



**BAY AREA
AIR QUALITY
MANAGEMENT
DISTRICT**

October 19, 2023

Anne Partmann
Environmental Supervisor - Martinez Refinery
Tesoro Refining & Marketing Company LLC
150 Solano Way
Martinez, CA 94553

RE: Disapproval of Regulation 12, Rule 15 Fenceline Air Monitoring Plan and Quality Assurance Project Plan

Dear Ms. Partmann:

On September 5, 2023, Tesoro Refining & Marketing Company (Tesoro) submitted a revised fenceline air monitoring plan (AMP) and quality assurance project plan (QAPP) to the Bay Area Air Quality Management District (Air District). Tesoro submitted the AMP and QAPP in response to the Air District's July 19, 2023 Notice of Deficiency (NOD), as required by Air District Regulation 12-15-404.4.

Having reviewed the AMP and QAPP, the Air District has determined that Tesoro failed to correct several deficiencies with respect to Regulation 12-15 or the Air Monitoring Guidelines for Petroleum Refineries, which the Air District identified in the NOD; the specific deficiencies Tesoro failed to correct are discussed in Attachment 1 to this letter. These remaining deficiencies are fundamental to compliance with Regulation 12-15. As a result, the AMP and QAPP do not meet the requirements in Section 12-15-403. Therefore, pursuant to Section 12-15-404.4, the Air District hereby disapproves Tesoro's AMP and QAPP.

Tesoro must develop an approvable AMP and QAPP that complies with Regulation 12-15; the Air District looks forward to working with you on that effort. If you have any questions regarding this notification, please contact me at jbovee@baaqmd.gov.

Sincerely,

Jerry Bovee, P.E., QSTI
Air Quality Engineering Manager

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Attachment 1 - Basis for Disapproval of Tesoro's Fenceline Air Monitoring Plan and Quality Assurance Project Plan

1. With regard to data completeness, the Air Monitoring Guidelines for Petroleum Refineries (Guidelines; p. 5) established pursuant to District Regulation 12-15-406 in April 2016 require that fenceline measurements be continuously measured with a time resolution of five minutes, and that instrumentation must meet a minimum of 75% completeness on an hourly basis 90% of the time based on annual quarters. The Air District's July 19, 2023 Notice of Deficiency (NOD) stated that while the air monitoring plan (AMP) and quality assurance project plan (QAPP) provided various statistics that will be used to calculate completeness, they lacked adequate detail to establish exactly how completeness will be demonstrated. To resolve this issue, the NOD stated that the procedures set forth in our December 22, 2022 letter interpreting Regulation 12-15 and the Guidelines must be incorporated into the AMP and QAPP.¹

While Tesoro did incorporate those procedures into the QAPP, the text in the AMP is incomplete and inconsistent with the procedures in the QAPP. Specifically, the AMP (p. 25) states:

Completeness is calculated as follows:

- **Possible:** The theoretical maximum number of 1-hr average data points in a clock hour.
- **Incomplete:** The number of 1-hr average data points that do not meet the completeness criteria.
- **% Incomplete:** The percentage of Incomplete data points relative to Possible data points.
- **Complete:** The number of 1-hr average data points that do meet the completeness criteria.
- **% Complete:** The percentage of Complete data points relative to Possible data points.

As outlined in the QAPP, completeness is not calculated as the percentage of complete data points relative to the number of possible data points. While the text in the AMP does not need to be identical to that in the QAPP, the two documents must be consistent with one another. As the AMP is inconsistent with the QAPP, it remains deficient.

2. Recognizing that open-path measurements are affected by low-visibility conditions like dense fog, the Guidelines (p. 5) state that data from such periods will not count against data completeness requirements as long as appropriate meteorological measurements document time periods when those conditions exist. However, the Guidelines do not similarly allow for the exclusion of invalid or missing data associated with maintenance activities. The NOD stated that language allowing for the exclusion of data during planned maintenance is inconsistent with the Guidelines and must be removed from the AMP and QAPP, and that the procedures for calculating data completeness in Attachment 3 to our December 22, 2022 letter must be added.²

While Tesoro did incorporate those procedures into the QAPP, the AMP (p. 25) still states, "Exclusionary conditions include low-visibility atmospheric conditions beyond the control of the refinery, as well as planned maintenance activities, which are not counted against the refinery for data completeness calculations." The AMP therefore remains deficient in this regard.

