Nuclear Technology Essay

In our world today, nuclear technology has become one of the top public topics being discussed through mass media. Nuclear technology involves the reactions of atomic nuclei. It has been used in different areas of our lives, from food and to the environment around us. Nuclear technology has become a major part of life in many nations. The use of nuclear technology for civilian and military use is a highly controversial issue. Of course, debates and discussions have been going on about the benefits of nuclear technology. Is it advancing our world? Or a destroyer? Nuclear power, nuclear weapons and medical applications are three examples of nuclear technology that have been highly debated on between their pros and cons.

Today, nuclear power has become one of the most advanced technologies. It is a major source of energy, produced by harnessing the power of the atom and the sun and stars are sustained by nuclear reactions. Nuclear reactors are used in dozens of countries to generate electricity. Only 30 years ago, nuclear power was a futuristic, exotic technology and now, it is one of the largest sources of electric power for many countries. "Presently nuclear power meets 15% of the world's energy needs and there are over 400 nuclear reactors in the world" (Buzzle.com). However, some may argue the beneficial use of nuclear power as nuclear power is widely perceived as a dangerous technology. Nevertheless, there are some advantages and disadvantages of the use of nuclear power.

Nuclear power is the world largest source to emission-free energy. Nuclear energy plants produce electricity by the fission of uranium, not the burning of fuels. As a result, nuclear don't pollute the air with sulfur oxides, nitrogen oxides, dust or greenhouse gases like carbon dioxide. Therefore the contribution of nuclear power to global warming is relatively little. "Data has shown that between 1973 and 2002, nuclear power has saved the pollution of 74.5 million tons of sulfur dioxide and 37.7 million tons of nitrogen oxides" (Nuclear – Advancing or Destructive). Furthermore, nuclear reactors not only preserve the Earth's air and climate due to global warming, but they also prevent acid rain. Therefore, well-operated nuclear power plants do not release contaminants into the environment. Not only that nuclear power are practically greenhouse gas emission free, "the waste that nuclear power produce is about 3.5 million times smaller than the leading energy source for United States: coal" (Nuclear – Advancing or Destructive). As reported nuclear energy does not produce any emissions, and if all electricity sources are provided from nuclear reactors, this will definitely be the solution to the global climate change, and possibly the meltdown of the polar icecaps.

Despite the environmental benefits, there are also some economical impacts of nuclear power. "Nuclear power costs only 1.68 cents per kilowatt-hour, while for coal it costs 1.80 cents per kilowatt-hour, oil was 4.39 cents and gas was 6.08 cents" (Nuclear – Advancing or Destructive). Therefore, from this, it is clearly shown that nuclear power costs way less than the others, while it is an environmentally friendly technology and it has more possibility of generating a high amount of electrical energy in one single plant. A single nuclear reactor can produce a substantial amount of power. A nuclear reactor produces much more power per unit weight of nuclear fuel than conventional energy sources like coal and oil. There is also a close and continuing connection between economic growth and electricity supply. Referring to the US economy, its economic growth has been fueled largely by electric power. "The U.S. economy grew by 50 percent while electricity use grew by 58 percent between 1973, when the nuclear energy plants were first operated, and 1990. The population has grown from 211 million to almost 250 million since 1973

as well. Nevertheless, 95% of the electric supply comes from nuclear power." (Nuclear Benefits). Therefore, from these statistics, growing reliable supplies of electric power to meet the needs of the population is a "must" to keep the economy strong.

