

1,4-DIOXANE BACKGROUND

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1,4-Dioxane is considered an emerging contaminant. This post provides some insight regarding the substance, underscoring its potential importance to you and your company.

What is 1,4-Dioxane?

1,4-Dioxane is a synthetic industrial chemical that is both a flammable liquid and is potentially explosive, especially at elevated temperatures.^[1] It is colorless, clear liquid and it has a faint, but pleasant, odor.

1,4-Dioxane was used as a solvent for extracting animal and vegetable oils as well as in the formulation of inks, coatings, and adhesives.^[2] Additionally, 1,4-Dioxane was used as a stabilizer or corrosion inhibitor for chlorinated solvents, such as 1,1,1-trichloroethane ("TCA").^[3] Although 1,1,1 TCA has not been used since 1995, the historical contamination caused by this substance is currently sparking the attention of regulators.^[4]

1,4-Dioxane was also used as a solvent in processing crude petroleum, petroleum refining, and petrochemicals.^[5] Some agencies claim that 1,4-Dioxane is possibly a health risk to humans, but it has not been listed as a known human carcinogen.^[6]

Importantly, 1,4-Dioxane is a contaminant that is created when other ingredients mix together.^[7] 1,4-Dioxane was (and sometimes currently still is) contained in trace amounts in numerous goods, including deodorants, perfumes, mouthwashes, paints, paint strippers, varnishes, shampoos, dyes, greases, cosmetics, foods containing residues from packaging adhesives, plastics (processed through polyethylene terephthalate or "PET"), antifreeze, aircraft deicing fluids, and some food supplements.^[8] 1,4-Dioxane also is created as a byproduct during the manufacturing process of certain cosmetic ingredients, including some detergents, foaming agents, emulsifiers, and solvents.^[9]

Where is 1,4-Dioxane located in the environment?

1,4-Dioxane is usually found at certain solvent release sites, such as those with TCA contamination, and PET manufacturing facilities. This substance moves rapidly in the groundwater and soil, usually faster than other contaminants.

There are some federal guidelines regulating 1,4-Dioxane, but these will probably be expanded. There is no federal maximum contaminant level for drinking water. The United States Environmental Protection Agency (“EPA”) has issued a non-binding health advisory for drinking water, [10] residential soil and air screening levels, a chronic oral reference dose,[11] and a “probable” or “reasonable” cancer risk level assessment.[12] There are also Food and Drug Administration monitoring practices relating to 1,4- Dioxane,[13] and the Occupational Health and Safety Administration has set legally binding permissible exposure limits.[14]

There are numerous states that have enacted various drinking water and groundwater guidelines, including New York in December of 2019.[15] California is presently considering some consumer product regulations.[16] We have been involved in a number of CERCLA Sites where the government has required the Potentially Responsible Parties (“PRPs”) to address 1,4-Dioxane.

Conclusion

1,4-Dioxane is an emerging contaminant and is gaining the attention of regulators. If you manufactured, used, processed or disposed of 1,4-Dioxane, it would be prudent to develop a plan for managing increased scrutiny and litigation involving this chemical.

[1] *See generally* https://www.epa.gov/sites/production/files/2014-03/documents/ffro_factsheet_contaminant_14-dioxane_january2014_final.pdf

[2] *See generally* <https://clu-in.org/contaminantfocus/default.focus/sec/1,4-Dioxane/cat/Overview/>

[3] *See id.* *See also* <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5409506/>

[4] https://www.epa.gov/sites/production/files/2014-03/documents/ffro_factsheet_contaminant_14-dioxane_january2014_final.pdf

[5] <https://clu-in.org/contaminantfocus/default.focus/sec/1,4-Dioxane/cat/Overview/>

[6] *See* <https://www.atsdr.cdc.gov/PHS/PHS.asp?id=953&tid=199>.

[7] <https://www.safecosmetics.org/get-the-facts/chemicals-of-concern/14-dioxane/>

[8] *See, e.g.,* <https://www.madesafe.org/science/hazard-list/14-dioxane/>

[9] *See, e.g.,* <https://www.fda.gov/cosmetics/potential-contaminants-cosmetics/14-dioxane-cosmetics-manufacturing-byproduct>

[10] https://www.epa.gov/sites/production/files/2014-03/documents/ffro_factsheet_contaminant_14-dioxane_january2014_final.pdf

[11] https://cfpub.epa.gov/ncea/iris/iris_documents/documents/subst/0326_summary.pdf

[12] <https://www.ncbi.nlm.nih.gov/books/NBK153666/>

[13] <https://www.fda.gov/cosmetics/potential-contaminants-cosmetics/14-dioxane-cosmetics-manufacturing-byproduct>

[14] <https://www.epa.gov/sites/production/files/2016-09/documents/1-4-dioxane.pdf>

[15] *See, e.g.*, <https://www.governor.ny.gov/news/governor-cuomo-signs-legislation-help-prevent-water-contamination-14-dioxane>.

[16] *See, e.g.*, <https://chemicalwatch.com/register/result?o=77968&layout=main&productID=1>.

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