Appendix B

Health and Ecological Effects of Coal Ash Contaminants

TOXIC POLLUTANT	HUMAN HEALTH IMPACTS	ECOLOGICAL IMPACTS
Arsenic	• Arsenic is a known human carcinogen (skin, bladder, and lung cancer).	• Arsenic accumulates in freshwater plants and bivalves, where it enters the food supply.
Antimony	• Antimony exposure causes heart and lung problems and stomach ulcers.	• Animals that breathed in high levels antimony have had fertility problems.
Boron	• Short term high levels of exposure can affect the stomach, intestines, liver, kidneys, brain, and lead to death.	• High levels can cause problems in rib formation, testicular pathology, decreased birth weight, fetal cardiovascular problems, and sterility in animals.
Cadmium	• Long-term exposure to low levels of cadmium in air, food, or water leads to a buildup of cadmium in the kidneys and possible kidney disease. • Cadmium is a known human carcinogen.	• Cadmium does not break down in the environment. Binding easily with soils, cadmium infiltrates feeding webs causing mutated births.
Chromium	• Chromium VI is a known human carcinogen. • Chromium VI has also caused stomach tumors in humans and animals	• Chromium can damage fish tissues, increasing susceptibility to infection, and bio-accumulate invertebrates like snails and worms.
Lead	• It can case miscarriages and damage male reproductive organs. • Is a probable human carcinogen, and children, infants, and unborn children are most susceptible and can suffer brain damage, premature birth, smaller birth weight, decreased mental ability, and reduced growth.	• It can also be transferred to an animal fetus through placenta.
Mercury	• High levels can permanently damage the brain and developing fetuses. • Short-term exposure to high levels of mercury vapors may cause effects including lung damage, and increases in blood pressure or heart rate.	• Mercury is easily absorbed through organic tissues and membranes. It easily bio-accumulates as it progresses up food chains.
Selenium	• Animal studies have shown that very high amounts of selenium can affect sperm production and the female reproductive cycle.	• At Belews Lake, selenium cut 20 fish species down to 3, and 2 of those 3 were rendered sterile.
Thallium	• High levels can adversely affect the nervous system (numbness in the extremities), and also lead to vomiting, diarrhea, and temporary hair loss. • Ingestion can impair lungs, heart, kidneys, liver, and even cause death.	• Exposure can reduce fertility and survival rates.

SOURCES: *EPA, 2007 CCW Risk Assessment*; Agency for Toxic Substances & Disease Registry, ToxFAQs, *available at* http://www.atsdr.cdc.gov/toxfaq.html/; World Health Organization International Programme on Chemical Safety: Environmental Health Criteria, *available at* http://www.inchem.org/.