

# South Portland Clean Air Advisory Committee

## 2022 Report

Delivered February 2023

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## Introduction and Overview

The South Portland Clean Air Advisory Committee (CAAC) is pleased to offer to the City Council this report of its work in 2022. The CAAC met 14 times over the course of 12 months to review information, hear from experts, and consider recommendations. This final report is the result of this year-long effort, which benefitted from the complementary backgrounds and expertise of the committee's five members and the assistance of a professional facilitator, the City Manager and the City's outside attorney.

This report describes the CAAC's process, offers recommendations and makes suggestions about next steps.

The CAAC is grateful for the opportunity to present these ideas, as well as the helpful input from technical experts, regulators, members of the public and other people who have shared viewpoints and information with the Committee during its meetings.

## CAAC Process and Focus

When the City Council first created the CAAC in late 2019, it cited a history of events that prompted its decision. The City mentioned its Draft Ordinance Committee, which had recommended the City “work with local, state and federal agencies to establish an effective ambient air quality monitoring program to ensure that point source and fugitive emissions from crude oil storage terminals have no undue adverse impact on public health.”

The City also highlighted the United States Environmental Protection Agency (USEPA) complaints against terminal operators Global Partners LLC and Sprague Energy and the subsequent consent decrees between the USEPA and the companies, as well as the “renewed interest amongst elected officials and members of the public in air quality monitoring” that resulted from the USEPA action. The public concerns around the impact of the tank farms on air quality were the primary context for the CAAC's creation.

The CAAC produced a set of recommendations<sup>1</sup> in February 2021, and the City Council voted to renew the CAAC later that year, with a focus on implementing the recommendations and “make findings of fact and provide recommendations to the City Manager and/or City Council on other or additional air quality and related health and quality of life issues that may be found to exist in the City of South Portland, as deemed appropriate or worthy of consideration.”

Below is a summary of the CAAC's recommendations from 2021 and the status of their implementation as of February 2023:

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<sup>1</sup> The February 2021 recommendations can be found here:  
[https://www.southportland.org/index.php/download\\_file/view/18359/2883/](https://www.southportland.org/index.php/download_file/view/18359/2883/)

<b>2021 CAAC Recommendations</b>	<b>Status in Early 2023</b>
<p>Achieve better air quality data in neighborhoods most impacted by emitters:</p> <ul style="list-style-type: none"> <li>• Relocate existing Maine Department of Environmental Protection (MEDEP) fixed monitoring stations as soon as possible into communities closest to petroleum storage tank farms and near major truck routes.</li> <li>• Implement additional monitoring for harmful pollutants along the tank farm fencelines.</li> <li>• Monitor particulate matter from truck traffic and/or rail locomotives.</li> <li>• Conduct human exposure modeling to predict risk.</li> </ul>	<ul style="list-style-type: none"> <li>• Permanent stations have not yet been moved directly into the neighborhoods most affected, despite repeated requests and CAAC members themselves building 2 new structures. MEDEP has cited staffing shortages, among other reasons.</li> <li>• Provisionally adopted state rules (Chapter 171), if given final approval, will require fenceline monitoring.</li> <li>• South Portland purchased particulate matter samplers and will install them in new permanent stations.</li> <li>• Human exposure modeling hasn't been conducted by regulators.</li> </ul>
<p>Prepare now for future actions to capture tank farm emissions, such as requirements to capture emissions on all tanks.</p>	<ul style="list-style-type: none"> <li>• The CAAC notes the need for data from the neighborhoods closest to the tank farms. Provisionally adopted rules, if given final approval, would require fenceline monitoring and additional emissions testing for VOCs and HAPs</li> </ul>
<p>Update rules and legislation to enhance MEDEP's regulatory oversight, including imposing Best Available Control Technology (BACT) requirements for all emissions units.</p>	<ul style="list-style-type: none"> <li>• Provisionally adopted rules, if given final approval, will require Best Practical Treatment (BPT). Rules specific to requiring BACT haven't happened.</li> </ul>
<p>Encourage approaches to regulating the tank farms that focus on human health effects from cumulative exposure from multiple facilities.</p>	<ul style="list-style-type: none"> <li>• Rules specific to human health effects and cumulative exposure haven't happened yet.</li> </ul>
<p>Measure actual emissions from all tanks and conduct audits of estimated emissions.</p>	<ul style="list-style-type: none"> <li>• State legislation now requires MEDEP to use actual emissions factors when regulating heated tanks (this requirement doesn't apply to non-heated tanks). Provisionally adopted rules, if given final approval, would require more frequent and comprehensive testing.</li> </ul>

Establish a committee that can help the City implement the actions in this report and respond to related events.	<ul style="list-style-type: none"><li>• The CAAC was re-convened and worked throughout 2022.</li></ul>
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The CAAC focused its meetings in 2022 around three main topics: 1) improving air quality monitoring, with an emphasis on the neighborhoods closest to the tank farms, as well as looking at acute events from burst emissions, 2) better understanding the impacts of cumulative exposures and human exposure modeling, and 3) looking into the role of permitting and regulation for protecting air quality in South Portland.

