

Guidelines/Criteria	
	Reference: Chu I, Villeneuve DC, Becking GC, Lough R. 1981. Subchronic study of a mixture of inorganic substances present in the Great Lakes ecosystem in male and female rats. Bull Environ Contam Toxicol 26(1):42-45.
<b>In vivo Study Type</b> Route of Administration Species & age of animals	90 day toxicity study Drinking water Sprague-Dawley rats
<b>Study Duration</b>	90 days
<b>Type of Mixture</b> Binary >2 components Similar acting or dissimilar What Mode of Action was investigated?	No Whole waters were tested Dissimilar Nothing specific
<b>Parameters/End points Measured</b> Target organs/Critical effects  Pharmacological changes or adverse effects	Body weight, food and water consumption, haematology, urinalysis, eye examination, gross organ pathology and weights (adrenals, heart, kidney, liver, lung, ovaries, testes, pituitary, prostate, uterus, spleen, thyroid, brain), 31 organ histopathology.
<b>Individual Components</b> Characterisation of individual compounds Name, exact chemical name, CAS no.	Yes Sodium arsenate, cadmium acetate, chromic sulphate, cupric sulphate, ferric ammonium sulphate, lead acetate, mercuric chloride, nickel sulphate, sodium selenate, zinc sulphate and sodium fluoride. The concentrations of each of these was measured in all waters tested.  The 1x mixture contained the following elemental concentrations in ug/l: arsenic 50, cadmium 0.2, chromium 50, copper 5, iron 300, lead 25, mercury 0.2, nickel 25, selenium 10, zinc 30, fluoride 1200
Were dose responses established for individual components?	No
Were no effect levels established?	No
Were doses below the NO(A)ELs investigated?	N/A
<b>Mixtures Investigated</b> Number of dose levels  How does the mixture make-up compare to individual components? (e.g. low dose) equivalents used?) No. of technical replicates per exposure condition ( <i>in vitro</i> ) No. of animals per dose group ( <i>in vivo</i> )	Five waters were tested: double de-ionised water, tap water, water containing the metals at 1x, 5x and 25x the 1979 Great Lakes water quality standard All the individual metals in the 25x water, except zinc and copper, were above the Canadian drinking water standard  15 per sex per group
<b>Observations/Findings</b>	No statistically significant effects
<b>Overall opinion</b> (e.g. sufficient numbers of groups investigated, group sizes adequate, observations reproducible, low dose levels used investigated)	Reasonable study for the period. Documentation is rather brief. The Great Lakes water standards were designed to protect aquatic organisms, not humans. Nevertheless the lack of effects at 25x the standard, when all but two metals were present above the drinking water standard, is reassuring.