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Transmitted via email

Craig S. Harrison
Nancy and Brantly Richardson
Neighborhood Coalition Sonoma County
P.O. Box 1229
Sebastopol, California 95473
NeighborhoodCoalition@gmail.com
craigspencerharrison@gmail.com
deppstein@gmail.com

Re: Response to Petition for Rulemaking to List β -Myrcene and Cannabis Emissions as Hazardous Air Pollutants and to Regulate Commercial Cannabis and Hemp Cultivation Operations as Stationary Sources Subject to New Source Review and Emissions Standards

Dear Craig Harrison, Nancy Richardson, and Brantly Richardson;

Thank you for submitting, on behalf of the Neighborhood Coalition Sonoma County, the January 20, 2026, petition for rulemaking pursuant to California Government Code section 11340.6 entitled "Petition for Rulemaking to List β -Myrcene as a Hazardous Air Pollutant and to Regulate Commercial Cannabis and Hemp Cultivation Operations as Stationary Sources Subject to New Source Review and Emissions Standards" to the California Air Resources Board (CARB or Board). CARB initially acknowledged receipt of the petition on February 6, 2026. CARB appreciates that petitioners agreed to extend the deadline for response to the petition to May 20, 2026, and now responds in this letter.

The petition requests that CARB submit beta-myrcene and other volatile organic compounds (VOCs) emissions from cannabis (collectively, "cannabis emissions") for consideration as toxic air contaminants (TACs), conduct a rulemaking for airborne toxic control measures (ATCMs) relating to any such designated TACs, and regulate cannabis operations as stationary sources subject to new source review.

Government Code section 11340.6 provides that "any interested person may petition a state agency requesting the adoption, amendment, or repeal of a regulation as provided in [the California Administrative Procedure Act provisions on rulemakings]." Such a petition must "clearly and concisely" state: "the substance or nature of the regulation, amendment or repeal requested," "[t]he reason for the request," and "[r]eference to the authority of the state agency to take the action requested." (Gov. Code, § 11340.6(a)-(c)).

Pursuant to Government Code section 11340.7, CARB may respond to the Petition in writing or by hearing.

By this letter, CARB respectfully denies the Petition. The basis for the denial is set forth in this letter.

I. Background

TACs are defined as “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...” (Health & Saf. Code, § 39655(a).) TACs are identified and designated pursuant to the statutory process laid out in Health and Safety Code sections 39650-39664. Pursuant to section 39660 specifically, CARB is charged with evaluating potential air toxics in collaboration with the Office of Environmental Health Hazard Assessment (OEHHA), including considering all available scientific data, and assessing the availability and quality of the data on health effects. (Health & Saf. Code, § 39660(a)-(c).) Additionally, priority must be given to the evaluation and regulation of substances based on risk of harm to public health, potential emissions, manner of and exposure to usage of the substance, persistence in the atmosphere, ambient concentrations in the community, and other factors. (Health & Saf. Code, § 39660(f).) CARB has formally identified over 200 substances and groups of substances as TACs.¹ These TACs are listed in the California Code of Regulations, title 17, section 93000. CARB's TAC Identification Reports² provides descriptions and summaries of each listed substance.

Upon TAC designation, CARB reviews the data for the TACs to develop ATCMs pursuant to Health and Safety Code sections 39665-39669. CARB prepares a report on the need and appropriate degree of regulation for each substance which the state board has determined to be a TAC with the participation of the districts and in consultation with affected sources and the interested public. (Health & Saf. Code, § 39665.) The report is released to the public for comment for 45 days. Following a public hearing, CARB adopts the ATCM related to the TAC. An ATCM is a recommended method or range of methods that “reduce, avoid, or eliminate the emissions of a toxic air contaminant” or an emission standard adopted by the U.S. Environmental Protection Agency under section 112 of the Clean Air Act.³ ATCMs include, but are not limited to, “emission limitations, control technologies, the use of operational and maintenance conditions, closed system engineering, design, equipment, or work practice standards, and the reduction, avoidance, or elimination of emissions through process changes, substitution of materials, or other modifications.”⁴ The ATCM may or may not indicate a threshold exposure level based on anticipated adverse health effects.

