

Air ProductsDate 6 March 1981INTEROFFICE
MEMORANDUMSubject 1, 4 DioxaneTo K. J. FemriteEscambia - 42

(Location, Organization, or Department)

From [REDACTED]Trexlertown

(Location, Organization, or Department)

CC: J. W. Gentile
J. G. Tolar

RE: Your memo to J. W. Gentile dated 19 February 1981 - "1, 4 Dioxane".

As I am sure you are aware, it is a very easy matter for a chemical to get a "suspect carcinogen" label these days. 1, 4 Dioxane gets its label from studies dating back as far as 1965 where test animals were fed 1, 4 Dioxane in drinking water at levels from 5,000 to 20,000 ppm. These studies found nasal, liver, and lung tumors.

By contrast, studies which exposed animals to vapor concentrations from 50 to 111 ppm found no evidence of cancer. To my knowledge, there have been no cases of cancer in humans attributed to 1, 4 Dioxane.

The ACGIH, in its publication "Documentation of Threshold Limit Values-1980", says in part,

"In view of the findings of tumors in both liver and lung at or near the 10,000 ppm dietary level, and the lack of such findings at inhalation exposure levels slightly above 100 ppm for two years, Dioxane has been classed by the TLV Committee as an animal tumorigen of such low potential as to be of no practical significance as an occupational carcinogen at or around the recommended TLV of 50 ppm."

(Note that the ACGIH is currently recommending a lowering of the TLV to 25 ppm).

NIOSH, of course, has used just the reverse logic and issued a criteria document in 1976 recommending a 1 ppm standard based on the "belief that Dioxane can cause tumors in exposed workers and on the belief that information allowing the derivation of a safe exposure limit is not now available".

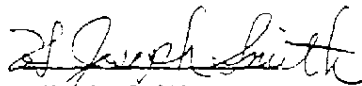
Now to your questions. Thiokol is most likely taking the safe approach and quoting the NIOSH evaluation. OSHA has also adopted the NIOSH evaluation and lists 1, 4 Dioxane as a suspect carcinogen. But, OSHA has not acted to lower their permissible exposure limit, which stands at 100 ppm, so they can't be too concerned about the cancer aspect. The only real effect of OSHA considering 1, 4 Dioxane as a suspect carcinogen is that any violations of the 100 ppm standard would be classified as serious. Therefore, to comply with OSHA, you need only control exposures below 100 ppm as an 8 hour time weighted average and control skin exposure, since 1, 4 Dioxane can be absorbed through the skin. There are no particular work practices, medical controls, or monitoring schedules to comply with.

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Recommendations:

In order to control the chronic liver and kidney toxicity of 1, 4 Dioxane I recommend that you control exposures to 25 ppm (8 hour time weighted average) as recommended by ACGIH and eliminate any skin exposure through the use of gloves etc. and good personal hygiene. This approach should be more than sufficient to control whatever cancer potential may be present. You should also be aware of the short term exposure limit (STEL) set by ACGIH at 100 ppm. This means that exposures up to 100 ppm are acceptable as long as they last no more than 15 minutes and provided that you don't exceed the 8 hour TWA of 25 ppm.

I hope this answers your questions. If not, I would be happy to answer any further questions you may have.


H. J. Smith

HJS:dmg

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