Monsanto

FROM (NAME & LOCATION) Medical, A2SC

DATE December 26, 1972 cc: J. H. Davidson - B2SF

SUBJECT Toxicity of [redacted], Pydraul 50E and Pydraul 115E

REFERENCE

TO : File

Two products designated Pydraul 50E and Pydraul 115E are intended for applications as industrial hydraulic fluids and steam turbine lubricants. These products are proposed as replacements for certain of the Aroclor applications and have the distinct advantage of being biodegradable.

Questions have been raised concerning the comparative safety of these materials. Pydraul 50E and Pydraul 115E contain organic phosphate esters. Various other representatives of this class of compounds have been found to be highly toxic by both the oral and dermal routes and still others have been shown to be potent neurotoxins.

The attached table summarizes the available information relating to the comparative toxicity of Aroclor 1242, Pydraul 50E and Pydraul 115E. The acute toxicological hazard of each of these three products is low. The Pydrauls 50E and 115E are classed as practically non-toxic by both the oral and dermal routes and are only slight irritants to the skin and eye. There is no vapor hazard from these materials under ambient conditions.

Specific studies were conducted to determine if either Pydraul 50E or Pydraul 115E were neurotoxins. Mature hens were given 10 g/kg twice daily for 3 consecutive days, a total dose of 60 g/kg. Following a 21-day observation period the hens were again dosed with 60 g/kg over a 3 day period and again observed for 21 additional days. No gross or microscopic evidence of neurotoxicity was found. Conversely a single dose of 0.5 g/kg triorthocresylphosphate resulted in reactions indicating, and microscopic evidence of, neural damage.

Ninety-day feeding studies in rats with levels of Pydraul 50E and 115E as high as 5000 ppm failed to cause any gross or microscopically detectable evidence of pathologic effects. There were no deleterious effects on food consumption, body weight gain, hematologic parameters or serum clinical chemistry values. Special reference is directed toward the lack of evidence for cholinesterase inhibition in these studies.

In summary, neither Pydraul 50E nor Pydraul 115E possess the acute or neurotoxicity properties of certain other phosphate esters. Neither of these materials would appear to present toxicological hazards greater than those of the Aroclors if handled by practices consistent with good industrial hygiene.

PLW

- Paul L. Wright

/bks

DSW 552670

IN-10 REV. 11-65

Comparative Toxicity of Aroclor 1242, Pydraul 50E and Pydraul 115E

	Aroclor 1242	Pydraul 50E	Pydraul 115E
Acute Toxicity			
Oral LD_{50}-rats (mg/kg)	8650	>15,800	>20,000
Dermal Minimal LD-rabbit (mg/kg)	1260-2000	>7,940	>7,940
Dermal Irritation-rabbit (max. 8.0)	2.3	1.0	1.3
Eye Irritation-rabbit (max. 110.0)	6.0	6.0	10.6
Vapor Inhalation-rat (ambient conditions)	non-hazardous	non-hazardous	non-hazardous
Fish 96 hour LC_{50}			
Trout (ppm)	25.1	2.5*	32
Bluegill (ppm)	31.6	3.2*	63
*values for 30E.			
NeuroToxicity - Chicken Demyelination Test			
Dosage	--	10 g/kg bid. for 3 days, repeated after 21 days	10g/kg b.i.d. for 3 days repeated after 21 days
Reactions and Mortality	--	none	none
Histopathology of brain, spinal cord and sciatic nerve	--	no lesions	no lesions
Subacute Toxicity - 90-day Rat feeding study			
Dosage (ppm)	1,10 and 100	200,1000 and 5000**	200,1000 and 5000
General Response	None;pilot study indicated weight gain depression and severe liver involvement at 1000 ppm after 30 days.	Possible liver weight increase at 5000;noned at 200 and 1000.	Possible liver weight increase at 5000,none at 200 and 1000.
** data for N_2CP.			
Cholinesterase (plasma, RBC and brain)	--	no effect	no effect

DSW 552671