¹ See Attachment 1 to the July 19, 2023 NOD, issue number 2, pp. 1-2

² See Attachment 1 to the July 19, 2023 NOD, issue number 3, p. 2

3. With regard to quality assurance and quality control (QA/QC), the Guidelines (p. 10) require the AMP to include a QAPP that follows EPA guidelines and specifies methodologies for ensuring appropriate levels of QA/QC, data acceptance criteria, levels of data quality, data management issues and procedures, and data review and validation procedures. The NOD stated that the AMP, QAPP, and associated appendices contained an insufficient level of detail regarding the methods, procedures, equations, and calculations that will be used to carry out these activities.³ The NOD also stated that the AMP and QAPP are unclear and ambiguous about how the data are managed and validated.⁴ To address these deficiencies, the NOD stated that Tesoro must provide standard operating procedures (SOPs) or other documentation to more fully describe these activities. Specifically, the NOD stated that Tesoro must:
- a. attach to the QAPP detailed SOPs for all performance indicator checks, corrective actions, maintenance activities, QA/QC activities, data management activities, and reporting activities;
 - b. for each performance indicator check, corrective action, maintenance activity, QA/QC activity, data management activity, or reporting activity identified in the AMP or QAPP, provide references to the relevant SOPs;
 - c. include in the QAPP a detailed process flow diagram depicting the end-to-end data handling, review, and management process, from the moment of data acquisition to the quarterly submittal of final quality-controlled data to the Air District;
 - d. revise the narrative descriptions of the data handling, review, and management process in the AMP and QAPP to clearly and fully describe the step-by-step process depicted in the flow diagram;
 - e. articulate all decision rules used to automatically or manually screen data; and
 - f. illustrate the application of all auto-screening rules using real data and screen shots depicting how the auto-screened data are depicted on the public website.⁵

While the AMP (pages 25 and 27) and QAPP (page 2) refer to the existence of SOPs, Tesoro's September 5, 2023, submittal did not include any SOPs beyond those previously provided to the Air District (e.g., Appendix C to the QAPP - *Unisearch LasIR Tunable Diode Laser System (TDLAS) Maintenance and Audit Procedure*). Furthermore, this SOP states that it is a, "working draft" for initial system validation and that it must be reviewed for compliance with local safety and quality assurance practices. Additionally, Tesoro failed to reference it throughout the QAPP, as stated in the NOD. Aside from relatively minor edits to the QAPP (e.g., to remove references to "an evolving checklist" of system performance indicators), Tesoro did not substantively address this issue identified in the NOD; many activities and the procedures for performing them remain poorly described in the AMP and QAPP. For example:

- With regard to maintenance of the tunable diode laser (TDL), page 28 of the AMP states that on an as-needed basis, system status alarms may alert operators to specific issues that need to be addressed. It is unclear what system status checks are referred to, why they are enabled on an "as-needed" basis, under what circumstances they are enabled, how operators are alerted, and what actions are taken in response to each alarm.
- Table 5 of the AMP and Table 4 of the QAPP identify several maintenance activities for the TDL including:
 - visually inspecting the system,

³ See Attachment 1 to the July 19, 2023 NOD, issue number 5, pp. 2-3

⁴ See Attachment 1 to the July 19, 2023 NOD, issue number 15, pp. 7-8

⁵ The Air District's July 19, 2023 NOD additionally stated that Tesoro should improve transparency about the data on its website by providing alternative views that show invalidated data. In discussions with Tesoro and its contractor following issuance of the NOD, the Air District stated that such changes to the website need not be addressed at this time.

- inspecting the optics on the detectors and cleaning them if necessary,
- checking the alignment to verify there has not been significant physical movement,
- downloading data older than 12 months from the analyzer hard drive, moving the data to a permanent archive, and deleting old files from the analyzer;
- checking long term trends in the signal intensity to evaluate the health of the optical components, the effects of cleaning optical components, and the noise characteristics of the spectral data;
- ensuring there are no obstructions between the detector and the retro-reflector, and
- inspecting all electrical and optical cables for wear and replacing them as necessary.

The AMP and QAPP are unclear about the following information, which should be included in SOPs according to guidance from the US Environmental Protection Agency:⁶

