**Patty Senecal**
Senior Director, Southern California Region

August 4, 2021

Michael Krause
Manager, Planning and Rules
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, CA 91765

Via e-mail at: mkrause@aqmd.gov

***Re: SCAQMD Proposed Rule 1109.1, Emissions of Oxides of Nitrogen from Petroleum Refineries and Related Operations***

***WSPA Comments on Revised Proposed BARCT Standards for Large Refinery Boiler and Heater Categories***

Dear Mr. Krause,

Western States Petroleum Association (WSPA) appreciates the opportunity to participate in the Working Group Meetings (WGMs) for South Coast Air Quality Management District (SCAQMD or District) Proposed Rule 1109.1, Emissions of Oxides of Nitrogen from Petroleum Refineries and Related Operations (PR1109.1). This proposed rulemaking is part of the District's larger project to transition facilities in the Regional Clean Air Incentives Market (RECLAIM) program for $NO_X$ emissions to a command-and-control structure (i.e., the "RECLAIM Transition Project"). WSPA is a non-profit trade association representing companies that explore for, produce, refine, transport, and market petroleum, petroleum products, natural gas, and other energy supplies in five western states including California. WSPA has been an active participant in air quality planning issues for over 30 years. WSPA-member companies operate petroleum refineries and other facilities in the South Coast Air Basin that are within the purview of the RECLAIM Program administered by the SCAQMD and will be impacted by PR1109.1.

The California Health & Safety Code (CHSC) requires the District, in adopting any best available retrofit control technology (BARCT) standard, to ensure the standard is technologically feasible, and take into account "environmental, energy, and economic impacts" and to assess the cost-effectiveness of the proposed control options.[1] Cost-effectiveness is defined as the cost, in dollars, of the control alternative, divided by the emission reduction benefits, in tons, of the control alternative.[2] If the cost per ton of emissions reduced is less than the established cost-effectiveness threshold, then the control method is considered to be cost-effective. Cost-effectiveness evaluations need to consider both capital costs (e.g., equipment procurement, shipping, engineering, construction and installation) 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 Air Quality Management Plan (2016 AQMP).[3]

[1] California Health & Safety Code §40406, 40440, 40920.6.
[2] California Health & Safety Code §40920.6.
[3] SCAQMD Final 2016 Air Quality Management Plan, Approved March 3, 2017.

On June 30, 2021, SCAQMD presented a BARCT reassessment for the large refinery boiler and heater categories with rated heat input greater than 40 MMBtu/hr heat input.[4] These are included in the "Pre-Preliminary" draft version of PR1109.1 released to stakeholders on July 21, 2021.[5] WSPA has the following comments on the revised BARCT proposals for these categories.

1. **The District's BARCT reassessment for the large refinery boiler and heater categories reflects the considerable technical feasibility issues associated with adding additional NOx control equipment to these existing sources.**

   Last year, the District's two third-party consultants reviewed the District's initial BARCT assessment. Both Norton Engineering Consultants (NEC) and Fossil Energy Research Corporation (FERCo) identified a number of technical feasibility concerns with the District's proposed 2 ppm $NO_X$ endpoint. WSPA highlighted these concerns in a February 2021 comment letter.[6] NEC concluded that the technical feasibility of the proposed 2 ppm endpoint for the large refinery boiler and heater categories would necessitate multiple selective catalytic reduction (SCR) design features which had not been included in the District's initial analysis. These included the potential need for secondary ammonia injection grids (AIG), multiple SCR catalyst beds, and the addition of ammonia destruction catalysts. NEC further noted that use of ultra-low $NO_X$ burners (ULNB) to help meet a 2 ppm endpoint in refinery heaters would trigger several design criteria to avoid flame impingent problems, which are a significant safety concern under applicable design standards. District staff has since acknowledged that many of the existing units would not be suitable for ULNB retrofits due to these complicating factors.[7]

   The District later suggested an alternative control technology option for achieving the proposed endpoint without ULNB, namely installing two SCR reactors in series which would require multiple AIGs.[8] Neither the District nor FERCo performed a feasibility assessment for potential installation of secondary AIGs and the additional spatial requirements. The FERCo report acknowledged, however, that physical spaces around refinery heater units are typically very congested, significantly limiting the distance available between the AIG and SCR. Absent such an assessment, the District cannot demonstrate that the multi-AIG option is technically feasible.

