

Letter Health Consultation

Mukilteo Tank Farm Pier Demolition, Review of Air Monitoring Data Mukilteo, Snohomish County, Washington

September 3, 2015

Prepared by

**The Washington State Department of Health
Under a Cooperative Agreement with the
Agency for Toxic Substances and Disease Registry**



Foreword

The Washington State Department of Health (DOH) prepared this health consultation in accordance with the Agency for Toxic Substances and Disease Registry (ATSDR) methodologies and guidelines. Health consultations are initiated in response to health concerns raised by community members or agencies about exposure to hazardous substances released into the environment. The health consultation summarizes our health findings and, if needed, provides steps or actions to protect public health.

The findings in this report are relevant to conditions at the site during the time the report was written. It should not be relied upon if site conditions or land use changes in the future.

This report was supported by funds provided through a cooperative agreement with the ATSDR, U.S. Department of Health and Human Services. The findings and conclusions in these reports are those of the author(s) and do not necessarily represent the views of the ATSDR or the U.S. Department of Health and Human Services. This document has not been revised or edited to conform to agency standards.

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September 3, 2015

2901 Third Avenue, M.S. TB-32
Seattle, WA 98121

Re: Letter Health Consultation
Review of Air Monitoring Data
Mukilteo Tank Farm Pier Demolition site
Mukilteo, Snohomish County, Washington

Dear Mr. Mannion:

At the request of the Washington State Department of Transportation (WSDOT), the Washington State Department of Health completed this letter health consultation for the Mukilteo Tank Farm Pier Demolition site.

We reviewed air monitoring data from the pier demolition area for potential health hazards. This evaluation aimed to address health concerns from the community. The nearby residential community expressed adverse reactions from creosote odors caused by the removal and stockpiling of pilings at the site. After reviewing air monitoring data, we conclude that there are no expected health effects from these creosote odors. This conclusion is limited to the evaluation of this dataset and represents air conditions from August 17, 2015. We recommend that Washington State Ferries (WSF) continue current efforts to mitigate odors.

Background and Statement of Issues

The Mukilteo Tank Farm Pier Demolition site is located in Snohomish County, Washington. The pier at this site is 60 years old and is being demolished as part of a WSF project to build a new ferry terminal for the Mukilteo-Clinton route. The pier is being replaced due to aging facilities, traffic congestion, and accessibility/safety concerns. Demolition activities began this summer and will continue until February 2016. Activities will then stop for six months to protect fish migration, and resume in August 2016. The project is expected to be completed in 2019.

There is mixed-use commercial and residential development near the demolition site. The demolition will remove about 7,000 tons of creosote treated marine pilings from the Puget Sound. Creosote odors released during removal have caused community health concerns including headache, nausea and burning of the eyes and throat. [1, 2]

WSF conducted air sampling at four locations around the demolition site (see Figure 1, below). The Puget Sound Clean Air Agency (PSCA) helped identify sampling locations based on complaints received. Air sampling was carried out at 11:15am on August 17, 2015 for four hours at each location.[3, 4] Results from air sampling were sent to the Department of Health on August 27, 2015.

