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Meltdown!: The Nuclear Disaster In Japan And Our Energy Future



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Synopsis

Japan. March 11, 2011. 2:46 P.M. The biggest earthquake in Japan’s history - and one of the world’s five most powerful since 1900 - devastated the Tohoku region, 320 kilometers (200 miles) northeast of Tokyo. It triggered a huge tsunami that left crippling damage in its wake. More than 13,000 people drowned, and thousands of buildings and homes were reduced to rubble. As people assessed the damage, they made the most frightening discovery of all: the Fukushima nuclear power plant was seriously damaged and three of its six reactors were heading for meltdowns. Workers tried desperately - but unsuccessfully - to save them. Explosions and fires released radioactivity into the air. Within days the Japanese government declared a 20-kilometer (12-mile) evacuation zone. The future of the plant, the long-term health of those exposed to radiation, and the effects on the environment remained uncertain. Learn more about this massive catastrophe as Dr. Fred Bortz examines both the human tragedy and the scientific implications of the nuclear meltdown. Compare this disaster to similar nuclear events in the United States and in Ukraine, and move ahead with Dr. Bortz as he explores the global debate about the future of nuclear power and alternative sources of energy.

Book Information

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Customer Reviews

My 11 yr old read this book for summer reading and loved it. Very good book to get young minds and adults thinking about nuclear safety and alternative energy options.

Very informative with lots of additional ways to research more information on the subject. Highly recommend for people of all ages.

Here is a summary of contents of this 64-page book.Prologue: Two-page account of events of March 11 1011 starting at 2:46 pm. In Tokyo, office towers sway for six minutes, most cell phone service is out, but the internet is still working to spread text, pictures, and videos about the Great Tohoku Earthquake.1) Earthquake! Tsunami! Meltdown!Two pages explain how collisions of shifting plates in the earth's crust produce earthquakes, with map showing location of Japan near the boundaries of the Pacific, North American, Russian, and Phillippine plates.Six pages explain how preparation for disasters saves lives in Japan, with a map showing the most damaged regions, pictures of the damage, and an illustration showing parts of the DART warning system for tsunamis.Two more pages describe the beginning of the emergency at the Fukushima Daiichi nuclear power plant, with a March 16 2011 photo of the damaged reactor 3.2) Energy from the heart of matterTen pages about the history of nuclear energy start with a diagram showing arrangement of protons, neutrons, and electrons within an atom. Text and photos tell of the roles of Pierre and Marie Curie in studying spontaneous radiation, and of Lise Meitner and Otto Hahn in the discovery of nuclear fission. More text explains how a critical mass of uranium that has a highly enriched proportion of U-235 can explode in an uncontrolled chain reaction, and how pellets of uranium oxide containing only 2 to 3 percent U-235 can be used to build fuel rods which can be used along with rods of a material which absorbs neutrons to produce a controlled chain reaction inside a nuclear power reactor.3) Nuclear reactor successes and failuresFive pages describe how over twenty years after the opening in 1958 of the first commercial nuclear power plant about thirty miles northwest of Pittsburgh at Shippingport Pennsylvania, public confidence in the nuclear power industry was shaken by the meltdown on March 21 1979 of a Babcock & Wilcox pressurized water reactor on Three Mile Island, eleven miles downstream from the Pennsylvania capital city Harrisburg, and how that might have been avoided by proper reporting of a serious problem with a similar reactor in September 1977 at the Davis-Besse plant on the shore of Lake Erie just east of Toledo Ohio.Three pages provide details of the meltdown of a reactor core and related non-nuclear explosions on April 25 1986 at the Chernobyl nuclear plant in Ukraine which led to the spreading of radioactive material over much of northern Europe and still makes the nearby town of Pripyat uninhabitable.4) What went wrong at FukushimaEight pages continue the description of events at the Fukushima Daiichi nuclear power plant begun in chapter 1. Reactor 1 is so damaged by the earthquake that a meltdown cannot be prevented. Reactors 2 and 3 have less severe problems, but the tsunami

knocks out backup generators and washes away their fuel tanks. Workers spray water attempting to cool the reactor cores, but by the fourth day after the March 11 2011 earthquake and tsunami, explosions of hydrogen gas have made continued spraying impossible, and meltdowns have occurred at all three of the seriously damaged reactors. Military helicopters dump giant buckets of seawater onto spent fuel storage pools for reactors 3 and 4 to prevent the spent fuel rods from going dry, catching fire, and releasing radioactive fission products into the atmosphere. The author explains why he ranks the Fukushima disaster as much worse than Three Mile Island, but not as bad as Chernobyl.5) Fukushima and our energy futureFourteen pages include a section explaining how nuclear power could help to slow global warming by reducing the amount of carbon dioxide now added to the atmosphere when coal and oil are burned to produce electricity, but due to rising safety concerns, Germany plans to close all nuclear power plants by 2022, and other countries are scaling back future plans for nuclear power. Pros and cons are then discussed for alternatives such as hydroelectricity, geothermal energy, wind power, solar power, and clean coal. Readers are urged to provide guidance to political leaders in making wise decisions to limit climate change caused by humans, protect the environment, and insure safety of all power plants.Glossary: Two pages with definitions for 36 terms.Source notes: One page providing sources for information found on 14 pages.Selected bibliography: One page listing two books and four websites.Further reading: One page listing four books by the author and seven books by others.Websites: One page listing four websites, including the author's own, plus a source for downloading free, complementary educational resources for this book.Index: One page with two columns of entries.Author's note: One page explaining how the author kept up with news events in Japan and urging readers to consult other sources for a better understanding of the issues that this book presents.

In a book of this size a lot must be left out.I was disappointed that he left out the fact that most of the nuclear power plants in the world were found to need upgrades to rectify deficiencies exposed by the Fukushima events.

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