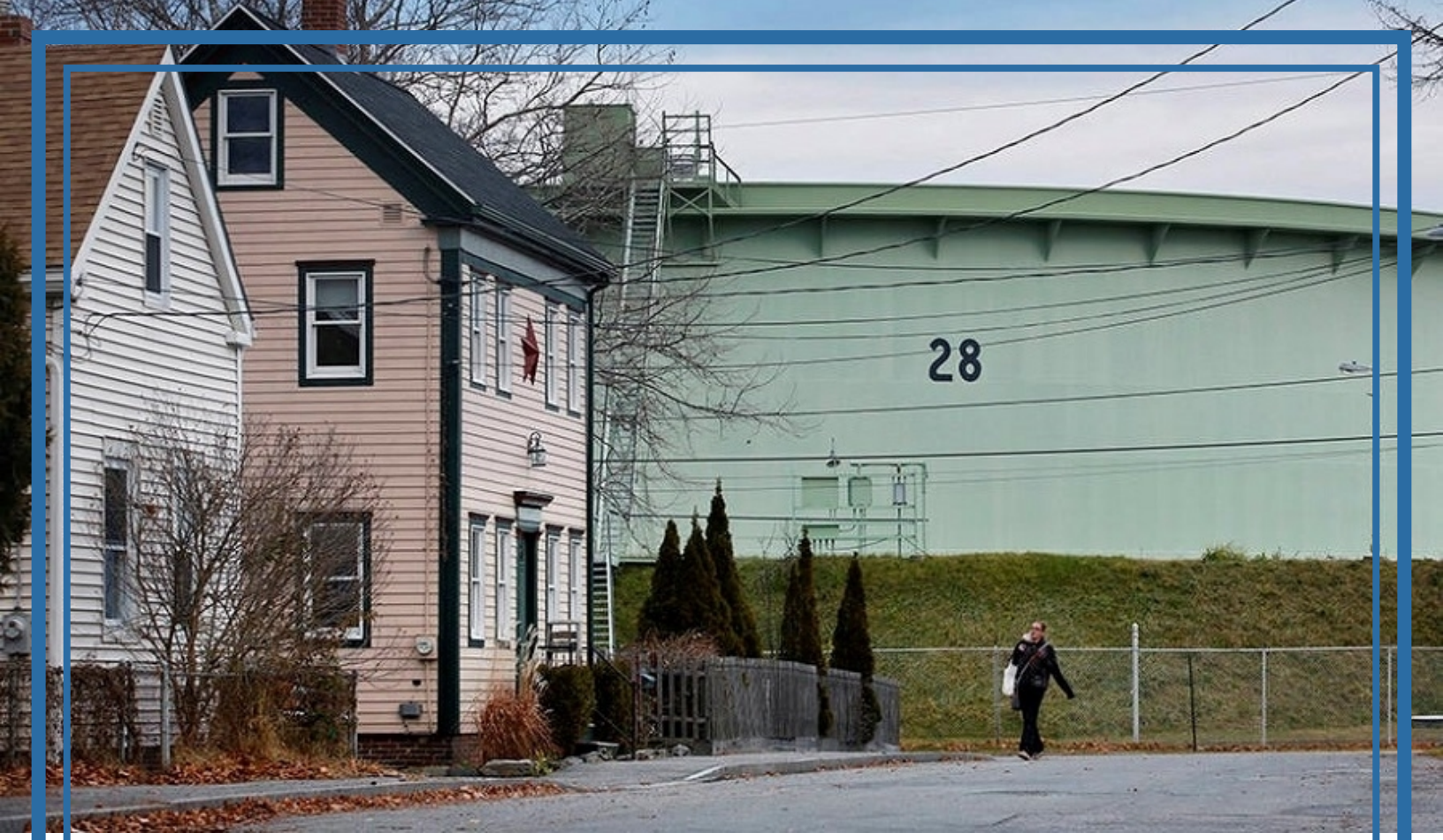

Photo by Derek Davis via Getty Images

Oil Tank Emissions Info Packet

Prepared by Protect South Portland
with support from
The Tank Emissions Coalition of Maine

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Oil Tank Terminal Emissions In Maine

THE ISSUE

Toxic Chemicals in tank farm emissions that are contaminating our air and making people sick are not monitored or controlled adequately. Regulators have repeatedly failed to address the problem in a way that protects public health.

People living in the neighborhoods surrounding the tanks are exposed to cumulative toxic substances that are known to cause cancer, respiratory problems such as asthma, neurological problems that particularly affect fetuses and young children, and damage to the liver and kidney. Air pollution also has been identified as making people more vulnerable to Covid-19. The tanks are merely feet away from homes, schools, businesses, daycares and senior housing. In South Portland, the tank farms are located close to one another and collectively are licensed to emit about 600 tons of volatile organic compounds (VOCs) and 104 tons of hazardous air pollutants (HAPs) every year. That is the equivalent of having a mid-sized oil refinery sitting here on the bank of the Fore River, between the two most densely populated communities in the state.

