CITY OF SEATTLE HEATING OIL TANK POLICY RECOMMENDATION – 6/30/2020

Prepared by:
Ken Brouillette, Seattle Fire Department
Christine Bunch, Office of Sustainability and Environment
Mike Podowski, Seattle Department of Construction and Inspections

Background

In September 2019, the City Council passed the Heating Oil Tax ordinance 125934 to help accelerate the conversion of environmentally harmful, costly, and inefficient heating oil to cleaner and more energy efficient electric heating. In acknowledging the harmful impacts of heating oil leaks on property, surface and ground water, and human health, the ordinance includes a provision for OSE, Fire, and SDCI to develop a recommendation for requiring all heating oil storage tanks to be either decommissioned or replaced with a modern tank no later than December 31, 2028. The Heating Oil Tax ordinance requested that the recommendations for addressing heating oil tanks include an assessment of tank risks and replacement, available financing options for tank decommissioning and fully funding conversions to electric systems, and any necessary code updates or code authority.

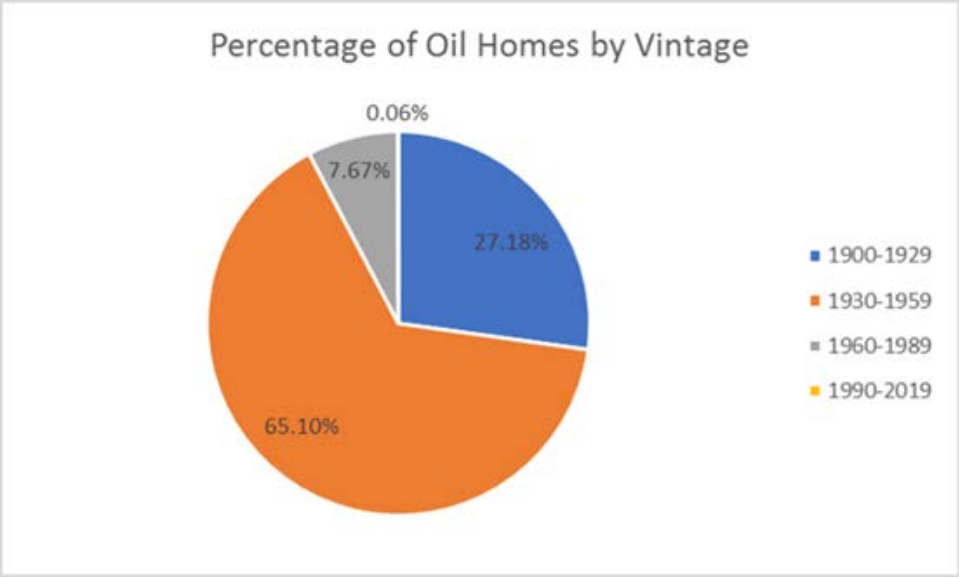
Executive Summary

There are about 16,000-18,000 oil heated homes in Seattle and many of the oil storage tanks are 60 years or more old, well passed the expected 15-20 year useful life of an oil storage tank. According to the best data available, approximately 25% of oil storage tanks are leaking, but given the average age of the equipment and the "out of sight, out of mind" nature of underground storage tanks, some industry experts suggest that leak rate may be as high as 50%. Current trends suggest that a majority of underground tanks will be decommissioned or replaced by 2028 in the absence of further action. With the implementation of the oil heat tax supported programs that will further encourage home owners to transition to electric heating, modifications to the State's financial assistance for oil storage tank cleanup and decommissioning, and an education and outreach effort aimed at improving awareness of the resources available for conversions to electric heat, it is possible that no further action will be required to reach the goal of full decommission or replacement by the end of 2028. The costs of cleaning up a leaking tank, however, can create a significant financial burden for low-income homeowners, even with the existing levels of financial assistance from the State government, and may require further commitment from government to achieve full decommissioning. In response to these circumstances, we recommend the City implement the oil heating tax and the associated incentives for switching heating oil to electric heating; distribute information regarding financial assistance for electric heat conversions and heating oil tank cleanup; monitor the progress of oil tank decommissioning; and if necessary, pursue options to use the City's authority under the Seattle Fire Code to ensure the long-term safety of heating oil tanks within Seattle.

