



Discussion Draft
Performance Standards for
Continuously Operating
Emissions Detection Systems
Required by California Senate Bill 1137
for Upstream Oil and Gas Production
Facilities in Health Protection Zones

****Draft — January 5, 2026****

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Discussion Draft Performance Standards for Continuously Operating Emissions
Detection Systems Required by California Senate Bill 1137 for Upstream Oil and Gas
Production Facilities in California

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Citation: CARB. 2026. Discussion Draft Performance Standards for Continuously Operating Emissions Detection Systems Required by California Senate Bill 1137 for Upstream Oil and Gas Production Facilities in Health Protection Zones. Draft document prepared by staff of the Monitoring and Laboratory Division, California Air Resources Board (CARB). January 5, 2026.

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Title 17. Public Health

Division 3. Air Resources

Chapter 1. Air Resources Board

Subchapter 7.8. Performance Standards for Continuously Operating Emissions
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Title 17, California Code of Regulations

Adopt subchapter 7.8 of title 17, California Code of Regulations, to read as follows:

[Note: The entire text of sections 93500 through 93506 set forth below is a ***discussion draft*** of new language in “normal type” proposed to be added to title 17, California Code of Regulations.]

§ 93500. Scope and Purpose.

- (a) The purpose of this subchapter is to implement and make specific the provisions of Public Resources Code, Division 3, Chapter 1, Article 4.6, section 3283(a), to accomplish the purposes of Article 4.6 as declared in Statutes of 2022, chapter 365, section 1 (Senate Bill 1137). This subchapter identifies performance standards for continuously operating emissions detection systems (EDS). Public Resources Code section 3283(a) requires all of the following:
 - (1) All operators of oil and gas production facilities in a health protection zone shall develop a leak detection and response plan (LDRP) that must be submitted to the Geologic Energy Management Division in the California Department of Conservation (CalGEM) no later than July 1, 2028, and fully implemented by operators by July 1, 2030.
 - (2) LDRPs shall include an EDS designed to provide for rapid detection of target chemical constituents to identify leaks before emissions impact the surrounding communities.
 - (3) California Air Resources Board (CARB) and the State Water Resources Control Board are directed to adopt regulations as necessary to set performance standards by regulation for the EDS to be implemented by operators of oil and gas production facilities within a health protection zone.
- (b) Pursuant to Public Resources Code section 3283(a), LDRPs are subject to review and approval by CalGEM, in consultation with and with the concurrence of CARB. CARB does not have enforcement authority. This subchapter is therefore limited to requirements for EDS performance standard implementation by operators in their LDRPs.

Note: Authority cited: Sections 3283 and 3288, Public Resources Code.

Reference: Sections 3280 and 3283, Public Resources Code.

§ 93501. Applicability.

- (a) This subchapter applies to all operators with a production facility or well with a wellhead in a health protection zone required to develop a leak detection and response plan including a continuously operating emissions detection system pursuant to Public Resources Code section 3283(a). Pursuant to Public Resources Code section 3281(d), underground gas storage wells and attendant production facilities are not subject to this subchapter.

Note: Authority cited: Sections 3280, 3282 and 3283, Public Resources Code; Section 39600, Health and Safety Code. Reference: Sections 3281 and 3283, Public Resources Code.

§ 93502. Definitions.

- (a) For the purposes of this subchapter, the following definitions shall apply:
 - (1) “Air district” or “local air district” means the local Air Quality Management District or the local Air Pollution Control District.
 - (2) “Alert threshold” means the predetermined threshold at which the continuously operating emissions detection system (EDS) signals a potential leak event requiring investigation by the operator.
 - (3) “CalGEM” means the Geologic Energy Management Division in the California Department of Conservation.
 - (4) “CARB” means the California Air Resources Board.
 - (5) “Continuously operating emissions detection system” or “EDS” means a system of one (1) or more sensors or monitors that operates automatically to detect and report the presence of target chemical constituents in ambient air from leaks or fugitive emissions of oil and gas production equipment. This definition of an EDS includes any associated hardware, software, and analytics used to detect fugitive emissions. An EDS shall be capable of continuous air monitoring (measurement resolution one (1) hour or less), shall be capable of providing time-resolved measurement data, and shall include automated alerting functionality that enables rapid operator response to leak emission events. An EDS shall include an alarm system. An EDS shall be programmed to automatically trigger the alarm system and generate and send a notification as soon as technically feasible, but no later than 15 minutes after a target chemical constituent

identified in the approved leak detection and response plan exceeds an applicable alert threshold. An EDS shall be programmed to automatically generate and send a notification to the operator in the event of a sensor or monitor failure. An EDS shall have sufficient sensors to continuously measure meteorological conditions at the facility including wind speed, wind direction, ambient temperature, ambient pressure, and relative humidity with the ability to continuously record measurements. An EDS shall have the ability to store at least five (5) years of continuous instrument data and the ability to generate hourly, daily, weekly, monthly, and annual reports.