An annex to this report contains additional detail about the context of the CAAC’s work, including results of air monitoring to date.

## Recommendations

The CAAC offers the following recommendations to the City Council regarding strategies to address the likely sources of air pollution in the city and to monitor air quality. These strategies build off its previous recommendations in February 2021.

The CAAC notes that there are federal sources of grant funding - the Inflation Reduction Act in particular - that are well suited for financing many of these recommendations. The CAAC encourages the city to pursue these funding sources, especially given statements from MEDEP about the state’s limited capacity to continue to support such intensive local air quality monitoring.

### Move fixed monitoring stations closer to the fenceline

The permanent monitoring stations set up three years ago have provided a broad window into air quality across the entire city, and in parts of Portland as well. In the annex to these recommendations, the CAAC describes the analysis of that monitoring to date.

While the monitors have offered a general view of air quality in the City, they haven’t been able to capture the ambient air quality in neighborhoods abutting the tank farms. The City does not yet have a sufficiently clear picture of the potential air quality impacts from tank farm emissions on these fenceline communities, given the monitors haven’t been located there. Data collected from monitors in residential neighborhoods closest to the bulk storage facilities could provide a more accurate localized assessment of potential health risks, which may be different from the assessments so far based on overall South Portland ambient air quality data.

To be sure, two of the five permanent monitoring stations in South Portland today are located relatively near a tank farm fenceline - the Bug Light station and the Mechanic Street station. The Bug Light station is about 200 yards from a fenceline and located in a non-residential area.

The Mechanic Street station is on the banks of the Fore River and is relatively new, so is just now being incorporated into health assessments by the Maine Center for Disease Control and Prevention (MECDC).

Despite repeated requests, starting in February 2021, from the CAAC, fixed monitoring stations have not been moved closer to the tank farm fenceline. Specifically, the CAAC requests moving monitoring stations to Pearl Street and Front Street to monitor the air quality in the Pleasantdale and Ferry Village neighborhoods. The CAAC recommends the following to address this gap.

### ***Support new fixed stations***

- New monitoring stations on Pearl Street and Front Street must be brought online as soon as possible. Both are located at City-owned pump stations. If DEP is unable to support these stations, consider using City funds or applying for grant funding.
- Continue monitoring at Cash Corner.
- Other stations that have already collected three years of data probably won't provide much more additional insight.<sup>2</sup>
- Ensure meteorological data are collected alongside the air quality and particulate matter sampling.

### **Advocate for final approval of Chapter 171 state rule**

- The reporting requirements around fenceline monitoring and actual emissions of heated tanks, as required in the provisionally adopted rules under Chapter 171, will produce important data and address concerns expressed by the CAAC throughout its work to date, if given final approval. The City should continue to advocate strongly for final passage of this law with its monitoring requirements intact.

### **Take steps to better understand burst emissions**

The CAAC heard repeated concerns about burst emissions, which are the vapors emitted when a tank is filled or during a similar event. These episodes involve larger volumes of emissions than the passive or “breathing” emissions that occur during periods of inactivity. Filling of a bulk storage tank will discharge the headspace vapors that are above the product or above the floating roof (for gasoline). Assessing health effects from burst emissions is difficult for several reasons. First, the current monitoring program is not set up to capture short-term emissions, since the fixed stations collect a 24-hour sample every six days. In addition, there aren't VOC or HAP data from the headspace (the air that would be discharged during a filling event), so the composition and volume of emissions isn't fully understood. Finally, there are few criteria for assessing health effects of short-term exposures in community settings, so interpreting the implications from repeated, short-term exposures is a challenge.

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<sup>2</sup> The CAAC also reviewed concerns that Red Bank, Tax Assessors Office, and Central Receiving stations were located close to combustion vents.

From a regulatory standpoint, neither federal nor state regulations restrict short-term bursts so long as those bursts don't cause the facility to exceed its annual permitted limit.

The CAAC recommends the following actions to better understand burst emissions – both what is emitted and the potential risks to public health. These data will assist the City in taking next steps in advocating for changes in state regulation, such as requiring shorter periods for limiting emissions, or proposing changes to City ordinances.