Heating Oil Storage Tank Risks and Replacement

There are about 16,000-18,000 oil heated homes in Seattle. The vast majority are single family homes and more than 90% were built before 1960 (Table 1). The majority of heating oil storage tanks in operation today are the same tanks that were installed when the house was built. These tanks are predominantly over 60 years old or more and have exceeded the average useful life, which is between 15 and 20 years, according to numerous environmental remediation companies across the country (please see resources page). For most homeowners, storage tanks are an "out of sight, out of mind" issue and action is not usually taken until the tank leaks. It is unknown how many above ground tanks exist. Aboveground tanks pose fewer hazards since any oil leak can be visibly recognized.

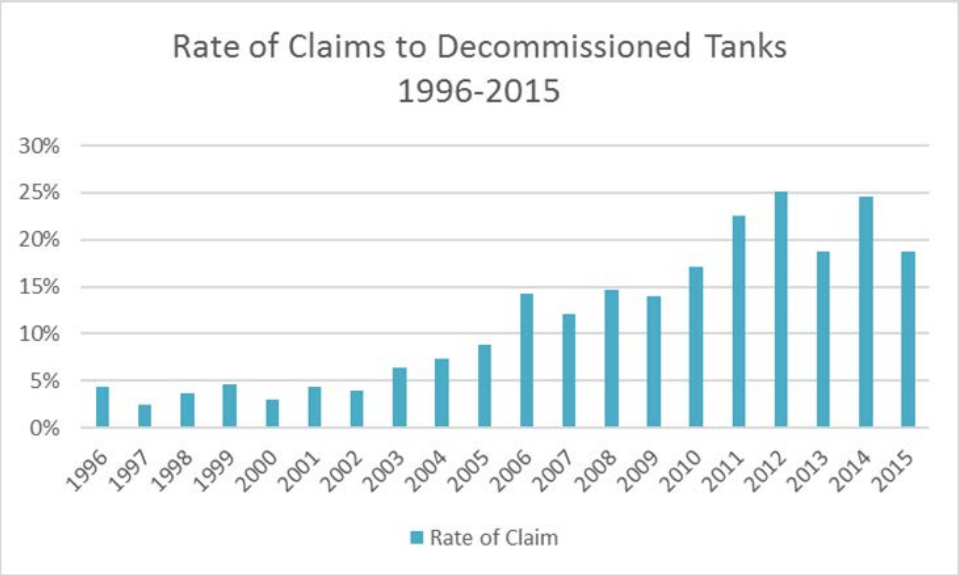
Table 1: Homes with oil heat by year built



In Washington state, heating oil storage tanks that are 1,100 gallons or less in capacity are regulated by local jurisdictions. Within Seattle, and many other jurisdictions, the Fire Department oversees decommissioning of storage tanks. Decommissioning includes fill in place or removal and a permit is required. A permit is not required for the installation of a new storage tank by either SDCI or the Fire Dept. "Heating oil tank" means a tank and its connecting pipes, whether above or below ground, or in a basement, with pipes connected to the tank for space heating of human living or working space on the premises where the tank is located.

Leaking heating oil storage tanks can harm property, surface and ground water, and human health. Clean up can be costly, disruptive, and time consuming. In conversations with tank decommissioning service providers, their experience leads them to estimate the tank leak rate may be as high as 50%. The data available, however, from the state's Pollution Liability Insurance Agency (PLIA) and the Seattle Fire Marshal, which is outlined in Table 2, suggest the tank leak rate is upwards of 25%, or 1 in 4 tanks.

Table 2: Claim rate. Source: PLIA and Seattle Fire



An additional potential risk for leaks comes from the use of biofuels ("BioHeat") as fuel source in conjunction with older, steel oil storage tanks. Most of the oil dealers in Seattle currently sell biodiesel. Biodiesel is blended with diesel oil as a percentage of total content – B5, B20, B50, B99, representing 5%, 20%, 50% and 99% biodiesel blended with regular diesel.