This is clearly a social and environmental justice issue. The oil industry maximizes profits at the expense of the public health of our community. Technology exists that can monitor and control these emissions up to 95 percent. What is needed is the will to do it. The Maine State Legislature must act to ensure that the oil industry conducts its business responsibly and in consideration of the health and welfare of all Mainers, including those who live near the 120 tanks in South Portland and the tanks in Searsport, Bucksport and Hampden.

BACKGROUND

The legislature last year directed the Department of Environmental Protection to study the best methods to measure and control emissions on all tanks in Maine, including reviewing what other states and regulatory bodies require of tank operators (LD1915). The department did not fulfill the mandate of the resolve, instead dismissing the need for more comprehensive monitoring; entirely excluding the efforts of Massachusetts to address the same issue; focusing more on odor than on the risk to public health; and recommending little more than the status quo.

Currently, no actual testing of emissions is conducted at any of the tanks as a requirement of the operators' state licenses. Instead, the DEP relies on oil companies to report their own estimated emissions, using formulas developed by the American Petroleum Institute, an industry trade group. The DEP, in its report, defended its practice of taking those estimates at face value despite the fact that the U.S. Environmental Protection Agency found that the companies were grossly underestimating their emissions and there is no accountability regarding the data employed or auditing of calculations.

In 2012 and 2013, the EPA required actual emissions to be tested at heated storage tanks in South Portland and Searsport. Those tests revealed that Global and Sprague were in violation of their state permits and the Clean Air Act. The companies failed to remedy those violations for years, and the federal government ultimately filed lawsuits against them. Those lawsuits ended in consent decrees in 2019 that did not mandate controls or transparency at the tanks. Nor did they ease residents' concerns.

The people of South Portland have been vocal about the need for action, filling the room during in-person and virtual meetings at the city level, and flooding the federal court with comments on the consent decrees. Many of those comments have come from people who live near or operate a business close to the tanks, and who worry about the health effects the often overwhelming stench of oil has on their loved ones, their neighbors and their customers. The South Portland City Council created a Clean Air Advisory Committee to study what can be done to make our air safer to breathe. That group has worked tirelessly for two years to vet this issue and to push for more transparency from regulators and the industry.

Twelve health advocacy and environmental groups have joined together to call for monitoring and control of emissions at all aboveground oil terminal tanks in Maine, including those classified as major and minor emitters. The Tank Emissions Coalition of Maine includes 350Maine, American Lung Association, Community Action Works, Conservation Law Foundation, Defend Our Health, Elders for Future Generations, Maine Association of Naturopathic Doctors, Natural Resources Council of Maine, Physicians for Social Responsibility Maine, Portland Climate Action, Protect South Portland and Sierra Club Maine.

THE DEP REPORT

There are a few things in the DEP report that were encouraging. They include a recommendation that fixed roof heated tanks should be insulated and have temperature monitoring; a recommendation to require vapor recovery equipment during switch-loading, which involves changing the contents of a truck from one substance to another; and the suggestion that the companies be required to use infrared cameras to detect equipment leaks.

There are many things that the DEP left out or got wrong:

- The department continues to represent this problem as being about odors, which cannot be monitored or regulated. The real concern is the serious toxic VOCs and HAPs these communities are exposed to, which can be monitored and controlled. And, if they were properly controlled, the odor issue would be moot.
- The department dismisses the possibility of stack monitoring to accurately assess direct output, despite the fact that this method is low-cost and effective. The report claims that it requires use of a fan that would create excessive emissions. Yet, the DEP in this report also validates methods that have used just such a fan, including a DEP-approved carbon bed installation at that facility that would require a fan about 10 times as strong.

- The report dismisses the need for any monitoring and control of gasoline tanks, claiming existing federal and state regulations are adequate. The gasoline tanks are responsible for 70 percent of tank emissions in South Portland, yet the DEP does not require even those classified as major emitters to conduct monitoring or install control technology beyond floating roofs. Vapor recovery units, similar to those being installed on some of the heated tanks, should be required on the gasoline tanks. They are referred to by the DEP as "odor control equipment" but their more important function can be control of VOC and HAP emissions.
- The report dismisses the requirement of carbon absorption equipment for emissions control due to the maintenance and operation required. Yet the DEP is permitting this equipment for Global and potentially requiring it for Sprague. Requirements for Operations & Management can be written into licenses.
- The DEP failed to include an assessment of efforts by state regulators in Massachusetts to grapple with exactly this issue of tank farm emissions.

ACTION NEEDED

A. Emissions testing is the critical first step. Actual emissions must be measured to define the problem and provide a basis for assessing mitigation efforts.

1. Develop a plan with the DEP to require stack testing to be incorporated at every facility on all tanks, heated and non-heated at the time of their next license renewal, or before.