### ***Conduct a burst emissions study focused on fenceline neighborhoods***

Using grant funding, the CAAC recommends the City work with an environmental firm and/or university partner to conduct a study of emissions in the fenceline neighborhoods during burst events, such as when a tank is being filled, to better understand emissions contents and any adverse health symptoms, such as irritating odors, or respiratory issues. The CAAC discussed several options for conducting this monitoring. In principle, the data should be collected in a way that makes it comparable to other air monitoring data already conducted in the City:

- Using a traditional Summa Canister with EPA TO-15 method and MADEP air phase hydrocarbons (APH), similar to what the MEDEP has been doing. Cost per sample for all of these with a commercial laboratory would be approximately \$500/sample.
- Using an Easy VOC sampler, which would allow an individual to collect a sample representing a short period of time. If the City would like to invest in its own sampler, preliminary research shows the device would cost about \$1,400, with each analysis costing about \$200; this would be a different analysis than what the MEDEP has been doing. A wind device attached to a cell phone (for about \$80) could provide basic meteorological data.
- Using a general VOC monitor using a photoionization detector (PID) in the range of 0.1 to 500 ppbv (Aeroqual.com), with a weather station, data tracking, and activation system to collect a Summa canister for TO-15 and APH analysis when VOCs reach a pre-selected setpoint. Costs for this unit is approximately \$2500/ month rental, or \$18,000 for purchase.
- Labor costs are not included with any of the approaches noted here, and it is expected that a City point of contact and/or outside contractors will be needed to complete any additional sampling.

### ***Seek additional emissions data***

The CAAC recommends that the City take steps to better understand the actual amount, and composition of, emissions during burst events. This information will allow all parties to make more informed decisions about next steps in addressing residents' concerns about these episodes. A presentation by MEDEP's Martha Webster in April 2022 to the CAAC showed that 24-hour spikes in benzene coincided at times with tanker offloading events at the tank farms. The presentation also showed spikes when no tankers were offloading, or when the tank farms

were not upwind of the monitors<sup>3</sup>. The CAAC believes more information from tank farm operators, combined with the fence-line monitoring of burst emissions described above, will provide a clearer picture of the contents of these emissions, and, as such, a better understanding of potential health risks.

- The CAAC recommends that the City work with the tank farms to reach a voluntary agreement that the companies make publicly available the information listed in the bullets below. If a voluntary agreement isn't possible, the City should advocate for state legislation to require this information be publicly available. As a final option, the City could consider a local ordinance requiring this information be made publicly available.
- The CAAC recommends the following specific information be requested of bulk petroleum storage facilities with more than one million gallons total storage capacity:
  - Provide advance notice to the public when filling bulk petroleum storage tanks.
  - Conduct, collect, and provide the following information on the expected/completed transfer:
    - Facility and tank location, type and volume of product being unloaded, and size, type, and ID# of tank it is transferred into.
    - Expected date and start/stop time and/or duration of unloading period.
    - Vapor pressure of product (Reid and/or true VP).
    - Expected estimated air emissions (in pounds) of total VOCs, HAPs, benzene, and naphthalene during the unloading period; projected estimates should be at least as much as actual calculated discharge based on sampling data.
  - During the unloading period, collect and make public, at least one air sample from a tank vent representative of air emissions from the discharge of head-space VOCs from liquid product displacement and analyze for:
    - VOCs/HAPs/naphthalene with TO-15 (with an appropriate dilution factor);
    - MADEP air phase hydrocarbons (APH); and,
    - Sulfides and mercaptans if reduced sulfur compounds may be present.
  - Calculate, and make public, the air emissions (in pounds) using analytical data (with submitted results) and liquid fill/displacement rates to determine total VOCs, total HAPs, benzene, naphthalene, and sulfide mass discharges during the transfer period.

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<sup>3</sup> The MEDEP presentation showed that the Bug Light and Mechanic St. stations in South Portland had functioning wind monitors, as did the three Portland stations. Wind direction for the other stations was inferred by using the Portland Jetport wind data.

## Partner with researchers on a health study

The data available today includes emergency room visits<sup>4</sup>, self-reported odor data<sup>5</sup>, and anecdotal reports from public comments during CAAC meetings. In addition, MECDC conducted an analysis that compared South Portland cancer incidence to incidence in Cumberland County and Maine. The study did not find a greater than expected number of cancer cases in South Portland, though the data did not differentiate between residents living adjacent to the tank farms and all other residents.

