Chapter 173-339 WAC (adopted)
Formaldehyde Releasers Technical Support

DEPARTMENT OF ECOLOGY
State of Washington

Relevant statute

The Toxic-Free Cosmetics Act (Chapter 70A.560 RCW)[1] requires the Washington State Department of Ecology (Ecology, we) to identify a list of chemicals used in cosmetic products that release formaldehyde, also called "formaldehyde releasers." The Toxic-Free Cosmetics Act also directs Ecology to consider the following criteria when establishing the list of formaldehyde releasers:[2]

- Estimated prevalence of use [RCW 70A.560.030(2)(a)(i)].
- Potential to reduce disproportionate exposure [RCW 70A.560.030(2)(a)(ii)].
- Other information deemed relevant by the department [RCW 70A.560.030(2)(a)(iii)].

This document describes our process for identifying and prioritizing formaldehyde releasers in cosmetic products. We explain how the list of formaldehyde releasers was developed during rulemaking, first for the proposed rule and then how we revised the list for the adopted rule.

Proposed rule: How we developed the list

Ecology and the Washington State Department of Health used the following process to identify and prioritize formaldehyde releasers:

1. Compiled a general list of formaldehyde releasers with chemical names and Chemical Abstract Services (CAS) numbers.
2. Prioritized the list of formaldehyde releasers based on:
    a. Prevalence of use in cosmetic products.
    b. Potential for disproportionate exposure.

Identifying formaldehyde releasers

Chemicals that release formaldehyde **don't** have a commonly used structural chemical definition, so we consulted many stakeholders and reviewed many resources to compile the initial list of formaldehyde releasers. We:

- Reviewed the scientific literature (see Table 1 and References).
- Reviewed the following product databases:
    - California Safe Cosmetics Product Database.

[1] Chapter 70A.560 RCW (https://app.leg.wa.gov/RCW/default.aspx?cite=70A.560)
[2] RCW 70A.560.030(2)(a)(i)–(iii) (https://app.leg.wa.gov/RCW/default.aspx?cite=70A.560.030)

    - EWG Skin Deep® Cosmetics Database (EWG Skin Deep®).
    - International Nomenclature Chemical Ingredients (INCI) Database.
    - Mintel's Global New Products (Mintel's Global) Database.
    - Mintel's United States Database.
    - National Institutes of Health PubChem (PubChem) Database.
    - SpecialChem.
    - Ultrus™ Prospector® from UL Solutions (Ultrus™ Prospector®).
- Worked with colleagues in the Safer Products for Washington program.
- Consulted other stakeholders, such as:
    - California Department of Health.
    - Environmental Working Group (EWG).
    - Breast Cancer Prevention Partners.
    - Toxic-Free Future.
    - The Good Face Project.
    - Underwriters Laboratory (UL).

We searched the PubChem database and INCI database using CAS numbers to remove duplicate chemicals. We identified 49 formaldehyde releasers used in many products and often used as preservatives. Of those 49, we found 26 formaldehyde releasers in the INCI database, indicating that they can be used in cosmetic products in the United States.

Prioritizing formaldehyde releasers

Disproportionate exposures

People who use cosmetic products that contain formaldehyde or formaldehyde releasers have the potential for exposure. But not everyone's exposures are equal. Cosmetic products contain different formaldehyde-releasing chemicals. Also, people use cosmetic products differently, so one person may have daily exposure or may use a cosmetic product that others don't. Some people, such as cosmetologists, are exposed to toxic chemicals at their job, particularly if they work with nail products and hair smoothers. The negative health impacts from these workplace exposures increase when added to other environmental and social risk factors (Morello-Frosch et al., 2011).

Our 2023 Chemicals in Cosmetics Report to the Legislature (Ecology, 2023) identified several cosmetic product categories that are more likely used by women of color. We determined these by reviewing scientific literature, talking to scientists in the cosmetics field, and asking people in Washington State what cosmetic products they use and where they buy them. Based on this report and our subsequent research, we identified makeup, hair straighteners and smoothers, facial cleansers, nail polish, and intimate hygiene products as products more likely used by workers and women of color.

When we prioritized formaldehyde releasers, we considered whether they are found in products more likely used by workers and women of color (products of concern). We also included formaldehyde releasers **not** used in products of concern in the proposed rule because they can still contribute to disproportionate exposures. If not restricted in the proposed rule, these formaldehyde releasers might become "regrettable substitutes" — that is, replacements for the formaldehyde releasers currently used, but resulting in similar negative health impacts as the original chemicals. Their use also contributes to cumulative exposures to formaldehyde.