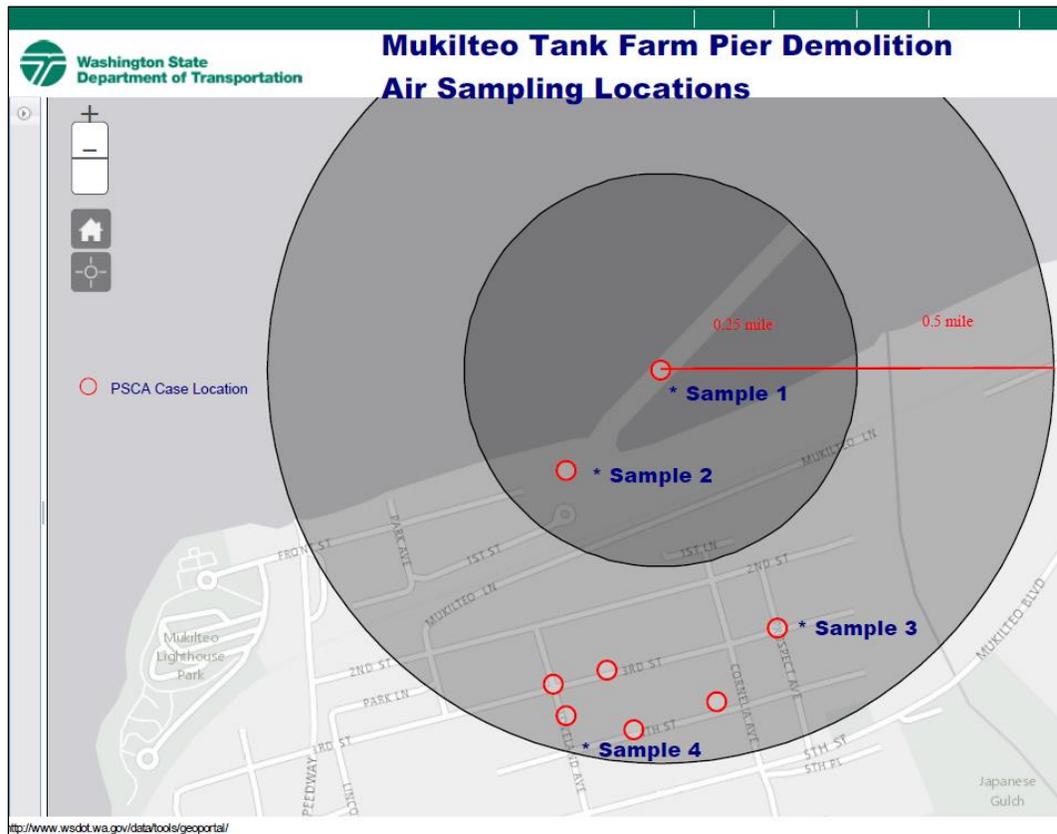


Figure 1: Air Sample Locations (labeled Samples 1-4) around Tank Farm Pier Demolition site, Mukilteo, Snohomish County, Washington.[4]

Community members reported that the intensity of creosote odors vary from day to day. Odors may be particularly worse with warmer weather and onshore breezes. On August 18, 2015, the Washington State Department of Ecology (Ecology) approved WSF's request to use a water misting machine to help reduce odors from marine pilings. WSF is also covering the barge where the pilings are being temporarily stockpiled before removal and disposal.[2]

Discussion

Creosote (or coal tar creosote) is a wood preservative that contains a mixture of many different chemicals. Symptoms of inhaling creosote are not well-characterized since there are many chemicals and mixtures involved. However, chemical burning of the skin and eyes, mental confusion, and kidney and liver problems have been observed in occupational settings where workers have been exposed to high levels of creosote through an unknown combination of inhalation, dermal absorption, and accidental ingestion. There are no health screening values available for creosote due to its complex mixture of chemicals, so chemicals need to be examined individually.[5]

Naphthalene is a polycyclic aromatic hydrocarbon (PAH). PAHs are a large group of chemicals found in creosote. Due to inadequate data from humans and limited evidence from animal inhalation toxicity studies, this chemical is considered a “possible” human carcinogen. Naphthalene was the only chemical detected in air at one of the air monitoring locations.

Air monitoring detected 0.0002 parts per million or about 1.0 micrograms per cubic meter of naphthalene. We compared this level to health-based screening values from ATSDR and EPA (see Attachment A for details).[6, 7] The health-based screening values used in this evaluation are much lower than levels that may cause health effects. These values are used in risk assessment as an initial screen to determine whether additional health risk assessment is necessary. The level of naphthalene in this dataset did not exceed our screening value, and does not require additional assessment.

Although smelling chemical odors does indicate some exposure to chemicals, it does not necessarily mean that adverse health effects will occur, particularly if it is a chemical that can be smelled at very low levels. Odor thresholds and reactions to odors can also vary greatly between individuals. According to ATSDR, people can smell naphthalene in the air at 0.084 parts per million (ppm).[6] Based on studies reported by EPA, naphthalene can be smelled in the range of 0.0095 to 1.02 ppm.[8] These odor thresholds for naphthalene are below the regulated level of 10 ppm for occupational exposure, so people can smell this chemical before conditions are hazardous. Based on these air monitoring data, the level of naphthalene detected (0.0002 ppm) was below its odor threshold. Since naphthalene is one of the more volatile and potent chemicals in creosote, air sampling on August 17, 2015 may not have captured a particularly high level of exposure.

Conclusions

Based on these data, no adverse human health effects are expected from inhaling air around the Mukilteo Tank Farm Pier Demolition site.

Recommendations

We recommend that WSF continue their current efforts to mitigate odors.

We appreciate the proactive actions made by WSF and are pleased to have assisted WSF with these technical issues. We are prepared to review any additional data that may be collected in the future. Please contact me at 360-236-3357 or amy.leang@doh.wa.gov if you have any questions.