There are opportunities to conduct more systematic state and municipal level health studies, included differentiating between residents closest to the farms and rest of the city. These studies could look at multiple types of health issues related to air quality. The CAAC encourages South Portland to partner with a research institution to co-design and implement a grant proposal.<sup>6</sup>

## Better understand transportation emissions

Committee members recommend that the City deploy its six Purple Air particulate matter monitors with the following criteria, noting that a final approach will reflect MEDEP's plans regarding monitoring stations.

- Co-locate the Purple Air monitors with the VOC stations in South Portland.
- Install monitors in Portland, at Deering Oaks and/or the two Commercial Street sites, to test the correlation with naphthalene levels from transportation emissions.

## Address odor complaints more comprehensively

Anecdotally, odor complaints have gone down in the past few years, in the CAAC's view. However, the CAAC heard significant concern from residents about odors in the Cash Corner area during the month of July 2022. Odors are a quality-of-life issue, as well as a potential health issue if the strong-smelling air also contains harmful pollutants such as VOCs or HAPs.

To address these concerns, the CAAC recommends the City develop a standard protocol for responding to significant instances of odors:

- Create a standard complaint form that will assist in receiving and tracking actionable information.

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<sup>4</sup> <https://data.mainepublichealth.gov/tracking/home>

<sup>5</sup> <https://smellmycity.org/data>

<sup>6</sup> The CAAC discussed several considerations around such a study, including the likely necessity of including indoor air quality in the research.

- Ask city staff to make their best judgment of odor origin, based on known point sources.
- Approach the facilities and request emissions data, specifically:
  - Data from the period of the odor complaints (if available).
  - Results from emission samples and flow rates on a regular basis going forward, perhaps quarterly, to help quantify actual emissions from the facility.<sup>7</sup>
- Simultaneously, establish an arrangement with a professional firm, in which the firm could collect a sample during an odor event in the affected neighborhood(s), to test for VOC concentrations and the profile of the emissions.
- If voluntary methods aren't successful in gathering data from the facilities, consider additional steps, such as codifying this approach in an odor ordinance, or seeking state legislation that would achieve the same goal.

### Advocate for regulatory changes

The CAAC recommends the City continue to advocate for further changes to state regulations for petroleum storage facilities, specifically:

- Approaches that would directly include the consideration of health impacts during the permitting process.
- Approaches that would better evaluate and address cumulative and long-term impacts.
- Requirements to use actual emissions, not estimates based on product volume throughput, when calculating emissions from all tanks (new legislation already requires using actual emission factors for heated tanks).
- Approaches that regulate all facilities, regardless of minor or major emitter status, requiring technology that will minimize emissions based on actual data and an accurate assessment of health impacts.
- Approaches that include regulatory limits for emissions over shorter periods of time, (i.e., more often than the current system of annual limits).
- Approaches that would require the types of data collection recommended in this document.

### Involve Maine's federal delegation

The CAAC urges South Portland to reach out to the federal delegation to involve them more in these issues.

### Conclusion and Next Steps

CAAC members are available to be reconvened on an as-needed basis. Once more data are available from the actions recommended in this report, the CAAC stands ready to be reconvened to analyze and consider the appropriateness of additional steps at the municipal, state and federal level.

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<sup>7</sup> The CAAC did not discuss in detail the exact data requirements, their periodicity, or length of time.

## CAAC Members and Support

### CAAC members

Anthony Moffa, Professor of Law

Brianne Hicknell, Environmental Engineer, P.E.

Dave Falatko, Environmental Engineer, P.E.

Rebecca Boulos, MPH, PhD, Public Health Expert

Tom Mikulka, PhD., C.I.H. (ret)

### Support

David Plumb, Consensus Building Institute (facilitator)

Scott Morelli, South Portland City Manager

Adrian Kendall, Special Legal Counsel

## Annex 1 – Context for the CAAC’s Work

### **BACKGROUND:**

#### *Initial Process*

In the Spring of 2019, USEPA and United States Department of Justice announced that they had filed a civil lawsuit against Global Partners’ South Portland facility, claiming Global had violated their air permit conditions as a minor source of volatile organic compounds (VOCs) and that they had the potential to emit VOCs at rates sufficient to classify them as a major source. This claim was based on site emissions testing conducted in 2012 and 2013 that estimated Global’s actual emission rates; prior to 2012 Global declared they did not emit VOCs. At the time, MEDEP disagreed with the USEPA’s assessment methodology and said they believed Global was compliant with their permit conditions.