2. Require tank operators to install fenceline monitoring around the perimeter of their facilities, to provide continuous testing and to make the data available to the public. This would provide information about the effects on the adjacent community. Both fenceline monitoring and stack testing represent reasonable expenses that should be borne by the companies as part of their permit to operate in these communities.

B. Direct the DEP to require all emissions to be treated in order to protect the community from the effects of their toxic chemicals. The preferred type of equipment for treating emissions are vapor recovery units (VRUs) as recommended by the EPA. Requirements for operation and maintenance of equipment should be included in their licenses.

Thank you for your time and consideration. Please find additional documents and materials attached, and feel free to reach out to us with any questions.

***Rachel Burger**, President of Protect South Portland*
protectsouthportland@gmail.com ProtectSouthPortland.com

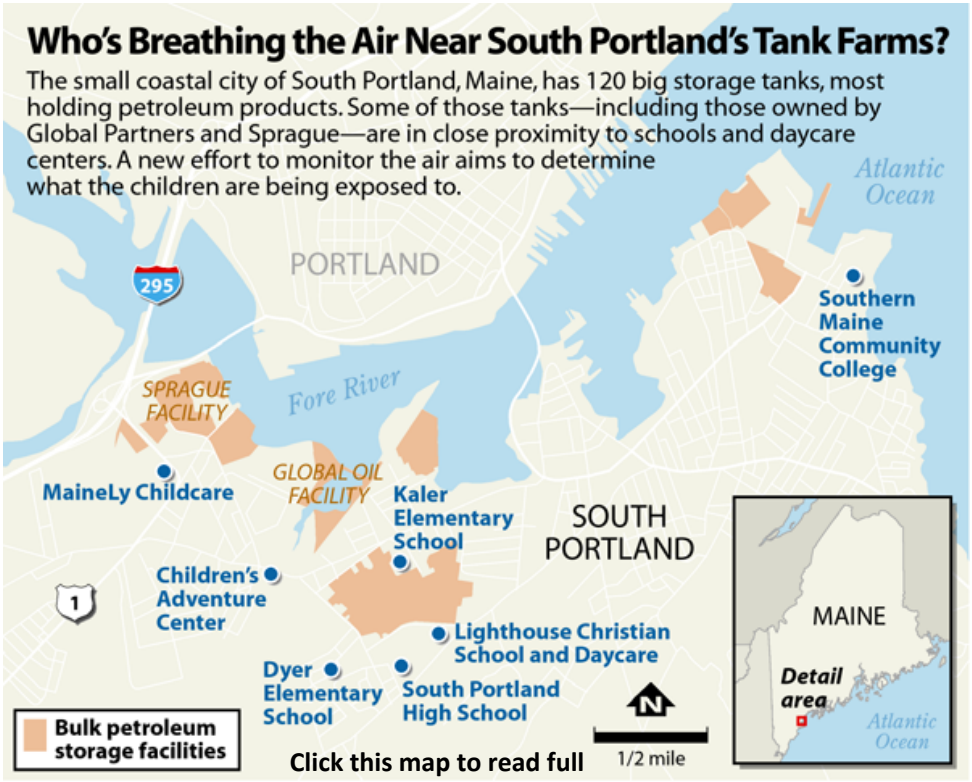
“I am a retired South Portland Teacher. Having taught at James Otis Kaler School, I experience first-hand the odors coming from the tanks. The tanks border the school on two sides. They are in close proximity to the school and the playgrounds.

We must take advantage of the advanced technology that exists to monitor and control up to 95% of these emissions.

Kaler has pre-kindergarten through grade 5 students. These students are among the most vulnerable of our residents.

It is our job to protect them.”

Louisa Beckett, in a letter to the ENR Committee



“My daughter Carly started attending daycare in the Ligonia neighborhood of South Portland in Spring 2018, when she was 1 ½ years old. In the mornings, we headed to daycare singing songs in the car with the windows rolled down in most any weather. On many, many days after making the turn– especially in better weather– my throat would start to burn. The fumes from that area would start to make us gasp and choke. The air smelled like a mix of petroleum and asphalt. We couldn't sing anymore, and I'd tell Carly to put her blanket over her nose and mouth to filter out the fumes.

At daycare, the teachers complained of headaches and respiratory issues, and many days the children couldn't go outside to play because of the heavy smell of oil in the air. The air is not safe and every day I think about Carly's classmates and those who live nearby. We must understand what's actually in the air around those tanks and act quickly to protect the community's businesses and residents– and all those kids.”

Melinda Hull, South Portland

Kaler Elementary School (PK-5) Playground with oil tanks prominently in the background; Photo by Roberta Zuckerman

Voices from the Neighborhoods

“My quiet, tree-lined neighborhood in South Portland is called Pleasantdale. But the toxic stench from nearby petroleum tank farms frequently makes our neighborhood decidedly unpleasant. I can step out my door on a beautiful day– be it Spring, Summer, Fall or Winter– and instead of fresh air, get a lungful of what smells and tastes like the fumes given off during a street-paving operation or at a gas station while filling up a car.”