2. **In addition to acknowledging these technical challenges, the District's BARCT reassessment clearly demonstrates that the initial 2 ppm proposal was not cost-effective for the large refinery boiler and heater categories.**

   In March 2021, WSPA member companies provided the District with updated cost estimates for PR1109.1. At the District's direction, these data were evaluated by NEC, and conclusions were provided in the NEC Evaluation of Cost Data report (NEC Report) on June 14, 2021.[9] NEC was directed to evaluate whether the costs submitted are "reasonable, realistic, and justified for $NO_X$ control equipment installations." The District also requested that NEC evaluate whether any cost data should be excluded based on whether the costs pertain to the requirements of PR1109.1. The NEC Report concluded the following:

[4] PR1109.1 WGM #22 presentation, slides 21-40 (June 30, 2021).
[5] Pre-Preliminary Draft of PR1109.1, released July 21, 2021. Available at SCAQMD PR1109.1 page.
[6] WSPA Letter: SCAQMD Proposed Rule 1109.1, NOx Emission Reduction for Refinery Equipment: WSPA Comments on Preliminary Proposed BARCT for Boiler and Heater Categories, February 16, 2021.
[7] PR1109.1 WGM #22 presentation, slide 26 (June 30, 2021).
[8] PR1109.1 WGM #22 presentation, slide 27 (June 30, 2021).
[9] Norton Engineering Consultants Evaluation of Cost Data, Document No: 19-9009-017, June 14, 2021.

*"the TIC [total installed cost] estimates provided in 2021 do not appear unreasonable when complexity factors are turned into defined scope during the latter phases of engineering. At least half of the data set obtained in 2021 still falls within the "expected" TIC range for SCR retrofits on heaters and boilers. From limited information provided in the responses from the refineries there does not appear to be extraneous scope items included in the TIC estimates."*[10]

As a result of NEC's third-party review, the District agreed to include all refinery-provided costs in the District's cost-effectiveness analysis. Factoring in these revised cost estimates, the District cannot demonstrate that 2 ppm proposal is cost-effective.

**3. WSPA appreciates that the District is now considering incremental cost-effectiveness as part of the PR1109.1 BARCT analyses, as required by CHSC.**

WSPA appreciates the inclusion of the incremental cost-effectiveness analysis in the most recent PR1109.1 analysis. The CHSC requires that the cost-effectiveness analysis include an evaluation of incremental cost-effectiveness, which is the difference in the annual dollar costs, divided by the difference in the annual emission reduction between each progressively more stringent control alternative, as compared either to the next less expensive control alternative, or to the current best available control technology, whichever is applicable. WSPA and other stakeholders submitted written comments highlighting the need for this analysis when establishing BARCT for a given class and category of equipment.[11]

The District presented cost-effectiveness and incremental cost-effectiveness results for the large refinery boiler and heater categories at the PR1109.1 Working Group meeting on June 30, 2021. These results are summarized in Table 1 below.

**Table 1: SCAQMD Cost-Effectiveness and Incremental Cost-Effectiveness Results**[12]

| Category | Cost-Effectiveness at 2 ppm | Cost-Effectiveness at 5 ppm [A] | Incremental Cost-Effectiveness 5 ppm → 2 ppm |
|---|---|---|---|
| Heaters 40-110 MMBtu/hr | $94,000 | $48,000 | **$293,000** |
| Heaters >110 MMBtu/hr | $110,000 | $50,000 | **$400,000** |
| Boilers 40-110 MMBtu/hr | $46,000 | $25,000 | **$656,000** |
| Boilers >110 MMBtu/hr | $19,000 | $12,000 | **$102,000** |

[A] Reported cost-effectiveness excludes those devices which have been identified by District for coverage under new "Near Limit" standards. Without these exclusions, the cost-effectiveness results would be higher; in some cases, above the District's $50,000/ton reduced threshold.

The District's incremental cost-effectiveness results clearly show that the initial 2 ppm $NO_X$ proposal for the large refinery boiler and heater categories is not cost-effective and thus, not BARCT.

**4. The District's revised analysis for the large refinery heater categories (i.e., now grouped as devices rated 40-110 MMBtu/hr and ≥110 MMBtu/hr) demonstrates that a 5 ppm endpoint is also not cost-effective unless certain devices with higher retrofit**

[10] Norton Engineering Consultants Evaluation of Cost Data, Document No: 19-9009-017, June 14, 2021.
[11] Latham & Watkins (M. Carroll) letter to SCAQMD (S. Nakamura), "Proposed Rule 1109.1 BARCT Analysis," April 15, 2021.
[12] PR1109.1 WGM #22 presentation, slides 35, 38, 44, 45 (June 30, 2021).

