

# “The Chernobyl Accident; understanding, effects, and the benefits/ drawbacks of nuclear power.”

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## Background

- On April 26, 1986, a power surge during a reactor systems test destroyed Unit 4 of the nuclear power station at Chernobyl, Ukraine... The accident and the fire that followed released massive amounts of radioactive material into the environment. (Kashcheev, 2015)
- The Chernobyl accidents severe radiation effects killed 28 of the site's 600 workers (Kashcheev, 2015)
- A total of 6000 children developed cases of thyroid cancer from drinking contaminated milk related to the spread of radiation among farm animals (Kashcheev, 2015)
- 6 million people in Ukraine, Belarus and Russia were living in areas which were officially designated as 'contaminated'(Beresford, 2016)

## Environmental Impact

- After 30 years, the effects of radiation on organisms at Chernobyl are still not clear. (Beresford, 2016)
- In urban areas open surfaces such as lawns, parks, streets, roads, squares, building roofs and walls became contaminated with radionuclides. (EGE, 2005)
- At present, in most of the settlements subjected to radioactive contamination the air-dose rate above solid surfaces has returned to the pre-accidental background level. (EGE, 2005)
- The radioiodine was rapidly transferred to milk at a high rate in Russia, Ukraine and Belarus leading to significant thyroid doses to those consuming milk, especially children. (EGE, 2005)
- The Chernobyl accident led to considerable contamination of reindeer meat in Finland, Norway, Russia and Sweden and caused significant problems for the Sami people. (EGE, 2005)
- Bioaccumulation of radiocaesium in the aquatic food chain led to significant concentrations in fish, in the most affected areas, and in some lakes as far away as Scandinavia and Germany. (EGE, 2005)

## Nuclear Power Benefits

- In the United States, nuclear energy produces more than 800 billion kilowatt hours of electricity yearly which cuts out 470 million metric tons of carbon yearly (ONE, 2021).
- 470 metric tons of carbon is equivalent to removing 100 million cars off of the road (ONE, 2021). Nuclear fission is almost 8,000 times more efficient than traditional fossil fuels (SPG, 2018).
- Nuclear power plants are more reliable than other energy sources since they run 24/7 and can operate at more than 93% capacity while only having to refuel every 1.5-2 years (ONE, 2021).
- Nuclear industry also creates jobs and helps local economies, contributing an estimated half a million jobs in the United States workforce, \$60 billion to U.S gross domestic product each year, and can employ workers with salaries 30% higher than the local average (ONE, 2021).

## Nuclear Power Drawbacks

- Nuclear energy is expensive to startup since power plant construction costs are high and struggle to bring in new investors (ONE, 2021).
- While the actual production cost of nuclear energy is low, operating costs are high in order to pay skilled workers who maintain the power plant (ONE, 2021; Kuet, 2018).
- Radioactive fission waste (the byproduct of nuclear energy) requires strict transportation, storage, and disposal guidelines otherwise it can kill individuals, and contaminate the environment (ONE, 2021; Kuet, 2018).
- Radioactive fission waste can also be reused as bomb fuel making it a target for terrorists (Kuet, 2018).
- A large scale terrorist attack on a reactor may also be catastrophic causing widespread radiation (Kuet, 2018).
- Accidents like Chernobyl and Fukushima which caused widespread radiation contamination may also occur.



Figure 1. The aftermath of the reactor meltdown (Walker, 2020).



Figure 2. Abandoned Pripyat apartment buildings (Franganillo, 2017).



Figure 3. Chernobyl liquidators (civilian and military personnel assigned with cleanup) measuring radiation levels, (Doyle, 2019).



Figure 4. An abandoned ferris wheel nearby the Chernobyl impact zone

## Conclusion

The catastrophic accident which occurred at the Chernobyl Nuclear Power Plant in 1986 spread nuclear contamination throughout the world. The global scale of the accident created fear and concern regarding nuclear energy. While radiation levels have returned to almost baseline levels pre-accident in the affected areas, the impact on the environment was substantial. Many Chernobyl liquidators and residents of surrounding areas died because of radiation or cancers. The local populations of animals were also affected throughout food chains, even affecting animal populations outside of the radiation zones. However, the Chernobyl accident caused by human failure and nuclear reactor failures is rare; Fukushima is the only other major nuclear accident caused by a tsunami. Besides the expensive start-up costs to build nuclear reactors and the waste produced, nuclear energy is cleaner and more efficient than its counterparts, especially fossil fuels.

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