¹ Cal. Code Regs., tit. 17, § 93000 et seq.

² CARB, TAC Identification Reports, <https://ww2.arb.ca.gov/resources/documents/toxic-air-contaminant-identification-reports> (last visited Apr. 21, 2026).

³ Health & Saf. Code, § 39660(f).

⁴ *Id.*

Once CARB adopts the ATCM, the districts are required to implement and enforce the ATCM for nonvehicular sources within their jurisdiction within 120 days after adoption.⁵ The districts are also allowed to adopt equally or more stringent measures. District New Source Review (NSR) rules must require new or modified sources to control emissions of TACs consistent with the requirements of the Health and Safety Code.

II. Request for New Source Review

With respect to the petition's request for new source review, CARB generally does not conduct such reviews. Under the Clean Air Act, only criteria pollutants are regulated as "new source review" (NSR) pollutants. (40 CFR § 51.165(a)(1)(xxxvi); 40 USC § 7410.) Beta-myrcene, the primary compound of concern in this request, is not a criteria pollutant under federal law and therefore is not subject to the federal NSR program. Air districts similarly have their own new source review programs.

For California, the 35 California air districts have primary authority to conduct new source reviews of stationary source emissions under California law. (Health & Saf. Code, § 42500, et seq.) Pursuant to Health and Safety Code section 42502, air districts "have primary responsibility for controlling air pollution caused by nonvehicular sources" through their NSR programs. (Health & Saf. Code, § 42502(c).)⁶ "Each district's 'existing new source review program' is comprised of those new source review rules and regulations for both nonattainment and prevention of significant deterioration for new, modified, repaired, or replaced sources that have been adopted by the district governing board" (Health & Saf. Code, § 42505.)

Questions relating to any district's NSR should be directed towards the respective regional air quality management district. Contact information for each air district is located at <https://ww2.arb.ca.gov/california-air-districts>.

III. Request to Evaluate 140 Compounds

The petition asks CARB to evaluate approximately 140 VOCs emitted from cannabis, known as terpenes. As the petition identifies, "[a] terpene is a volatile, unsaturated carbon, and includes beta-myrcene and d-limonene." However, the request clearly focuses on the identification of beta-myrcene, which has a higher known potential health risk than d-limonene. As stated above, the statute requires CARB to prioritize evaluation. (Health & Saf. Code, § 39660(f).) Thus, for these reasons, CARB treated the petition as one to examine beta-myrcene only as the compound of greatest concern in the emissions inventory from

⁵ Health & Saf. Code, § 39666(d).

⁶ CARB may exercise authority over stationary sources in circumstances not present here. See Health & Saf. Code, §§ 38510, 41500, et seq.

cannabis. Under Health and Safety Code section 39660, CARB consultation in this evaluation must include:

all available scientific data, including, but not limited to, relevant data provided by the state board, the State Department of Health Services, the Occupational Safety and Health Division of the Department of Industrial Relations, the Department of Pesticide Regulation, international and federal health agencies, private industry, academic researchers, and public health and environmental organizations.

Further “[t]he evaluation shall be performed using current principles, practices, and methods used by public health professionals who are experienced practitioners in the fields of epidemiology, human health effects assessment, risk assessment, and toxicity.” (*Id.*) As discussed above, TAC identification is complex, time-consuming, and generally requires significant resources.

Health and Safety Code section 39657 allows for fast-tracking of compounds that U.S. Environmental Protection Agency (U.S. EPA) has determined are Hazardous Air Pollutants (HAP) under Section 112 of the Clean Air Act (42 USC § 7412) but not compounds outside the federal HAP list. (Health & Saf. Code, § 39657(b).) Even then, CARB is charged with evaluating the federal emission standard for that compound to determine whether it is sufficient for California’s needs. (Health & Saf. Code, § 39658(b).)

The petition references beta-myrcene, which is not a HAP, as the primary compound of concern, so CARB is limiting its analysis to this compound. (Cal. Code Regs., tit. 17, § 93001.)

