



Styrene Information and Research Center (SIRC)

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**Styrene Information and Research Center Statement on the  
California Environmental Protection Agency's Revised Technical Support Document  
On a Proposed Public Health Goal for Styrene in Drinking Water**

The Styrene Information and Research Center's (SIRC's) initial review of a revised technical document prepared by the California Environmental Protection Agency (Cal/EPA) Office of Environmental Health Hazard Assessment (OEHHA) indicates that it continues to lack the scientific underpinnings to support the 0.5 parts per billion (ppb) Public Health Goal (PHG) proposed for styrene in drinking water.

SIRC in 2008 filed extensive comments on the original draft, asking OEHHA to revise the document to reflect the most current styrene science. In particular, SIRC does not believe that OEHHA's basis for such an onerous PHG number – lung tumor formation in mice exposed to styrene – is appropriate or scientifically supportable.

The revised OEHHA document's principal shortcoming is that it continues to exclude much of the newest styrene science available for regulatory decision-making. Over the years since 2001 when OEHHA announced that it would establish a PHG for styrene, SIRC has continually encouraged state officials to use the latest mode-of-action (MoA) data in evaluating styrene's potential health effects. MoA refers to the way a substance acts biologically within and upon an organism. Susceptibility to a chemical's toxic effects in different species is determined by the interaction of differences in genetic makeup, which can lead to structural, metabolic and other differences.

State-of-the-art "lifetime" styrene inhalation studies in the 1990s found lung tumors in exposed mice, but no tumors in rats, even though the rats were exposed to much higher levels. Since those studies revealed the mouse lung tumors, SIRC and its European counterpart, Cefic, have sponsored significant additional research to better define the tumorigenic process of styrene – its MoA – in the mouse and examine why styrene does not seem to produce the same response in rats or humans. Based on this exhaustive research, it is SIRC's position that the finding of lung tumors in mice exposed to styrene is not relevant for human risk assessment, leading to less carcinogenicity concern for styrene<sup>1</sup>.

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<sup>1</sup> A SIRC statement on the carcinogenic potential of styrene is available upon request.

A report published in 2009 in the peer-reviewed journal *Regulatory Toxicology and Pharmacology* summarized and interpreted this mouse-lung MoA argument, which is common to several other substances. The report by SIRC science advisor George Cruzan, Ph.D., and four co-authors is entitled “Mouse specific lung tumors from CYP2F2-mediated cytotoxic metabolism: An endpoint/toxic response where data from multiple chemicals converge to support a mode of action.

SIRC continues to support additional MoA research to further validate these findings. Additionally, a 2009 epidemiology study published in a highly respected, peer-reviewed journal found that the “available epidemiologic evidence does not support a causal relationship between styrene exposure and any type of human cancer.”

An absence of cancer findings in humans exposed at exponentially higher styrene levels than any possible drinking water concentration would seem to confirm that carcinogenicity is not a relevant endpoint for setting a styrene PHG. The report, “Epidemiologic Studies of Styrene and Cancer: A Review of the Literature,” appeared in the *Journal of Occupational and Environmental Medicine (JOEM)*, Volume 51 (2009); JOEM is the flagship scientific publication of the American College of Occupational and Environmental Medicine.

SIRC also has reminded OEHHA over the years that California’s own test data on some 15,000 water wells has indicated that styrene is virtually undetectable in drinking water, making it an unwarranted candidate for the PHG assessment. At the same time, SIRC acknowledges that OEHHA is required by the state to conduct assessments for all substances – including styrene -- for which federal drinking water maximum contaminant levels (MCLs) exist.

According to OEHHA, PHG documents are used to provide technical assistance to the California Department of Public Health and also are informative reference materials for federal, state and local public health officials and the public.

SIRC appreciates the fact that OEHHA has extended the original deadline for comments on the revised document to give public entities, including SIRC, more time to prepare their comments. SIRC intends to submit comments to OEHHA in advance of the May 15, 2010 deadline. A copy SIRC’s 2008 comments on the original draft styrene technical document is available by contacting Joseph Walker at the address below.

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Please direct any questions to SIRC’s communications representative, Joseph Walker, Walker Communications, [Walkercom2@aol.com](mailto:Walkercom2@aol.com) or 703-491-3301.