Prevalence of use

First, we searched the Mintel United States database for the 49 chemicals identified as formaldehyde releasers to determine if they are used as ingredients in cosmetic products sold in the United States. To do this, we filtered by product type and only included chemicals used in products classified as "Beauty and Personal Care Products." We also removed products classified as "Bar Soap," because Chapter 70A.560 RCW and the proposed rule exclude bar soap from the definition of "cosmetic."

We then searched for the 49 chemicals identified as formaldehyde releasers in other databases (EWG Skin Deep®, INCI database, Mintel's Global database, SpecialChem, and Ultrus™ Prospector®) to ensure we had a complete list of formaldehyde releasers used in cosmetic products. Finally, we removed formaldehyde releasers with **no** evidence of use in cosmetic products.

Proposed rule: List of formaldehyde releasers

The proposed rule includes a list of 28 formaldehyde releasers used in cosmetic products. We prioritized those most frequently used in cosmetic products in the United States and those used in products of concern. The prioritized formaldehyde releasers are listed as items 1 through 10 in the proposed rule. Ninety-nine percent of cosmetic products that use formaldehyde releasers contain one of the chemicals listed as items 1 through 7 in the proposed rule, based on the prevalence of use in US products as described below.

Because the prevalence of use for these remaining chemicals was comparatively low or unknown, we also used the potential for disproportionate exposure to determine which formaldehyde releasers to include as items 8 through 10 in the proposed rule.

We included all formaldehyde releasers used in cosmetics in the proposed rule. The chemicals that are currently used less frequently pose a similar health risk to Washington residents as those used more frequently, and their use contributes to cumulative exposures to formaldehyde. Restricting all formaldehyde releasers used in cosmetics also prevents regrettable substitutes, where chemicals with similar health risks are selected to replace those that are restricted.

The following table contains the list of 28 formaldehyde releasers included in the proposed rule. Item numbers correspond to the item numbers in the proposed rule.[3] We used Mintel usage data to determine the prevalence of use in cosmetics products sold in the United States. We calculated the percentage by dividing the number of products containing the formaldehyde

[3] https://ecology.wa.gov/rulemaking-proposed-language-wac-173-339-01-30-25

releaser by the total number of beauty and personal care products (less bar soap) containing any formaldehyde releaser sold in the United States. Our 2023 Chemicals in Cosmetics Report to the Legislature[4] and subsequent research identified cosmetic products more likely to be used by people of color or people with a heightened risk for occupational exposure. We refer to these products as products of concern. The references are the sources we used to identify chemicals that release formaldehyde.

Table 1: List of formaldehyde releasers in the proposed rule.

Item	Chemical name	Prevalence of use in U.S. products (%)	Found in these products of concern	References
1	DMDM Hydantoin	43.59	Color cosmetic, hair styling/treatment, facial cleansers, intimate hygiene	de Groot et al. (2009); ECHA (2017); UL Solutions, pers. comm. (2024)
2	Diazolidinyl Urea	32.27	Color cosmetic, hair styling/treatment, facial cleansers, intimate hygiene	de Groot et al. (2009); ECHA (2017); UL Solutions, pers. comm. (2024)
3	Imidazolidinyl Urea	13.59	Color cosmetic, hair styling/treatment, facial cleansers, intimate hygiene	de Groot et al. (2009); ECHA (2017); UL Solutions, pers. comm. (2024)
4	Quaternium-15	3.63	Color cosmetic, hair styling/treatment facial cleansers, intimate hygiene	de Groot et al. (2009); ECHA (2017); UL Solutions, pers. comm. (2024)
5	Tosylamide/ Formaldehyde Resin (PTSAF)	2.18	Nail polish	UL Solutions, pers. comm. (2024)
6	2-Bromo-2-Nitropropane-1,3-Diol (Bronopol)	1.81	Color cosmetic, hair styling/treatment, facial cleansers, intimate hygiene	de Groot et al. (2009); UL Solutions, pers. comm. (2024)
7	Sodium Hydroxymethylglycinate	1.72	Color cosmetic, hair styling/treatment, facial cleansers, intimate hygiene	de Groot et al. (2009); UL Solutions, pers. comm. (2024)