Tess Nacelewicz, in a letter to the ENR Committee

“I am a proud resident and property owner in Portland’s West End, where I own and live in a 150 year old house with my wife and two small children (5 and 8). My children’s bedroom windows are less than a mile– in direct line of site across the Fore River from South Portland’s active oil tanks– notably Global and Sprague facilities. When my children play in their sandbox, they complain of the stinging smell of tar in their nostrils.”

Andrew Butcher, in a letter to the ENR Committee

School buses waiting outside South Portland High School with oil tanks in the background. Photo by Abby Huntoon

“The toxic tank fumes have been making me and my loved ones ill for years. I’ve come to calling them the ‘cancer fumes.’ Nausea, dizziness, headaches, swollen glands, and heart pain are among our symptoms when the tank fumes suffuse my home neighborhood near the Gulf tanks, often at night. During late night toxic emissions episodes, I’ve worn a gas mask in my home.

I used to bicycle to work near Global and Sprague tanks, where I care for women with disabilities, but the air along the way was frequently painful to breathe. When I learned that these toxic fumes cause illness and cancer, I stopped bicycling to work. During my night shift, often the fumes make me so ill that I must close all windows and seal the home, just like I do at my own home, to protect myself and the ones in my care.

Sadly, our community has come to realize that, for decades, neither industry nor government regulators have kept us safe. It is beyond comprehension that so many people’s bodies have been and continue to be sacrificed for industry profit. We need to make all tank fume exposures stop immediately.”

Pamela Cragin, South Portland

Expert Testimonial

In response to community concerns, South Portland's Clean Air Advisory Committee (CAAC) was created to study and make recommendations regarding the problem of air pollution in South Portland, including an examination of the impact of tank farm emissions. One member of the committee knew of a scientist and medical doctor who could perhaps be helpful in advising the committee on various research related tank emissions. Dr. David Carpenter was invited to learn more about the South Portland tank issue and share his expertise with the CAAC at one of their meetings in July, 2020. He spoke of findings from his many years of research on fracking sites and other gas line emissions (one in the port of Albany, very similar to the South Portland circumstances) and expressed his concerns about what is happening here in Maine. Subsequently, Dr. Carpenter summarized his thoughts in a letter to the CAAC. We would like to draw the ENR Committee's attention to the following particularly salient points of that letter:

> "There are a variety of health concerns related to exposure to VOCs (Volatile Organic Compounds) and HAPs (Hazardous Air Pollutants). Cancer is a major concern, especially from exposure to benzene and 1,3-butadiene. Naphthalene and acrolein are also a concern, as both are considered probable human carcinogens. Effects on the nervous system are a major concern resulting from chronic effect from exposure to different VOCs. There are other adverse effects on immune system function and reproduction that are well documented in studies done around fracking sites… and that are of concern in this situation as well."

Over the past year, the MEDEP has been involved in a long term study looking for, and finding, some of these same chemical constituents (benzene and naphthalene among them) in ambient air. They have done periodic air sample collection from many neighborhoods in South Portland and Portland.

Carpenter, in his letter, further stated that "Many federal and state standards put in place are based on average [emissions] releases over long periods of time (many hours, days, and weeks). These standards should always be enforced." But he cautioned that "intense episodic emissions are often obscured with long-term monitoring… but still may cause significant health effects… Ambient Air Guidelines (AAGs)," he stated, "are not a boundary between safe and not safe. They are reasonable goals to achieve for the protection of human health." He went on to say that "The EPA assumes there is no level of exposure that does not increase the risk of cancer." Dr. Carpenter feels strongly that emissions of chemicals like benzene, 1,3-butadiene, naphthalene, and acrolein at any level above the AAGs "should not be tolerated, as they pose a direct threat to the health of those individuals living near the tank farms." His letter in its entirety is included in the following pages.

UNIVERSITY AT ALBANY
State University of New York

Institute for Health and the Environment
WHO Collaborating Center in Environmental Health

8 July 2020

Clean Air Advisory Committee
City of South Portland

Dear Committee Members:

Thank you for the opportunity to comment on air monitoring done to date and what possibly may be expanded around the tank farms in South Portland.

I have been provided a number of documents, which I have carefully reviewed. These include the "South Portland VOC air quality monitoring project update, dated August 20, 2019", the "VOC and VOC HAP emissions testing from residual oil tank No.3 tank headspace and loading operations at Global's South Portland, Maine Terminal", and a similar report on emission from asphalt tank No. 9, both report prepared by Eastmount Environmental Services, LLC. I have also reviewed the "Preliminary Health Assessment South Portland Air Quality: report prepared by Dr. Andrew Smith, as well as several EPA documents and a report of naphthalene levels in South Portland. I have also reviewed several memos prepared by Tom Mikulka and measurement of ambient benzene levels at various sites in South Portland.