- (6) "Corrective action plan" means a plan that details the actions an operator will execute to correct any deficiencies identified in an independent audit report.
- (7) "Data quality indicators" means the quantitative statistics and qualitative descriptors that are used to interpret the degree of acceptability or utility of data. The principal data quality indicators are bias, precision, comparability, completeness, and representativeness, as understood in U.S. EPA quality assurance guidance.
- (8) "Detection target" means the specific chemical constituent that has been identified for detection by the EDS.
- (9) "Emissions" means the discharge of natural gas and any associated toxic air contaminants (TAC) into the atmosphere.
- (10) "Executive Officer" means the Executive Officer of CARB or her or his designee.
- (11) "Fixed LiDAR camera" means a ground-based stationary light detection and ranging EDS that uses light from a laser to detect emissions and measure concentrations within its field of view.
- (12) "Fixed OGI camera" means a ground-based stationary optical gas imaging EDS designed for and capable of detecting (or producing a detectable image of) hydrocarbons.
- (13) "Glycol dehydration process" means any production equipment containing a glycol dehydrator or glycol system process. This describes any location containing a glycol dehydrator, glycol process vessel, or glycol scrubber.
- (14) "Health protection zone" means the area within 3,200 feet of a sensitive receptor. The measurement shall be made from the property line of the

receptor unless the receptor building is more than 50 feet set back from the property line, in which case the measurement shall be made from the outline of the building footprint to 3,200 feet in all directions, pursuant to section 3280(b) of the Public Resources Code.

- (15) "Independent performance audit" means an assessment conducted by a qualified independent party with relevant technical expertise in EDS that was not involved in the implementation of the EDS being audited, including the installation, operation, maintenance, and quality assurance procedures.
- (16) "LDRP" means leak detection and response plan specified by Public Resources Code section 3283(a).
- (17) "Leak" means the unintentional release of emissions.
- (18) "LiDAR" means a light detection and ranging sensor that uses light from a laser to detect emissions and measure concentrations within its field of view. The laser light can be transmitted in the ultraviolet, visible, or infrared wave range.
- (19) "Natural gas" means a naturally occurring mixture or process derivative of hydrocarbon and nonhydrocarbon gases. Its constituents include the greenhouse gases methane and carbon dioxide, as well as heavier hydrocarbons. Natural gas may be field quality (which varies widely) or commercial quality.
- (20) "NIST-traceable standards" means national, traceable measurement standards developed by the National Institute of Standards and Technology (NIST).
- (21) "OEHHA" means California Office of Environmental Health Hazard Assessment.
- (22) "OEHHA Air Toxics Hot Spots Program Guidance Manual" means the [Air Toxics Hot Spots Program Risk Assessment Guidelines, Guidance Manual for Preparation of Health Risk Assessments](#), published by the Office of Environmental Health Hazard Assessment, February 2015, and any subsequent revisions or updates OEHHA may make to the manual thereto, which is incorporated by reference in this subchapter.
- (23) "Open-path EDS" means an EDS that transmits a laser beam across an open-air path and measures the absorption of specific wavelengths by

target gas molecules, allowing determination of the average gas concentration along the beam.

- (24) “Operator” means a person who, by virtue of ownership, or under the authority of a lease or any other agreement, has the right to drill, operate, maintain, or control a well or production facility.
- (25) “Out-of-control” means a sensor or monitor that fails ongoing quality assurance checks, as specified in subparagraph 93504(m)(8)(I), or if the sensor or monitor output is outside of range.
- (26) “Point sensor network EDS” means an EDS that consists of a network of point sensors installed at fixed locations.
- (27) “Processing equipment” means any production equipment used to separate, thermally treat, remove (‘scrub’), or add to original material from wells, or compress material flow downstream of well or wellhead processes including, but not limited to, oil and water separators, amine vessels, production separators, gas and condensate separators, compressors, water/oil/gas separators, free water knockouts, produced water, flare scrubber, vapor recovery from processing equipment, and vent scrubbers.
- (28) “Production equipment” or “production facility” means any equipment associated with oil and gas production or injection operations including, but not limited to, tanks, flowlines, headers, gathering lines, wellheads, heater treaters, pumps, valves, compressors, injection equipment, production safety systems, separators, manifolds, and pipelines that are not under the jurisdiction of the State Fire Marshal pursuant to section 51010 of the Government Code, excluding fire suppression equipment. “Production equipment” and “production facility” are used interchangeably.
- (29) “Qualified independent party” means a person, research institution, educational institution, consulting firm, analytical laboratory, vendor, or other organization with the relevant technical training and experience that is not an employee of the operator.
- (30) “Qualified personnel” means a person with the relevant technical training and experience who may be an employee of the operator or a qualified independent party.
- (31) “Reference exposure level” or “REL” means a concentration level at or below which no adverse noncancer health effects are anticipated for the

specified exposure duration. RELs adopted by OEHHA are presented in the [“OEHHA Acute, 8-hour and Chronic Reference Exposure Level \(REL\) Summary,”](#) August 2020, with webpage date of October 23, 2023, and any subsequent revisions or updates OEHHA may make to the REL summary webpage thereto.