A similar enforcement action was brought against Sprague Operating Resources, LLC, which also operates a fuel oil terminal in South Portland. The emissions findings were related to the facilities’ heated tanks, which are used for heavier asphalt and No. 6 oil. Ultimately, the USEPA enforcement actions were settled by facility operators agreeing to restrictions on (i) the number of tanks used, (ii) the number of tank heating days, and (iii) a cap on the throughput volume of the products in question. The USEPA formulated these restrictions to ensure that emissions would remain at a level that would ensure compliance with minor source emissions standards, however throughput caps were set above actual operating throughput volumes. The settlement also required the installation of odor control equipment and, in the case of Global, the establishment of a regional wood stove upgrade program. The wood stove program requirement reflected the USEPA’s concerns with the ozone impacts of the emissions, not the direct health effects of VOCs and HAPs.

Faced with this disagreement between the USEPA and the MEDEP over such an important issue, the City launched its own series of public hearings and lines of inquiry. The hearings made clear that citizen concern over air quality and odors was extremely high.

The City engaged directly with the MEDEP to collect and test air samples, which included MEDEP’s installation of ambient air monitoring stations to assess air quality at five South Portland-owned buildings; MECDC assisted with interpretation of the data.

Most air monitoring stations were not located near bulk petroleum storage facilities, as both MEDEP and South Portland City Council expressed in public meetings they intended to collect data representative of average air quality across the entire City of South Portland, with one station in each City voting district.

The air monitoring stations were equipped with a sampling canister that collects an air sample over a 24-hour period every six days. Due to the intermittent nature of sample collection and

the potential for seasonal variations in air quality, the process of calculating average VOC concentrations representative of air quality at the ambient air monitoring stations takes time. As part of their effort to assess South Portland's air quality, MEDEP also provided individual air sampling canisters to residents to collect quick "grab" air samples when odors were present.

South Portland's population is dense and much of it is located near the waterfront and adjacent to the bulk petroleum storage facilities. The bulk petroleum storage facilities are the largest regulated source of potential VOC emissions in South Portland and, together with the semiconductor facilities, are permitted to cumulatively discharge 671 tons per year (tpy) of VOCs, including 154 tpy of hazardous air pollutants (HAPs) as a subset.<sup>8</sup> Estimates of actual emissions are calculated to be lower than the permitted amounts. The estimates are calculated by companies using MEDEP-approved methodology. HAPs are generally established carcinogens, such as benzene. While non-HAP VOCs have not been established as carcinogens, they have been associated with other negative health effects and have proposed human exposure limits.<sup>9,10</sup>

The most common prevailing winds in South Portland are from the west, with a northern component in the winter and a southern component in the summer.<sup>11</sup> Most of the MEDEP monitoring stations are not located downwind (east, southeast) of the bulk petroleum storage facilities, in the context of South Portland's prevailing winds.

The MEDEP ambient air monitoring techniques used to analyze the South Portland data focus primarily on HAPs, such as benzene, and do not measure all potential VOCs that could be emitted as petroleum vapor emissions. Generally, HAPs make up only about 15% of total VOC emissions from petroleum,<sup>1</sup> and benzene makes up only about 1-2% of the HAPs and compounds measured in the DEP data.<sup>12</sup> In general, 1 part of benzene in an air sample from petroleum hydrocarbons indicates the presence of approximately 250 parts of total VOCs; this ratio will vary with the petroleum product.<sup>13,14,15,16</sup> MEDEP tests for 47 constituents in its air monitoring.

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<sup>8</sup> <https://www.maine.gov/dep/air/permits/index.html>

<sup>9</sup> Maine Department of Environmental Protection, Bureau of Remediation & Waste Management: "Remedial Action Guidelines for Contaminated Sites" Table 6, page 55, May 1, 2021.

<sup>10</sup> USEPA Superfund Health Risk Technical Support Center, National Center for Environmental Assessment, Office of Research and Development: "Provisional Peer-Reviewed Toxicity Values for Complex Mixtures of Aliphatic and Aromatic Hydrocarbons", 2009, Tables 8 and 9, USEPA, Cincinnati, Ohio 045268.

<sup>11</sup> <https://weatherspark.com/y/26950/Average-Weather-in-South-Portland-Maine-United-States-Year-Round>

<sup>12</sup> <https://www.maine.gov/dep/air/monitoring/spo-sampling-results.html>.

<sup>13</sup> Falatko, David, "Review of MEDEP Analytical Air Sample Data" May 9, 2022, submitted to the CAAC, in drop box.

<sup>14</sup> Brewer, R., J. Nagashima, M. Kelly, M Heskett, M, Rigby: "Risk-Based Evaluation of Total Petroleum Hydrocarbons In Vapor Intrusion Studies", *Int. J. Environ. Res. Public Health* 2013, 10(6), 2441-2467; <https://doi.org/10.3390/ijerph10062441>.

