UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

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SUBJECT: The Acute Toxicity of Penta: A Summary for PD-2/3.

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Table ____ shows a selection of LD50 values for penta by the oral, dermal, and inhalation routes.

TABLE ____

The Acute Toxicity of Penta

Route	Species	LD50 (mg/kg)	Reference
Oral	Wistar Rat (0.5% in Stanolex fuel oil)	27.3	Deichman et al. (1942)
	Wistar Rat (1% in olive oil)	77.9	Deichman et al. (1942)
	Wistar Rat (2% in water)	210.6	Deichman et al. (1942)
	Sherman Rat (M; F) (in peanut oil)	146; 175	Gaines (1969)
	White Mice	130	Pleskova and Bencze (1959)
	C57 Black Mice (F) (in 40% ethanol)	74	Ahlborg and Larsson (1958)
	Guinea Pigs (Dowicide 7 in propylene glycol)	50-140	Dow Report (1965)

Route	Species	LD50 (mg/kg)	Reference
Dermal	Sherman Rat (M; F) (in peanut oil)	320; 330	Gaines (1969)
Inhalation	Sprague-Dawley Rat (M) (sodium penta aerosol)	11.7 (estimation by researcher)	Hoben et al. (1976)

We expect the oral toxicity to be less than that by the inhalation route depending upon the significance of liver detoxification and the rate of absorption across the gut as affected by vehicles or excipients. Unfortunately penta is not highly metabolized in the rat or the human (Braun et al., 1978). One explanation for the variation of the oral LD50 values for penta from the inhalation value may reside in the different ablities of the several vehicles employed to affect absorption in the gut.

Realizing the fact that the metabolites of penta are less toxic than the parent compound (Ahlborg and Larsson, 1978), and also the fact that in the human or the rat over 76 or 79 percent (respectively) of a penta dose remains unmetabolized (Braun et al., 1978), we have no reason to expect any substance, such as fuel oil or alcohol, to significantly increase the acute toxicity of penta as mediated by induction of any metabolizing enzyme system. Nor is there reason to expect additive or synergistic effects (or antagonistic effects) from the combination of penta and any carrier or solvent of Table____; none of the carriers has the same pharmacologic action as penta, and there is no proven antagonist or antidote for penta.

Dreisbach (1980) presents a value of 1 gram (approximately 25 mg/kg) as the lowest human lethal dose of penta. We have reason to believe this is not an unreasonable value. Thus, Haley (1978) has presented pharmacokinetic data describing the forced diuresis required to save the life of a patient ingesting weed killer formulation containing pentachlorophenol in amount sufficient to provide an estimated dose ranging upwards from about 200 mg/kg. Symptoms were typical of the action of penta as an uncoupler of oxidative phosphorylation. Hayes (1963) states that there is a very small margin between the dose of penta in humans giving no symptoms and the lowest lethal dose.

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