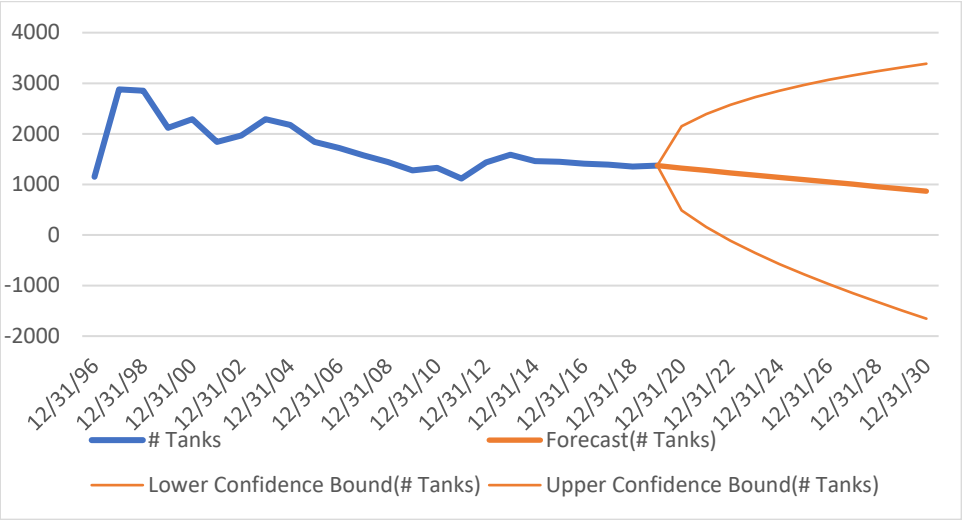
In conversations with Renewable Energy Group (REG), a biodiesel supplier, and the Pollution Liability Insurance Agency, we were made aware that biofuels produce a byproduct that acts as a cleaning agent, which can accelerate existing leaks in old tanks. During the regular use of traditional heating oil, a sludge accumulates at the bottom of storage tanks and piping, and over time, blocks holes in these surfaces. Using biofuel in an old steel tank after years of use can clean out the sludge, which then exposes holes in the tank, exacerbating the leakage rate. The EPA regulates large underground storage tanks (UST) and has identified that B20 biofuel or higher must be stored in a compatible tank approved by the EPA.

The Federal UST regulation in 40 CFR 280.32 requires, "Owners and operators must use an UST system made of or lined with materials that are compatible with the substance stored in the UST system." EPA understands that the chemical and physical properties of ethanol and biodiesel can be more degrading to certain UST system materials than petroleum alone, so it is important to ensure that all UST system components in contact with the biofuel blend are materially compatible with that fuel.

While the EPA regulations do not apply to home heating storage tanks, the chemical properties affect the steel tank regardless of the size. It is unknown how many homes in Seattle are using biofuel or the exact impacts to leakage rates and mechanical equipment failure. Since most of the biofuel used for heating in Seattle is sourced from used cooking grease from local restaurants, the use of biofuels may be significantly reduced, in the near term, as a result of COVID-19 impacts on restaurants. Biofuels also are more expensive, adding approximately $.50/gallon. Biofuels are, however, exempt from the heating oil tax of $.236/gallon tax. Even considering these concerns, given the current rates and expected acceleration of decommissioning and replacing tanks, we are not at this time recommending the City take further action to regulate the use of bioheat.

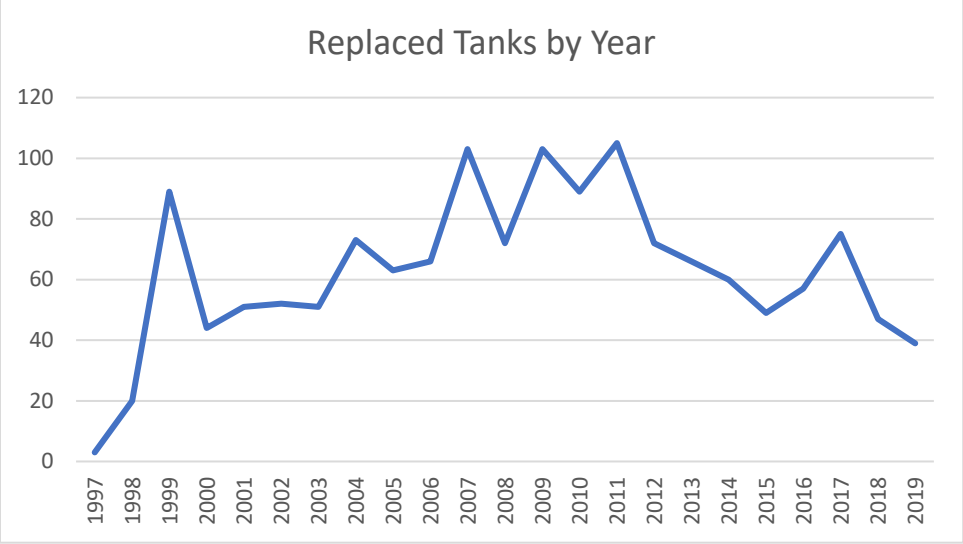
Based on decommissioning data from the Seattle Fire Department (SFD), we attempted to project future rates of storage tank decommissioning using the forecasting model function in excel (Table 3). The thick orange line represents a most likely scenario, with thinner lines representing confidence bounds.