- the scope of these activities,
 - the step-by-step procedures for carrying out the activities,
 - what personnel qualifications are needed to perform the activities,
 - what equipment and supplies are necessary,
 - the availability of spare parts and equipment,
 - what health and safety warnings must be followed to prevent personal injury, and
 - what other precautions must be followed to prevent equipment damage.
- With respect to maintenance of the visibility instruments, page 30 of the AMP and pages 14-15 of the QAPP state that the instrument will be visually inspected on a monthly basis, the optics will be inspected and cleaned as necessary on a monthly basis, and that the instrument calibration will be checked semi-annually. The QAPP goes on to say that the maintenance schedules will be adjusted as needed. Tables 7 and 10 of the AMP and tables 6 and 11 of the QAPP additionally state that the acceptance threshold for the percent error of the instrument is $\pm 25\%$. The AMP and QAPP are unclear about the details for performing these activities (e.g., scope, step-by-step procedures, personnel qualifications, equipment and supplies, availability of parts and equipment, health and safety warnings, and other precautions).
 - With regard to quarterly data validation, page 29 of the QAPP states that statistical tests are used to ensure the data are valid for the intended end use. Additionally, page 37 of the AMP and page 29 of the QAPP state that the data are validated by looking for statistical anomalies and outliers. The AMP and QAPP are unclear about what statistical tests are applied and how they are used to validate the data. The AMP and QAPP are also unclear about how outliers are defined and identified in the data, and about what is done with them.
 - With regard to quarterly data validation, page 37 of the AMP and page 29 of the QAPP state that the reasonableness of the data are ensured by comparing them to “other sources of data.” It is unclear how this is performed, what data are used, and what is done with the results of this comparison.
 - With regard to quarterly data validation, page 37 of the AMP and page 30 of the QAPP state that the reasonableness of the data is confirmed by assessing instrument meta-data. It is unclear how this is performed, what meta-data are used, and what is done with the results of this assessment.

⁶ United States Environmental Protection Agency, (2007). Guidance for Preparing Standard Operating Procedures (SOPs) [QA/G-6]. Available at <https://www.epa.gov/quality/agency-wide-quality-program-documents>.

- With regard to quarterly data validation, page 29 of the QAPP states that the QA Manager evaluates QA and QC procedures and ensures adherence to the methods for meeting data quality objectives. It is unclear in the QAPP how both of these activities are carried out.
- Page 37 of the AMP and page 6 of the QAPP explain that because the Unisearch TDL operates in a wavelength range that also contains an absorbance feature for water vapor and carbon dioxide, the correlation coefficient of these gases can be used as a performance metric. It goes on to say that if the water vapor correlation drops below a threshold value, the carbon dioxide correlation is examined and if that is also below a threshold value the data are flagged as invalid. While Table 10 of the AMP and Table 11 of the QAPP state that the water vapor correlation is measured continuously with an acceptance threshold of ≥ 0.95 , these tables do not similarly identify an instrument check and corresponding acceptance threshold for the carbon dioxide correlation coefficient. These checks are also not discussed in detail in the section of the QAPP pertaining to data validation, and it is unclear when and how these checks are applied to the data.
- Page 19 of the QAPP states that the automated data QC process flags any data with poor spectral matches to reference libraries. The QAPP lacks detail about the reference libraries and how they are applied and maintained.
- Page 21 of the AMP and page 7 of the QAPP state that data with real-time MDL values greater than 25 ppb are flagged for additional review. However, the flagging and review of MDL values greater than 25 ppb are not otherwise discussed in the sections of the AMP and QAPP pertaining to automated data screening or subsequent data validation. In addition, while Table 9 of the AMP and Table 10 of the QAPP indicate that measured concentrations below the MDL are flagged, they do not indicate that MDL values themselves are checked and flagged. Similarly, while Table 9 of the QAPP includes an operational code for values below the MDL, there is no clear code for flagging values when the MDL is outside of the required range. It is thus unclear in the AMP and QAPP when and how this check is applied and what follow-up actions are taken.
- To the extent flagged measurements appear on the public website, the AMP and QAPP are unclear about an acceptable time frame for resolving the flags.
- With respect to measuring the system precision and accuracy, page 23 of the QAPP states that during these tests a number (N) of replicated measurements of a standard reference material of known magnitude will be measured and various statistics will be calculated. While the QAPP states that an acceptable number of trials is defined as $7 \leq N \leq 15$, it is unclear whether this represents raw 8-second measurements, or measurements averaged over a period of time.
- With respect to emergency maintenance procedures, page 16 of the QAPP states that corrective action will be taken to ensure that data quality objectives are met. The QAPP refers to Table 8, which identifies potential sampling and data reporting problems and corrective actions. Page 16 of the QAPP goes on to say that this table is not all-inclusive. The QAPP is unclear about how Tesoro intends to respond to other anticipated issues.

As the AMP and the QAPP continue to lack sufficient detail regarding the procedures for maintenance activities, QA/QC activities, and data management, review, and validation, they are deficient. For guidance on the development of an adequate QAPP and SOPs, see EPA guidance document QA/G-5, *Guidance for Quality Assurance Project Plans*, and guidance document QA/G-6, *Guidance for Preparing Standard Operating Procedures (SOPs)*.

