

1st Place CCCAF Essay

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“Forty Years after the accident at the Chernobyl Nuclear Power Plant in 1986, is the continued use of nuclear power still a worthy option for producing energy?”

Despite the catastrophic accident at the Chernobyl Nuclear Power Plant in 1986, nuclear power remains a viable energy option today. While Chernobyl is often used as evidence of the risks associated with nuclear power, a close examination shows the disaster was primarily caused not by the nuclear technology itself, but by specific engineering design flaws, inadequate safety protocols, poor governance, and policy decisions unduly influenced by political and economic pressures. In the forty years since the accident, important lessons learned from Chernobyl have led to significant improvements in reactor engineering design, safety procedures, regulatory systems, and policy.

The Soviet-designed RBMK reactor used in the Chernobyl Nuclear Power Plant had known instabilities and design flaws from its inception in 1970. The design largely prioritized Soviet military and economic objectives over sound engineering practices, environmental considerations, and safety. For example, the reactor lacked a strong containment structure, allowing radioactive materials to leak directly into the environment. Online refueling, replacing fuel while the reactor remained operational, was also of flawed design. While it eliminated the need for powerplant shutdowns, it introduced safety challenges such as the risk of fuel channel damage or improper sealing during refueling operations, which could lead to leaks and overheating that were not addressed.

Inadequate training and failure to follow established safety protocols also directly contributed to the accident. Poorly trained plant operators failed to properly conduct a thorough safety test on the day of the explosion. These factors collectively demonstrate that the catastrophe was not an inevitable outcome of nuclear power, but rather a likely preventable incident had design and safety been prioritized over external influences.

Design and safety factors aside, the nuclear power industry was and continues to be heavily influenced by energy politics. Historically, fossil fuel industries have shaped public opinion and policy discussions, competing with nuclear energy and other alternatives. Although there is no credible evidence that the fossil fuel industry played any direct role in the Chernobyl disaster, economic competition has contributed to persistent public mistrust toward nuclear technology. This context helps explain why rare nuclear accidents often carry a disproportionate negative impact on public perception compared to the role fossil fuel combustion plays in climate change, air pollution, and global health.

When assessing whether nuclear power remains a viable energy source, the risks must be weighed realistically. Modern nuclear power, when regulated responsibly, can be operated safely and with minimal risk. Decades of advanced reactor designs, safety improvements, and international regulation, including reinforced containment structures, passive cooling systems, and stricter oversight by organizations such as the International Atomic Energy Agency, have kept emissions low and prevented accidents mimicking the scale and nature of Chernobyl.

In summary, the lessons learned from Chernobyl highlight the importance of strict adherence to sound engineering and design principles, safety regulations, and good governance in nuclear energy. Over the past forty years, nuclear power has evolved and been modernized; given the current climatic conditions, it remains a feasible and viable component of sustainable energy strategies.



I am a rising junior at the University of Miami pursuing a dual degree in Marine Science and Biology. I currently work as an undergraduate researcher in a coral research lab and am particularly interested in studying marine pathogens and diseases. I am honored to receive this scholarship, and I am incredibly grateful for the support it provides. -Maren Reid