IV. Emissions Directly from the Cannabis Plant

The petition requests CARB to regulate emissions that stem directly from the cannabis plant as opposed to emissions that may be created by any part of its processing. CARB is analyzing this issue as one relating to human processes and not the plant itself.

For initial background, Health and Safety Code section 41700(a) states that “[e]xcept as otherwise provided in Section 41705, a person shall not discharge from any source whatsoever quantities of air contaminants... that cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or that endanger the comfort, repose, health, or safety of any of those persons or the public... or have a natural tendency to cause, injury or damage to business or property.” CARB’s analysis would therefore, by necessity, be limited to human intervention that caused the emission.

The petition stated that certain plant cultivation practices are designed to increase the beta-Myrcene and other VOC content in the plants, so CARB is focusing on whether these cause the VOC content to rise to a level that may endanger human health.

V. Scientific Review

The available scientific literature in the context of cannabis emissions provides conflicting information about any potential health effects and their extent. There is not enough information in the literature to support a finding that cannabis emissions or beta-myrcene should be prioritized for TAC identification. As noted above, Health and Safety Code section 39660(f) recognizes the need for prioritization and states that priority must be given to the evaluation and regulation of substances based on risk of harm to public health, potential emissions, persistence in the atmosphere and other factors. The available scientific evidence for the potential for beta-myrcene to cause human health risks is not as well-established compared to current TACs, such as inorganic arsenic or formaldehyde.

Beta-myrcene has been shown to be carcinogenic in experimental animals, but there is inadequate evidence of carcinogenicity in humans. Additionally, the mode of action, or how it causes physiological effects, is uncertain, with evidence indicating both adverse and potentially beneficial biological effects.

In two-year National Toxicology Program (NTP) gavage studies, beta-myrcene caused renal tubule adenomas and carcinomas (kidney tumors and cancer) in a specific species of male rats, designated with strain number F344/N, as well as hepatocellular adenomas, hepatocellular carcinomas, and hepatoblastomas (liver tumors and cancer) in a specific species of male mice, strain number B6C3F1, with equivocal evidence of carcinogenic activity in females of both species.⁷ Based on these findings, NTP concluded that “beta-myrcene caused kidney cancers in male rats and liver cancer in male mice” under the study conditions.⁸

Based on findings of the NTP report, the California Office of Environmental Health Hazard Assessment (OEHHA) subsequently listed beta-myrcene under Proposition 65⁹ as “known to the state to cause cancer” via the authoritative bodies mechanism.¹⁰ The International Agency for Research on Cancer (IARC) classified beta-myrcene as “possibly carcinogenic to humans” (Group 2B), citing sufficient evidence in animals and inadequate evidence in humans.¹¹ The Australian Industrial Chemicals Introduction Scheme (AICIS) determined that

⁷ National Toxicology Program. 2010. “Toxicology and Carcinogenesis Studies of β -Myrcene (CAS No. 123-35-3) in F344/N Rats and B6C3F1 Mice (Gavage Studies).” NTP Technical Report 557.

⁸ *Id.*

⁹ Safe Drinking Water and Toxic Enforcement Act of 1986, Health & Saf. Code, § 25249.5, et seq.

¹⁰ OEHHA. 2015. “Chemical Listed Effective March 27, 2015 as Known to the State of California to Cause Cancer: Beta-Myrcene.” California Environmental Protection Agency. <https://oehha.ca.gov/proposition-65/cnr/chemical-listed-effective-march-27-2015-known-state-california-cause-cancer-beta-myrcene>.

¹¹ IARC. 2019. “IARC Monographs on the Evaluation of Carcinogenic Risks to Humans. Volume 119: Some Chemicals That Cause Tumours of the Urinary Tract in Rodents.” IARC, World Health Organization, Lyon, France. (β -Myrcene monograph, Group 2B classification). <https://www.iarc.who.int/news-events/iarc-monographs-volume-119-some-chemicals-that-cause-tumours-of-the-urinary-tract-in-rodents>.

while animal data clearly indicate tumor formation, evidence is insufficient to establish human carcinogenic potential.¹²

The mode of action for beta-myrcene, or how it impacts the physiology of living organisms, is uncertain. NTP (2010) and IARC (2019) reviews consistently find that beta-myrcene is not clearly genotoxic (damaging to genetic material) in standard bacterial and mammalian assays, either *in vitro* or *in vivo*. However, there have been newer findings of positive genotoxic effects in human cells.¹³ Further study is needed to fully determine genotoxicity and mutagenic impacts as well as the method of administration. In addition, due to beta-myrcene being a major constituent of many essential oils, studies examining beneficial effects have suggested antioxidant, anti-inflammatory, or neuropharmacological effects, although the study qualities vary and their relevance for risk assessment is questionable.

