide level for designers, architects, and builders. We also recommend keeping the proposed four-year gap between new construction and existing construction compliance dates. For future rule development proceedings, we recommend SCAQMD align with state energy code cycles and Department of Energy (DOE) rulemakings.

In addition to aligning with the CEC, we recommend four additional compliance date changes.

- **Type 1 Pool Heater equipment category** align with the 2029 date for new construction and subsequently 2033 for existing construction. On May 30, 2023, the DOE published a Final Rule, which amended energy conservation standards for these products[3] containing a new Integrated Thermal Efficiency (TE_I) metric to measure efficiency and sets the TE_I for gas-fired pool heaters at 84%. Additionally in this rule, the DOE is raising the efficiency requirements for electric pool heaters to effectively require the use of heat pump technology. These new requirements go into effect May 30, 2028. More closely aligning SCAQMD's proposed zero NOx compliance date with this DOE Final Rule, will help ease the burden for manufacturers, who can then be mindful of these changes, as well as those potentially adopted by SCAQMD as they work to redesign their products.
- **Type 2 (Non-High Temperature) equipment category** align with the 2029 date for new construction and subsequently 2033 for existing construction. The 2025 Energy Code is already addressing all-electric construction in smaller multifamily, hotel/motel and school building applications. Further, larger applications requiring over 1 million Btu rated input must use the highest efficiency gas equipment to achieve a combined rated efficiency of 90% Thermal Efficiency or better. In addition to Title 24, manufacturers will already have a significant challenge meeting the already finalized DOE Commercial Water Heater Energy Conservation Standards

[3] Federal Register :: Energy Conservation Program: Energy Conservation Standards for Consumer Pool Heaters

requirements[4]. These changes go into effect on October 6, 2026, and effectively will require all commercial storage water heaters to meet a 95% Thermal Efficiency.

- **The Instantaneous Water Heater category** be split into two categories with different compliance dates:
    - *Gas-fired instantaneous water heater* (as further defined below) with a nameplate input rating less than 200,000 Btu/hr equipment category align with the 2026 date for new construction and subsequently 2030 for existing construction. This category is predominantly used in residential new construction and the 2025 Energy Code is already proposing a HPWH baseline for residential new construction. Adopting a January 1, 2026, compliance date for this category and subsequently a 2030 date for existing construction would better align with statewide efforts to reduce emissions in new construction and make for an easier transition.
    - *Instantaneous Water Heater* (as further defined below) with a nameplate input rating greater than 200,000 Btu/hr equipment category align with the 2029 date for new construction and subsequently 2033 for existing construction. These products also fall under the DOE efficiency changes on October 6, 2026, discussed above and will require all instantaneous water heaters to meet a 96% Thermal Efficiency.

Our summary of proposed changes to compliance dates and equipment categories is contained in the following table:

Equipment Category	**NOx and CO Emission Limits (ppmv)**	**Building Type**	**Compliance Date**	**Useful Life (years)**
Type 1 Unit	0	New/Existing	Jan. 1, 2026/Jan 1, 2030	15
Gas-fired instantaneous water heater (≤200,000 BTU)	0	New/Existing	Jan. 1, 2026/Jan 1, 2030	25
Instantaneous Water Heater (>200,000 BTU)	0	New/Existing	Jan. 1, 2029/Jan 1, 2033	25
Type 1 Pool Heater	0	New/Existing	Jan. 1, 2029/Jan 1, 2033	15
Type 2 Unit	0	New/Existing	Jan. 1, 2029/Jan 1, 2033	25
Type 1 High Temperature Unit	0	New/Existing	Jan. 1, 2029/Jan 1, 2033	25
Type 2 High Temperature Unit	0	New/Existing	Jan. 1, 2029/Jan 1, 2033	25

Lastly, we ask the District to clarify in the rule, that the proposed compliance dates for existing buildings are based on date of equipment manufacture, and not an effective date.

[4] 2023-20392.pdf (govinfo.gov)

Definitions

BWC recommends that SCAQMD align their equipment category definitions with the Code of Federal Regulations. The Code of Federal Regulations governs certain regulated products, including those covered by this rulemaking. By adopting these definitions in Rule 1146.2, SCAQMD can harmonize their rule with how products are built in the United States and avoid creating product classes specific to one region of southern California. Additionally, by adopting these definitions, compliance with NOx emission standards is made simpler as manufacturers are not sorting each product class by Btu/hr to determine which model units comply. The specific equipment category changes we propose are as follows:

- **Type 1 and Type 2 (Non-High Temperature Units):** This category includes all *Storage water heaters* and *Residential-duty commercial water heaters* as defined in 10 CFR 431.102[5]
    - "*Storage Water Heater* means a water heater that uses gas, oil, or electricity to heat and store water within the appliance at a thermostatically-controlled temperature for delivery on demand, including:
        1. Gas-fired storage water heaters with a rated input both greater than 75,000 Btu/hr and less than 4,000 Btu/hr per gallon of stored water
        2. Oil-fired storage water heaters with a rated input both greater than 105,000 Btu/hr and less than 4,000 Btu/hr per gallon of stored water; and
        3. Electric storage water heaters with a rated input both greater than 12 kW and less than 4,000 Btu/hr per gallon of stored water."
    - "*Residential-duty commercial water heater* means any gas-fired storage, oil-fired storage, or electric instantaneous commercial water heater that meets the following conditions:
        1. For models requiring electricity, uses single-phase external power supply;
        2. Is not designed to provide outlet hot water at temperatures greater than 180 °F; and
        3. Does not meet any of the following criteria:

Water heater type	Indicator of non-residential application
Gas-fired storage	Rated input >105 kBtu/hr; Rated storage volume >120 gallons.
Oil-fired storage	Rated input >140 kBtu/hr; Rated storage volume >120 gallons.
Electric instantaneous	Rated input >58.6 kW; Rated storage volume >2 gallons.

- **Type 1 and Type 2 High Temperature Units:** This category includes *Hot water supply boilers*[6] and *Commercial package boiler* as defined in 10 CFR 431.102
    - *"Hot water supply boiler* means a packaged boiler (defined in § 431.82 of this part) that is industrial equipment and that:
        1. Has a rated input from 300,000 Btu/hr to 12,500,000 Btu/hr and of at least 4,000 Btu/hr per gallon of stored water;
        2. Is suitable for heating potable water; and
        3. Meets either or both of the following conditions:

[5] eCFR :: 10 CFR 431.102 -- Definitions concerning commercial water heaters, hot water supply boilers, unfired hot water storage tanks, and commercial heat pump water heaters.

[6] eCFR :: 10 CFR 431.102 -- Definitions concerning commercial water heaters, hot water supply boilers, unfired hot water storage tanks, and commercial heat pump water heaters.

i. It has the temperature and pressure controls necessary for heating potable water for purposes other than space heating; or
ii. The manufacturer's product literature, product markings, product marketing, or product installation and operation instructions indicate that the boiler's intended uses include heating potable water for purposes other than space heating.

- *"Commercial package boiler* means a packaged boiler that meets all of the following criteria:
  1. Has rated input of 300,000 Btu/hr or greater;

- **Instantaneous Water Heater Units:** This category includes *Instantaneous water heaters*[7] as defined in 10 CFR 431.102 and *Gas-fired instantaneous water heaters*[8] as defined in section 10 CFR 430.2
  - "*Instantaneous water heater* means a water heater that uses gas, oil, or electricity, including:
    1. Gas-fired instantaneous water heaters with a rated input both greater than 200,000 Btu/hr and not less than 4,000 Btu/hr per gallon of stored water;
    2. Oil-fired instantaneous water heaters with a rated input both greater than 210,000 Btu/hr and not less than 4,000 Btu/hr per gallon of stored water; and
    3. Electric instantaneous water heaters with a rated input both greater than 12 kW and not less than 4,000 Btu/hr per gallon of stored water."
  - "*Gas-fired instantaneous water heater* means a water heater that uses gas as the main energy source, has a nameplate input rating less than 200,000 Btu/hr, and contains no more than one gallon of water per 4,000 Btu per hour of input."

While the definitions above contained in the Code of Federal Regulations do not exactly align with SCAQMD's Btu/hr limits for Type 1 and Type 2, these definitions have little to no bearing on the proposed compliance dates. Specifically for Type 1 and Type 2 High Temperature units, SCAQMD proposes the same compliance dates, covering the entire Btu/hr range. We strongly believe these definition changes need to be adopted into Rule 1146.2 to align with federal equipment categories and provide additional clarity.

In closing, we would like to reiterate the need for SCAQMD to align compliance dates with Title 24 Energy Code cycles and update equipment category definitions to align with the Code of Federal Regulations. We fully understand the District's goals to reduce emissions and want to play a part in ensuring it is successful in responsibly doing so. We welcome continued dialogue on this matter and would be pleased to have further, direct, conversations with District staff.

BWC is grateful to SCAQMD for the opportunity to provide feedback on the Initial Preliminary Draft of Rule 1146.2. Please let me know if you have any questions or would like to schedule a meeting to discuss our comments further.

Respectfully Submitted,

Bradford White Corporation

[7] eCFR :: 10 CFR 431.102 -- Definitions concerning commercial water heaters, hot water supply boilers, unfired hot water storage tanks, and commercial heat pump water heaters.

[8] eCFR :: 10 CFR 430.2 -- Definitions.

Tom Gervais
Senior Director, Regulatory Affairs

Cc: R. Carnevale; E. Truskoski; R. Simons; B. Hill; L. Prader; C. VanderRoest; T. Gervais; M. Corbett; B. Wolfer