<sup>15</sup> Isaacman-VanWertz Gabriel, Xin Lu, E. Weiner, E. Smiley, M. Widdowson, "Detailed chemical characterization of the composition and variability of soil gas at remediated residential heating oil discharges", *Journal of Hazardous Materials*, 2021, 413 125372.

<sup>16</sup> Maine Department of Environmental Protection, Bureau of Remediation & Waste Management: "Typical Concentrations of Petroleum Compounds In Maine Residential Indoor Air", January 2014.

### *Regulation, permitting, and guidelines*

The MEDEP air permitting section regulates and issues air emission permits to industry to maintain compliance with the ambient air quality standards for particulates, sulfur oxides, nitrogen oxides, carbon monoxide, and ozone. Neither VOCs nor HAPs have ambient air quality standards; they only have guidelines. The MECDC establishes chronic Ambient Air Guidelines (AAGs) for air toxins; levels below which are considered to pose minimal risk to human health. The MECDC states AAGs are “derived to be protective of human population (including sensitive subpopulations) exposures over a lifetime,”<sup>17</sup> meaning 24-hour exposure at that concentration during a person’s entire life. The AAG for benzene is 0.41 parts per billion by volume (ppbv).<sup>18</sup> AAGs also exist for naphthalene (0.055 ppbv) and a variety of other chemicals, though there are no AAGs for most other petroleum hydrocarbon VOCs. As the word “guideline” suggests, AAGs are essentially used as an informational tool and do not represent enforceable regulatory limits.

Air permits issued for VOC emissions in South Portland for the bulk storage facilities are classified as either minor or major emitters, with a 50 tons-per-year divider between the two. Although major emitters could be required by existing regulations to contain and treat emissions, all South Portland emitters have essentially the same treatment requirements: VOC vapors from volatile products like gasoline have to be collected and burned when loading trucks or when de-gassing tanks for cleaning, and bulk volatile product storage tanks are required to have internal floating roofs to minimize VOC emissions from headspace vapors when being filled (by containment); there are no other treatment requirements. Petroleum products other than gasoline, such as diesel fuel, fuel oil, asphalt, and heavy oils, are typically stored in fixed-roof tanks, and headspace vapors are simply discharged when the tanks are being filled.<sup>19</sup>

Filling a bulk storage tank can cause direct discharge of the headspace vapors above the product or above the floating roof (for gasoline); these discharges have been called “burst” emissions. Filling of a bulk storage tank can take up to 24 hours, and MEDEP data showed that some bulk storage tank filling events coincided with high benzene concentrations at several air monitoring stations. To be sure, the data also showed spikes when no tankers were offloading, or the tank farms were not upwind of the monitors.<sup>20</sup> Residents expressed concerns to the CAAC about the impact of burst emissions on their health and quality of life.

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<sup>17</sup> [https://www.southportland.org/files/1915/8697/1550/South\\_Portland\\_-\\_Portland\\_24\\_Hour\\_VOC\\_Air\\_Monitoring\\_Summary\\_Report\\_Nov\\_2019\\_\\_Jan\\_2020\\_FINAL\\_03.19.20.pdf](https://www.southportland.org/files/1915/8697/1550/South_Portland_-_Portland_24_Hour_VOC_Air_Monitoring_Summary_Report_Nov_2019__Jan_2020_FINAL_03.19.20.pdf)

<sup>18</sup> <https://www.maine.gov/dep/air/monitoring/index.html>

<sup>19</sup> The Global and Sprague heated tanks now have odor-control systems in place.

<sup>20</sup> Maine Department of Environmental Protection, Bureau of Air Quality, Division of Air Quality Assessment, Atmospheric Science and Analysis Section: “Overview of information on days when VOCs rose above the threshold in the SoPo-Po Project in 2021”, presentation by Martha Webster to CAAC. Cited benzene concentrations above average and above ambient air guidelines with bulk petroleum tanker unloading events on days: 6/9/21, 6/20/21, 7/27/21, 10/7/21, 8/31/21.

Assessing health impacts from burst emissions is difficult because VOC concentrations present in the headspace of petroleum products stored in South Portland are unknown, timely sampling of ambient air immediately adjacent to and downwind of a burst emission event is very difficult, and there are few criteria for assessing health effects of short-term community exposures. Also, the current air monitoring stations collect a 24-hour sample every six days, meaning a sample may miss a burst event unless it happens on the day of the sampling.

The CAAC has expressed several concerns about how bulk petroleum tanks are regulated today in Maine.

