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Nuclear Power Is Not the Solution

Nuclear power has been hailed as the solution to all of our modern day energy problems. Advocates claim that it is clean, safe, and cost effective. However, accidents like the one at Chernobyl have forced us to take a hard and thorough look at the minefield of nuclear power. After studying the mountains of information about the subject, it is easy to come to the conclusion that nuclear power is not a good source for future energy. Nuclear fission is a poor choice for energy because it is dangerous, expensive, and can easily be replaced by true renewable resources.

First it is important to understand how nuclear energy really works. The underlying principle of a reactor is called nuclear fission, which is when an atom's nucleus is broken into smaller pieces, releasing large amounts of energy in the form of heat (pringle 9). The broken nucleus sends out more neutrons, which collide with more atoms, resulting in a chain reaction. The core of the reactor is made up of fuel rods and control rods. The fuel rods contain pellets of uranium that produce vast amount of heat, while the control rods absorb neutrons and are lowered to stop the nuclear reaction. The reactor heats water until it produces steam, which then turns a generator to produce electricity (pringle 11). A coolant substance, usually water, is cycled through the reactor in a loop to keep the reactor cool. If the fuel rods become too hot they will catch fire and melt, which is known as a nuclear meltdown.

Many people have been told that nuclear power is practically foolproof. However, the nuclear

industry does not have a very strong record when it comes to telling the truth. The AEC, or Atomic Energy Commission, was created to moderate nuclear materials and development. The deception began when the AEC assured the public that radiation from nuclear testing was relatively harmless which, as we know today, is completely untrue (pringle 5). What followed was a series of deceptions and cover-ups by the AEC. For many years no one knew the truth about nuclear energy until the freedom of information act was passed in 1973. Afterwards they were required to release a large amount of documents containing reports of incidents within plants across the nation (pringle 28.) One such file even described how a vat of toxic waste was connected to a plants drinking water supply (pringle 28). No matter what the nuclear industry tells us, there is a mountain of evidence proving that nuclear energy is not nearly as safe as it is made out to be.

Naturally, most people associate the word “nuclear” with “bomb.” While a nuclear reactor could not explode like an atomic bomb, there are many dangers that come with the territory. Of all the accidents that can occur, a loss of coolant accident is the most feared (pringle 20). This catastrophe is exactly as the name suggests; it’s what would happen if for any reason a reactor lost its coolant and there was no way to replace it. The first step if this sort of reaction were to occur would be to lower the control rods and completely stop the nuclear chain reaction. This would not solve the problem at hand, because the fuel rods still produce heat naturally, reaching 4,000 degrees Fahrenheit in just a small amount of time (pringle 20). A little while after that the fuel rods would melt and become a mass of molten radioactive material. This mass would burn its way through the reactor encasement and into the ground, where it would release tons of radioactive steam into the atmosphere. According to a study conducted in 1964, an accident like

this would result in around 45,000 deaths, 100,000 injuries, and 17 billion dollars of property damage over an area the size of Pennsylvania (pringle 21). Imagine how much greater these numbers would be in modern times with bigger, and more dangerous, nuclear reactors.

One of the biggest anti-nuclear arguments other than safety is the issue of nuclear waste. High level waste is generated in the form of spent uranium fuel rods that can no longer sustain a reaction, and is extremely radioactive (Radioactive). Waste like this can stay dangerously radioactive anywhere from ten thousand to more than a million years (Radioactive). Today most of this waste is kept in pools of water called spent fuel pools, until some agreement is reached about what to do with all of it. With more than 63,000 tons of nuclear waste existing in the US, and more being generated every day, we will soon run out of places to put it (Hargreaves). The waste will be stored closer and closer to urban populations, causing health risks for the citizens who live there. The more spent fuel there is just lying around, the greater the chance for an accident to occur.

The biggest part of the nuclear energy cycle that is at risk for attack is spent nuclear fuel. Nuclear reactors have a 50 mile fallout zone, which the major cities of Washington, Boston, New York, Philadelphia, and Chicago all happen to occupy (Hargreaves). All of the spent fuel pools in every reactor are vulnerable to sabotage. A fuel pool consists of spent rods collected in a deep pool of water, which is the only thing that keeps them from overheating. If the water was somehow removed from the pool, the uranium rods would burst into flame and melt, causing “an area the size of half of New Jersey to become permanently uninhabitable” (Hargreaves). Some of the reactors in the US store their spent fuel above ground, which makes them vulnerable to attacks such as a plane crash, like the one that occurred on 9/11 (Hargreaves).

Very few new nuclear plants are being built because of the significant costs involved in producing energy. One of the largest costs within the nuclear cycle is building the plant itself. The price tag on a nuclear reactor has varied throughout the years. In 2008 the Georgia Power Company agreed to build two nuclear reactors for a total price of about 17 billion dollars (Economics). The only nuclear plant that was built in Oregon cost 450 million dollars to construct, which many considered a waste as it was destroyed about 30 years later due to safety reasons (Trojan). On the opposite side of the energy cycle, it costs a large amount of money to decommission a nuclear plant as well. Most nuclear plants are required to be shut down after 60 years of operation (Economics). It can cost upwards of 300 million dollars to destroy a nuclear plant, which in some reactors is more expensive than building the plant itself (Economics). There is also a significant price tag involved in disposing and storing of nuclear waste. In Britain, it cost up to about 308,000 US dollars per cubic meter to dispose of high level waste (Economics). Extra precautions must be taken to shield the average citizen from harmful radiation. Whether by train or truck, the waste must be constantly guarded against potential terrorist attacks. There are costs involved in building and maintaining the many spent fuel pools in plants around the country (Economics). Without a permanent storage facility, which will also cost money to construct, more pools will have to be built, and more money will need to be spent. In all aspects of the nuclear industry, extra safety means extra money.