Sincerely,

Amy Leang, Toxicologist/Health Assessor
Site Assessments and Toxicology Section

Enclosures (1)

cc: Joanne Snarski, Department of Health

Attachment A – Air Monitoring Evaluation

Table A1: Air Monitoring Results from NVL Labs, Mukilteo Tank Farm Pier Demolition Site, Mukilteo, Snohomish County, Washington.[9]

Airborne Chemical Contaminant	Tank Farm Pier - North End (ppm)	Walking Path/Rail Station (ppm)	3rd St. & Prospect Ave. (ppm)	4th St. & Loveland Ave. (ppm)	PEL TWA	PEL STEL	Results Above PEL?
1-Nitropyrene	<0.00006	<0.00006	<0.00006	<0.00006	NE	NE	-
Acenaphthene	<0.00009	<0.00009	<0.00009	<0.00009	NE	NE	-
Acenaphthylene	<0.00009	<0.00009	<0.00009	<0.00009	NE	NE	-
Anthracene	<0.00008	<0.00008	<0.00008	<0.00009	NE	NE	-
Benzo (a) anthracene	<0.00007	<0.00007	<0.00007	<0.00007	NE	NE	-
Benzo (a) pyrene	<0.00008*	<0.00008*	<0.00008*	<0.00008*	0.2 mg/m ³	0.6 mg/m ³	No
Benzo (b) flouranthene	<0.00007	<0.00007	<0.00007	<0.00007	NE	NE	-
Benzo (e) pyrene	<0.00007	<0.00007	<0.00008	<0.00008	NE	NE	-
Benzo (g,h,i) perylene	<0.00008	<0.00008	<0.00008	<0.00008	NE	NE	-
Benzo (k) flouranthese	<0.00007	<0.00007	<0.00007	<0.00007	NE	NE	-
Chrysene	<0.00007*	<0.00007*	<0.00007*	<0.00007*	0.2 mg/m ³	0.6 mg/m ³	No
Dibenz (a,h) anthracene	<0.00006	<0.00006	<0.00006	<0.00007	NE	NE	-
Fluoranthene	<0.00008	<0.00008	<0.00008	<0.00008	NE	NE	-
Fluorene	<0.00008	<0.00009	<0.00009	<0.00009	NE	NE	-
Indeno (1,2,3-cd) pyrene	<0.00007	<0.00007	<0.00007	<0.00007	NE	NE	-
Naphthalene	0.0002	<0.0001	<0.0001	<0.0001	10 ppm	15 ppm	No
Phenanthrene	<0.00008	<0.00008	<0.00008	<0.00009	NE	NE	-
Pyrene	<0.00008	<0.00008	<0.00008	<0.00008	NE	NE	-
Total Cresols	<0.099	<0.10	<0.10	<0.10	5 ppm (OSHA)	NE	No
Phenols	<0.009	<0.01	<0.01	<0.01	6 ppm (OSHA)	NE	No

Note: the < symbol indicates sample results below the analytical limit of detection mg/m³; milligrams of an airborne contaminant per cubic meter of air

*Approximately equal to <0.0007 mg/m³

ppm: parts per million

NE: Not Established

PEL: Permissible Exposure Limit – the amount of an airborne chemical, toxic substance, or other harmful agent that must not be exceeded during any part of the workday.

TWA(8): An 8-hour, time-weighted average limit

STEL: Short-term exposure limits (STEL) pertain to 15-minute exposure periods

Additional Screening of Naphthalene

Due to the detected presence of naphthalene at the Tank Farm Pier - North End Location, the Department of Health further examined this chemical level by screening it against the ATSDR Environmental Media Evaluation Guide (EMEG) for naphthalene. The EPA naphthalene reference concentration (RfC) for toxic effects, including respiratory and peripheral respiratory system effects, is also referenced below.

Naphthalene EMEG: 3.7 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$)

Naphthalene RfC: 3 $\mu\text{g}/\text{m}^3$

Conversion Factor for Air [7]

$$C (\mu\text{g}/\text{m}^3) = [C \text{ ppb} \times \text{molecular weight (grams/mole)}] / 24.45$$

C = concentration; C ppb of naphthalene = 0.2 parts per billion

Molecular weight of naphthalene: 128.17 grams/mole

$$C (\mu\text{g}/\text{m}^3) = [0.2 \times 128.17] / 24.45 = \mathbf{1.0 \mu\text{g}/\text{m}^3}$$

Tank Farm Pier- North End naphthalene concentration is about $1.0 \mu\text{g}/\text{m}^3$, which is below the ATSDR screening value of $3.7 \mu\text{g}/\text{m}^3$. No additional assessment for health risk is necessary for this level of naphthalene. No other chemicals were detected at any of the air monitoring locations.

References

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5. *Toxicological Profile for Wood Creosote, Coal Tar Creosote, Coal Tar, Coal Tar Pitch, and Coal Tar Pitch Volatiles*. 2002, Agency for Toxic Substances and Disease Registry: Atlanta, GA.
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