For your information, I am attaching my CV. I am a public health physician whose research interest is the study of human disease resulting from exposure to environmental contaminants. Most of my research relevant to the South Portland situation has been in relation to fracking and natural gas infrastructure facilities. I have also been somewhat involved in a relatively similar situation in the Port of Albany, where oil trains bring crude oil from the Midwest to be unloaded, stored, then loaded onto tanker ships for travel down the Hudson River. The local community has had similar concerns to those raised in South Portland. My expertise is in human health effects of air pollution.

There are a variety of health concerns related to exposure to VOCs and HAPs. Cancer is a major concern, especially from exposure to benzene and 1,3-butadiene. Naphthalene and acrolein are also a concern, as both are probable human carcinogens. Effects on the nervous system are a major concern resulting from chronic exposure to many different VOCs. There are other adverse effects on immune system function and reproduction that are well documented in studies done around fracking sites and that are of concern in this situation as well.

Many federal and state standards are based on average releases over long periods of times (many hours, days, weeks). These standards should always be enforced. Intense episodic emissions are often obscured with long-term monitoring, but still may cause significant health effects. I'm pleased to see that a number of grab samples have been taken, as these give better information on the degree of variability. But by their nature grab samples may not catch the extreme emissions.

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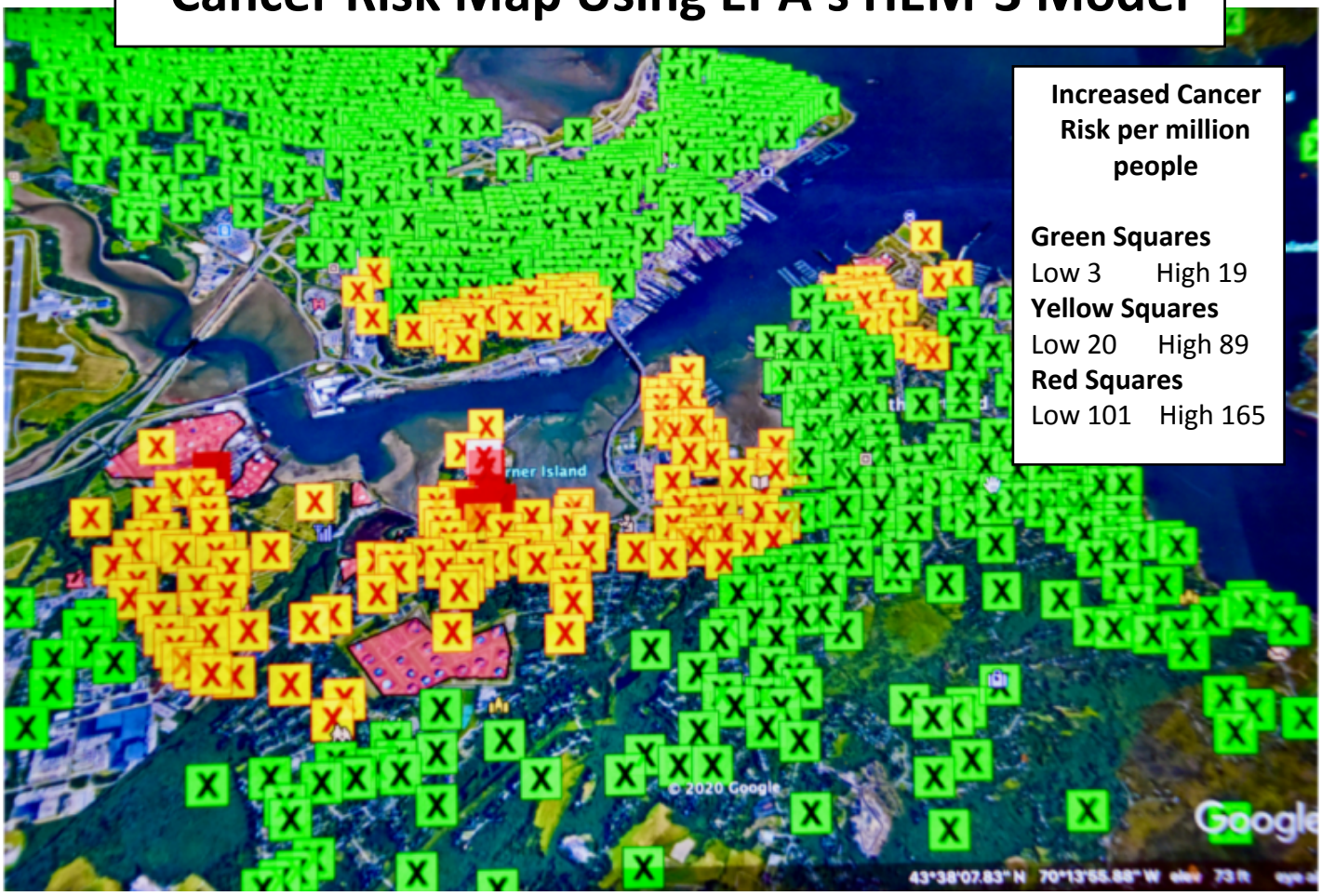
Benzene is the contaminant of greatest concern because it is a potent carcinogen. We are all exposed to benzene every day because it has natural sources, and it is emitted from all internal combustion engines. This, however, is not to imply that emissions from point sources such as tank farms are insignificant, as they may add greatly to exposure. Furthermore these are sources for which state and federal agencies set limits on allowable emission It appears that the sampling done to date has documented background exposure at various sites around the city, but that the sampling was not done at the boundaries with the tank farms. Such fence line sampling should be done in order to determine the degree to which these point sources contribute to total exposure of those living closest to the tank farms. Sampling must be done with knowledge of wind rose data. A mix of 24-hour and grab samples, taken by community members when odors or other events suggest elevated emission, at the fence lines should be obtained.