[4] https://apps.ecology.wa.gov/publications/summarypages/2304007.html

Item	Chemical name	Prevalence of use in U.S. products (%)	Found in these products of concern	References
8	Polyoxymethylene Urea (POM)	0.37	Color cosmetic, intimate hygiene	de Groot et al. (2009); UL Solutions, pers. comm. (2024)
9	Glyoxal	0.24	Color cosmetic, hair styling/treatment	UL Solutions, pers. comm. (2024)
10	Polyoxymethylene Melamine	0.042	Nail polish	ECHA (2017); UL Solutions, pers. comm. (2024)
11	5-Bromo-5-Nitro-1,3-Dioxane‡ (Bronidox)	0	—	de Groot et al. (2009); ECHA (2017); UL Solutions, pers. comm. (2024)
12	7-Ethylbicyclo-oxazolidine (Bioban CS1246)‡	0	—	de Groot et al. (2009); ECHA (2017); UL Solutions, pers. comm. (2024)
13	Benzylhemiformal‡	0	—	de Groot et al. (2009); ECHA (2017); UL Solutions, pers. comm. (2024)
14	Dimethylhydantoin formaldehyde (DMHF)‡	0	—	de Groot et al. (2009); ECHA (2017); UL Solutions, pers. comm. (2024)
15	Dimethylol Glycol	0.006	—	ECHA (2017)
16	Dimethylol Urea	0.012	Hair treatments	de Groot et al. (2009); ECHA (2017)
17	Dimethyl Oxazolidine‡	0	—	de Groot et al. (2009); ECHA (2017); UL Solutions, pers. comm. (2024)
18	Glyoxylic Acid (when used in heat-activated hair straighteners)	0.0001	Hair styling/treatment	Flyvholm & Andersen (1993)
19	Glyoxyl Carbocysteine (when used in heat-activated hair straighteners)	0.000004	Hair treatment	Flyvholm & Andersen (1993)

Item	Chemical name	Prevalence of use in U.S. products (%)	Found in these products of concern	References
20	MDM Hydantoin	0.042	—	de Groot et al. (2009); ECHA (2017); UL Solutions, pers. comm. (2024)
21	Methenamine	0.048	—	de Groot et al. (2009); ECHA (2017); UL Solutions, pers. comm. (2024)
22	Methylal	0.024	Hair styling	de Groot et al. (2009); ECHA (2017)
23	Paraformaldehyde‡	0	—	de Groot et al. (2009); ECHA (2017); UL Solutions, pers. comm. (2024)
24	Polxymethylene‡	0	—	UL Solutions, pers. comm. (2024)
25	Tetramethylolglycoluril‡	0	—	de Groot et al. (2009); ECHA (2017); UL Solutions, pers. comm. (2024)
26	Timonacic‡ (when used in heat-activated hair straighteners)	0	—	Flyvholm & Andersen (1993); UL Solutions, pers. comm. (2024)
27	Tris-Hydroxymethylnitromethane	0.024	—	de Groot et al. (2009); ECHA (2017)
28	Urea, polymer with formaldehyde, isobutylated	0.006	—	UL Solutions, pers. comm. (2024)

Table note:

‡ These chemicals are either used in the United States but were identified with sources other than Mintel, or they are still found in foreign markets and may constitute regrettable substitutes.

Adopted rule: How we revised the list

Received and reviewed formal public comments

On February 6, 2025, we proposed the formal draft rule[5] (proposed rule), and shared rulemaking documents[6] for formal comment. We accepted formal comments on the proposed rule and other rulemaking documents from February 6, 2025, through April 11, 2025. During the 64-day comment period, we received 39 comments, including verbal testimony provided during two public hearings.[7] We used that feedback to develop the adopted rule,[8] including the final list of formaldehyde releasers, the Concise Explanatory Statement,[9] the Final Regulatory Analyses,[10] and the Cosmetics Implementation Plan.[11]

When evaluating whether to add or remove a chemical from the list, we considered the following questions:

- Is the substance used in cosmetic products?
- Does the substance release formaldehyde?
- Does the released formaldehyde serve a function in the cosmetic product?

Removed three formaldehyde releasers from the list

Glyoxal

In response to formal comments, we removed glyoxal (CAS No. 107-22-2) from the list of formaldehyde releasers in the adopted rule.

