Supplementary information

1. Butyl acetates

Additional study for consideration

David RM, Tyler TR, Ouellette R, Faber WD, Banton MI. 2001. Evaluation of subchronic toxicity of n-butyl acetate vapor. Food Chem Toxicol.39(8):877-86.

Author	Study type	Results	Discussion and Assessment
David, 2001; Other studies	Male and female Sprague–Dawley (SD) rats were exposed to concentrations of 0, 500, 1500 or 3000 ppm nBA for 6 h per day, 5 days per week for 13 consecutive weeks.	Body weights for the 1500 and 3000 ppm groups were significantly reduced. Weights of the liver, kidneys and spleen were significantly lower for the 3000 ppm male group; testes and adrenal gland weights for the 1500 and 3000 ppm groups and the lung weight for the 3000 ppm male group were significantly higher than for the control group. Degeneration of the olfactory epithelium along the dorsal medial meatus and ethmoturbinates of the nasal passages of some 1500 (10/20) and all 3000 ppm (20/20) rats was also seen. The severity was mild to moderate for the 3000 ppm group and minimal to mild for the 1500 ppm group. NOAEL = 500 ppm	RfC derivations: WHO, 2005 500 ppm x 6/8 x 1000 UF = RfC = 0.375 ppm UF = 10 intraspecies, 10 interspecies, 10 subchronic – chronic. Texas CEQ, 2004 NOAEL = 500 ppm POD adjusted: 89.28 ppm POD_{HEC}: 89.28 ppm UF: 90 (10 for intraspecies variability and 3 each for interspecies extrapolation and database insufficiency) RfC =: 1 ppm

Current Butyl Acetates and Alcohols TLV and PEL values; Proposed PEL

Substance	TLV/STEL	PEL/STEL	Proposed PEL
n-butyl acetate	50/150	150/200	50/150
sec-butyl acetate	50/150	200	50/150
tert-butyl acetate	50/150	200	1
isobutyl acetate	50/150	150	50/150
n-butanol	20	50 C	-
sec-butanol	100	100	-
tert-butanol	100	100/150	-
isobutyl alcohol	50	50	-

Measurement information

tert-Butyl acetate

OSHA Method 1009 (fully validated) uses a charcoal tube (or organic vapor monitor), a flowrate of 0.05 lpm, a volume range of 0.75 to 12 liters, and a GC-FID analytical method with an estimated reliable quantitation limit of 45.9 parts per billion (.0459 ppm).

NIOSH Method 1450 uses a charcoal tube (or organic vapor monitor), a GC-FID, and provides an estimated detection limit of 0.9 µg per sample. The range studied was 14-440 ug per sample. With a maximum 10L sample this would yield 0.29 to 9.26 ppm range.

Based on this information, there are no anticipated concerns with analytical feasibility to 1 ppm.

n-Butyl acetate

OSHA Method 1009 (fully validated) uses a charcoal tube (or organic vapor monitor), a flowrate of 0.05 lpm, a volume range of 0.75 to 12 liters, and a GC-FID analytical method with an estimated reliable quantitation limit of 37.1 parts per billion (.0371 ppm).

NIOSH Method 1450 uses a charcoal tube (or organic vapor monitor), a GC-FID, and provides an estimated detection limit of 0.9 µg per sample. The range studied was 15-440 ug per sample. With a maximum 10L sample this would yield 0.32 to 9.26 ppm range.

Based on this information, there are no anticipated concerns with analytical feasibility to 50 ppm.

sec-Butyl acetate

OSHA Method 1009 (fully validated) uses a charcoal tube (or organic vapor monitor), a flowrate of 0.05 lpm, a volume range of 0.75 to 12 liters, and a GC-FID analytical method with an estimated reliable quantitation limit of 24.8 parts per billion (.0248 ppm).

NIOSH Method 1450 uses a charcoal tube (or organic vapor monitor), a GC-FID, and provides an estimated detection limit of 0.9 µg per sample. The range studied was 14-440 ug per sample. With a maximum 10L sample this would yield 0.29 to 9.26 ppm range.