Table 3: Decommissioning rate forecast. Source: Seattle Fire



In 2019, 1,373 tanks were decommissioned, and 39 new replacement tanks were installed per the SFD data. During conversations with a former oil furnace installer, their experience led them to indicate that replacement may total as high as 50 or 75 tanks a year, which is in the range of replacement tanks illustrated in Table 4. Overall, the number of new tanks installed relative to total number of decommissioned tanks, is low. Based on projections, most homes are expected to decommission or replace their tank by 2028, with the vast majority of those decommissions.

Table 4: Replaced Tanks 1997-2019. Source: Seattle Fire Marshal



The “business as usual” (BAU) scenario, not factoring in effects of a tax or tank requirement policy, projects approximately 10,000 tanks decommissioned between 2020 and 2028. If the City is to accelerate the BAU conversion from heating oil to minimize future leak hazards by 2028, then we would

need to encourage the decommission or replacement of an additional 6,000 to 8,000 tanks. We anticipate that the heating oil tax, heat pump rebates, and grants for households with lower incomes, will support a significant portion the required acceleration of tank decommissions. It is possible, however, that the overall progress of decommissioning may be impacted by COVID-19-related reduction in construction and HVAC activities and economic impacts to households.

To support the necessary acceleration, we recommend the City conduct outreach to residences heating with oil, which could include annual mailings, distribution of flyers, FAQ, updates to existing Client Assistance Memos (CAM), web page content, etc. Outreach and education could include information from the Pollution Liability Insurance Program on their newly developed grant and loan program for storage tank replacement and decommissioning. This state program is currently in development as legislation recently passed in the 2020 legislative session.

After annual monitoring and analysis, should the decommissioning or tank replacement rate not meet the projections required to achieve our targeted objective of replacement with a modern tank or decommission by 2028, an update to a future Seattle Fire Code is recommended as a possible regulatory mechanism. A fire code update could focus on requiring tanks that are beyond their useful life of 20 years or greater to be replaced or decommissioned. Any exemptions to this requirement, such as for residents 65 years or older, will need to be addressed once the City has more information from the state on their grant and loan program details, such as grant and loan eligibility and amounts available. This information is expected to be available in the Fall of 2020.

Financing Options for Tank Decommission and Converting to Electric Systems

According to Angie's list and Filco, one of the larger tank decommissioning companies in Seattle, the average cost to decommission starts at $1,800 (plus tax and permit to decommission the old tank) and can go up from there based on a number of factors such as the depth of the tank and access to the property. These costs are for a single walled tank and not a double-walled/fiberglass tank. The cost to decommission a leaking oil storage tank, however, can exponentially escalate the financial liability for a homeowner. The cost to decommission and remediate the environmental hazards for a spill can exceed $100,000.

The Pollution Liability Insurance Agency (PLIA) Heating Oil Insurance Program provides up to $60,000 of coverage to clean up contamination caused by a release from a heating oil tank. There is no cost to owners to have this insurance. The policy covers releases from active heating oil tanks that are registered before the release occurs. PLIA also provides technical assistance to heating oil tank owners who are cleaning up contamination from tank releases.

Based on 2020 legislation passage, PLIA is transitioning the Heating Oil Insurance Program to a Loan and Grant Program. After July 1, 2020, PLIA will continue insurance coverage on all existing registrations, but will no longer accept new registrations. All existing policies and registrations in place before July 1, 2020 will continue to be honored.

