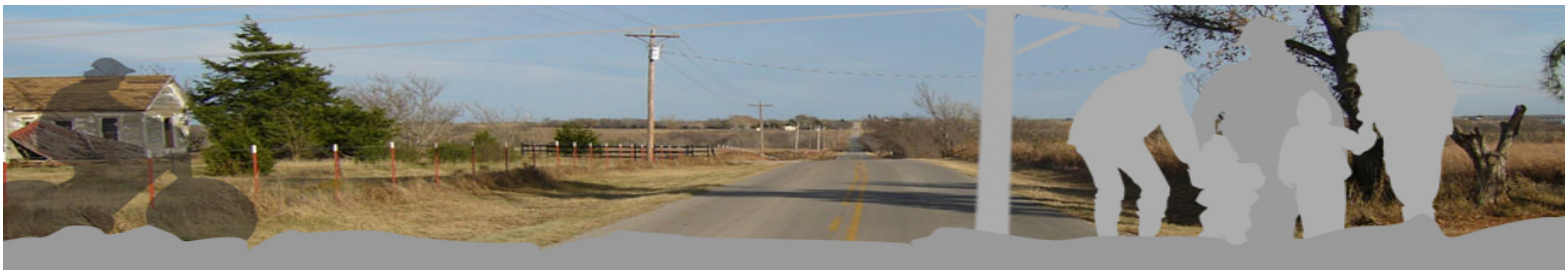

Hazard Risk Assessment

Nuclear Failure

Nuclear Accidents

Nuclear Failure

Nuclear accidents can be caused by nature or by people (human-caused). Resources are available to assist you in completing this assessment in the Risk Assessment Resources section.

Definition

Nuclear reactors produce heat which in turn can boil water, drive steam turbines and thereby generate electricity. They rely on harnessing 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..."[1]

If a reactor malfunctions, or the integrity of the casings which enclose the enriched uranium are damaged, or if power is shut off and the reactor is unable to cool the uranium the reactor may leak dangerous radioactive particles. "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."[2]

Discussion

While there have been smaller incidents in nuclear reactors 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"[3] 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 have been explosions from a build-up of hydrogen gas and leakages of radioactive gas and water into the environment. At the time of writing of this document it remains unclear just how extensive the damage is, or could be. Because radioactive particles can be carried in the air, communities in the path of air currents from a leaking nuclear reactor could risk 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[4]. No immediate fatalities or injuries resulted and a follow-up study of exposed workers showed no long-term health effects.

Risk Rating

The following hazards relates to nuclear facilities.

Nuclear Accidents [5] [6] - Natural and Human-caused

Hazard Rating	High Risk ☐	Low Risk ☐	Need More Info ☐	Not Applicable ☐

Yes	No	Need More Info	Not Applicable	FACTORS
☐	☐	☐	☐	Are facilities that use or make nuclear/radioactive material located in or near to your community?
☐	☐	☐	☐	Are nuclear/radioactive materials used in, stored in, or transported through your community?
☐	☐	☐	☐	Radioactive materials are sometimes used in healthcare. Is there a nuclear medical facility in your community? If so do fail to adhere to proper handling and storage protocols for any radioactive material?
☐	☐	☐	☐	University research facilities may use radioactive materials. Are there any university research facilities which use radioactive materials in or near your community?
☐	☐	☐	☐	Military facilities may use radioactive materials. Are there any military facilities which use radioactive materials in or near your community?
☐	☐	☐	☐	If you have a nuclear power facility in or near your community and you are likely to experience a major earthquake unless the nuclear facility has been built to withstand potential earthquakes your community is at added risk. Is there a nuclear facility close to your community, are you in an area likely to experience earthquakes (Refer to the section on Earthquakes) and has your facility been built (or retrofitted) to withstand an earthquake of the magnitude expected in your area?

References

[1] Scientific American. Retrieved April 14 2011 from http://www.scientificamerican.com/article.cfm?id=nuclear-energy-primer

[2] Scientific American. Retrieved April 14 2011 from http://www.scientificamerican.com/article.cfm?id=nuclear-energy-primer

[3] Scientific American. Retrieved April 14 2011 from http://www.scientificamerican.com/article.cfm?id=nuclear-energy-primer

[4] Nuclear Accidents. Retrieved March 13 2011 from http://en.wikipedia.org/wiki/List_of_civilian_nuclear_accidents

[5] British Columbia (2002). "Biological, Radiological and Nuclear (CBRN) Terrorism Consequence Management Plan." Retrieved February 3 from http://www.pep.gov.bc.ca/hazard_preparedness/terrorism_consequences.html

[6] Centre for Disease Control (2010) "Emergency Preparedness and Response." Retrieved February 19 2011 from www.emergency.cdc.gov