As the public has begun to realize the dangers of nuclear power, energy companies have to spend more money to convince people of its reliability. More guards to protect waste, reinforced concrete to protect against earthquakes, and more sophisticated security measures all lead to more government money being spent (Economics). There is a huge cost to be considered when

all that safety fails. It can cost a lot of government money to clean up a nuclear accident. Nuclear accidents like the one at Chernobyl also make people less likely to welcome a reactor into their neighborhood, making it more difficult and expensive to find potential plant sites (Economics).

Nuclear reactors can easily be replaced by true renewable energy sources. The Fukushima nuclear disaster of 2011 took out 11 of japans nuclear reactors, while no damage was caused to the nations several wind farms (Thomas). Obviously, renewable energy is much safer than nuclear power. Solar farms can't cause radiation sickness, wind farms won't melt and cause irreparable environmental damage, and hydroelectric power doesn't produce radioactive waste. Experts may claim that nuclear power is more a more reliable source of energy. The problem with this statement is that the wind will always blow and the sun will always shine. We just haven't invested enough money to truly tap into the huge amounts of energy available.

Renewable energy is also much easier to produce than nuclear power. Nuclear plants can take more than a decade to complete, and have a history of construction delays (Thomas). By comparison, small wind farms can be built in just a few months, and larger farms are completed in less than a year. Solar farms are typically completed within a few months (What.) If more money was invested into renewable energy, and more conservative energy practices were used, renewable energy could easily overcome the electricity produced by nuclear power (Thomas). In 2011, the US invested about 50 billion dollars in renewable energy sources (Macguire). While this is an impressive number, compare it to the 64 nuclear plants in the US, some costing more than 10 billion to build, plus insurance and maintenance cost (Economics). If all the money that is being spent on nuclear energy was funneled into renewable energy, the amount of electricity produced would be more than enough to compensate for the loss of nuclear.

One of the arguments promoting the use of nuclear power is that it is one of the most promising renewable resources. There's one big problem with this statement, which is that nuclear energy is not actually renewable. In the process of creating energy uranium is used up, and there is a finite supply of uranium in the world, which makes nuclear energy completely non-renewable. Nuclear waste can be reprocessed to produce more usable uranium, but very few power companies choose to do this because of the large cost and little benefit (pringle 85.)

Advocates of nuclear energy like to insist that reactors cannot be used to create nuclear weapons. While the reactors themselves can't be used as a weapon, the spent fuel they produce can. When spent fuel is reprocessed it can produce atoms of uranium-235 and plutonium-239, both of which can be used to make a nuclear weapon (Nuclear). Global governments have realized this threat and stepped up their security, but in this case it's not enough. Between the years 1980 and 1981, the US government found that 55 pounds of plutonium and 159 pounds of uranium had gone missing (Nuclear). While security measures have evolved since then, so have criminal technologies, and it is perfectly feasible for an organization to steal enough radioactive material to sell to rival countries. It is also possible for a country to open a power plant for "peaceful" intentions, and use it to make weapons-grade uranium instead. A good example of this is North Korea, who recently announced plans to reopen their decommissioned nuclear plant, one that they had used to produce 6-8 bombs worth of plutonium (North).

Another one of the pro-nuclear arguments is that it is a "clean" source of energy. In fact, the American Nuclear Society claims that "Nuclear reactors emit no gasses during operation" (Top). This is an ingenious way to put it, since it's true; however, there are large amounts of CO2 involved in other aspects of nuclear energy. It takes heavy machinery to mine and transport

uranium ore by truck (Kimble). In a refinery, uranium ore is ground into dust, treated with chemicals, and trucked to the power plant. All the steps of refining uranium ore require the release of carbon dioxide (Kimble). There is also carbon released in vast amounts during the construction of a nuclear plant. The trains and trucks that transport spent nuclear fuel let out carbon dioxide into the atmosphere as well (Kimble). Nuclear power is not as clean of an energy source as its advocates would like to believe.

Many people of the modern age wish to see a "nuclear comeback." It's obvious after even just a little research that a nuclear comeback could be one of the worst things for the US, and other nations around the world. Nuclear power is not a good source of energy for the future because it is dangerous, expensive, and easily replaced by other clean energy sources. It would be a much better idea to save the money that we be sucked into the nuclear energy process and spend it on cleaner and safer renewable energy. People often say that if mistakes aren't made, there is no way to learn from them. If that's true then it's time to learn from the mistakes of Chernobyl and Fukushima, as well as the many other nuclear accidents that have occurred, and get rid of nuclear energy for good.

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