Evidence from the grab sampling reported by Mr. Mikulka show clearly that levels of both benzene and naphthalene are often above the Ambient Air Guideline at sites near to the tank farms. This is of concern. It also must be noted that the AAG is not a boundary between safe and not safe. For carcinogens it is assumed by EPA that there is no level of exposure that does not increase risk of cancer. But the AAGs are reasonable goals to achieve for the protection of human health. Emissions of these chemicals at levels above the AAGs should not be tolerated, as they pose a direct threat to the health of those individuals living near to the tank farms. The city and state should require that the industry never exceed these guidelines.

Yours sincerely,

David O. Carpenter, M.D.
Director, Institute for Health and the Environment
University at Albany

Cancer Risk Map Using EPA's HEM-3 Model



The above map summarizes the areas at greatest risk for increased cancer incidence by color. It was created by South Portland professional environmental engineer, David Falatko using the EPA risk assessment model, HEM-3. The Human Exposure Model (HEM-3) is a streamlined yet rigorous tool that can be used to estimate ambient concentrations, human exposures and health risks that may result from air pollution emissions from complex industrial facilities.

The risk factors are based upon the permitted levels of emissions for each tank farm (see Table on following page), with the exception of the Portland Pipeline Co. LLC which was not included since the tanks were no longer in use. However, since that time, six to eight of the 23 tanks have been filled with crude oil. Refilling these tanks will result in an increase in the above risk estimates since the Portland Pipeline company was ranked with Sprague and Gulf as the largest permitted emitter of HAP's when in full operation.

The Maine CDC considers the acceptable cancer risk to be 10 additional cancers per million in population. Other states such as Massachusetts and New York consider the acceptable increase to be 1 cancer per million in population.

What the model clearly shows is that the tank farms presently represent an increased unacceptable risk of cancer to fence line neighborhoods. The solution is to require the capture of the harmful emissions using the best available control technology.

Table 1: Permitted Annual Emissions for the Largest South Portland Petroleum and Other Industrial Facilities

Facility	Location	Total HAP (tons/year)	Total VOC (tons/year)	Total VOC (lbs/year)	HAP % of VOCs:
Global Companies, LLC	1 Clark Road	9.9	21.9	43,800	45%
Portland Pipe Line Corp.	30 Hill Street	24.9	220	440,000	11%
CITGO Petroleum Corp.	102 Mechanic St.	5	117.3	234,600	4%
South Portland Terminal LLC	170 Lincoln St.	14.1	135.4	270,800	10%
Gulf Oil	175 Front Street	24.9	49.9	99,800	50%
Sprague Operating Resources	59 Main Street	24.9	49.9	99,800	50%
	Petrol Terminal Totals:	104	594	1,188,800	17%
ON/Fairchild Semiconductor		24.9	40	80,000	62%
Texas Instruments		24.9	37	74,000	67%
	Other Industry Totals:	50	77	154,000	65%
	Combined Totals:	**154**	**671**	**1,342,800**	**23%**

Table compiled by David Falatko, Environmental Engineer

This table shows the permitted emissions (Volatile Organic Compounds (VOCs) and Hazardous Air Pollution (HAPs)) amounts as detailed in the permits issued by the DEP for the tank owners and operators in South Portland. These permitted emissions amounts were used in the HEM – 3 Modeling formulas to assess the cancer risk outlined in the map above. When combined, these petroleum facilities (which are so close together as to be considered a contiguous single site in reality) are currently permitted to discharge 671 tons of emissions per year into an area surrounded by residents, schools, daycare centers, and senior residential facilities - some of the most vulnerable among us. But these emissions pose a great risk to all living and working in the area.