**costs are excluded. The District presented an iterative process for establishing separate BARCT categories for these devices, calling them "Near Limit" units. The sole purpose for creating these "Near Limit" categories is to cause the BARCT analysis for the remaining units in the categories to appear cost-effective. The result is that the large refinery heater categories are now being split into smaller categories. These Near Limit units must be considered a separate category for purposes of establishing BARCT and should be included in Table 1 of the rule.**

BARCT must be established based on the maximum degree of reduction achievable, taking into account environmental, energy, and economic impacts by each class or category of source.[13] The District's revised analysis shows that the average cost-effectiveness for the proposed 5 ppm $NO_X$ endpoint would be above $50,000 per ton of NOx reduced for refinery heaters in both the 40-110 MMBtu/hr category and the ≥110 MMBtu/hr category.[14]

To lower the average cost-effectiveness for the larger categories, the District has proposed that certain units operating between the proposed $NO_X$ endpoint (i.e., 5 ppm) and a newly established "Near Limit" would not be required to meet the proposed Table 1 $NO_X$ limit provided the operator has (or accepts) a permit limit at or below the Near Limit value listed in Table 2.[15] The District suggests there would be no additional control costs associated with these units since they are already meeting the applicable Near Limit level.

WSPA agrees that BARCT must be established for each class and category of equipment and the establishment of such classes/categories must be based on clear criteria (i.e., not arbitrary). These new Near Limit categories are being created solely for the purpose of establishing a lower BARCT endpoint for the devices remaining in the respective categories. As such, the Near Limit units must be treated as separate categories for the purposes of establishing BARCT and the District should reassess the BARCT limits, including the cost effectiveness, accounting for these separate categories. Consequently, the Near Limit levels need to be listed in Table 1 of the rule along with the other BARCT endpoints.

5. **The Near Limit applicability criteria specified in the "pre-preliminary" draft PR1109.1 rule language is inconsistent with the methodology presented to the Working Group. The criteria for the Near Limit categories need to be consistent with the criteria applied in the District's BARCT analyses.**

   On June 30, 2021, the District presented a methodology for identifying the Near Limit devices in the large refinery heater categories.[16] From that method, the District proposed a Near Limit of 18 ppm for refinery heaters rated 40-110 MMBtu/hr, and 22 ppm for heaters rated >110 MMBtu/hr. The staff presentation clearly labeled both of these limits as being "based on annual average emissions."

   In later discussions with District staff, WSPA heard conflicting representations regarding the data actually used for this qualification. While the District has access to facility Continuous Emission Monitoring System (CEMS) data for the subject devices which could be used to assess annual average emissions, WSPA understood that the District may have used "representative emissions" values which had been reported by the companies under the District's 2018 PR1109.1 Survey. Data from this survey would generally not be "annual

[13] CHSC §40406.
[14] PR1109.1 WGM #22, slide 30 (June 30, 2021).
[15] Pre-Preliminary Draft PR1109.1 (dated July 21, 2021), Section (d)(6).
[16] PR1109.1 WGM #22 presentation, slides 34-40 (June 30, 2021).

average" values since those values were (according to the survey instructions) provided from facilities' compliance source tests.

On July 21, 2021, the District published a revised "pre-preliminary" draft of the PR1109.1 rule language which states that Near Limit units would be determined based on "Permit to Operate limits for $NO_X$ and CO emissions" and based on a 24-hour rolling average.[17] It is unclear whether the District has updated the BARCT analyses for the large refinery heater categories to reflect this change, and what effect that may have had on the cost-effectiveness results presented to stakeholders at WGM #22.

WSPA believes the applicability criteria for the Near Limit categories must be clearly articulated in the rule and those criteria must be consistent with the criteria used in the District's BARCT analyses. This is especially important given that the BARCT analyses to support the proposed 5 ppm endpoints for the remaining categories depends on the criteria for these Near Limit categories, and the fact that those Near Limit levels are the BARCT outcomes for those categories.

6. **The District has provided no technical information or analysis to support the proposed carbon monoxide (CO) limits in Table 1 or Table 2 of the rule. Absent such information or analysis, these CO limits should be removed from the rule, or at least changed to reflect the least restrictive CO limit that could apply for each class/category of equipment under existing District rules.**

   The 2016 AQMP indicates that all areas of the South Coast and Salton Air Basin have CO concentrations that are well below the California and federal ambient standards. Yet, the District has included CO limits in PR1109.1 without identifying a need for such limits. These CO limits, found in Table 1 and Table 2, would impose emissions limitations which may be more restrictive than the limits contained in existing District rules and/or the applicable District-issued Permits to Operate. The District has provided stakeholders no information about the baseline CO emissions performance for the equipment covered by PR1109.1, or analysis to suggest whether this equipment would be able to meet those limits without additional controls and compliance costs. And the District has not provided any analysis to demonstrate these new CO limits represent BARCT (i.e., technical feasibility or cost-effectiveness).