Given the conflicting information, the lack of conclusive evidence of beta-myrcene being a carcinogenic compound in humans and the need for further study relating to how it impacts physiology, it is premature to consider beta-myrcene for TAC inclusion.

VI. Determination and Conclusion

Therefore, after careful consideration of the petition, the relevant law, and the current context of cannabis regulations, CARB denies the petition in whole, pursuant to paragraph (a) of Government Code section 11340.7¹⁴ With respect to beta-myrcene, there is insufficient scientific evidence to prioritize this compound by taking it through the TAC identification process. As noted above, new source review is primarily led by air districts.

The record upon which this decision is based includes the petition and its exhibits, this letter, the materials referenced herein, and its attachments. While CARB is denying the petition to initiate a rulemaking, CARB appreciates the petitioners' engagement and will continue to monitor the scientific literature.

In accordance with Government Code section 11340.7 (d), a copy of this letter is being transmitted to the Office of Administrative Law for publication in the California Regulatory Notice Register. The agency contact person in this matter is Myanna Dellinger, Senior Attorney, available at (951) 542-3147 or myanna.dellinger@arb.ca.gov.

¹² AICIS. 2022. "Evaluation Statement: 1,6-Octadiene, 7-methyl-3-methylene- (myrcene). Evaluation Statement [EVA00048], 30 May 2022." Australian Government, Department of Health.

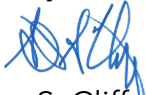
<https://www.industrialchemicals.gov.au/sites/default/files/2022-05/EVA00048%20-%20Evaluation%20statement%20-%2030%20May%202022.pdf>.

¹³ Orlando JB, Silva BO, Pires-Cunha CL, Hiruma-Lima CA, Gaivão IOM, Maistro EL. 2019. "Genotoxic effects induced by beta-myrcene following metabolism by liver HepG2/C3A human cells." *J Toxicol Environ Health A*. 2019;82(3):176-185. doi: 10.1080/15287394.2019.1577195. <https://pubmed.ncbi.nlm.nih.gov/30806179/>.

¹⁴ CARB, "[u]pon receipt of a petition requesting the adoption...of a regulation pursuant to Article 5 (commencing with Section 11346), a state agency shall notify the petitioner in writing of the receipt and shall within 30 days deny the petition..." Gov. Code, §11340.7(a).

Interested parties may obtain a copy of the petition upon request to Jennifer Simpson, Supervisor, Board Administration and Regulator Coordination Unit, jennifer.simpson@arb.ca.gov. Upon request, physical copies could be obtained from 1001 I Street, Sacramento, California, 95814.

Sincerely,



Steven S. Cliff, Ph.D., Executive Officer

cc: California Office of Administrative Law
Lauren Sanchez, Chair, California Air Resources Board
California Air Resources Board Honorable Board Members
Edie Chang, Deputy Executive Officer, California Air Resources Board
Rajinder Sahota, Deputy Executive Officer, California Air Resources Board
Shannon Dilley, Chief Counsel, California Air Resources Board
Abigail May, Deputy Counsel, California Air Resources Board
Rich Boyd, Division Chief, Transportation and Toxics Division, California Air Resources Board
Ajay Manget, Assistant Division Chief, Transportation and Toxics Division, California Air Resources Board
Matthew O'Donnell, Branch Chief, Risk Reduction Branch, Transportation and Toxics Division, California Air Resources Board
Elizabeth Scheele, Division Chief, Research Division, California Air Resources Board
Bonnie Holmes-Gen, Branch Chief, Health and Exposure Branch, Research Division, California Air Resources Board
CARB Board Administration and Regulatory Coordination Unit