Glyoxal used as an ingredient in a cosmetic product can introduce formaldehyde into the product because it can contain formaldehyde as an impurity. Glyoxal doesn't release additional formaldehyde and there are ways to make glyoxal without the use of formaldehyde. We encourage manufacturers who use glyoxal as an ingredient in cosmetic products to source it from suppliers that minimize or eliminate residual formaldehyde.

Glyoxylic acid and glyoxyloyl carbocysteine

In response to formal comments, we removed glyoxylic acid (CAS No. 298-12-4) and glyoxyloyl carbocysteine (CAS No. 1268868-51-4) from the list of formaldehyde releasers in the adopted rule.

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[5] ecology.wa.gov/getattachment/e34c9041-9364-476d-b072-d5af6294e58f/RDS-5886-6-For-Filing.pdf
[6] https://ecology.wa.gov/regulations-permits/laws-rules-rulemaking/rulemaking/wac-173-339
[7] See Appendices B and C in the Concise Explanatory Statement to view the public comments (https://apps.ecology.wa.gov/publications/SummaryPages/2504042.html).
[8] https://ecology.wa.gov/adopted-rule-language-wac-173-339-08-28-25
[9] https://apps.ecology.wa.gov/publications/SummaryPages/2504042.html
[10] https://apps.ecology.wa.gov/publications/SummaryPages/2504045.html
[11] https://apps.ecology.wa.gov/publications/SummaryPages/2504043.html

Glyoxylic acid and glyoxyloyl carbocysteine can break down to formaldehyde under heat. This process occurs under typical product use conditions. We didn't find evidence that the released formaldehyde serves an intended function in the cosmetic product.

Glyoxylic acid and glyoxyloyl carbocysteine can form bonds with hair proteins as crosslinking agents when used in heat-activated hair straighteners, a function that formaldehyde often serves in products without these chemicals. One commenter noted that the efficacy of glyoxylic acid "on hair does not involve formaldehyde at any stage," supporting our finding that formaldehyde from chemical breakdown of glyoxylic acid doesn't serve a function in the cosmetic product.

While we found no evidence that this is currently the case, if a manufacturer were to use glyoxylic acid or glyoxyloyl carbocysteine to release formaldehyde to serve a function in a cosmetic product, it would be restricted by applying the definition of intentionally added to the formaldehyde restriction.

Considered but did not remove: Formaldehyde resins

We included the five formaldehyde resins below in the list of formaldehyde releasers for the proposed rule. Formaldehyde is used as a monomer to synthesize these resins.

- Tosylamide/formaldehyde resin (CAS No. 25035-71-6)
- Polyoxymethylene Urea (CAS No. 9011-05-6; 68611-64-3)
- Polyoxymethylene Melamine (CAS No. 9003-08-1)
- Polyoxymethylene (CAS No. 9002-81-7)
- Urea, polymer with formaldehyde, isobutylated (CAS No. 68002-18-6)

In response to a comment we received about melamine plastics, we revisited our inclusion of formaldehyde resins in our list of formaldehyde releasers to restrict.

We decided to include all five formaldehyde resins because formaldehyde is intentionally used as a monomer in their synthesis, formaldehyde is present in the resin matrix, and formaldehyde may be released over time from the resin matrix and when the resin breaks down.

We recognize formaldehyde doesn't serve a function in the cosmetic product when released from any of these formaldehyde resins. The rule restricts formaldehyde resins used in cosmetic products because the resin can't be made without the intentional use of formaldehyde. In addition, formaldehyde can be released from the resin matrix over time and the resin can break down to release more formaldehyde. This is different than formaldehyde being used to make other chemicals like glyoxal, where there are ways to make it without the use of formaldehyde.

Considered but did not add: D5 or dimethicone

In response to a comment, we considered adding cyclopentasiloxane (D5) and dimethicone to the list of formaldehyde releasers to restrict.

While cyclopentasiloxane and dimethicone are used in products such as flat iron sprays, they only break down to formaldehyde under specific conditions, such oxidation in air or under high

heat (Kang et al). We didn't find evidence that the formaldehyde released from cyclopentasiloxane or dimethicone serves a function in the cosmetic product.

Separately, the Safer Products for Washington program (established under Chapter 70A.350 RCW[12]) identified cyclic volatile methylsiloxanes, including cyclopentasiloxane, as a priority chemical class in cosmetic products. The Safer Products for Washington program is better suited to explore broader concerns about the class of cyclic volatile methylsiloxanes in cosmetic products and adopt appropriate regulatory actions. For more information, review the Safer Products for Washington Cycle 2 Phase 2 Priority Products report.[13]

For these reasons, we didn't add cyclopentasiloxane (D5) or dimethicone to the list of restricted formaldehyde releasers in the adopted rule.