Based on this information, there are no anticipated concerns with analytical feasibility to 50 ppm.

isobutyl acetate

OSHA Method 1009 (fully validated) uses a charcoal tube (or organic vapor monitor), a flowrate of 0.05 lpm, a volume range of 0.75 to 12 liters, and a GC-FID analytical method with an estimated reliable quantitation limit of 38.9 parts per billion (.0389 ppm).

NIOSH Method 1450 uses a charcoal tube (or organic vapor monitor), a GC-FID, and provides an estimated detection limit of 0.9 µg per sample. The range studied was 14-440 ug per sample. With a maximum 10L sample this would yield 0.29 to 9.26 ppm range.

Based on this information, there are no anticipated concerns with analytical feasibility to 50 ppm.

2. **MIBK**

MIBK - Economic Impact Analysis/Assessment

The Division believes very few users of MIBK containing products will need to expend funds to comply with the proposed reduced PEL and STEL. MIBK is not manufactured as a pure chemical in California. Some chemical distribution facilities in California may blend MIBK with other solvents for their downstream customers or otherwise repackage containers received from chemical manufacturers in other states or countries. However, this operation is likely to either be mechanized, with little exposure, or adequate respiratory protection is already provided to employees. One industry where exposures is likely high is rubber manufacturing, but rubber is no longer manufactured in California.

The extant California industry likely to have the highest employee exposures to MIBK is paint spraying of oil-based paints. MIBK is not utilized in latex paints, which are water-based. When MIBK is utilized as a solvent in paints, it is typically one of several solvents utilized to dissolve and carry the paint resins and solids. Typically, spray painters are already provided adequate respiratory protection of full faced respirators; this class of respirators provide a protection factor of 50, adequate for the proposed new exposure limits. Employers of paint sprayers who have provided only half-face elastomeric respirators (protection factor of 10) might have to evaluate worker exposure and possibly upgrade to the full-face respirator. These would be modest one-time costs (perhaps $1000 for exposure evaluation and $150 to $350 per employee for upgraded respirators). Measurement of typical paint spraying exposures to MIBK taken in the early 1990's showed exposure usually were not above the protection provided by half-faced respirators.

However, according to IARC ((Occupational Exposure as a Painter, https://www.ncbi.nlm.nih.gov/books/NBK304433/ , 2012), the total amount of volatile organic compounds like MIBK in most paints today has been greatly reduced--even as compared to the early 2000's—so that in some cases the amount of VOC released into the air is similar to that of water-based paints.

Paint recyclers in California would experience no costs from the proposed changes because oil based paint is not repackaged and reused in California the way latex paint is reused. Oil based paint is shipped out of state for incineration at facilities as far away as Nebraska.

MIBK is also used in California as a constituent of parts cleaning solvents utilized by automotive and machine shops. However, in part due to strong regulations of California's air quality management districts, parts cleaning and paint spray gun cleaning is typically performed in a covered apparatus that, in the words of one provider of such machines, "put the environment and employee first." Parts cleaning and paint spray gun cleaning typically are of limited duration as well. The Division believes the proposed changes will not impact this industrial sector.

3. Phthalates

From Title 8, Subchapter 7, appendix to Section 5155 https://www.dir.ca.gov/Title8/5155a.html

“In the absence of information to the contrary, the adverse health effects of exposure to two or more toxic materials during the workday shall be considered additive and the following formula shall be used for calculating D, the fraction of the allowable daily exposure.

$$D = \frac{TWA_1}{PEL_1} + \frac{TWA_2}{PEL_2} + \ldots \frac{TWA_n}{PEL_n}$$

where TWA is the time-weighted average concentration of a particular substances involved in the exposure (as calculated by the formula in Section (A) of this Appendix), and PEL is the corresponding permissible exposure limit for that substance as specified by Table AC-1. The value of D shall not exceed unity.

Example : To illustrate the use of this formula, consider the following exposures:

Substance	*Actual 8–hour time weighted average (TWA) exposure concentration (ppm)*	*8–hour time weighted average permissible exposure limit (PEL) (ppm)*
1	500	1,000
2	45	200
3	40	200

Substituting in the formula was have

$$D = \frac{500}{1000} + \frac{45}{200} + \frac{40}{200} = 0.925$$

Since D is less than unity (1), the exposure to multiple contaminants is within acceptable limits.”