

Table 1. Elk River Spill Chemicals Tested in Zebrafish

CASRN*	Compound Name	Notes
34885-03-5	4-Methylcyclohexanemethanol (MCHM)	a
NA	Crude 4-Methylcyclohexanemethanol (Crude MCHM)	b
770-35-4	Propylene glycol phenyl ether (PPH)	a
94-60-0	Dimethyl 1,4-cyclohexanedicarboxylate	a
51181-40-9	Methyl 4-methylcyclohexanecarboxylate (MMCHC)	a
98955-27-2	4-(Methoxymethyl)cyclohexanemethanol (MMCHM)	a
4331-54-8	4-Methylcyclohexanecarboxylic acid	a
2105-40-0	2-Methylcyclohexanemethanol (2MCHM)	a
105-08-8	1,4-Cyclohexanedimethanol	
4169-04-4	Phenoxyisopropanol	
114651-37-5	Cyclohexanemethanol, 4-[(ethenoxy)methyl]-	c
498-81-7	Cyclohexanemethanol, alpha, alpha, 4-trimethyl-	c
NA	DOWANOL™ DiPPH	d

* CASRN = Chemical Abstracts Service Registry Number. ^aMajor or minor constituent of the spilled liquid (a minor constituent is considered to be approximately 10% or less of the spilled material); ^bA commercial mixture containing >70% MCHM along with lesser amounts of five other chemicals; ^cNot a component of the spilled liquid, but included because the compound is structurally related to MCHM or PPH; ^dA proprietary commercial mixture of dipropylene glycol phenyl ether isomers.

Study Findings

Chemicals associated with the spill were evaluated in two identical and independent studies. Two chemicals altered zebrafish photomotor response in both studies. MCHM, the main component of the spilled liquid, had effects on the zebrafish photomotor response at doses as low as 35 µM or 4.5 ppm. A chemical that is structurally similar to MCHM and was not in the spilled liquid (cyclohexanemethanol, alpha,alpha,4-trimethyl-) also altered the zebrafish photomotor response.

The finding that MCHM exposure caused neurotoxic effects in zebrafish is consistent with clinical signs of neurotoxicity observed in rats following oral exposure to doses of 400 mg/kg/day and higher in studies conducted by Eastman Chemical^{2,3} and NTP.⁴ In the rat studies, the dose levels where these effects were observed are more than 1000-fold higher than the estimated human exposure levels during the spill. Notably, outward signs of neurotoxicity were not observed in rats exposed to doses that are in the range of human exposure during the spill.⁵

² http://www.eastman.com/Literature_Center/Misc/Pure_Distilled_MCHM-28-Day_Oral_Feeding_Study.pdf

³ http://www.eastman.com/Literature_Center/Misc/Pure_Distilled_MCHM-Acute_Toxicity_Battery_Containing_5_Study_Reports.pdf

⁴ http://ntp.niehs.nih.gov/ntp/research/areas/wvspill/prenatal_wvupdate_dec2014_508.pdf

⁵ http://ntp.niehs.nih.gov/ntp/research/areas/wvspill/micronucleus_update_508.pdf

