The Consequences of Nuclear Technology

By: Myles Scollon

Student#: 301186623

Tutorial Session: D101

**Abstract**

*The benefits of Nuclear technology outweigh its detriments, this is supported by the technologies used in the fields of medical science and treatment procedures as well as in the development of new types of clean and more energy efficient power production. Nuclear research has also lead to better understandings of basic particles in our world causing dramatic changes in the way matter in perceived. Counter arguments to nuclear technology argue that environmental and destructive implications are far too severe, but these can be proven false by stating evidence to the contrary with the advances in modern safety procedures and techniques.*

Nuclear Technologies have become a major part of modern research and medicine but has always been subject to ridicule due to its destructive potential as a weapon of war and its environmental impacts. Nuclear technology is in fact a much broader field covering material such as medical applications and power production all involving the use of radiation and radioactive materials. As a result of research into nuclear technologies such benefits as advanced medical imaging and treatments, new understandings of subatomic structures and their components, and new forms of clean power have been developed. These support the ideal that the benefits of Nuclear Technology outweigh its detriments.

Firstly is the impact it has had on medical treatments, as a beneficial partner. Many medical conditions were undetectable as there was no method of accurately observing internal structures of patient’s bodies. Methods such as x-ray were only effective for viewing damages and growths that occurred with respect to bone mass. As knowledge of radioactive materials improved however, it became possible to image the entire body by using cameras which could capture images of the radiation from these materials which could be ingested by patients. There were also many conditions such as cancer that couldn’t be effectively treated and would claim many lives as a result. Cancer - as an example - could be removed surgically but because cancer cells can move through the blood stream, the patients could re-develop cancer elsewhere. After research into radioactive chemicals, it was found that radioactive particles could be injected into the body and would destroy the cancer cells all throughout the body which in addition to surgery could cure the patient with a much higher success rate than previous treatment.

Secondly, the technology has a profound effect on how we understand matter. Many of our understandings of how an atom is structured either resulted from experiments with nuclear technology or from the initial research that lead to nuclear technology. It allowed for the discovery of vast amounts of data regarding matter such as its mass, size and shape. Mysteries such as what the sun and the planets are composed of were finally answered and in addition, information on how matter was created has be revealed; It also opened the doors to new forms of research which can develop new forms of power production and metallurgy which are much more efficient than current standards; New experiments are being conducted which are altering previous understandings that were thought to be correct and absolute, all of which would be impossible to without this technology.

Third is its creation of ‘green’ energy. New forms of power production that are not only cleaner but are also more efficient at producing power can be created using the same nuclear technology as used in the first nuclear weapons. These reactions could be harnessed to produce electricity while producing no greenhouse gasses and a small amount of nuclear waste which can then be safely stored underground. This method also produces much more power than coal plants and doesn’t require vast pit mines used to extract coal which leads to major ecosystem changes for many animals. As a result, land can also be repurposed to be farms or be reclaimed as forests helping to correct environmental damage.

Lastly are the arguments against this technology. Many argue that nuclear technology is to dangerous due to, not only its use as a weapon, but that even the risks involved in nuclear power are too great. Many feel that nuclear power is too dangerous for the environment and not worth the costs or the security risks associated with these plants. These environmental concerns are towards the storage of the nuclear waste that is created by these plants, which can take thousands of years to safely ‘decompose’, the argument is that this waste cause damage to the area around where it is stored and are costly to watch over. However these waste materials are – as of modern standards – now stored is facilities that are much more environmentally protected and developed to be easily maintained by very few staff resulting in much lower costs than previous storage methods.

Another Environmental concern is for the possibility of a meltdown in a reactor. This concern arose as a result of three incidents involving nuclear reactors, the worst of which was the Chernobyl incident near the town of Prypait in 1986 when a reactor melted down during a systems test. Disasters such as this can leave the surrounding area uninhabitable and cause long term health damage to the environment. Those against nuclear power fear that the risk for current reactors to meltdown is too high to merit their continued use. But these disasters were a result of improper operating practices, improper training and inefficient design due to the naivety of those who owned and operated the reactors. Modern practices however have made the probability of future nuclear disasters relatively small and in the result of a natural disaster or an attack on these facilities there are many safeguards in place which are designed to either remove or dramatically reduce the chance of a catastrophic disaster.

As with all new technologies there is always a length of time after its development where problems will arise and be addressed, but that doesn’t necessitate a need to dispose of the technology as solutions to these problems can be readily found making the technology much safer. It is important to remember this with all new technologies as humanity furthers itself into the future with new technologies in industry and in medicine as new discoveries will always be made.