- 1) Cumulative impacts: Regulation doesn't consider VOC and HAP emission limits for a given geographic area or city, such as South Portland; each permit is issued regardless of other VOC discharges in the area.
- 2) Modeling: Regulators neither conduct modeling nor use other methods to estimate/predict VOC and HAP concentrations from single sources, nor consider the combined effects from multiple sources at various adjacent and downwind locations.
- 3) Health impacts: Regulation does not consider health effects when issuing air permits for VOC and HAP discharges; it is assumed that dilution will be sufficient to disperse VOCs and HAPs to achieve safe levels for the immediate adjacent areas.
- 4) Non-HAP VOCs: The existing regulations guiding air permits for non-HAP VOCs considers them to have limited negative health effects except that these VOCs can photo-chemically break down and cause the formation of ground-level ozone, which does have negative health effects. However, other MEDEP sections, such as the Bureau of Remediation and Waste Management, with support from the MECDC, have established health-based exposure guidelines for non-HAP VOCs<sup>2122</sup>.
- 5) Actual emissions versus estimates: For non-heated tanks, regulation does not require testing of actual VOC and HAP emissions; instead, facilities are allowed to estimate and self-report their emissions. Heated tanks now need to conduct emissions testing to establish emission factors. The USEPA issued an "Enforcement Alert" in November 2020 recommending facilities estimate their emissions based on actual emissions testing, citing the Sprague and Global experiences in the alert.<sup>23</sup>
- 6) Threshold for being regulated: Current regulations allow for total VOC emissions of up to 100 pounds/day, or 36,500 pounds per year without an air permit. Local industrial wastewater treatment facilities for oily wastewater may have emissions below this

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<sup>21</sup> Maine Department of Environmental Protection, Bureau of Remediation & Waste Management: "Remedial Action Guidelines for Contaminated Sites" Table 6, page 55, May 1, 2021.

<sup>22</sup> Maine Department of Environmental Protection, Bureau of Remediation & Waste Management: "Typical Concentrations of Petroleum Compounds In Maine Residential Indoor Air", January, 2014.

<sup>23</sup> USEPA, Office of Enforcement and Compliance Assurance: "Enforcement Alert: EPA Reminder About Inappropriate Use of AP-42 Emission Factors", November 2020. <https://www.epa.gov/sites/default/files/2021-01/documents/ap42-enforcementalert.pdf>

threshold but may still be a source of VOC air emissions and the cause of local VOC-related odor complaints.

- 7) Yearly limits: The VOC/HAP emission limits in all MEDEP air permits are based on a yearly limit in tons. In this approach, short-term burst emissions have no upper limit, as long as the total for the year is not exceeded. In the current permit process, there is no regulatory structure or incentive for an emitting facility to limit burst emissions.

## **AMBIENT AIR MONITORING RESULTS**

MEDEP has collected approximately three years of ambient air quality data from the permanent monitoring stations located in South Portland and Portland. MECDC has analyzed two years of those data, though has only released an in-depth analysis from the first year. Maine CDC also offered to the CAAC in April 2022 a brief analysis of cancer risk based on two years of data.

### *MECDC's in-depth analysis (on one year of data)*

MECDC reviewed collected data from November 2019 – January 2020 and issued a “24-Hour Volatile Organic Compounds Air Monitoring Results Analysis and Summary Report” in March 2020 (the “March Report”).<sup>24</sup> In that report, MECDC stated that “no 24-hour sample result at any sample location for the measured VOCs exceeded an acute MRL [Minimum Risk Level].<sup>25</sup>

For long-term exposures, the time-weighted cumulative average for most VOCs was well below the corresponding AAG. However, the cumulative averages for two chemicals exceeded their corresponding AAG - acrolein at all locations, and naphthalene at some locations. With respect to acrolein, the March Report revealed that the cumulative average was “approximately 20 times higher than the AAG. However, cumulative average acrolein levels at the South Portland/Portland stations are comparable to averages from other air monitoring stations across the state.”

With respect to naphthalene, the report found: “At two sample stations in South Portland and two stations in Portland the cumulative average for naphthalene is currently above the long-term, health-based AAG, but no more than 2.5 times higher.” However, “[a]t least a year of data will be needed to fully capture seasonal variations and assess whether these time-weighted cumulative averages are reasonably reflective of long-term exposures.”