- (32) “REL-level leak rate” means the minimum leak rate of the detection target from a piece of production equipment, or group of production equipment, that would result in a one (1) hour ground-level concentration at a sensitive receptor within the health protection zone exceeding the acute REL of the toxic of highest concern in air dispersion modeling results.
- (33) “Scanning or imaging EDS” means a monitoring technology that detects the presence or location of emissions by collecting and analyzing visual, infrared, or other spectral images over a defined field of view, which may include stationary, panning, or scanning configurations. Examples include fixed OGI and fixed LiDAR cameras.
- (34) “Sensitivity” means the ability of an EDS to detect the presence of leaks at the REL-level leak rates of the production equipment monitored by the EDS.
- (35) “Sensitive receptor” means, for the purpose of this regulation, any of the sensitive receptor examples listed in section 3280(c) of the Public Resources Code and section 1765.1(c) in title 14, California Code of Regulations (effective June 27, 2024).
- (36) “Separator” means any tank or pressure separator used for the primary purpose of separating crude oil, produced water, and natural gas or for separating natural gas, condensate, and produced water. In crude oil production, a wash tank may be referred to as a separator. A separator that separates crude oil, produced water, and natural gas may be referred to as a three-phase separator.
- (37) “Storage equipment” means a subset of production equipment that act as temporary storage of material prior to any further production processes including, but not limited to, gauge tanks, surge tanks, skim tanks, drain tanks, chemical tanks, reject tanks, vapor recovery from tanks, and slop tanks.
- (38) “Tank” means any container constructed primarily of nonearthen materials used for the purpose of storing, holding, or separating emulsion, crude oil, condensate, or produced water and that is designed to operate below 15 psig normal operating pressure.

- (39) "Tank system" means the first separator in a crude oil or natural gas production system and any tank or sump connected directly to the first separator.
- (40) "Toxic of highest concern" means the TAC present in site-specific natural gas chemical composition testing that would exceed its associated acute REL at a sensitive receptor first.
- (41) "Timeliness" means the extent to which emissions detection data, alerts, or reports are available within a timeframe that allows for effective response, investigation, or regulatory compliance.
- (42) "Toxic air contaminant" or "TAC" means an air pollutant which may cause or contribute to an increase in mortality or in serious illness, or which may pose a present or potential hazard to human health. A substance that is identified as a hazardous air pollutant pursuant to subsection (b) of Section 112 of the federal act (42 U.S.C. Sec. 7412(b)) and has been designated by CARB to be a TAC pursuant to Health and Safety Code section 39657. TACs are identified in title 17, California Code of Regulations sections 93000 and 93001.
- (43) "Well" means any oil or gas well or well for the discovery of oil or gas; any well on lands producing or reasonably presumed to contain oil or gas; any well drilled for the purpose of injecting fluids or gas for stimulating oil or gas recovery, repressuring or pressure maintenance of oil or gas reservoirs, or disposing of waste fluids from an oil or gas field; any well used to inject or withdraw gas from an underground storage facility; any gravity-based energy storage well created pursuant to Public Resources Code sections 3474, et seq.; or any well drilled within or adjacent to an oil or gas pool for the purpose of obtaining water to be used in production stimulation or repressuring operations.
- (44) "Well casing vent" means an opening on a well head that blocks or allows natural gas to flow to the atmosphere or to a vapor collection system.
- (45) "Wellhead" means the piping, casing, tubing, and connected valves protruding above the earth's surface for an oil or natural gas well. The wellhead ends where the flow line connects to a wellhead valve. The wellhead does not include other equipment at the well site except for any conveyance through which gas is vented to the atmosphere.
- (46) "Well or wellhead process" means all production equipment from the wellhead until reaching any storage equipment. This process includes, but is not limited to, all production equipment associated with "well", "well

casing vent”, “or “wellhead”, and wellhead pipelines, threaded fittings, casing, and associated tubing.

Note: Authority cited: Sections 3280 and 3283, Public Resources Code; Section 39600, Health and Safety Code. Reference: Sections 3006, 3007, 3008, 3009, 3010, 3280, 3283 and 3286, Public Resources Code; Sections 39655 and 39657, Health and Safety Code.

§ 93503. Requirements Specified by Public Resources Code Section 3283(a).

Public Resources Code section 3283(a) specifies the following requirements for leak detection and response plans (LDRP) and associated continuously operating emissions detection systems (EDS).

- (a) All operators with a production facility or well with a wellhead in a health protection zone shall develop an LDRP that shall be submitted to CalGEM no later than July 1, 2028, and fully implemented by operators by July 1, 2030.
- (b) For any LDRP submitted by July 1, 2028, CalGEM shall either approve the plan or provide notice of deficiencies by July 1, 2029.
- (c) Commencing July 1, 2030, the operator shall suspend all production and injection operations within a health protection zone unless an approved LDRP is fully implemented in that area.
- (d) An LDRP shall be reviewed and updated by the operator, subject to CalGEM approval, at least once every five (5) years from the date of its initial approval by CalGEM.
- (e) The LDRP is subject to review and approval by CalGEM, in consultation with and with the concurrence of CARB.

The LDRP shall include a response plan for notification of community members and emergency services, if needed, in the event an alert indicates a toxic of highest concern is likely to impact a sensitive receptor. The response plan shall also include the operator’s protocol for inspecting the facility when an alert is triggered.

§ 93504. Standards to Make Specific the Requirements for Continuously Operating Emissions Detection Systems Pursuant to Public Resources Code Section 3283.

