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6PPD-QUINONE
AN EMERGING CONTAMINANT TO WATCH

JULY 2026 | MARY ANN GRENA MANLEY



While PFAS continues to receive significant regulatory attention, 6PPD-quinone is emerging as another contaminant of interest as scientists and regulators evaluate its environmental impacts.

Formed when a common tire additive reacts with ozone, 6PPD-quinone has been linked to stormwater runoff and toxicity in certain aquatic species, prompting increased research and regulatory evaluation.

Although 6PPD-quinone is still in the early stages of evaluation and not subject to widespread regulation, recent actions by the U.S. Environmental Protection Agency (EPA) and several states suggest it is a contaminant worth watching. As science evolves, property owners, developers, and environmental professionals may begin encountering new questions regarding stormwater management, permitting, and environmental due diligence related to this emerging contaminant.

What Is 6PPD-Quinone?

6PPD-quinone is a chemical transformation product of 6PPD, an additive commonly used to extend tire life by preventing rubber from breaking down when exposed to ozone and heat. However, as tires wear during normal vehicle use, tire particles containing 6PPD can enter the environment. When 6PPD reacts with ozone in the air, it forms 6PPD-quinone, which can then be transported into waterways through stormwater runoff.

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Scientific research has identified 6PPD-quinone as highly toxic to certain aquatic species, including coho salmon. The research has primarily focused on ecological impacts, particularly in freshwater environments where stormwater runoff is an issue. These findings have increased interest in understanding how tire-related pollutants move through the environment and what potential management approaches may be appropriate.

Regulatory and Legal Developments

EPA has identified 6PPD-quinone as an emerging contaminant requiring additional study. Through its FY 2025–2028 6PPD/6PPD-quinone Action Plan, EPA is focused on improving scientific understanding of the chemical, including research related to occurrence, exposure, toxicity, and potential risk management approaches.

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Meanwhile, states are beginning to evaluate 6PPD-quinone. Washington is among the first states to act due to concerns about the tire additive's impacts on its salmon population. State lawmakers enacted legislation directing regulatory agencies to address 6PPD in motor vehicle tires and are evaluating potential alternatives that could reduce environmental releases of the chemical. California similarly evaluated the chemical through its Safer Consumer Products Program and continues to assess whether additional action may be appropriate. Numerous other states are participating in the Interstate Technology and Regulatory Council's efforts to research 6PPD-quinone and provide guidance on regulatory initiatives.

The issue has also entered the legal landscape. Environmental groups have filed lawsuits against tire manufacturers alleging that companies failed to adequately address the environmental risks associated with 6PPD. In Washington, environmental organizations and fishing groups sued several tire manufacturers, claiming that the companies' continued use of 6PPD harms the salmon population and other aquatic species. While the litigation remains ongoing, these cases reflect growing scrutiny of tire-derived contaminants and may influence how regulators, manufacturers, and other stakeholders evaluate potential risks associated with 6PPD-quinone.

Why It Matters for Property Stakeholders

ASTM E1527-21, the industry standard for conducting Phase I environmental site assessments (ESA), focuses on identifying recognized environmental conditions (RECs) associated with hazardous substances regulated under CERCLA. Following EPA's designation of PFOA and PFOS as hazardous substances under CERCLA, those chemicals (once considered emerging contaminants) are now within the scope of a Phase I ESA. But, to date, 6PPD-quinone has not been designated a CERCLA hazardous substance and therefore generally falls outside the scope of a typical Phase I assessment. However, as scientific understanding and regulatory interest evolve, 6PPD-quinone may become, or may already be, a relevant consideration for certain properties, particularly those with significant stormwater runoff or vehicle activity.

For example, properties with higher vehicle activity levels and extensive paved surfaces may generate greater quantities of tire wear particles, which can accumulate on roadways and other impervious surfaces before being transported through stormwater runoff. As research on 6PPD-quinone continues, it may become an increasingly important consideration in stormwater management practices, permitting decisions, and evaluation of environmental risks associated with tire-derived contaminants that may be deposited on these potential 6PPD-quinone sites and adjacent properties.

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As a result, property owners and developers should monitor how emerging contaminants are incorporated into future regulatory frameworks and stormwater planning. Environmental professionals may also need to consider how contaminants like 6PPD-quinone fit into broader discussions regarding environmental risk, property impacts, and long-term compliance obligations.

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Questions to Consider

Although it remains too early to determine how 6PPD-quinone may ultimately be regulated, parties involved in property ownership, development, and environmental management may want to consider:

- Could future stormwater requirements affect certain property types or redevelopment plans?
- Are transportation-intensive properties more likely to face additional scrutiny as research and regulations develop?
- How might emerging contaminants influence future environmental due diligence, permitting, or project planning?

As with other emerging contaminants, early awareness of developments in 6PPD-quinone may help property stakeholders better understand potential future risks and prepare for evolving best practices, environmental standards, and regulations.

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About the author

Mary Ann is the Founder and President of 15E Communications LLC, a Washington, DC-based consulting firm that assists clients with communications strategy, content, business development, and public relations. Prior to founding 15E in 2020, Mary Ann managed Bloomberg Industry Group's coverage and analysis of global environment, health, safety, and sustainability issues for more than 20 years. With experiences cutting across environmental law, policy analysis, journalism, and marketing, she most recently served as Deputy Editorial Director for Bloomberg Environment. Her areas of policy expertise include environmental compliance, environmental due diligence, risk management, brownfields redevelopment, and sustainability.

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