PLIA's new Loan and Grant Program will provide financial assistance to heating oil tank owners and operators. The Heating Oil Loan and Grant Program will provide up to $75,000 for heating oil tank owners to upgrade, replace, decommission, or remove heating oil tank systems and for tank leak clean-up costs. PLIA believes that the Loan and Grant Program will serve more people with greater flexibility

than the current insurance program and allows for funds to be used for infrastructure needs. Rulemaking for the new program has not started and OSE has been in direct communication with PLIA requesting close engagement and expects to participate in rulemaking this summer.

Transition from insurance program to grant/loan program will:

- Increase the limit from $60,000 to $75,000 for leak clean-up costs – it is unknown if this new amount is a full grant or in the form of a loan.
- Cover the cost of decommissioning the tank or replacing with a new tank. Again, it is unknown how the benefits will be distributed in the form of a grant or loan. However, this new benefit will reduce or eliminate the cost barrier to decommission or replace a tank

In addition to the State assistance, the Office of Sustainability and Environment provides a rebate to households who convert from oil to an energy-efficient heat pump. Since 2017, the program has utilized a "mid-stream" model, whereby an HVAC distributor manages the rebate administration and has brought manufacturer(s) to match City rebate funding and provided other resources such as contractor training and marketing resources. The homeowner chooses from the list of participating contractors and has the heat pump installed. The contractor applies an instant rebate directly on their customer invoice. This model has resulted in more than 450 homes being converted through the end of 2019.

Additionally, the Office of Housing (OH) operates a longstanding energy efficiency and clean energy program, which provides energy retrofits to low-income homeowners and multi-family properties that have predominately low-income tenants. Since 2010, OH has offered a small number of oil to electric conversions annually with a variety of fund one-time fund sources. The passage of Ordinance 125934 now provides OH with the resources to convert approximately 125 low-income owner-occupied homes a year from oil to electric heat.

Oil to electric conversions are provided at no cost to the low-income homeowner and includes the cost of decommissioning the oil tank, heat pump, and necessary electrical upgrades. OH manages the entire process, including conducting the energy audit, bidding, contracting, project management and conducting a final inspection.

Authority to Regulate Storage Tanks

Article 11, Section 11 of the Washington State Constitution authorizes cities "to make and enforce within its limits all such local police, sanitary, and other regulations as are not in conflict with general laws." This includes the authority to regulate household oil storage tanks.

The regulation of household oil storage tanks is not preempted by state or federal law, because federal and state regulation of oil storage tanks specifically exclude the regulation of household oil storage tanks.

Section R107.1 of the Seattle Residential Code provides that "mechanical systems lawful at the time of the adoption of this code may continue and may be maintained or repaired, converted to another type of fuel or have components replaced if it is done in accordance with the basic original design and location and no hazard to life, health or property is created by such mechanical system". Regulations focused on household oil storage tanks determined to create a hazard to life, health, or property would not conflict with R107.1, e.g. regulations that prohibit tanks of a certain age that are likely to leak because they have exceeded their life expectancy.

Under the Seattle Fire Code, section 603.3.3 Underground storage of fuel oil, it states that "The storage of fuel oil in underground storage tanks shall comply with the National Fire Protection Agency (NFPA 31). The NFPA 31 design standards for underground storage tanks are outlined in section 7.2.7.

These design standards are applicable to all new tanks installed, but the Seattle Fire Code does not require existing old tanks to retroactively meet the design standards. Per NFPA 31, section 1.4.2, it states that "In those cases where the authority having jurisdiction determines that the existing situation presents an unacceptable degree of risk, the authority having jurisdiction shall be permitted to apply retroactively any portions of this standard deemed appropriate."

Based on Fire Code language that explicitly permits retroactive standards apply to existing tanks, the City could consider updating the Seattle Fire Code in a future code cycle to require all storage tanks that are of a specific vintage or older, be replaced or decommissioned, so long as a determination was made that older oil storage tanks present an unacceptable degree of risk. Based on industry research, the storage tank industry seems to agree that 15-20 years is the average useful life of a standard oil storage tank (single ply steel), and up to 30 years for a double-walled plexiglass tank.

