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The Lane Regional Air Protection Agency (LRAPA) requested that Oregon Health Authority (OHA) provide a public health interpretation of naphthalene concentrations measured at one of LRAPA's long-term air monitoring stations. LRAPA's request was prompted by ongoing interagency work and community engagement related to the wood treatment facility JH Baxter in Lane County, that LRAPA regulates through a Standard Air Contaminant Discharge Permit.

This letter health consultation is OHA's response to LRAPA's request for a health interpretation of LRAPA's naphthalene data. OHA understands that LRAPA's monitoring program is not designed or intended to evaluate risk from specific industrial sources of pollution. LRAPA has called JH Baxter in to Oregon's new health-based regulatory program, Cleaner Air Oregon (CAO), for stationary sources of air contaminants. OHA expects that the CAO process will provide more precise information about health risks posed to neighbors near the JH Baxter facility that are specifically caused by the facility. The strong community interest in all data about toxic air contaminants in proximity to the Bethel neighborhood, and what they might mean for the health of the community, prompted LRAPA to request this analysis from OHA.

Environmental Data OHA Used

LRAPA operates air quality monitors in Lane County, including one located a half mile from the JH Baxter facility, on Highway 99. This Highway 99 air monitoring station measures changes in air pollution levels over long periods and takes one 24-hour sample every six days. Air samples are analyzed for common air pollutants (such as particulate matter) and over 100 toxic air contaminants, including naphthalene. This document explains the levels of naphthalene that were measured at the Highway 99 station from April 2018 through December 2020. Naphthalene is one of the chemicals associated with JH Baxter's operations, although there are multiple additional sources of naphthalene in the area as well. Other sources of naphthalene include, but are not limited to, vehicle exhaust, wood smoke, and smoke from wildfires.

Analysis

OHA obtained these data from LRAPA and examined the levels of naphthalene over this two-plus year period, and estimated risks to health based on these naphthalene concentrations. OHA evaluated both average and maximum naphthalene concentrations. The average naphthalene concentration represents a central value of all measurements over that period, while the maximum naphthalene concentration represents the highest concentration measured in any 24-

hour period. OHA screened these measured naphthalene concentrations against health-based Comparison Values (CVs), which are based on exposure studies in animals or people that measure levels at which health effects are known to occur. CVs also assume constant exposure to the chemical of concern. People who spend less time breathing in the contaminated area will have less health risk than estimated by the simple comparison of measured levels to the CV.

OHA used CVs for 24-hour or short-term exposure to evaluate whether naphthalene is present at levels that could cause acute health effects (meaning effects which happen immediately during a high exposure). The 24-hour CV is best compared against a single 24-hour measurement by the air monitor, usually the maximum 24-hour concentration measured.

OHA also used long-term CVs intended for comparison against annual average naphthalene concentrations that protect against chronic health effects (meaning effects which happen over longer periods of time at lower concentrations). There are two annual CVs for naphthalene, one that considers cancer-based health effects, and one that considers all other health effects (noncancer).

For monitoring results that show chemical concentrations in the air below the CV, it is unlikely an exposure at these levels will cause health effects. When chemical concentrations are above the CV, the next step is to look more closely at how actual conditions compare against the very health-protective assumptions built into the CV (as described above). This more in-depth analysis includes factors such as:

- Amount of time people in the affected area spend breathing the air compared to the amount of time assumed and built into the CV.
- The degree of certainty in the scientific evidence supporting the CV (CVs for different chemicals have different levels of safety buffer built in depending on the certainty of the supporting scientific studies).
- Characteristics of the people exposed that might make them more or less sensitive to the health effects of the contaminant (such as age, or environmental justice issues).
- The degree of certainty about the measured concentrations of the contaminant and how representative they are of the conditions to which people are exposed.

OHA's conclusions result from the in-depth analysis including the factors above. Therefore, measured air concentrations above a CV do not mean that a health effect will occur or that OHA will automatically conclude there is a health risk. OHA's approach is consistent with guidance from the federal Agency for Toxic Substances and Disease Registry (ATSDR).

Findings

Health-related findings

Noncancer risks. The results of the non-cancer risk assessment showed that both 24-hour and annual levels of naphthalene were below their respective non-cancer CVs (Table 1), and therefore, too low to cause non-cancer health effects.