   In the absence of such information or analysis, WSPA believes the District should remove these CO limits from PR1109.1. Alternatively, the District could revise these values to match the least restrictive CO concentration limits applicable under existing District rules.

7. **WSPA supports the District's "Guiding Principles" for $NO_X$ Interim Limits. As such, the $NO_X$ Interim Limits specified in PR1109.1 Table 3 must reflect $NO_X$ levels which can be met by the existing equipment under all normal operating conditions with some compliance margin. The District needs to demonstrate that the proposed $NO_X$ Interim Limits will accomplish this design objective.**

   In order to facilitate a transition of $NO_X$ RECLAIM facilities out of Regulation XX, the District has proposed a concept of establishing "Interim Limits" for PR1109.1 equipment.[18] In its "Guiding Principles," the District states the following:[19]

[17] Pre-Preliminary Draft PR1109.1 (dated July 21, 2021), Section (d)(6)(A) and (C).

[18] WSPA has proposed an alternative "bridge" concept that relies on mass emission limits rather than concentration-based Interim Limits. While WSPA continues to support its alternative concept, it is nevertheless providing these comments on the proposed Interim Limits.

[19] PR1109.1 WGM #21 presentation, slide 27 (May 27, 2021).

- "Interim limits would reflect current operating conditions until BARCT emission limits are achieved and ensure enforceable emission limits are in place;"
- "Interim limits are not an interim step down to BARCT emission limits;"
- "Interim limits will apply to individual units and ensure RACT requirements are being met;" and
- "Interim limits will be incorporated in PR1109.1 for units that have compliance dates after January 1, 2024."

WSPA supports the concepts expressed in these Guiding Principles, but we are concerned that the Interim $NO_X$ Emission Limits presented in Table 3 of the rule may not meet these objectives. The District needs to demonstrate that the proposed $NO_X$ Interim Limits will meet the Guiding Principles.

8. **The District has not demonstrated that the CO Interim Limits in Table 3 would represent "hold the line" limits as suggested in the District's Guiding Principles. Several of these limits appear to be more stringent than required under currently applicable District rules. Absent a demonstration, these CO Interim Limits should be removed from the rule, or at least changed to reflect the least restrictive CO limits that would apply for each class/category of equipment pursuant to existing District rules.**

   The District has included CO Interim Limits in PR1109.1 Table 3. As explained above, these CO limits would impose emissions limitations which may be more restrictive than the limits found under existing District rules and/or the applicable District-issued Permits to Operate. To date, the District has not provided stakeholders with information about the baseline CO emissions performance for the PR1109.1 equipment or demonstrated that the proposed CO Interim Limits are in fact "hold the line" limits. Additionally, as described above, the District has not identified a need for new CO limits. For this reason. WSPA believes the District should remove these CO limits from Table 3. Alternatively, the District could change these values to match the least restrictive CO concentration limit applicable under existing District rules.

9. **SCAQMD Rule 1303 requires implementation of Best Available Control Technology (BACT) for any new or modified source that results in an emission increase of any nonattainment air contaminant. The District has proposed to amend Rule 1304 to include language that provides a limited BACT exemption for certain modifications made in order to comply with a BARCT rule. WSPA has been working with the District for over a year on this co-pollutant BACT matter and stakeholder concerns that facilities' efforts to comply with PR1109.1 could inadvertently trigger a PM or SOx BACT requirement. WSPA is supportive of the District's PAR1304 proposal to resolve this matter, but the District must affirmatively demonstrate that the proposal will be approvable by the United States Environmental Protection Agency (US EPA) and the California Air Resources Board (CARB) since the (future) availability of the PAR1304 exemption is a key premise underlying the District's cost-effectiveness analysis for the District's proposed PR1109.1 $NO_X$ BARCT determination.**

   WSPA has been working with the District for over a year on the co-pollutant BACT matter and stakeholder concerns that facilities' efforts to comply with PR1109.1 could inadvertently trigger a PM or SOx BACT requirement. WSPA supports the District's PAR1304 proposal to resolve this matter, but the District needs to affirmatively demonstrate that the proposal will be approvable by US EPA and CARB since the availability of the exemption is a key premise underlying the District's cost-effectiveness analysis for the proposed NOx BARCT standards.

WSPA appreciates the opportunity to provide these comments related to PR1109.1 and PAR1304. We look forward to continued discussion of this important rulemaking. If you have any questions, please contact me at (310) 808-2144 or via e-mail at psenecal@wspa.org.

Sincerely,

Cathy Senecal

Cc: Wayne Nastri, SCAQMD
Susan Nakamura, SCAQMD
Cathy Reheis-Boyd, WSPA