Summary of Findings and Policy Considerations

The majority of storage tanks are well beyond their useful life, posing hazards to human health, property, and the environment. More than 1 in 4 tanks are leaking, with some estimates by local tank decommissioning companies to be in the 50% range. We project that the majority of tanks will be decommissioned by 2028, but a significant increase in the rate of decommissions is required to adequately minimize future leak hazards within that timeframe. The Seattle Fire Department is the authority in charge of regulating household oil storage tanks and the code has flexibility to impose requirements on storage tanks that pose an unacceptable degree of risk. Based on the analysis outlined above, OSE, SDCI, and Seattle Fire recommend:

1) Implement the oil heating tax and the associated incentives for switching heating oil to electric heating
2) Create and distribute outreach materials on the risks associated with oil heat and the financial and technical support available for switching to electric heat
    a) Create web presence on Fire, OSE, and SDCI pages
    b) Create fact sheet that informs homeowners, real estate agents, and other stakeholders of risks and resources in addition to an update to the existing Client Assistance Memo (CAM). Translate in various languages.
    c) Yearly mailing to oil tank owners letting them know of the potential hazards and their options for switching out/upgrading; promote City of Seattle oil conversion rebates and HomeWise program.
    d) Promote tank grants/loans offered by the Pollution Liability Insurance Agency and work in close coordination with the state agency and oil dealers to ensure that people with limited incomes and in marginalized communities are aware of the program and benefits.
3) Monitor decommissioning rate annually to determine if sufficient acceleration of oil storage tank decommissioning is occurring
4) Should the decommissioning rate not meet the necessary decommissioning rate forecasts recommended that the City explore including a requirement for decommissioning in the Seattle Fire Code that would apply to existing oil storage tanks that are of a specific vintage or older (e.g. 20 years of age or older).

a) As a preview for that potential requirement, in the upcoming 2018 Fire Code, an informational note will be added in section 603.3 that states that “Due to the high prevalence of leaking oil storage tanks in Seattle and that because many may be beyond their useful life, posing a hazard to people, property, and the environment, Seattle Fire may propose a retroactive code change applying storage tank design standards to storage tanks that are of a specific vintage (e.g. 20 years of age or older)". In addition to the informative note in the Fire Code, Seattle Fire would update the current Client Assistance Memo.

Resources

Angie's List:
https://www.angieslist.com/articles/how-much-does-oil-tank-replacement-cost.htm

City of Seattle Heating Oil Ordinance:

http://clerk.seattle.gov/search/results?s6=heating+oil&l=200&Sect1=IMAGE&Sect2=THESON&Sect3=PLURON&Sect4=AND&Sect5=CBORY&Sect6=HITOFF&d=ORDF&p=1&u=%2Fsearch%2Fordinances&r=1&f=G

City of Seattle Fire Marshal Decommissioning Open Data:

https://data.seattle.gov/Public-Safety/Underground-Storage-Tank-UST-Records-Residential/xvj2-ai6y

City of Seattle Fire Marshal Client Assistance Memo:

https://www.seattle.gov/Documents/Departments/Fire/Business/5962CAMDecommisionOilTanks.pdf

EPA Biofuel in tanks:

https://www.epa.gov/ust/emerging-fuels-and-underground-storage-tanks-usts

https://www.mnn.com/earth-matters/energy/stories/biodiesel-corrosion-could-cause-leaks-in-fuel-infrastructure

Pollution Liability Insurance Agency:

https://plia.wa.gov/heating-oil-pollution-liability-insurance-program/

Pollution Liability Insurance Agency passed legislation:

http://lawfilesext.leg.wa.gov/biennium/2019-20/Pdf/Bills/Session%20Laws/Senate/6256-S.SL.pdf?q=20200601160647

Storage Tank Useful Life Industry Publications:

https://www.seattletank.com/faqs/#lifeexpectancy

https://oiltankremovalnj.us/factors-effecting-oil-tank-life-expectancy/

https://www.jstankremoval.com/how-long-does-an-oil-tank-last/

https://www.tristateenvironmental.net/post/2018/12/18/life-expectancy-of-buried-oil-storage-tanks-residential

https://www.currenenvironmental.com/oil-tanks-life-span

https://www.aboveenvironmental.com/how-to-determine-the-life-expectancy-of-an-underground-oil-tank

https://www.aboveenvironmental.com/how-to-determine-the-life-expectancy-of-an-underground-oil-tank

https://www.granbyindustries.com/en-us/petroleum-tanks/categories/residential-oil-tanks-en-us/