

Michael Morris
Planning and Rules Manager
South Coast Air Quality Management District
21865 Copley Dr.
Diamond Bar, CA 91765

**SCAQMD PROPOSED RULE 1147.2, NO_x REDUCTIONS FROM METAL
MELTING AND HEATING FURNACES
COMMENTS ON PR 1147.2 BARCT ANALYSIS**

Dear Mr. Morris:

September 27, 2021

Ramboll appreciates the opportunity to participate in the Working Group Meetings (WGMs) for South Coast Air Quality Management District (SCAQMD or District) Proposed Rule 1147.2 (PR1147.2), NO_x Reductions from Metal Melting and Heating Furnaces. This rulemaking is being undertaken to (1) transition facilities in the RECLAIM program for NO_x emissions to a command-and-control structure requiring Best Available Retrofit Control Technology (BARCT) level controls as soon as practicable, as required by Control Measure CMB-05 of the 2016 Air Quality Management Plan¹ (2016 AQMP), and (2) remove certain equipment categories from Rule 1147 and regulate those categories under a separate source specific rule.

Ramboll
350 S Grand Avenue
Suite 2800
Los Angeles, CA 90071
USA

T +1 213 943 6300
F +1 213 947 1116
www.ramboll.com

The California Health & Safety Code (CHSC) defines BARCT as "an emission limitation that is based on the maximum degree of reduction achievable, taking into account environmental, energy, and economic impacts by each class or category of source."^{2,3} The CHSC defines cost-effectiveness as "the cost, in dollars, or the potential control option divided by the emission reduction potential, in tons, of the potential control option."⁴ If the cost per ton of emissions reduced is less than the established cost-effectiveness threshold, then the control method can be considered to be cost-effective. Cost-effectiveness evaluations need to consider both capital costs (e.g., equipment procurement, shipping, engineering, construction and installation)

-
- ¹ SCAQMD Final 2016 Air Quality Management Plan, March 2017. Available at: <https://www.aqmd.gov/docs/default-source/clean-air-plans/air-quality-management-plans/2016-air-quality-management-plan/final-2016-aqmp/final2016aqmp.pdf?sfvrsn=15>. Accessed: September 2021.
 - ² California Health & Safety Code §40440. Available at: https://leginfo.ca.gov/faces/codes_displayText.xhtml?lawCode=HSC&division=26.&title=&part=3.&chapter=5.5.&article=4. Accessed: September 2021.
 - ³ California Health & Safety Code §40406. Available at: https://leginfo.ca.gov/faces/codes_displaySection.xhtml?sectionNum=40406.&lawCode=HSC#:~:text=40406.,class%20or%20category%20of%20source. Accessed: September 2021.
 - ⁴ California Health & Safety Code §40920.6. Available at: <https://codes.findlaw.com/ca/health-and-safety-code/hsc-sect-40920-6.html>. Accessed: September 2021.

and operating (including expenditures associated with utilities, labor, and replacement) costs. Currently, the District is applying a cost-effectiveness threshold of \$50,000 per ton of NO_x emissions reduced for BARCT rules. This threshold is consistent with what was applied in the 2016 AQMP.

On July 8, 2021, SCAQMD presented a proposed NO_x emission limit of 40 ppm for metal melting furnaces, with a cost-effectiveness of \$23,700/ton NO_x reduced based on revised cost data received.⁵ Alternatively, units may elect to meet an Alternative NO_x Emission Limit of 50 ppm provided a facility submits an application to modify the permit limit to the alternative NO_x limit by July 1, 2022.⁶ These proposed NO_x limits are included in the preliminary draft rule language released on September 9, 2021.⁷

Ramboll offers the following comments the BARCT analysis for small metal melting furnaces.

1. The District has not properly categorized units, nor presented technical feasibility nor cost-effectiveness analysis results to support a BARCT determination for small furnaces rated at 550,000 BTU/hr or less.