4. With regard to assessment of the TDL's accuracy and precision during monthly bump tests, the NOD stated that the AMP and QAPP were inconsistent with the requirement that the TDL have a measurement accuracy within 15% of the reference standard and a coefficient of variation (CV) not greater than 15%. To address this issue, the NOD stated the AMP, QAPP, and any SOPs must clearly state that the system's

accuracy (as % Error) and precision (as % CV) will be assessed during each bump test, with acceptance criteria of $\leq 15\%$ for both performance indicators.⁷

While Tesoro revised Table 10 of the AMP (p. 36) and Table 11 of the QAPP (p. 31) to add acceptance criteria of $\pm 15\%$, both tables include a footnote, which states that the accuracy and repeatability specifications will be treated as objectives to become requirements at some future time, once it has been proven they can be reliably met for all seasons and atmospheric conditions.

At a meeting with representatives from Tesoro and other refineries on September 19, 2023, the Air District and refinery representatives discussed the need for the plans to lay out a pathway for meeting the performance specifications if they cannot be met at the present time. As currently written, Tesoro's plan treats the accuracy and repeatability specifications as future requirements, but lacks sufficient detail for approval by the Air District. Tesoro must elaborate on the process it would use to prove the specifications can be met under varying conditions, suggest a time frame for making such a demonstration, or suggest a process by which the "objectives" would become actual requirements. The Air District can approve an adequately detailed plan for meeting the accuracy and precision specifications, but in their current form, the AMP and QAPP remain deficient.

5. With regard to assessment of the TDL's accuracy and precision during quarterly 3-point calibration checks, the NOD stated that the AMP and QAPP were inconsistent with the requirement that the TDL have a measurement accuracy within 15% of the reference standard and CV not greater than 15%. To address this issue, the NOD stated that the AMP, QAPP, and any SOPs must clearly state that both accuracy (as % Error) and precision (as %CV) will be assessed during each 3-point calibration check, with acceptance criteria of $\leq 15\%$ for both performance indicators at each calibration point.⁸

While Tesoro revised Table 10 of the AMP (p. 36) and Table 11 of the QAPP (p. 31) to include acceptance criteria of $\pm 15\%$, both tables reference the same footnote discussed above regarding the acceptance criteria for the monthly bump tests. For the same reasons stated above regarding the bump tests, the revised AMP and QAPP remain deficient with respect to the acceptance criteria for the quarterly 3-point calibration checks.

6. With regard to the required 3-point calibration checks and bump tests, the Air District's December 22, 2022 letter stated that a failure to meet the stated accuracy and precision specifications must trigger repair, maintenance, and root cause analysis, followed by repeat calibration checks or bump tests, until a passing check or test is completed. The letter also stated that all steps in this process, including results of each passing and failed calibration check and bump test, and monitor response or calibration adjustments, must be fully documented in the quarterly report submitted to the Air District. The NOD explained that while page 23 of the QAPP states that repair, maintenance, and root-cause analysis will be performed if monthly bump test accuracy and precision specifications are not met, the QAPP does not contain similar provisions for failed 3-point calibration checks.⁹

Tesoro failed to address this issue in the NOD and the QAPP remains deficient.

7. With regard to the detection capabilities of the TDL, the Air District's December 22, 2022 letter stated that a TDL system used to monitor hydrogen sulfide must have a limit of quantitation (LOQ), which ranges

⁷ See Attachment 1 to the July 19, 2023 NOD, issue number 7, p. 4

⁸ See Attachment 1 to the July 19, 2023 NOD, issue number 8, p. 5

⁹ See Attachment 1 to the July 19, 2023 NOD, issue number 9, pp. 5-6

from 3 to 25 ppb depending on environmental and operational conditions. The NOD stated that the AMP and QAPP were inconsistent with this requirement and that Tesoro must revise the AMP and QAPP to explain how the LOQ is determined and reflect that the LOQ must be between 3 and 25 ppb.¹⁰

In response to this issue in the NOD, Tesoro revised the AMP and QAPP to state that the LOQ is considered to be equivalent to the MDL. While we are not taking issue with that approach per se, the AMP and QAPP contain multiple definitions of the LOQ. For example, at the top of page 21, the AMP states that it is calculated as twice the standard deviation of a blank sample but on the same page the AMP states that it is calculated as three times the standard deviation of the last seven 5-minute average concentration values containing no measurable analyte. While it is not necessarily inappropriate to use various approaches for quantifying the detection capabilities of the monitoring equipment, the AMP and QAPP must be clear about when, how, and for what purpose those approaches are used. Because of the lack of clarity in the AMP and QAPP, they remain deficient in this regard.

¹⁰ See Attachment 1 to the July 19, 2023 NOD, issue number 11, p. 6