The following performance standards are designed to ensure EDS selected and implemented by operators are capable of the Public Resources Code section 3283(a) requirement that EDS continuously provide for rapid detection of target chemical constituents to identify leaks before emissions impact the surrounding communities as

well as other requirements within section 3283. To the extent operators have an emissions detection system in service that qualifies as an EDS, no new emission monitoring system is required and operators may instead submit the system details in their LDRP for approval.

- (a) Potential toxics of highest concern that can be used as a detection target for EDS for all regions of California are identified in Table 1.

Table 1. Potential toxics of highest concern.

Chemical Species	OEHHA Reference Exposure Level (REL) ($\mu\text{g}/\text{m}^3$)	CAS Number
Benzene	2.70×10^1	71-43-2
Toluene	5.50×10^3	108-88-3
Ortho-xylene	2.20×10^4	95-47-6
Meta-xylene	2.20×10^4	108-38-3
Para-xylene	2.20×10^4	106-42-3
n-Hexane	7.00×10^3	110-54-3
Hydrogen sulfide	4.2×10^1	7783-06-4

- (1) Site-specific natural gas chemical composition testing pursuant to paragraph 93504(b) is required to identify the site-specific toxic of highest concern.
- (2) Site-specific natural gas chemical composition testing pursuant to paragraph 93504(b) shall be repeated when an LDRP is updated as required by Public Resources Code section 3283(e).
- (3) Methane may be used as a surrogate detection target for the site-specific toxic of highest concern if all of the following site-specific criteria are met:
 - (A) The relationship between methane and the site-specific toxic of highest concern (e.g., benzene) is determined using the site-specific composition source testing methodology in paragraph 93504(b).

- (B) The proposed methane EDS shall meet the performance standards pursuant to section 93504.
- (b) An LDRP shall identify the site-specific toxic of highest concern, and if a methane EDS is utilized, the LDRP shall establish methane as a surrogate for the site-specific toxic of highest concern using the following methodology:
 - (1) Conduct site-specific natural gas composition source testing to identify natural gas composition for production equipment monitored by the EDS. Compositional source testing must include the potential toxics of highest concern listed in Table 1 of paragraph 93504(a).
 - (A) Chemical composition source samples shall be collected by a qualified independent party in accordance with one of the following methods:
 - 1. U.S. EPA Method 18 (April 1, 2025), which is incorporated herein by reference; or
 - 2. U.S. EPA Method TO-15A (September 2019), which is incorporated herein by reference; or
 - 3. API MPMS 14.1 (May 1, 2016), which is incorporated herein by reference.
 - (B) Sample chemical composition analysis shall be conducted by a qualified independent party in accordance with the following methods:
 - 1. U.S. EPA Method TO-15A (September 2019); or U.S. EPA Method 18 (April 1, 2025) for composition analysis of TACs. For the chemical species listed in Table 1 of paragraph 93504(a), the analysis method shall have the capability of detecting these chemical species in the source samples at concentrations as low as one (1) ppmv.
 - 2. As applicable, ASTM D1945-14 (September 26, 2023) for composition analysis of methane, which is incorporated herein by reference.
 - (C) Chemical composition source samples shall be collected during the routine and representative operational state of the production equipment during periods of planned, steady-state operation. This excludes periods of startup, shutdown, maintenance, malfunction, or other nontypical operating modes. Production equipment shall be

operating at or near its usual throughput, pressure, and temperature.

- (D) As applicable, if methane and TAC concentrations for a piece of production equipment are obtained from separate samples, samples shall be collected at the same time and location.
- (E) For the purposes of this sampling method, the production process is divided into four categories for collecting natural gas samples. These process categories will be used to classify sampling site locations within the LDRP. A minimum of three (3) samples shall be collected for each production process associated with production equipment monitored by the EDS.
 - 1. Well or wellhead process category
 - 2. Storage equipment process category
 - 3. Processing equipment process category
 - 4. Glycol dehydration process category
- (2) The compound with the highest weighted risk contribution is the site-specific toxic of highest concern. For each compound listed in Table 1 of paragraph 93504(a) that is present in sampling results, calculate the compound-specific acute risk factor (RF) and weighted risk contribution.
 - (A) Compositional source measurements for each production process category shall be averaged by calculating the arithmetic mean species mass percentage of each compound present in the source test measurements.
 - (B) Compound-specific acute risk factors shall be calculated using Equation 1:

$$RF(acute) = \frac{\text{Pollutant Mass Percentage (\%)}}{\text{Inhalation Reference Exposure Level } (\mu\text{g m}^{-3})}$$

[1]

- 1.
- 2. Where:
 - a. $RF(acute)$ is the compound-specific acute risk factor.