As discussed above, the CHSC requires that BARCT be established based on each class or category of source. SCAQMD noted that all 54 melting furnaces with source tests are operating below 60 ppm NO_x, with the heat input range of those source tested units between 0.2 and 34 MMBtu/hr, and including 26 units rated <5 MMBtu/hr.⁸ The District reportedly considered subdividing the metal melting class based on the size of the unit, with different proposed BARCT limits for furnaces operating below 40 MMBtu/hr.⁹ However, this approach does not adequately consider the different compliance cost or cost effectiveness profiles for smaller furnaces. For example, furnaces rated at 550,000 BTU/hr or less with NO_x emissions ≤60 ppm will have significantly less emission reduction potential if required to meet a 40 or 50 ppm endpoint. That will result in a higher cost effectiveness as compared to larger furnace designs. The District is obligated by the CHSC to establish technical feasibility and cost effectiveness on the basis of class & category, and smaller units should be differentiated from larger ones.

2. It is not cost-effective to retrofit small metal melting furnaces which currently meet existing Rule 1147 limits. These units should be exempted from the PR1147.2 NO_x Emission Limits presented in Table 1, as well as the Alternative NO_x Emission Limits listed in Table 2.

To understand the impact of the PR1147.2 proposed NO_x limits on small metal melting furnaces, Ramboll conducted a sensitivity analysis of a hypothetical metal melting furnace rated at 550,000

⁵ SCAQMD PR1147.2 WGM #8, Slide 13, July 8, 2021. Available at: <http://www.aqmd.gov/docs/default-source/rule-book/Proposed-Rules/1147.2-1147-1100/pr-1147-2---wgm-8.pdf?sfvrsn=6>. Accessed: September 2021.

⁶ SCAQMD PR1147.2 Preliminary Draft Rule Language, September 9, 2021. Available at: <http://www.aqmd.gov/docs/default-source/rule-book/Proposed-Rules/1147.2-1147-1100/pr-1147-2-pdr-discussion-version-09-09-2021.pdf?sfvrsn=4>. Accessed: September 2021.

⁷ SCAQMD PR1147.2 Preliminary Draft Rule Language, September 9, 2021. Available at: <http://www.aqmd.gov/docs/default-source/rule-book/Proposed-Rules/1147.2-1147-1100/pr-1147-2-pdr-discussion-version-09-09-2021.pdf?sfvrsn=4>. Accessed: September 2021.

⁸ SCAQMD PR1147.2 WGM #2, Slide 17, August 6, 2019. Available at: http://www.aqmd.gov/docs/default-source/rule-book/Proposed-Rules/1147.2-1147-1100/pr-1147-2---wgm-2_v21_final-19-08-06.pdf?sfvrsn=4. Accessed: September 2021.

⁹ SCAQMD PR1147.2 WGM #7, Slide 26, February 2, 2021. Available at: http://www.aqmd.gov/docs/default-source/rule-book/Proposed-Rules/1147.2-1147-1100/pr-1147-2---wgm-7_final.pdf?sfvrsn=4. Accessed: September 2021.

BTU/hr. It was assumed that the furnace operates at the current Rule 1147 limit of 60 ppm and would be required to meet the proposed Table 1 NOx Emission Limit or the Table 2 Alternative NOx Emission Limit, 40 or 50 ppm respectively. Ramboll then back-calculated the present worth value (PWV) thresholds for these endpoints using the District’s \$50,000 per ton NOx-reduced threshold and two assumed burner lifetimes. In WGM #6, SCAQMD stated that emission reductions are “calculated for the assumed useful life of the specific control technology that can achieve the initial BARCT limit” and showed a burner useful life as 15 years, and a SCR useful life as 25 years.¹⁰ While we believe that 15 years is a more appropriate burner lifetime, we present PWV cost effectiveness thresholds using both an assumed 15 useful life as well as 25 year useful life (see Table 1 below).