Adopted rule: List of formaldehyde releasers

The adopted rule includes a list of 25 formaldehyde releasers used in cosmetic products. We prioritized those most frequently used in cosmetic products in the United States and those used in products of concern. The prioritized formaldehyde releasers are listed as items 1 through 9 in the adopted rule. Ninety-nine percent of cosmetic products that use formaldehyde releasers contain one of the chemicals listed as items 1 through 7 in the adopted rule, based on the prevalence of use in US products as described below.

Because the prevalence of use for these remaining chemicals was comparatively low or unknown, we also used the potential for disproportionate exposure to determine which formaldehyde releasers to include as items 8 through 9 in the adopted rule.

The chemicals that are currently used less frequently pose a similar health risk to Washington residents as those used more frequently, and their use contributes to cumulative exposures to formaldehyde. Restricting all formaldehyde releasers used in cosmetics at the same time also prevents regrettable substitutes, where chemicals with similar health risks are selected to replace those that are restricted.

The following table contains the list of 25 formaldehyde releasers included in the adopted rule. Item numbers correspond to the item numbers in the adopted rule.[14] We used Mintel usage data to determine the prevalence of use in cosmetics products sold in the United States. We calculated the percentage by dividing the number of products containing the formaldehyde releaser by the total number of beauty and personal care products (less bar soap) containing any formaldehyde releaser sold in the United States. Our 2023 Chemicals in Cosmetics Report to the Legislature[15] and subsequent research identified cosmetic products more likely to be used by people of color or people with a heightened risk for occupational exposure. We refer to these products as products of concern. The references are the sources we used to identify chemicals that release formaldehyde.

[12] Chapter 70A.350 RCW (https://app.leg.wa.gov/rcw/default.aspx?cite=70A.350)
[13] https://apps.ecology.wa.gov/publications/documents/2504030.pdf
[14] https://ecology.wa.gov/adopted-rule-language-wac-173-339-08-28-25
[15] https://apps.ecology.wa.gov/publications/summarypages/2304007.html

Table 2: List of formaldehyde releasers in the adopted rule.

Item	Chemical name	Prevalence of use in U.S. products (%)	Found in these products of concern	References
1	DMDM Hydantoin	43.59	Color cosmetic, hair styling/treatment, facial cleansers, intimate hygiene	de Groot et al. (2009); ECHA (2017); UL Solutions, pers. comm. (2024)
2	Diazolidinyl Urea	32.27	Color cosmetic, hair styling/treatment, facial cleansers, intimate hygiene	de Groot et al. (2009); ECHA (2017); UL Solutions, pers. comm. (2024)
3	Imidazolidinyl Urea	13.59	Color cosmetic, hair styling/treatment, facial cleansers, intimate hygiene	de Groot et al. (2009); ECHA (2017); UL Solutions, pers. comm. (2024)
4	Quaternium-15	3.63	Color cosmetic, hair styling/treatment facial cleansers, intimate hygiene	de Groot et al. (2009); ECHA (2017); UL Solutions, pers. comm. (2024)
5	Tosylamide/ Formaldehyde Resin (PTSAF)	2.18	Nail polish	UL Solutions, pers. comm. (2024)
6	2-Bromo-2-Nitropropane-1,3-Diol (Bronopol)	1.81	Color cosmetic, hair styling/treatment, facial cleansers, intimate hygiene	de Groot et al. (2009); UL Solutions, pers. comm. (2024)
7	Sodium Hydroxymethylglycinate	1.72	Color cosmetic, hair styling/treatment, facial cleansers, intimate hygiene	de Groot et al. (2009); UL Solutions, pers. comm. (2024)
8	Polyoxymethylene Urea (POM)	0.37	Color cosmetic, intimate hygiene	de Groot et al. (2009); UL Solutions, pers. comm. (2024)
9	Polyoxymethylene Melamine	0.042	Nail polish	ECHA (2017); UL Solutions, pers. comm. (2024)
10	5-Bromo-5-Nitro-1,3-Dioxane‡ (Bronidox)	0	—	de Groot et al. (2009); ECHA (2017); UL Solutions, pers. comm. (2024)