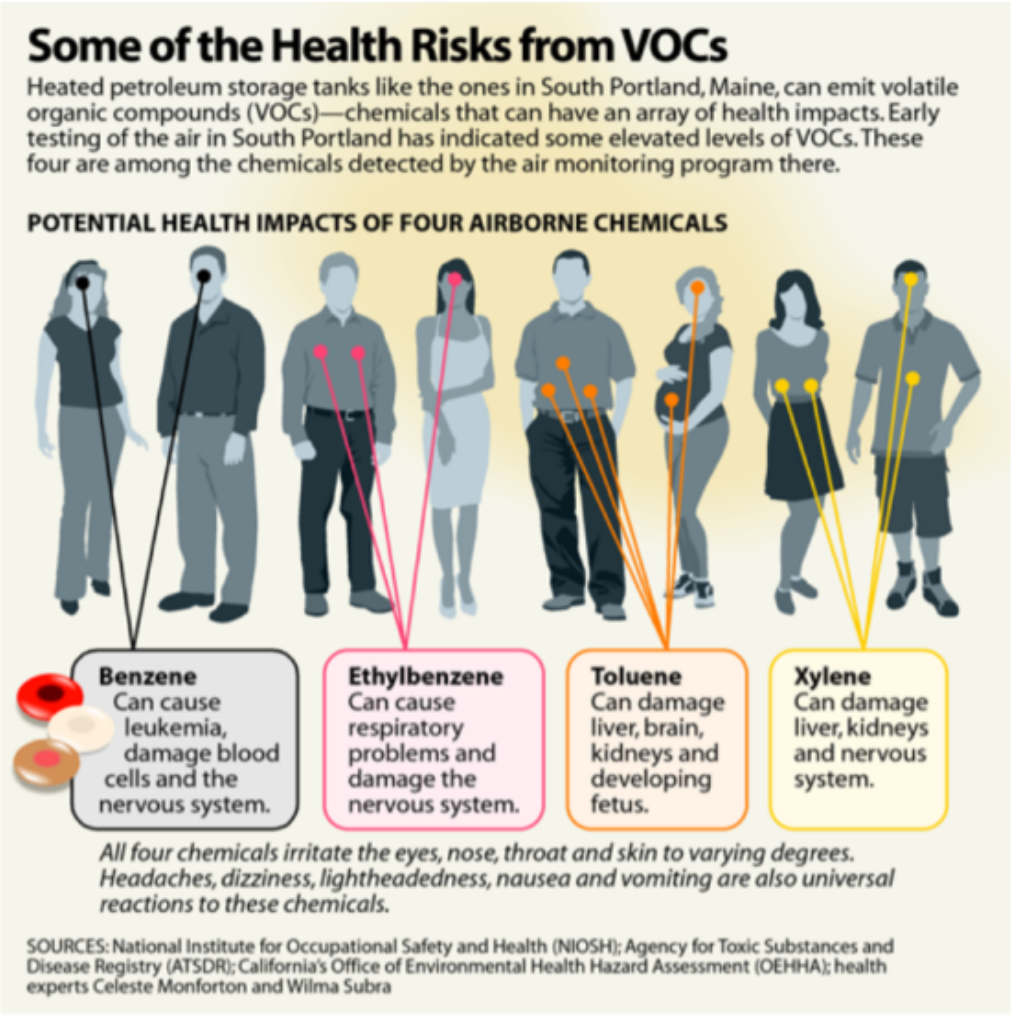


Table 2: Permitted and Calculated Annual Emissions for South Portland Petroleum Facilities

	Permitted VOCs (tons)	Air Pollution-42 (AP-42) revised VOCs (tons) in calculated emissions
Gulf	49.9	25.8
Global	21.9	4.0
Sprague	49.9	7.5
Citgo	117.3	42.2
South Portland Terminal	135.4	43.7
Portland Pipeline	220	41.0
	Source: MEDEP: Air Permits, Liscences, Certifications	Source: phone call with Emissions Inventory Section of MEDEP 2/5/21

This table represents the emission total amounts allowed by each company's permit. It then gives the total estimated emissions calculated using Air Pollution-42 (AP-42) and self-reported by each facility. These calculated totals are not based on any actual testing. There are some additional nuances that we encourage the ENR Committee to explore, particularly how emissions are calculated under the recently revised AP-42 guidelines. It should be noted that there had never been throughput limits in Global's previous permits. As a result of the Consent Decree, there is now a throughput limit for Global in their new permit. But the "limit" is about 6x higher than the amount of throughput that Global previously reported processing. These allowed elevated throughput amounts, in conjunction with the recently revised way to calculate estimated emissions reports, can result in the companies being able to process more product while appearing to reduce their emissions, which is very alarming. This scenario sets up the case where more emissions in reality will be permitted to go into the air; the calculated emissions would look smaller, but the actual amounts of emissions would end up being larger. The prospect of this is deeply disturbing and highlights the urgency for accurate monitoring and measuring of emissions.

The Tank Emissions Coalition of Maine supports the actionable recommendations submitted by David Falatko, environmental engineer, regarding the testing, monitoring and control of emissions from all above ground terminal oil tanks in Maine.