- b. *Pollutant Mass Percentage (%)* is the mass percentage of the compound present in sampling results pursuant to subparagraph 93504(b)(2)(A).
 - c. *Inhalation Reference Exposure Level (REL) ($\mu\text{g m}^{-3}$)* is the OEHHA determined inhalation risk factor for acute exposure for each compound.
- (C) REL is defined in paragraph 93502(a).
- (D) To identify the most recent RELs adopted by OEHHA, operators shall reference the [“OEHHA Acute, 8-hour and Chronic Reference Exposure Level \(REL\) Summary”](#).
- (E) Compound-specific weighted risk contributions shall be calculated using Equation 2.

$$\text{Weighted Risk Contribution (\%)} = \frac{RF}{\sum \text{All Species } RF} \times 100\% \quad [2]$$

- 1.
 2. Where:
 - a. *RF* is the compound-specific acute risk factor.
 - b. $\sum \text{All Species } RF$ is the summation of all compound-specific acute risk factors.
- (3) If a methane EDS is used, the smallest ratio of methane to the toxic of highest concern identified for any production process category monitored by the EDS pursuant to subparagraph 93504(b)(2) shall be selected as the site-specific ratio of methane to the toxic of highest concern that will be used to identify methane-based alert thresholds for the EDS pursuant to paragraph 93504(e).
- (4) Natural gas chemical composition sampling, analysis methods, and results pursuant to subparagraph 93504(b)(1), and site-specific toxic of highest concern calculation and results pursuant to subparagraph 93504(b)(2) shall be documented in the LDRP, including at minimum the following information:
- (A) Documentation of sampling methods.

- (B) Documentation of analytical methods, including description of the analytical system(s) and detection limits.
 - (C) Source composition testing results, including:
 - 1. Sample analysis reports.
 - 2. Table(s) of raw concentration values of the chemical species identified in Table 1 from paragraph 93504(a).
 - (D) Site-specific toxic of highest concern calculation and results, including:
 - 1. Table(s) of compound-specific acute risk factor (RF) calculation results.
 - 2. Table(s) of compound-specific weighted risk contribution calculation results.
 - 3. Calculations identifying the site-specific toxic of highest concern.
 - (E) As applicable, table(s) of methane-to-toxic of highest concern (e.g., methane-to-benzene) ratios for corresponding production process categories.
 - (F) Maps that identify sampling locations and corresponding source production category as described in paragraph 93504(b) for chemical composition testing. These maps must also include the locations of all production equipment monitored by the EDS to which the chemical composition testing results are being applied.
- (c) The EDS shall be capable of continuous air monitoring.
- (1) The EDS shall be capable of providing time-resolved measurement data at intervals of one (1) hour or less.
 - (2) The EDS must continuously collect data as specified in subparagraph 93504(c)(1), except as specified in subparagraphs 93504(c)(2)(A) through (D):
 - (A) The rolling 12-month average operational downtime of the EDS must be less than or equal to 10%.

- (B) Operational downtime of the EDS is defined as a period of time for which any sensor or monitor fails to collect or transmit data as specified in subparagraph 93504(c)(1) or any sensor or monitor is out-of-control as specified in subparagraph 93504(c)(2)(C).
 - (C) A sensor or monitor is considered out-of-control if either of the following occurs:
 - 1. The sensor or monitor fails ongoing quality assurance checks, as specified in subparagraph 93504(m)(8)(I).
 - 2. The sensor or monitor output is outside of the applicable operating range.
 - (D) The out-of-control period for a sensor or monitor begins at the time a quality assurance check failure occurs under subparagraph (C)(1) or, for a sensor or monitor outside of range under subparagraph (C)(2), at the time the output first reads outside of the applicable operating range, and ends only when the sensor or monitor, including any replacement sensor or monitor, subsequently passes a quality assurance check conducted in accordance with subparagraph 93504(m)(8)(I) or, for a sensor or monitor outside of range, when the output returns to within the applicable operating range.
 - (E) The downtime for the EDS must be calculated each calendar month. Once 12 months of data are available, at the end of each calendar month, the 12-month average shall be calculated by averaging that month with the previous 11 calendar months. The rolling 12-month average shall be determined by recalculating the 12-month average at the end of each month.
- (d) The EDS shall be capable of measuring the alert threshold(s) set pursuant to paragraph 93504(e).
- (1) The EDS shall have a minimum detection limit at least three (3) times less than the alert threshold(s).
 - (2) The EDS shall have a manufacturer-documented precision within ± 15 percent at the alert threshold concentration(s).
 - (3) EDS sensor(s) or monitor(s) shall be performance tested at least once per quarter to verify field precision is maintained within ± 25 percent at the alert

threshold concentration(s). A sensor or monitor that does not meet this criterion shall be calibrated, repaired, or replaced.

- (A) Testing shall be performed using a NIST-traceable standard at concentration(s) equal to the alert threshold(s) of the detection target.
 - (B) For EDS measuring the site-specific toxic of highest concern, testing methods shall prevent any emission of the detection target. Testing may be conducted using contained methods or surrogate gases that ensure safety and maintain traceability to an appropriate standard.
 - (C) EDS equipped with an automated built-in functional verification feature (e.g., optical reference cell, optical filter) that provides a traceable and logged response check equivalent to a manual performance verification test may be exempt from manual quarterly performance verification testing, provided the automated verification is conducted at least quarterly and manufacturer-documented equivalency is maintained.
 - (D) The methodology used for testing the EDS shall be documented in the LDRP.
 - (E) Test records shall be maintained pursuant to paragraph 93504(m)(8)(l)(3).
- (e) The EDS shall be capable of detecting leaks with sufficient sensitivity and timeliness to identify leaks before concentrations of the toxic of highest concern exceed the acute REL at any sensitive receptor located within the health protection zone. The performance standard shall be met by measuring the toxic of highest concern directly, or by measuring methane as a surrogate detection target pursuant to paragraph 93504(b).
- (1) REL-level leak rates for the production equipment monitored by the EDS shall be calculated using air dispersion modeling results pursuant to paragraph 93504(h).
 - (2) The EDS shall be sited to meet the following objectives, as applicable:
 - (A) If production equipment monitored by the EDS has the potential to leak at the REL-level leak rate(s) calculated pursuant to subparagraph 93504(e)(3):