Table 1: PWV of Small Furnaces Meeting Current 1147 Emission Limits

Furnace Rating (MMBtu/hr)	Operating Capacity	Lifetime of equipment (Years)	PWV Cost Effectiveness Threshold for Table 1 NOx Emission Limit (\$)	PWV Cost Effectiveness Threshold for Table 2 Alternative NOx Emission Limit (\$)
0.55	100%	15	\$ 44,000	\$22,000
0.55	100%	25	\$73,000	\$37,000

As shown in Table 1, the PWV thresholds for a burner life of 15 years range from \$22,000 - \$44,000 depending on the BARCT endpoint. The PWV thresholds for a burner life of 25 years increase to \$37,000 - \$73,000. Assuming that there is no change in annual operating cost, and that installation costs are equal to the cost of the equipment itself (i.e., rule of thumb), the burner replacement costs for these retrofits would need to lower than \$11,000-\$37,000 depending on the equipment lifetime in order for the District’s proposed endpoint to be cost effective.

A Ramboll client (potentially subject to PR 1147.2) recently received information from their equipment manufacturer for a furnace rated at 500,000 BTU/hr. That vendor noted that it would not be possible to retrofit their existing furnace with Lo NOx burners without a near complete rebuild and redesign in the field. As we have heard with other fired equipment, the manufacturer noted that new Lo NOx burners would require significant modifications to the burner mounts due to geometry differences, as well as entirely new electric controls and a new gas train and flame system. The net result of this scope would be a project cost equal to or greater than purchasing a comparable new unit.

For that reason, the manufacturer recommended replacing the furnace at a cost of \$90,948. That equipment quotation did not include installation costs, so the total compliance cost would be considerably higher than the estimated \$73,000 PWV threshold needed to stay below the cost-effectiveness threshold.

Given this information, we do not believe the District’s proposed endpoint can be found to be BARCT for these smaller units rated at 550,000 BTU/hr or less.

¹⁰ SCAQMD PR1147.2 WGM #6, Slide 29, September 3, 2020. Available at: <http://www.aqmd.gov/docs/default-source/rule-book/Proposed-Rules/1147.2-1147-1100/pr-1147-2---wgm-6.pdf?sfvrsn=12>. Accessed: September 2021.

3. The proposed exemption in PR1147.2 (k) does not adequately exempt smaller units from being subjected to standards in section (d) that are not BARCT due to cost-effectiveness. Therefore, small furnaces should be exempted from all rule requirements based on equipment size.

PR1147.2(k) exempts units emitting less than 1 pound per day of NO_x from meeting the emission limits in Section(d). This proposed exemption is not adequate to address small units which, as shown in Comment #2, are not going to be cost effective at the proposed endpoints.

The proposed exemption states that these units shall only be subject to subdivisions (i) and (j). Section (j) requires that the owner or operator maintain monthly records demonstrating compliance with subdivision (e). Subdivision (e) requires that an owner or operator demonstrating compliance with NO_x emissions of less than one pound per day demonstrate compliance with the limit through one of four options. These requirements are out of proportion to the scale of emissions from small furnaces. SCAQMD is imposing onerous monitoring and recordkeeping requirements with no associated environmental benefit. Small furnaces rated at <550,000 BTU/hr should thus be exempted from all rule requirements.

The District has not presented technical feasibility or cost-effectiveness data to adequately establish BARCT emission limits for small furnaces. The equipment costs to retrofit a small metal melting furnace will need to be below a low PWV cost-effectiveness threshold in order to remain cost-effective. In addition, any monitoring and recordkeeping requirements of low-emitting units are onerous and costly and result in no associated environmental benefit. On this basis, Ramboll recommends that small furnaces rated at ≤550,000 BTU/hr need to be exempt from all provisions of Rule 1147.2

If you have questions regarding these comments, please contact Scott Weaver at (213) 943-6360.

Regards,



M. Scott Weaver
Principal

(213) 943-6360
msweaver@ramboll.com