CAAC Comments on DEP's Report on Measurement and Control of Tank Emissions

Overview

The South Portland Clean Air Advisory Committee (CAAC) offers the City Council these comments on the report "Measurement and Control of Emissions from Aboveground Petroleum Storage Tanks" by the Maine Department of Environmental Protection (MEDEP), published in January this year in response to L.D. 1915 of the Maine Legislature.

Comments on the Report

More Information of the type and status of tanks needed

- The potential for emissions of tanks depends on characteristics such as: Are they riveted or welded? What is the condition of the interior walls? What types of seals are present? And which exact product they contain?
- The CAAC believes this information would assist concerned citizens and other invested parties estimate potential emissions.

Concerns with having companies calculate their own emissions using AP-42 methodology for gasoline tanks

- Given the number of assumptions and variables that go into calculating emissions using AP-42, the CAAC recommends that MEDEP run the calculations themselves, in addition to having the companies calculate them. The CAAC sees value in this type of "audit" of the calculations, given concerns around how calculations have been made in the past.
- Relatedly, the CAAC would have liked to have seen more effort by MEDEP to explore methods for measuring actual emissions from gasoline tanks. The EPA study cited in the MEDEP report included references to experiences of measuring actual emissions from gasoline tanks. MEDEP did not mention those experiences nor the experience by counterpart in Massachusetts and the Environmental Protection Agency.

Concern about degassing tanks and cutter stock

- The CAAC has heard concerns about the "degassing" process of tanks and was disappointed that the report did not mention the issue. The CAAC recommends MEDEP require vapor capture during degassing.
- Similarly, the CAAC was disappointed that the report didn't address more significantly the challenge of "cutter stock" and products added to asphalt and No. 6 oil, and implications that those products might have on emissions.

Cumulative Impacts

- The report says the MEDEP does not recommend fenceline monitoring as a way to control individual facilities because emissions may be "mingled with emissions from other nearby sources" and "not necessarily be directly attributable to the facility at whose fences the monitors are located.
- The CAAC sees the logic of this argument as it related to controlling individual facilities. However, it begs the question in South Portland about cumulative impacts. The CAAC sees a compelling argument to consider a regulatory approach that focuses on the impacts that residents perceive from these facilities, which are likely cumulative in nature. The CAAC was disappointed that MEDEP did not consider cumulative impacts, given the proximity of the facilities to one another in South Portland.

Greater focus on health impacts

- Similarly, the CAAC would like to see MEDEP proactively consider how it can incorporate into its regulatory approach a more explicit emphasis on the potential health impacts from the facilities. The CAAC believes there are opportunities to do this under MEDEP's existing authority, in coordination with other state agencies. Incorporating health impacts more explicitly could mean, among other things, taking into account the proximity of homes, when determining Best Practical Treatment.
- The CAAC has expertise on this issue and is willing to collaborate with MEDEP on methods for applying this lens to its regulatory approach.

What comes next?

- The report's Summary section lists the measures MEDEP will take as a result to this analysis and asserts that MEDEP has sufficient authority to act on these measures.
- CAAC urges the City Council and the Legislature to question MEDEP about additional concrete regulatory next steps that would allow the state to regulate these facilities in a way that recognizes their potential cumulative effects and the potential health risks they may present for residents. The CAAC is concerned that suggested measures don't represent a significant improvement over existing regulatory practice. Does the MEDEP see any opportunities to use existing authority, or new authority, to ensure the facilities don't present an "unreasonable risk to the people who live closest to them?

The Clean Air Advisory Committee

Visit their website here

Brianne Hicknell, Environmental Engineer
Thomas Mikulka, Environmental Scientist/ Chemist
Rebecca Boulos, Public Health Official
Scott Morelli, City Manager, Staff Liaison (non-voting)
Joshua Cutler, Member
Anthony Moffa, Environmental Attorney
David Plumb, Facilitator (non-voting)

Media Coverage
for Further Reading

Fumes in South Portland
Sabrina Shankman via Inside Climate News Series, 2019-2020

State admits it was wrong to resist federal crackdown on oil tank pollution
Kelly Bouchard via Portland Press Herald, July 2019

Toxic Fumes in the West End
Espahbad Dodd via The West End News, November 2020

'Is our air safe to breathe?'
Robert Lewis-Nash via Portland Phoenix, December 2020

SoPo residents seek tighter regulations, accountability for oil tank emissions
Emily Weyrauch via Maine Beacon, January 2021

Maine Department of Environmental Protection issues report on South Portland oil storage tanks
Philip Hirschkorn via WMTW Channel 8, January 2021

South Portland residents press Maine environmental regulators on oil storage tank emissions testing, remediation
Philip Hirschkorn via WMTW Channel 8, January 2021

South Portland, Portland respond to air quality concerns surrounding oil storage tanks
Philip Hirschkorn via WMTW Channel 8, January 2021