MECDC issued a second “24-Hour Volatile Organic Compounds Air Monitoring Results Analysis and Summary Report” in August 2020 (the “August Report”), which reviewed data from February through June of 2020. The August Report conclusions included:

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<sup>24</sup> <https://www.maine.gov/dep/air/monitoring/docs/S.Portland-Portland-24-hour-VOC-summary-report-03.19.20.pdf>

<sup>25</sup> An MRL is an estimate of the daily human exposure to a hazardous substance that is likely to be without appreciable risk of adverse non-cancer health effects over a specified duration of exposure. MRLs are developed by the Agency for Toxic Substances and Disease Registry under the Centers for Disease Control and Prevention.

- No 24-hour VOC sample result exceeded a health-based guideline for short-term, acute exposures.
- For long-term exposure comparisons, the time-weighted cumulative averages for most VOCs were more than 3-fold below their corresponding AAG.
- The cumulative averages for two VOCs, naphthalene and acrolein, continued to exceed the AAG.
- Acrolein: The cumulative averages for acrolein at all stations remained approximately 20 times higher than the AAG, but levels were similar to levels measured at other monitoring stations in the state.
- Naphthalene: At five stations, three in South Portland and two in Portland, the naphthalene cumulative average was 1.2 to 3.2 times higher than the AAG. In June 2020, several stations in South Portland recorded 24-hour naphthalene levels that were higher than previously measured.

MECDC also presented its review and analysis of all findings through September 2020 at a November 2020 meeting of the CAAC (the “November Report”).<sup>26</sup> The data showed higher naphthalene levels during summer months and higher benzene levels during winter months. None of the chemicals with acute MRLs were measured at levels above their toxicity value. Naphthalene and acrolein were the closest. Where 1.0 represented the acute MRL, naphthalene and acrolein registered at approximately 0.25; however, the findings for those chemicals also showed that their cumulative averages exceeded their corresponding AAG.

At the November 2020 meeting, MECDC also addressed cumulative lifetime cancer risks associated with the findings. The figures presented were based on the cumulative lifetime cancer risk for the chemicals detected per 1,000,000 population. Based on findings from the various testing sites, MECDC presented the marginal increase in the risk of cancer based on a lifetime of exposure at the concentrations collected as follows:

	<b>Increased Risk Per Million</b>	<b>Increased Risk So. Portland</b>
Central Receiving:	46	1.27
Red Bank:	45	1.22
High School:	38	1.03
Bug Light	35	0.95
Assessor’s Office:	30	0.81

South Portland has a population of approximately 27,000 residents. Given this, the second column in the figure above divides the numbers by 37, in order to convert these figures to the cumulative cancer risk for South Portland.

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<sup>26</sup> <https://www.maine.gov/dep/air/monitoring/docs/MECDC-CAAC-24hr-voc-sample-analysis-update11.09.20-annotated.pdf>

*Updated Maine CDC analysis (based on two years)*

Maine CDC briefed the CAAC in April 2022 with results from two years of monitoring. The results were similar to those obtained in previous reports. Acrolein continued to exceed its AAG, similar to the background level in all stations across Maine. Naphthalene levels also exceeded the guidelines in all South Portland stations. As points of comparison, two sites on Portland's waterfront showed even higher naphthalene concentrations, while Deering Oaks was lower. The CAAC also noted the data from the Bug Light station showed periodic spikes in benzene levels, though the cumulative average did not exceed the AAG.

Using data from the first two years of monitoring, Maine CDC estimated an increased lifetime cancer risk for South Portland of approximately 35 in a one million population, based primarily on detected naphthalene and, to a lesser extent, benzene, and other VOC concentrations. The equivalent data for the Deering Oaks monitoring station in Portland indicated an increased cancer risk of 26 in one million, and monitoring stations on the heavily traveled West Commercial Street and at the Ocean Gateway in Portland had total cancer risks at 51 and 58 in one million, respectively. As stated before, given South Portland's population of approximately 27,000, a cancer risk of 35 in one million is roughly equivalent to increased lifetime cancer risk of 0.95 in 27,000.

***Recent VOC-Odor Complaints:***

In the summer of 2022, there were several odor complaints in the Cash Corner and Rigby Yards areas of South Portland. These complaints correlated with increased VOC emissions as recorded by the air monitoring station at the new Cash Corner fire station. Anecdotal reports indicated the odors may have come from creosote-soaked railroad ties being stored at Rigby Yards, but odors were also reported near the adjacent Clean Harbors facility; it is possible both locations could have been emitting odors. There were no additional samples collected (beyond the fire station's ambient air monitor) to determine the nature of the VOC-odors, as there are currently no procedures or staff to do so in either South Portland or at MEDEP. MEDEP told the CAAC they have no jurisdiction over Rigby Yards, Clean Harbors does not have sufficient emissions to warrant an air permit, and MEDEP does not regulate odors.