1. For EDS that scan or image leaks (e.g., fixed OGI cameras, fixed LiDAR cameras), the EDS shall scan or image all production equipment monitored by the EDS and report measurements at a minimum frequency of one (1) hour.
 2. For EDS that detect leak plumes downwind of a source (e.g., point sensor network EDS, open-path EDS), the EDS shall be sited to achieve detection on an hourly basis of at least 90 percent of leaks that exceed the REL-level leak rate(s) from the production equipment monitored by the EDS that are transported in the direction of sensitive receptors within the health protection zone.
- (B) If production equipment monitored by the EDS does not have the potential to leak at the REL-level leak rate(s) calculated pursuant to subparagraph 93504(e)(3):
1. The EDS shall have sufficient sensors to measure upwind and downwind concentrations of the detection target throughout the facility, with at least one (1) sensor located in a predominant upwind location and at least one (1) sensor located in a predominant downwind location.
- (C) For monitoring an individual well, EDS siting may include at minimum one (1) sensor located within 10 meters of the well, positioned predominantly downwind under prevailing wind conditions, with no obstructions to airflow between the sensor and the well.
- (3) The EDS shall include alert threshold(s) that meet the following minimum requirements:
- (A) Alert threshold(s) shall be defined in terms of measured concentration.
 - (B) Alert threshold value(s) shall be set using one of the following options:
 1. Set alert threshold(s) to achieve detection of leaks exceeding REL-level leak rates from production equipment monitored by the EDS.
 2. Set alert threshold(s) at the acute REL of the toxic of highest concern.

- (C) Alert threshold averaging time shall be one (1) hour or less.
 - (D) The EDS shall account for uncertainty in measured values in determining if an alert threshold has been exceeded.
 - (E) If methane is used as a surrogate detection target, the ratios of methane to toxic of highest concern identified pursuant to paragraph 93504(b) shall be used to calculate alert threshold(s) based on methane concentrations.
 - (F) Alert thresholds shall be quantifiably resolved from temporal variation in the baseline concentration of the detection target.
- (f) An EDS siting and alert threshold setting analysis shall be conducted to ensure the EDS is capable of the performance standard specified by paragraph 93504(e) of this subchapter.
 - (1) At a minimum, the EDS siting and alert threshold setting analysis shall include:
 - (A) As applicable, calculations demonstrating that production equipment monitored by the EDS does not have the potential to leak at the REL-level leak rates calculated pursuant to subparagraph 93504(e)(3).
 - (B) Calculations demonstrating the ability of the EDS, as sited, to comply with the performance standard pursuant to paragraph 93504(e).
 - (C) As applicable, table(s) that identify EDS sensor or monitor GPS coordinates, detection target(s), and alert threshold(s) pursuant to paragraph 93504(e) of this subchapter.
 - (D) Maps that identify sensitive receptors, production equipment monitored by the EDS, and EDS measurement locations (points, paths or areas, as applicable).
 - (2) The EDS siting and alert threshold analysis methods and results shall be documented in the LDRP.
- (g) Baseline conditions shall be established for EDS that detect leak plumes downwind of a source (e.g., point sensor network EDS, open-path EDS). The EDS shall remain capable of detecting and reporting leaks during the period in which baseline conditions are being established. The process to establish baseline conditions shall meet the following minimum requirements:

- (1) The EDS shall collect 12 months of valid hourly measurements before establishing baseline detection target concentration(s).
 - (A) Measurements shall be representative of normal operating conditions of the production equipment monitored by the EDS. Periods when maintenance activities, malfunctions, or leaks occur from production equipment monitored by the EDS shall be excluded from baseline conditions.
 - (B) Days with incomplete data five (5) or more hours of missing measurement values) shall be excluded from baseline conditions.
- (2) An interim baseline value shall be calculated each calendar month and include all valid hourly measurements collected to date, until baseline detection target concentrations have been established pursuant to subparagraph 93504(g)(1).
- (3) Measurements shall be made using the same averaging time as used for the EDS alert threshold(s) calculated pursuant to paragraph 93504(e).
- (4) Baseline detection target concentration(s) shall be calculated as the arithmetic mean of baseline measurements made pursuant to subparagraph 93504(g)(1).
- (5) The methodology used to establish baseline detection target concentration(s) shall be documented in the LDRP.
- (h) Air dispersion modeling of potential leaks from production equipment monitored by the EDS to identify REL-level leak rates shall conform to the air dispersion modeling guidance provided in the OEHHA Air Toxics Hot Spots Program Guidance Manual, which is defined in paragraph 93502(a) of this subchapter.
 - (1) AERMOD shall be used for air dispersion modeling.
 - (2) If methane is used as a surrogate detection target, the ratios of methane to toxic of highest concern identified pursuant to paragraph 93504(b) shall be used.
 - (3) The air dispersion modeling shall account for the location, as identified in paragraph 93504(m), of all production equipment monitored by the EDS.
 - (4) Air dispersion modeling inputs, methods, and results shall be documented in the LDRP, including at minimum the following information:

- (A) Input parameters, including production equipment locations, receptor grid configuration, source parameters and locations, meteorological data, and terrain data.
 - (B) Modeling methods, description of all modeling steps, and software version(s).
 - (C) Modeling results, including a table of REL-level leak rate(s), isopleth maps, and a sensitivity analysis of source parameters.
- (i) The EDS shall include a meteorological monitoring system that shall have sufficient sensors to continuously measure representative meteorological conditions at the facility including ambient temperature, ambient pressure, relative humidity, wind speed, and wind direction, with the ability to continuously record measurements at a measurement resolution of one (1) minute or less.
 - (1) Meteorological sensor quality, siting, and quality assurance shall, to the extent site-specific conditions allow, adhere to the specifications and guidelines that are specified in the U.S. EPA Quality Assurance Handbook for Air Pollution Measurement Systems, Volume IV: Meteorological Measurements (March 24, 2008), which is incorporated herein by reference.
 - (2) The meteorological monitoring system shall have the ability to store at least five (5) years of continuous instrument data at a data resolution of one (1) hour or less.
- (j) The EDS shall include automated alerting functionality.
 - (1) The EDS shall be programmed to automatically trigger the alarm system and generate and send a notification to the operator as soon as technically feasible, but no later than 15 minutes after the detection target identified in the approved LDRP exceeds an alert threshold determined pursuant to paragraph 93504(e) and identified in the approved LDRP.
 - (2) The EDS shall be programmed to send a notification to the operator in the event of a sensor or monitor failure.
- (k) The EDS shall have the ability to store at least five (5) years of continuous instrument data and the ability to generate hourly, daily, weekly, monthly, and annual reports.
- (l) The operator shall cause the assessments, procedures, and documentation specified by this subchapter to be conducted by qualified personnel or qualified independent parties to ensure EDS selected and implemented by operators are

compliant with the requirements specified by Public Resources Code section 3283(a) and performance standards specified by this subchapter. This information must be included in the LDRP.

- (m) The operator shall submit the LDRP, including the following information with respect to the EDS, to CalGEM and the Executive Officer:
 - (1) The operator's name and the contact information of the operator's representative for monitoring purposes.
 - (2) The address and name of the production facility to be monitored and the locations of production equipment to be monitored by the EDS, including the following information:
 - (A) Latitude and longitude coordinates for production equipment in decimal degrees to an accuracy and precision of five (5) decimals of a degree using the North American Datum of 1983.
 - (B) API number(s) of any well(s).
 - (C) Facility or equipment number(s) identified in the CalGEM Well Statewide Tracking and Reporting System (WellSTAR) database and/or CARB California Electronic Greenhouse Gas Reporting Tool (Cal e-GGRT).
 - (D) Description of different operating scenarios that could affect the characterizations of emissions from the relevant source or facility.
 - (E) Determination of facility boundary or "fence line" that accounts for any shared or overlapping perimeters with other production facilities and for potential nearby sources of the EDS detection target.
 - (3) The location(s) and type(s) of sensitive receptor(s) within the health protection zone surrounding the production facility including, but not limited to, the most recent sensitive receptor inventory and map submitted by the operator to CalGEM pursuant to Public Resources Code section 3285.
 - (4) Natural gas compositional source test sampling and analysis methods and results pursuant to paragraph 93504(b).
 - (5) EDS siting and alert threshold analysis methods and results pursuant to paragraph 93504(f).

- (6) Air dispersion modeling inputs, methods, and results pursuant to paragraph 93504(h).
- (7) A description of the EDS to be deployed including, but not limited to, the following information:
 - (A) Detailed lists and descriptions of EDS equipment and software specifications, including sensors and instruments used to measure the detection target and meteorological conditions. Descriptions shall include manufacturer and model information and any manufacturer specifications for the monitoring equipment, software, and data systems.
 - (B) A description of the EDS's detection capabilities and thresholds, data resolution, detection and averaging times, spatial resolution, automatic alarming capabilities and timing, power source and backup systems, and known operational constraints that could cause the EDS to not operate continuously pursuant to paragraph 93504(c) of this subchapter (e.g., performance limitations under certain wind speeds, temperature ranges, precipitation, requirement for daylight operation, or specific maintenance intervals).
 - (C) A discussion of how the EDS is appropriate for the site-specific emission sources, meteorology, and facility layout. This discussion shall include relevant performance data and validation results, where validation results may include controlled release testing results or other field-based evaluations demonstrating that the system performs as expected under operating conditions representative of oil and gas production facilities.
 - (D) For EDS that track baseline concentrations of the detection target, the methodology used by the EDS to track baseline detection target concentrations pursuant to paragraph 93504(g).
 - (E) The number of monitors and/or sensors to be deployed and detailed descriptions of the expected installation locations including, but not limited to, the following information:
 - 1. Latitude and longitude coordinates for all EDS equipment in decimal degrees to an accuracy and precision of five (5) decimals of a degree using the North American Datum of 1983.

