ANI-Bradken site - summary soil test results and health impacts of contaminants.

Soil Contaminant	Maximum concentration on on-site (mg/kg)	Health Standard HIL-A (mg/kg soil)	Health impacts	Comments
Antimony	**18**	30	Dermatitis, keratitis, conjunctivitis, nasal septum ulceration. Stibine gas – nausea, vomiting, headache, haemolysis, haematuria, abdominal pain, death (Merck,2001)	Does not degrade in the environment, stays in soil. Released into the air attached to small particles, it may stay in the air for up to a month. Under certain conditions antimony may form the extremely toxic stibine gas.
Arsenic	**330**	100	Dermatitis, bronchitis, vomiting, abdominal pain, death; carcinogen of mouth, oesophagus, larynx. (Duffus, 1983) Carcinogen of skin, liver, bladder, kidney, lung. (Merck)	Arsenic is a cumulative poison. It can concentrate in animal tissues and can bio-accumulate – favoured by increasing salinity. Attached to small particles arsenic may stay in the air for many days and travel long distances. May remain in the body for many months Under certain conditions arsenic may form the extremely toxic arsine gas.
Cadmium	**590**	20	Very small doses cause vomiting, diarrhoea, colitis. Continuous exposure causes hypertension, heart enlargement, premature death; carcinogen of lungs, may cause chromosome abnormalities.(Duffus) Headache, chest pains, cough, weakness, GI disturbances, muscular cramps, vertigo, convulsions, emphysema, chronic bronchitis, anaemia, kidney damage, osteomalacia, osteoporosis, known human carcinogen.(Merck)	Both plants and animals are known to efficiently absorb and concentrate cadmium.[1] It has serious implications for human health and is a known carcinogen.[2] Absorption is higher in nutritional deficiency. Stays in body for years. Attached to small particles it can travel long distances before falling as dust or in rain.
Chromium	**1200**	210	Eye, nose, throat irritant. Chronic exposure may lead to liver and kidney damage. (Duffus) Histologic fibrosis of lungs, dermatitis, skin ulcers, nasal inflammation, perforated nasal septum, lung cancer, nasal cavity cancer. Chromium is also a known human carcinogen. (Merck)	Chromium is known to accumulate in animal tissues.[3] Remains as small particles in air for upto10 days.
Copper	**1400**	1000	Brain damage.(Duffus) Irritation of eyes, nose and pharynx, nasal perforation, metallic taste, dermatitis.(Merck)	It takes several days for copper to leave the body. Children are more susceptible to risks.
Fluorine	**1400**	500 (Dutch target value)	High doses cause damage to the testes and sperm production. Irritating to the skin, eyes and respiratory tract.	
Lead	**16 000**	300	Anorexia, vomiting, malaise, convulsions, brain damage. Children show weight loss, weakness, anaemia. Adults: vague GI and CNS complaints. (Merck) There is also some indication of lead having carcinogenic properties and effects on male fertility. It is known that lead derived from the maternal skeleton can impact on the developing foetus and that lead can be passed to the infant through breastfeeding. Lead	Recent research indicates that lead is dangerous to pre-school children at relatively low levels of 100mg/kg. There is also mounting evidence that any exposure to lead is unsafe for the target group. In young children neurological damage may occur at low levels with no obvious symptoms. Once lead enters the atmosphere it may travel thousands of miles if the lead particles are small or the compounds of lead easily evaporate (ATSDR).

[1] Duffus, J.H. (1983). *Environmental toxicology*. Edward Arnold, London.
[2] Merck Research Laboratories. (2001). *Merck Index.* Merck Research Laboratories, NJ.
[3] Duffus, J.H. (1983). *Environmental toxicology*. Edward Arnold, London.

			has been found to be more toxic in the presence of alcohol[4]. The list of people most vulnerable to lead toxicity include children, pregnant women (and the foetus), the elderly, smokers, alcoholics, people with genetic diseases affecting haeme synthesis, those with nutritional deficiencies, neurological and kidney dysfunctions.[5] This list is not exhaustive.	
Manganese	**25 000**	1500	Cramps, tremors, hallucinations, manganic pneumonia. (Duffus) Parkinsonism, asthenia, insomnia and mental confusion, lower back pain, vomiting, malaise, fatigue and kidney damage. (Merck)	
Mercury	**19**	15	Anaemia, nausea, vomiting, abdominal pain, degeneration of CNS esp. in children. (Duffus) Inflammation of mouth, gums, XS salivation, loose teeth, kidney damage, muscle tremors, personality changes, depression, irritability, nervousness. (Merck)	Readily absorbed via the GI tract. Bioaccumulation and concentration in liver and kidneys, bones, teeth & brain of animals. (Duffus)
Molybdenum	**130**	390	Irritation of eyes, nose, throat, anorexia, diarrhoea, weight loss, listlessness, liver and kidney damage (Merck)	
Nickel	**340**	600	Dermatitis, respiratory disorders, lung cancer. (Duffus) Allergic asthma, pneumonitis. Anticipated to be a human carcinogen.(Merck)	
Zinc	**13 000**	7000	Sweet taste, dry throat, cough, weakness, generalised aching, chills, fever, nausea, vomiting, irritation to mucus membranes, skin irritation. (Merck)	

[4] Flora, S.J.S. and Tandon, S.K. (1987). *Effect of combined exposure to lead and ethanol on some biochemical indices in the rat.* Biochem Pharm 36:537-541.

[5] ATSDR. (1988). *The nature and extent of lead poisoning in children in the United States: A report to Congress*, July 1988. Atlanta GA:US. Department of Health and Human Services, Public Health Service.