Cancer risks. The average concentration for naphthalene was above the cancer-based CV. OHA calculates and expresses cancer risk in terms of additional cancer cases out of a million people, in addition to the background rate of cancer from all causes (approximately 400,000 people in a million according to the American Cancer Society). The last column of Table 1 indicates increased cancer risk, based on exposure 24 hours per day, seven days per week, for a period of 78 years. Cancer risk from data LRAPA collected in years 2018 to 2020 was 6 in one million. Cancer risk from data LRAPA collected for just 2019 was 9 in one million, and cancer risk for 2020 was 4 in one million.

Note that these are theoretical estimates of cancer risk that OHA uses as tools for deciding whether public health actions are needed to protect health – they are not actual estimates of cancer cases in a community. As noted above, OHA’s analysis makes worst-case assumptions about exposure to estimate cancer risk.

Comparing observed rates of cancer in the US (400,000 in a million) to the 4-9 in a million estimated from OHA’s analysis, the level of risk associated with naphthalene measured at the Hwy 99 monitor is tens of thousands of times below normal U.S. rates and hundreds of times below levels that could be measured or verified in an actual population. **Overall, OHA concludes that cancer risk from naphthalene levels measured at the Highway 99 monitoring location is low.**

Table 1. Highway 99 ambient air toxics monitoring station - trend site (4/26/2018 – 12/29/2020) (154 samples total)

	Naphthalene results ($\mu\text{g}/\text{m}^3$)	Noncancer long-term/annual comparison value ($\mu\text{g}/\text{m}^3$) _{nc}	Noncancer 24-hour comparison value ($\mu\text{g}/\text{m}^3$) _{nc}	Cancer comparison value (1 in 1 million risk) ($\mu\text{g}/\text{m}^3$) _c	Exceeds comparison value (Y/N)	Cancer risk assuming 24/7 exposure for 78-year lifetime (chances in a million)
Maximum	2.67 (10/6/2019)	3.7	200	0.029	Y _c	N/A
Minimum	0.005 (4/26/2018)				N	N/A
Average overall	0.18				Y _c	6
Average 2019	0.26				Y _c	9
Average 2020	0.13				Y _c	4
<p>$\mu\text{g}/\text{m}^3$ = micrograms of naphthalene per cubic meter of air c = cancer-based comparison value nc = noncancer-based comparison value N/A = Not applicable – single day measurements cannot be used to calculate lifetime cancer risk due to the high degree scientific uncertainty and minimum measurement did not exceed any comparison values.</p>						

Limitations and uncertainties

LRAPA's Highway 99 monitoring station is located about a half mile away from the JH Baxter facility and may underrepresent concentrations of naphthalene in neighborhoods directly across the street to the north of the facility. There are also other sources of naphthalene in the area like traffic from Highway 99 itself, residential wood burning, and wildfire smoke. So, a limitation of this study is that it does not provide conclusive information about the amount of naphthalene the JH Baxter facility contributes to the air near the facility, and therefore the degree to which it contributes to health risk to near neighbors.

The risk assessment required under Oregon's Cleaner Air Oregon program to regulate local impacts of industrial toxic air contaminants will use emissions specific to JH Baxter to model risk to the community that is specific to JH Baxter. This assessment will be the most comprehensive opportunity to understand risks caused by JH Baxter to those nearest neighbors of the facility. The Cleaner Air Oregon program also has authority to require JH Baxter to reduce emissions if their naphthalene or other emissions contribute to health risk levels higher than allowed in state laws.

This analysis was limited to the period from April 2018 through December 2020. LRAPA air toxics sampling did not occur at this specific site prior to April 2018; 2021 data was not yet available for this Letter Health Consultation.

Conclusion

Concentrations of naphthalene measured at LRAPA's Highway 99 monitoring station from April 2018 through December 2020 are too low to harm people's health, including vulnerable groups of people.

Recommendations

Based on the conclusion of this letter health consultation, OHA recommends that LRAPA:

- Continue to prioritize evaluation of JH Baxter's emissions through the Cleaner Air Oregon program
- Identify other sources of naphthalene and other air pollutants in the area and seek ways to reduce those emissions
- Continue to make air monitoring data publicly available along with applicable health-based comparison values
- Make this letter health consultation available to the community

Sincerely,



David Farrer
Public Health Toxicologist