Item	Chemical name	Prevalence of use in U.S. products (%)	Found in these products of concern	References
11	7-Ethylbicyclo-oxazolidine (Bioban CS1246)‡	0	—	de Groot et al. (2009); ECHA (2017); UL Solutions, pers. comm. (2024)
12	Benzylhemiformal‡	0	—	de Groot et al. (2009); ECHA (2017); UL Solutions, pers. comm. (2024)
13	Dimethylhydantoin formaldehyde (DMHF)‡	0	—	de Groot et al. (2009); ECHA (2017); UL Solutions, pers. comm. (2024)
14	Dimethylol Glycol	0.006	—	ECHA (2017)
15	Dimethylol Urea	0.012	Hair treatments	de Groot et al. (2009); ECHA (2017)
16	Dimethyl Oxazolidine‡	0	—	de Groot et al. (2009); ECHA (2017); UL Solutions, pers. comm. (2024)
17	MDM Hydantoin	0.042	—	de Groot et al. (2009); ECHA (2017); UL Solutions, pers. comm. (2024)
18	Methenamine	0.048	—	de Groot et al. (2009); ECHA (2017); UL Solutions, pers. comm. (2024)
19	Methylal	0.024	Hair styling	de Groot et al. (2009); ECHA (2017)
20	Paraformaldehyde‡	0	—	de Groot et al. (2009); ECHA (2017); UL Solutions, pers. comm. (2024)
21	Polxymethylene‡	0	—	UL Solutions, pers. comm. (2024)
22	Tetramethylolglycoluril‡	0	—	de Groot et al. (2009); ECHA (2017); UL Solutions, pers. comm. (2024)
23	Timonacic‡ (when used in heat-activated hair straighteners)	0	—	Flyvholm & Andersen (1993); UL Solutions, pers. comm. (2024)

Item	Chemical name	Prevalence of use in U.S. products (%)	Found in these products of concern	References
24	Tris-Hydroxymethylnitromethane	0.024	—	de Groot et al. (2009); ECHA (2017)
25	Urea, polymer with formaldehyde, isobutylated	0.006	—	UL Solutions, pers. comm. (2024)

Table note:

‡ These chemicals are either used in the United States but were identified with other sources than Mintel, or they are still found in foreign markets and may constitute regrettable substitutes.

References

de Groot, A.C., Flyvholm, M.-A., Lensen, G., Menné, T., Coenraads, P.-J. 2009. Formaldehyde-releasers: Relationship to formaldehyde contact allergy. Contact allergy to formaldehyde and inventory of formaldehyde-releasers. *Contact Dermatitis*, 61(2), 63-85. http://doi.org/10.1111/j.1600-0536.2009.01582.x

ECHA (European Chemicals Agency). 2017. Investigation Report: Formaldehyde and formaldehyde Releasers. https://echa.europa.eu/documents/10162/13641/annex_xv_report_formaldehyde_en.pdf/58be2f0a-7ca7-264d-a594-da5051a1c74b

Ecology (Washington State Department of Ecology). 2023. Chemicals in Cosmetics Used by Washington Residents: Report to the Legislature Pursuant to ESSB 5693 (2022) Section 302 (56). Publication 23-04-007. Olympia. https://apps.ecology.wa.gov/publications/summarypages/2304007.html

Flyvholm, M.A., & Andersen, P. 1993. Identification of formaldehyde releasers and occurrence of formaldehyde and formaldehyde releasers in registered chemical products. *American Journal of Industrial Medicine*, 24(5), 533-552. http://doi.org/10.1002/ajim.4700240505.

Kang, H.G., Chen, Y., Park, Y., Berkemeier, T., & Kim, H. 2023. Volatile oxidation products and secondary organosiloxane aerosol from D_5 + OH at varying OH exposures. *Atmospheric Chemistry and Physics*, 23, 14307–14323. http://doi.org/10.5194/acp-23-14307-2023

Morello-Frosch, R., Zuk, M., Jerrett, M., Shamasunder, B., & Kyle, A.D. 2011. Understanding the cumulative impacts of inequalities in environmental health: Implications for policy. *Health Affairs (Millwood)*, 30(5), 879-887. http://doi.org/10.1377/hlthaff.2011.0153

UL Solutions, personal communication, 12 March 2024.

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[16] ecology.wa.gov/contact
[17] ecology.wa.gov/TFCA