2. A topographic map and plan of the production facility site that identify the expected locations of EDS equipment, including air quality and meteorological monitor or sensor locations and their distance from production equipment and operations. The topographic map must indicate any obstructions to air flow to the monitor(s) or sensor(s) and also show all roads and access ways within a half mile of the facility and any contiguous structures.
- (8) A quality assurance project plan (QAPP) describing the necessary quality assurance, quality control, and other technical procedures that must be implemented to ensure proper performance of the EDS. At a minimum, these procedures shall include the following information:
- (A) Installation procedures recommended by the equipment manufacturers including safety considerations.
 - (B) Protocol that will be used for acquiring, processing, and recording relevant concentration and meteorological data.
 - (C) Data system and operating protocol to be used for data collection and record management including, but not limited to, data logging, data processing, recording, downloading, backup and storage, and reporting.
 - (D) Routine maintenance requirements, including maintenance recommended by the equipment manufacturers.
 - (E) EDS calibration requirements including, but not limited to, the calibration procedures and calibration schedule for the detection systems and meteorology systems.
 - (F) Qualifications and training requirements recommended by the equipment manufacturers for personnel who will maintain, calibrate, and repair the EDS.
 - (G) Description of any specialized tools and supplies needed to maintain and calibrate EDS instrumentation.
 - (H) System Failure Plan that describes the measurements that would be taken in the event of a system failure or during routine maintenance activities and used until the EDS is restored to normal operating conditions.
 - (I) Quality assurance procedures, including:

1. Data quality indicators for the EDS, including the meteorological monitoring system.
 2. When and what quality assurance checks are made to the data, including raw data, processed data, and output data.
 3. Procedures for tracking data quality indicators and corrective actions for inclusion in annual reporting pursuant to subparagraph 93504(m)(8)(K).
 4. Performance audit validation template for use in independent performance audits pursuant to paragraph 93504(n).
- (J) Methods for compiling the EDS information reports specified by Public Resources Code section 3286(a) for submission to CalGEM.
- (K) Methods for compiling the most recent calendar year of electronic historical data collected by the EDS for submission to CalGEM.
- (L) Methods for retaining EDS data and records of EDS nonoperation or inactivation for 10 years pursuant to Public Resources Code sections 3283(f) and 3286 and paragraph 93504(c). The operator shall produce these retained records to any agency involved in the review of their LDRP upon request.
- (9) Identification and description of the qualifications (training, experience, accreditation) for the following personnel, including whether they are a specific in-house group or a qualified independent party and, if a qualified independent party, the party's name and address:
- (A) Authors of the LDRP information required by paragraph 93504(m).
- (B) Qualified personnel or qualified independent parties who conduct the following tasks:
1. The assessments and documentation specified in this subchapter.
 2. EDS selection.
 3. EDS installation.
 4. EDS calibration, maintenance, and repair specified by subparagraph 93504(m)(8).

- (10) An attestation that all information provided about the EDS equipment specifications, alarm system, and other information generated pursuant to this subchapter is provided by qualified personnel authorized by the operator to do so, and that the information is true and correct.
 - (11) An electronic version of the LDRP shall be submitted in Portable Display Format (PDF) or other format acceptable to the Executive Officer.
- (n) A qualified independent party hired by the operator shall conduct and complete independent performance audits to verify that EDS data continues to meet the data quality objectives defined in the QAPP of the approved LDRP.
 - (1) Independent performance audits shall be completed according to the following schedule:
 - (A) An independent performance audit shall be completed within 12 calendar months after the installation and operation of the EDS.
 - (B) Subsequent independent performance audits shall be completed once every 36 calendar months and/or within three (3) calendar months of material modification to the facility such that a new LDRP would be required.
 - (C) Independent performance audits shall be included with the information provided to CalGEM under Public Resources Code section 3286 for that applicable calendar year.
 - (2) The independent performance audit shall be documented in a report that shall be signed by the party that conducted the independent performance audit, certifying under penalty of law, based on information and belief formed after reasonable inquiry, that the statements and information in the audit report and in all attachments and other materials are true, accurate, and complete.
 - (3) The independent performance audit shall identify any deficiencies in EDS data meeting data quality indicator acceptance criteria in the performance audit validation template pursuant to subparagraph 93504(m)(8)(I). If the independent performance audit report identifies deficiencies, the operator shall cause the following tasks to be completed within three (3) calendar months of the independent audit report:
 - (A) Develop a corrective action plan describing all corrective actions that will be taken to address identified deficiencies and restore EDS

performance to the performance level specified in the approved LDRP.

- (B) Perform all corrective action(s).
- (C) Maintain a record indicating when the corrective action(s) have been completed.
- (o) The Executive Officer shall notify CalGEM in writing if the EDS described in the submitted LDRP is incomplete or deficient. If the EDS is acceptable, the Executive Officer shall notify CalGEM that the requirements for EDS performance standards are met.

§ 93505. No Preemption of More Stringent Air District or Federal Requirements.

This regulation does not preempt any more stringent requirements imposed by any air district. Compliance with this subchapter does not excuse noncompliance with any Federal or other state regulation.

Note: Authority cited: Section 39600, Health and Safety Code.

§ 93506. Severability.

Each part of this subchapter is deemed severable, and in the event that any part of this subchapter is held to be invalid, the remainder of the subchapter shall continue in full force and effect.

Note: Authority cited: Section 39600, Health and Safety Code.