

EAGLE MOUNTAIN CITY

STAFF MEMO

TO: Mayor Westmoreland, City Council, and Planning Commission

FROM: S. Peter Kane, Planning Manager

DATE: 18 June 2020

SUBJECT: Gas Station Studies - Overview

Eagle Mountain City received a petition in opposition to the proposed 7-Eleven gas station and requested that the City consider modifying the existing code to set a minimum distance between gas stations and residences. The letter thoroughly outlined the concerns and wishes of the neighboring residents and included references to various studies on the topic.

Staff has reviewed these studies and located a couple additional studies. Below is an overview of the studies.

STUDIES

- Between the resident petition and additional research, a total of ten studies dealing with gas station proximity to residential uses were found and reviewed.
- Of the ten, one looked at property value impact, two dealt with health impacts, and the remaining seven specifically evaluated air quality impacts.
- A list of all the studies is available at the end of the memo.

RELEVANCE

The studies included data collection from various areas around the world. All but three dealt with gas stations outside the United States. This is important as the City should make sure that the studies can truly be compared and applied to a situation in the U.S. This is emphasized by Lehi City's recent experience with a study that was submitted during the approval process for a 7-Eleven gas station there. That study collected data at a French gas station. It was found that the French gas station didn't have the vacuum systems and other mitigations to minimize benzene leaks and exposure that are required in the U.S. (and specifically, here in Utah).

HEALTH IMPACTS

The studies indicate that exposure to volatile organic compounds (VOCs) and benzene does play a role in preterm births as well as acute leukemia in children. However, the studies noted that benzene is a byproduct of not just gasoline but also cigarette smoke, adhesives, cleaning products, and paint strippers. The study relating to acute leukemia specifically found that there is no clear association between residential proximity to gasoline service stations in Montreal and preterm births.

AIR QUALITY

Each of the studies did find that air quality improved (concentration of certain VOCs diminished) the further away you were from gas stations. The distance at which point there was

no discernable difference in the concentration as compared to safe levels varied significantly from study to study. This likely has to do with the fact that the studies occurred in various countries – Brazil, Korea, Spain, and the U.S.

Looking at each study individually, you could ascertain a potential “minimum” distance requirement between gas stations (tanks/pumps) and residential uses. The potential distance varies greatly between the studies.

STUDY LOCATION	POTENTIAL MINIMUM DISTANCE
Brazil	500 ft
Korea	300 ft (both studies)
Spain	Provides a tool to determine distance – requires re-evaluation as an area becomes more developed and/or traffic increases
U.S.	100 to 650 ft (1993 study ¹); 150 to 500 ft (2019 study)

One study pointed out that the relative concentration of these types of VOCs is also impacted by the amount of developed space and automotive travel in a community. As a community grows, the VOC concentration will increase with the added development and increased numbers of vehicles on the road. The study from Spain provides a great tool to determine distance, but as noted above, the development and increased traffic of a city over time means that the threshold (minimum distance) would need to be changed routinely.

A 2015 study in the U.S. noted that there may be hydrocarbon release during fuel storage and transfer at gas stations. It culminates in recommending suitable pollution prevention technology to reduce/eliminate the off gasses. It however does not make a recommendation on distancing. As noted in the “State Oversight” memo, Utah has requirements for vapor capture during delivery to minimize this impact.

GOVERNMENTAL GUIDANCE

The petitioners included a reference to the California Air Resources Board’s “Air Quality and Land Use Handbook: A Community Health Perspective.” California is noted for some of the more advanced air quality standards in the nation. The handbook does provide for guidance on the siting of gas stations in relation to residential uses:

- Large gas station² – minimum distance of 300 ft
- Typical gas station – minimum distance of 50 ft

The petitioners also included a reference to the U.S. EPA’s “School Siting Guidelines.” Due to the EPA’s concerns regarding possible air pollution, soil contamination, ground water contamination, vapor intrusion into structures, and heavy vehicular traffic, the EPA recommends that “large gas stations dispensing more than 3.6 million gallons per year” be identified and evaluated if they are within 1,000 feet of a prospective school. It however doesn’t set a location distance limit, which may likely be due to the fact that if the evaluation of the gas stations determines there is limited or managed risks, the school can be located within that radius. The guidelines however do not include a distancing recommendation or evaluation for a typical gas station.

¹ This study occurred in 1993 which was over 10 years before the current installation and monitoring requirements went into effect

² Large gas station = “a facility with a throughput of 3.6 million gallons per year or greater”

DISTANCE REQUIREMENT HISTORY

Staff also looked into how gas station distancing has been handled in the past.

Looking at Eagle Mountain City's "1997 Interim Code," the City had no minimum distance requirement between a gas station and any other type of use. There was however a landscape buffer requirement of 100 ft between any auto-oriented commercial use and residential/park/open space use. The City's current code, as noted in the petition, does include regulation 17.75.030(G) for an auto service station special use that sets a minimum distance between a gas station and an existing school, park, playground, museum, or place of public assembly of 500 feet. It does not include residential uses.

The American Planning Association's Planning Advisory Service has published "PAS Reports" since 1949 with guidance on issues and practices related to planning. Over the nearly 70 years, gas stations were evaluated only twice. The 1950 report, "Self-Service Gasoline Stations," outlined the concerns and requirements set for gas stations around the U.S. One distance element noted in the report related to visibility – essentially that the speed limit of the roadway should play into the length of street frontage visibility. The only other distance requirement related to setting a minimum distance between different gas stations (1,000 feet). The 1960 PAS report, "Gasoline Service Station Location and Design," is unfortunately unavailable.

STUDIES EVALUATED

Country	Year	Topic	Title
Brazil	2012	Air Quality	"The Impact of BTEX Emissions from Gas Stations into the Atmosphere" https://www.sciencedirect.com/science/article/pii/S1309104215304384
Canada	2013	Health	"Residential Proximity to Gasoline Service Stations and Preterm Birth" https://www.researchgate.net/publication/236460284_Residential_proximity_to_gasoline_service_stations_and_preterm_birth
China	2017	Property Value	"The Impacts of Gasoline Stations on Residential Property Values" http://www.jstor.org/stable/10.2307/26377431
France	2003-2004	Health	"Acute Childhood Leukemia and Residence Next to Petrol Stations and Automotive Repair Garages" https://pubmed.ncbi.nlm.nih.gov/19213757/
Korea	1999	Air Quality	"Housewives' Exposure to Volatile Organic Compounds Relative to Proximity to Roadside Service Stations" https://www.sciencedirect.com/science/article/abs/pii/S1352231099000977
Korea	2011	Air Quality	"Exposure to Methyl Tertiary Butyl Ether and Benzene in Close Proximity to Service Stations" https://www.tandfonline.com/doi/abs/10.1080/10473289.2001.10464339
Spain	2010	Air Quality	"Assessing the Impact of Petrol Stations on Their Immediate Surroundings" https://www.sciencedirect.com/science/article/pii/S0301479710002574
U.S.	1993	Air Quality	"Exposure of the General Population to Gasoline" https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1520004/
U.S.	2015	Air Quality	"Hydrocarbon Release During Fuel Storage and Transfer at Gas Stations: Environmental and Health Effects"

<https://pubmed.ncbi.nlm.nih.gov/26435043/>

U.S.

2019

Air Quality

“Vent Pipe Emissions from Storage Tanks at Gas Stations:
Implications for Setback Distances”

<https://www.sciencedirect.com/science/article/pii/S0048969718337549>