Guidelines/Criteria	
Reference	NTP. 1993a. NTP Technical Report on toxicity studies of a chemical mixture of 25 groundwater contaminants. NTP toxicity report series no. 35 - NIH Publication 93-3384. National Toxicology Program, National Institute of Environmental Health Sciences (NIEHS), Research Triangle Park, NC, USA Hong HL, Yang RSH, Boorman GA. 1991. Residual damage to hematopoietic system in mice exposed to a mixture of groundwater contaminants. Toxicol Lett 57:101-111. Hong HL, Yang RSH, Boorman GA. 1992. Alterations in hematopoietic responses in B6C3F1 mice caused by drinking a mixture of 25 groundwater contaminants. J Environ Pathol Toxicol Oncol 11(2):1-10.
***In vivo* study type**	
Route of Administration	drinking water, water control group
Species & age of animals	B6C3F1 mice, 10 weeks
Study Duration	2.5, 15.5, 31.5 weeks and 108 days with 2-days and 10 weeks of recovery
Type of Mixture	
Binary	no
>2 components	yes
Similar acting or dissimilar	dissimilar action assumed (chemicals mix to simulate groundwater supplies near hazardous dumps)
What Mode of Action was investigated?	haematotoxicity
Parameters/End points Measured	
Target organs/Critical effects	Haematopoietic system (whole body irradiation, haematology, bone marrow cellularity, progenitor (granulocyte macrophage) cell formation (CFU-GM), erythroid precursor formation (CFU-E)); water consumption, body, liver, spleen, kidney, thymus weights, histopathology of lung, heart, liver, kidney, adrenal glands, spleen thymus, stomach, uterus, bone marrow (sternum), urinary bladder, small and large intestines)
Pharmacological changes or adverse effects	adverse and non-adverse effects
Individual Components	
Characterisation of individual compounds	yes
Name, exact chemical name, CAS no.	One mixture was investigated: Acetone, Aroclor 1260, Arsenic, Benzene, Cadmium, Carbon tetrachloride, Chloroform, Chlorobenzene, Chromium, 1,1-Dichloroethane, 1,1-Dichloroethylene, 1,2-Dichloroethane, 1,2-t-Dichloroethylene, Di/2-ethylhexyl)phthalate, Ethylbenzene, Lead, Mercury, Methylene chloride, Nickel acetate tetrahydrate, Phenol, Tetrachloroethylene, Toluene, 1,1,1-Trichloroethane, Trichloroethylen, Xylenes
Were dose responses established for individual components?	No, only mixtures at three dose levels were administered: Target dose (see below and 2 and 10 fold dilutions thereof)
Were no effect levels established?	Yes
Were doses below the NO(A)ELs investigated?	Yes presumably
Mixtures Investigated	
Number of dose levels	Target concentrations: Acetone: 53 ppm, Aroclor 1260: 0.01 ppm, Arsenic: 9.0 ppm, Benzene: 12.5 ppm, Cadmium: 51.0 ppm, Carbon tetrachloride: 0.40 ppm, Chloroform: 7.0 ppm, Chlorobenzene: 0.10 ppm, Chromium: 36.0 ppm 1,1-Dichloroethane: 1.4 ppm, 1,1-Dichloroethylene: 0.5 ppm, 1,2-Dichloroethane: 40.0 ppm, 1,2-t-Dichloroethylene: 2.5 ppm, Di-2-ethylhexyl)-phthalate: 0.015 ppm, Ethylbenzene: 0.3 ppm, Lead: 70 ppm, Mercury: 0.50 ppm, Methylene chloride: 37.5 ppm, Nickel: 6.80 ppm, Phenol: 29.0 ppm, Tetrachloroethylene: 3.40 ppm, Toluene: 7.0 ppm, 1,1,1-Trichloroethane: 2.0 ppm, Trichloroethylen: 6.50 ppm, Xylenes: 1.60 ppm Target concentrations: 375 ppm
How does the mixture make-up compare to individual components? (e.g. low dose) equivalents used?)	Would have to be evaluated, NOAELs of individual compounds are not given.
No. of technical replicates per exposure condition (*in vitro*)	not applicable
No. of animals per dose group (*in vivo*)	8 mice/group
Observations/Findings	108 days Decreased water consumption in mid and high dose High dose: Increased rel. Kidney weights, decreased rel. Thymus weights no other changes observed Haematology: High dose: decreased MCV values Haematopoiesis: mid and high dose: decreased number of progenitor cells capable of forming granulocyte-macrophage colonies (CFU-GM) (reversible after 10 weeks); significantly slower recovery of bone marrow progenitor (even after 10 weeks of recovery) 2.5, 15.5, 31.5 weeks exposures High dose: 15 days: rel. increased kidney and decreased thymus weight; 31 days: decreased rel. liver and thymus weights, thymus atrophy; mid and high dose: 15 and 31 days decreased MCV levels (at 15 days only in high dose), dose-related decrease in the numbers of CFU-GM
Overall opinion (e.g. sufficient numbers of groups investigated, group sizes adequate, observations reproducible, low dose levels used investigated)	Questionable relevance of some parameters (CFU-GM...).