

Hazard Risk Analysis

Nuclear Failure

Nuclear Accidents

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Nuclear accidents can be caused by nature or by people (human-caused)..

Definition

Nuclear power plants have nuclear reactors that produce heat, which can boil water, drive steam turbines and generate large quantities of electricity. The power plants rely on the process of nuclear fission, which is the ... "splitting of an atom into two smaller atoms, which also yields heat and sends neutrons flying. If another atom absorbs one of those neutrons, the atom becomes unstable and undergoes fission itself, releasing more heat and more neutrons. The chain reaction becomes self-sustaining, producing a steady supply of heat..." Nuclear reactors use enriched uranium for fuel.

A nuclear reactor could malfunction: for example the uranium casings could get damaged or if power is shut off and the reactor is not able to cool the uranium in time, the reactor may leak dangerous radioactive particles. The radioactive particles are very hazardous to human health and are difficult to clean up. "In a worst-case meltdown scenario the puddle of hot fuel could melt through the steel containment vessel and through subsequent barriers meant to contain the nuclear material, exposing massive quantities of radioactivity to the outside world."

As of October 2012, about 15% of Canada's electricity is produced by nuclear power. All of this is produced in Ontario, except for one reactor in New Brunswick.

Discussion

While there have been smaller accidents at nuclear power plants, the world remembers two main incidents: the 3 Mile Island partial meltdown in 1979 in Pennsylvania where some radiation did escape from the plant into the surrounding environment, and the 1986 Chernobyl accident where "a power surge caused an explosion in one of the plant's reactors, releasing huge doses of radioactive fallout into the air" affecting thousands of people.

The recent March 2011 nuclear tragedy in Japan, which affected three of the reactors at Fukushima Daiichi station, was caused by a major earthquake and tsunami. There were explosions from a build-up of hydrogen gas and leakages of radioactive gas and water into the

environment, causing large amounts of contamination. Because radioactive particles can be carried in the air, communities in the path of air currents from a leaking nuclear reactor were at a much greater risk of contamination.

It Happened Here...

On December 12, 1952 the reactor core in Chalk River, Ontario (population 800) was damaged at AECL's NRX reactor causing a Level 5 alert. No immediate fatalities or injuries resulted and a follow-up study of exposed workers showed no long-term health effects.

Hazard Rating		High Risk	<input type="checkbox"/>	Low Risk	<input type="checkbox"/>	Need More Info	<input type="checkbox"/>	Not Applicable	<input type="checkbox"/>
Yes	No	Need More Info	Not Applicable	FACTORS					
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Are facilities that use or make nuclear/radioactive material located in or near to your community?					
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Are nuclear/radioactive materials used in, stored in, or transported through your community?					
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Radioactive materials are sometimes used in healthcare. Is there a nuclear medical facility in your community? If so, have these facilities failed to adhere to the proper handling and storage protocols for any radioactive material, either in the past or currently?					
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	University research facilities may use radioactive materials. Are there any university research facilities that use radioactive materials in or near your community?					
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Military facilities may use radioactive materials. Are there any military facilities that use radioactive materials in or near your community?					
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	If you have a nuclear power facility in or near your community and you are likely to experience a major earthquake, your community is at added risk (unless the nuclear facility has been specifically built to withstand potential earthquakes). Is there a nuclear facility close to your community that is not specially built to withstand earthquakes, and are you in an area likely to experience earthquakes (Refer to the section on Earthquakes)?					

Historical Events – General Information

Please Note: See your Provincial/Territorial Risk and Resilience Information Guides for additional resources, including information regarding your community emergency manager, contact with Aboriginal Affairs and Northern Development Canada, and provincial or territorial Emergency Management Organization (EMO). EMO websites generally provide information specific to the hazards in your territory or province. Band websites or regional Aboriginal community websites can provide more information.

Resources
<p>The “Canadian Disasters - An Historical Survey” website by Robert L. Jones provides a great list of past disasters which have occurred since the 1500s in Canada and have resulted in at least 20 deaths.</p> <p style="text-align: center;">http://web.ncf.ca/jonesb/DisasterPaper/disasterpaper.html</p> <p>Keywords: Canadian disasters historical survey</p>
<p>The Public Safety Canada “Canadian Disaster Database” contains a list of past disasters in Canada.</p> <p style="text-align: center;">http://www.publicsafety.gc.ca/prg/em/cdd/srch-eng.aspx</p> <p>Keywords: Canada disaster database</p>
<p>Wikipedia has a list of disasters in Canada and links to various events; however, it does not have a lot of information about British Columbia.</p> <p style="text-align: center;">http://en.wikipedia.org/wiki/List_of_disasters_in_Canada</p> <p>Keywords: Canada disasters wiki</p>
<p>SOS! Canadian Disasters is supported by Library and Archives Canada, and provides some interesting stories on historical events and also has a great website on an education program (Grades 7 to 12) on understanding hazards and disasters in Canada.</p> <p style="text-align: center;">http://www.collectionscanada.gc.ca/sos/index-e.html</p> <p>Keywords: sos! Canada library archives</p>
<p>CBC Archives have a wide variety of news clips on historical and current disasters in Canada as well as educational information on hazards for teachers. On the CBC Digital Archives webpage, search for “disaster” in their own keyword search bar.</p> <p style="text-align: center;">http://www.cbc.ca/cgi-bin/MT4/mt-search.cgi?search=disaster&IncludeBlogs=777&limit=20</p> <p>Keywords: CBC archives, Disaster</p>

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