On the other hand, there are also some disadvantages of the use of nuclear power. These include the radioactive wastes, nuclear radiation which may lead to some nuclear accidents. As energy is produced from nuclear fission, the products of fission reactions are often radioactive isotopes. Therefore, safety issues must be seriously addressed. Radioactive products of fission must be handled carefully so they do not escape in the environment releasing nuclear radiation. Nuclear radiation can cause damage to living tissues in human bodies, as it harms the cells of the body which can lead to serious cancer, disease or genetic mutations. These illnesses can appear or strike people years after they were exposed to nuclear radiation and yet, they could not be thrown away like regular garbage. Furthermore, during the operation of nuclear power plants, high radioactive wastes are produced and the wastes are extremely dangerous and it has to be carefully looked after for several thousand of years. Currently, many nuclear wastes are stored in special cooling pools at the nuclear reactors. Despite a generally high security standard, accidents can still happen. It is technically impossible to build a plant with 100% security. A small probability of failure will always last. The consequences of an accident would be absolutely devastating both for human being as for the nature. The more nuclear power plants and nuclear waste storage shelters are built, the higher is the probability of a disastrous failure somewhere in the world. Some past nuclear accidents that happened was firstly, the Three Mile Island in Pennsylvania when the cooling system of a nuclear reactor failed. Radiation did escape which forced thousands of people to run away. Luckily, it was solved and there were no deaths. However, in 1986, a much worse disaster hit Russia's Chernobyl nuclear power plant. "In this incident, Reactor 4 only let out 3% of its core into the atmosphere and a total of 210,000 people had to evacuate their homes as hundreds of thousands of people were exposed to the radiation, and the worse case, several dozen died within a few days and some thousands may die of cancers induced by the radiation in the upcoming years." (Nuclear – Advancing or Destructive). These two were the most significant reactor disaster known as meltdown.

Perhaps, what humans have heard the most today, and feared the most are nuclear weapons. Nuclear weapons are explosive device that release its destructive force from nuclear reactions. Nuclear weapons had made nuclear power terrifying. It created a time where humans lived in constant fear of their lives, as they and their families and all they knew could be destroyed with a few warheads. The technology used for generating nuclear power can also be used to produce nuclear weapons because of the radioactive wastes. Types of nuclear weapons may include atomic bombs which produce its explosive energy through fission reactions, and hydrogen bombs and thermonuclear bombs produces large amount of its energy through nuclear fusion reactions. Nuclear power plants as well as nuclear waste could be targets for terrorist attacks as well. This type of terrorist act would have catastrophic effects for the whole world. These nuclear weapons can destroy the Earth as now, the nations of the world have more than enough nuclear bombs to kill every person on Earth. In the future, no one will know what is going to happen. What if there is going to be a nuclear war? What if terrorists got their hands on nuclear weapons? And What if nuclear weapons were launched by accident? These questions still remain as a mystery.

Although nuclear technology can caused thousands of lives lost due to nuclear weapons, it can also save thousands of lives at the same time through medical applications. The medical

applications of nuclear technology are divided into diagnostics and radiation treatment. Nuclear medicine is the medical specialty that involves the use of radioactive isotopes in the diagnosis and treatment of disease. With the radioisotope being introduced into the body through injection, it then takes up by different organs. From this, it is then possible to recognize the presence, size and shape of various abnormalities in body organs. One of the most common instrument used for imaging are x-rays. Radiation therapy gives treatment for cancer with beams of high-energy radiation such as gamma rays or X-rays. Radiation therapy damages cells by destroying the genetic material that controls how cells grow and dived. While both healthy and cancerous cells are damaged by radiation therapy, the goal of it is to destroy as few normal, healthy cells as possible. It is often used to treat any type of cancer. "With nuclear diagnosis or therapy, it benefits 1 of every 3 US hospital patients" (Benefits)

Overall, there are still quite a few more examples of nuclear technology that could be an advantage or a disadvantage to our world such as industrial, commercial applications and food and agriculture processing. However, after analyzing the advantages and the disadvantages of nuclear power, nuclear weapons and medical applications, I believe that nuclear technology has brought more advantages to the society than disadvantages. Because of nuclear power, we have electricity that is used to light the homes of millions of families, we can help stop and reduce global warming and the economy growth of nations has increased. Because of medical applications, people are able to detect cancer earlier. Because of radiation therapy, those ill patients now have a hope to live on with their lives. Although nuclear power may emit nuclear radiation and radioactive wastes as mentioned, however, I believe that these all can be prevented through further advance technology because in our world today, radioactive wastes has mostly been stored safely in special areas already. And yes, nuclear weapons is the major threat to our society, however, nuclear weapons have also been used for testing purposes, but in order to stop the spread of nuclear weapons through the globe, resolutions has to be passed through the UN, laws has to be created and with these, less to even none lives will be lost with nuclear weapons attack. And this is possible to do. After all, can you imagine a life without electricity? Our world being destroyed because of global warming? The amount of people losing their hope in living without radiation therapy? Just imagine, without nuclear technology, we will not have the life we are having right now.