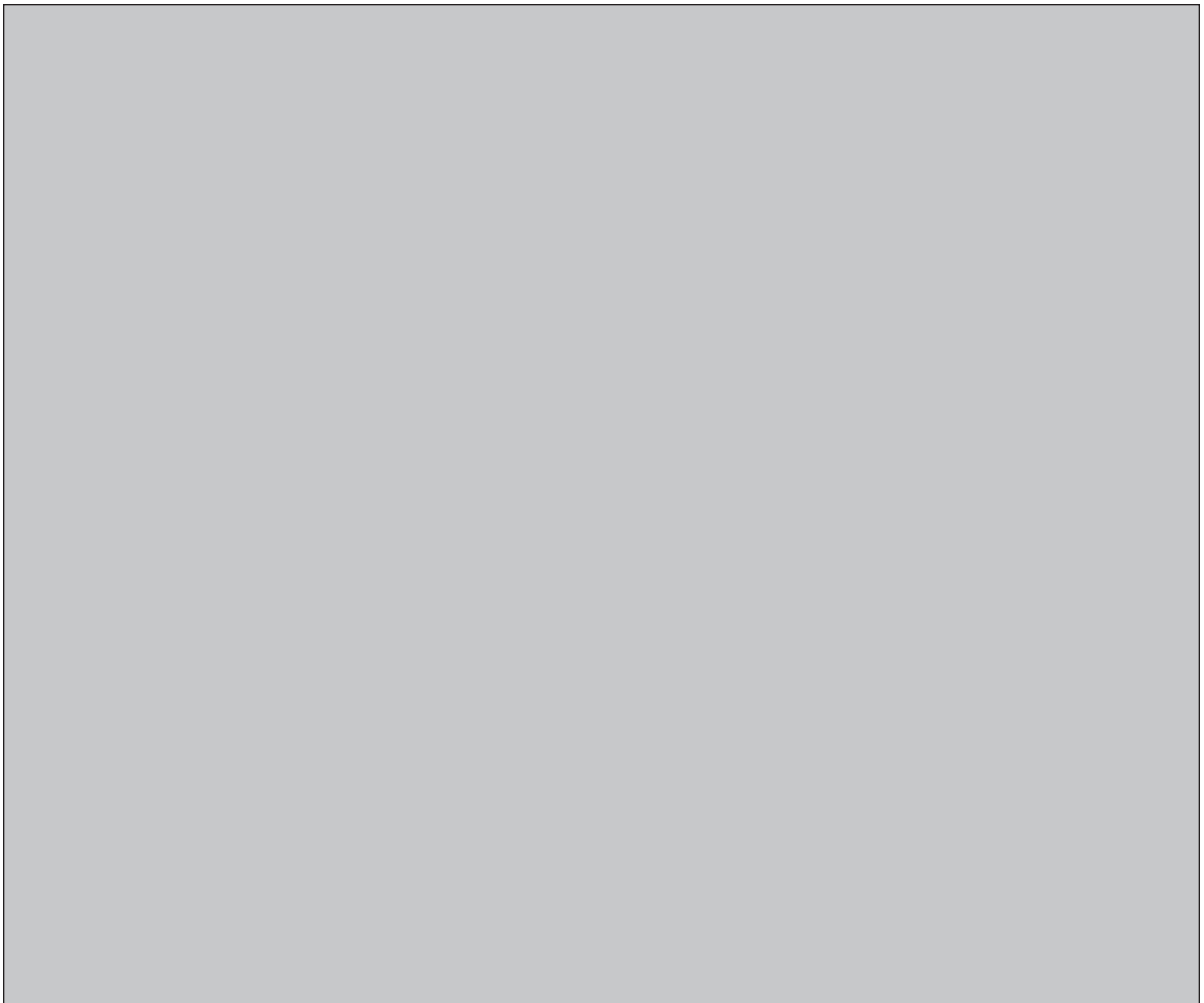


NWMO BACKGROUND PAPERS
4. SCIENCE AND ENVIRONMENT

**4-5 REVIEW OF THE POSSIBLE IMPLICATIONS OF CLIMATE CHANGE ON THE
LONG-TERM MANAGEMENT OF SPENT NUCLEAR FUEL**

EXECUTIVE SUMMARY

Gordon A. McBean



EXECUTIVE SUMMARY

Climate and weather are basic characteristics of Canada and they impact almost everything. There is now strong evidence that the climate is changing and will change at an accelerating rate in the coming century. Despite international efforts through the UN Framework Convention on Climate Change, it is unlikely that atmospheric greenhouse gas concentrations will be stabilized within the next two hundred years. Stabilization of climate will only come after that while the full effects of sea level rise will take further hundreds of years to materialize. Changing climate will bring with it more intense precipitation events, severe winter storms and stronger hurricanes. Lake levels will likely fall while the sea level rises. Groundwater will be impacted through more frequent droughts interspersed with intense rain events. There is a risk of more tornadoes. These weather events will have impacts on all structures and transportation systems in Canada (and around the globe). Risks to above ground storage and transportation facilities for spent nuclear fuels will come from extreme wind and precipitation events. Near-surface, belowground storage will be at risk from effects of changing ground characteristics, mainly hydrologic but also thermal. If ships are used for transportation of spent fuels, the lowering of the Great Lakes will impact on vessel capacity. Sea level rise will impact the facilities at Point Lepreau. These risks will increase over the next few hundred years, requiring comprehensive risk and adaptive management strategies.

Over the next several hundred years, climate could stabilize but in the interim there are risks of rapid climatic changes or discontinuities. These risks become more likely if emissions of greenhouse gases continue at high levels and push the climate system far from that of the past few thousand years. Model studies indicate that the onset of the next ice age will be delayed to beyond the next 10,000 years but it will inevitably come with major impacts on any surface facilities and risks to deep geological disposal.

Climate change is a reality and it brings risks that must be factored into the long-term management of spent nuclear fuel. The scientific basis for the risk analysis is available and with an adaptive management approach, the new knowledge can be factored in as the decades pass.