Nuclear power advantages and disadvantages

ASSIGN BUSTER

The title question of my case study is: ‘ Should Nuclear Power be Banned’. I have chosen this question as I believe it is a key topic at this present moment in life, with a lot of information about it in the media, such as on the news and in the papers each day. Also it is something that will affect the life in which we live in the future. So because of these reasons it is something that people need to be aware of and need to actually understand what nuclear power is and how it is affecting us or is going to affect us in the years to come.

Evidence for:

‘ One major problem that could occur with nuclear power is that there is always the risk that there could be a leakage’ of radioactive fluids, which will have a massive impact on the environment and its surroundings. These radioactive fluids that may leak from the power stations can cause cancers and very harmful illnesses in humans. So for this reason people will believe that yes, nuclear power should be banned, especially those people living around or near a nuclear power station, or those that have close relatives that may be affected if something like this were to happen.

-I think that this is a reliable piece of information as it is a very valid reason, and can be found elsewhere on the internet, on various other sites which proves to us that other people are also using this information as evidence for their arguments, so we should as well.

Evidence against

A reason against banning Nuclear power is that ‘ it provides a lot of our energy sources’, and can be used to generate electricity and to power ships,

so therefore we need nuclear power to continue doing these things, and if we were to get rid of it then we would only have to resort to finding another way of providing this energy, which is only going to cost even more money, on top of what we'd already be paying to get rid of the nuclear power plants that exist at this moment in time.. Without the use of the ships that are powered by the nuclear power, we would have a lot of difficulty in transporting goods such as food and material from one place to another.

(http://uk. answers. yahoo. com/question/index? qid= 20090121112744AAxRJTv)

25th September 2010, 10: 30.

– I think that this is a genuinely reliable source of information in the respect that it is a reasonable argument for why we shouldn't ban nuclear power. Although this may also be seen as not so reliable as it is written by a member of the public, someone that may not have a lot of knowledge on the topic, but has heard bits about it. Besides that fact, I agree with this argument against banning nuclear power so therefore am going to use it as evidence in my case study.

SCIENCE BEHIND NUCLEAR POWER

Nuclear power is made and generated by using Uranium. Uranium is a metal that is mined in various different parts of the world. Most on world's Uranium is mined from Australia, Canada and Kazakhstan.

The first ever large-scale nuclear power station was opened in 1956, in England in the city of Cumbria at a place called ' Calder Hall'.

There are a number of military ships and submarines that contain nuclear power plants as their engines in order for them to keep up and running.

Nuclear power produces approximately 11% of the world’s energy source and can produce very large amounts of energy from only a small amount of fuel. As well as this there isn’t all the pollution along with it like there is when you burn fossil fuels.

(This can therefore be seen as an argument against banning nuclear power plants as there is the burning of fossil fuels that is taking place which are producing greater amounts of pollution than what nuclear power stations are giving off.)

The equation above shows us what happens in a nuclear power plant and the stages in which it goes through before it reaches our homes and provides us with the energy sources that we use in everyday life.

It is in the ‘ Nuclear fission’ where the Uranium is used, this starts off the process for nuclear power to be generated. ‘ Nuclear fission is the process of atoms splitting’, so when a heavy nucleus such as Uranium splits into two smaller, lighter nuclei. In this reaction, the ‘ strong nuclear force’ which is the attractive force, is acting on the ‘ electrostatic force’ which is the repulsive force, these can be knocked out of balance on each other when they gain the energy from either a photon or a neutron. The two forces are affected by the gain of this other element and will try to act on each other to regain the state in which they were in, but in nuclear fission the ‘ electrostatic force’ will gain more power than the ‘ nuclear force’, therefore

causing it to repel and for the nucleus to split apart, also releasing energy as it does so.

To make this slightly easier to understand, imagine a load of marbles in a rough circle shape on a flat tabletop (this is going to be representing the original atoms nucleus, where all the forcing are acting the same on one another and are equal, so all the marbles/atoms are stable). ‘ What if I were to then throw or roll another marble into this group of stable marbles?’ All the marbles would spread apart and move out into the space around them, this marble that is being rolled into them is acting as the photon or neutron that is being gained in the nucleus. This is unbalancing the forces and causing the atoms to all move around as they react to the change that is taking place, but seeing as all the marbles move out, and away from each other shows to us that the repelling force has gained more control, as the attractive force wasn’t able to keep them all together, and this is exactly what happens in nuclear fission.

(http://library. thinkquest. org/17940/texts/fission/fission. html)

(http://physics. about. com/od/glossary/g/nuclearfission. htm)

Both of the sites above were visited on the 30th January 2011, 15: 15.

-I think that both of these sites are reliable sites to use as evidence in my case study, and one of them is a site specifically focusing on physics topics and gives very scientific definitions to certain topics involved in physics. Also the other site is made by university students, that did a study on nuclear fission and how it takes place, they then put all their information together on

this site for other students to look at and use if they need the information required. I have combined the information from both websites to give an overall example of how nuclear fission takes place and what it involves.

Nuclear power that is made by Uranium is not renewable, this means that once we have dug up the Earth’s supply of Uranium there will be no other way of getting any more, so once it’s gone it’s gone.

There are several advantages and disadvantages to nuclear power these include:

Nuclear power costs roughly the same amount as coal, so in that respect it’s not too expensive, so this is an advantage.

Although, millions of pound has to be spent each year to supply the safety that is required in a power plant, this is because if they were to take the chance and something went wrong like a nuclear accident, then this would result in a major disaster.

The making of nuclear power does not give off a smoke or carbon dioxide, so therefore we can be sure that this is not contributing to the greenhouse effect that is causing global warming, unlike the burning of fossil fuels which do contribute to this, so this then puts nuclear power at an advantage.

Also, as mentioned previously, huge amounts of energy can be made by just a small amount of fuel. With only small amounts of waste being produced, once again putting nuclear power at an advantage.

Saying that, although there isn’t much waste being produced, that that is produced is extremely dangerous and would have to be stored, ‘ sealed up and buried for thousands of years to allow the radioactivity to die away’. During this time it has to be kept far away from any potential natural disasters such as Earthquakes, Volcanic eruptions, flooding and terrorist attacks. This can be very difficult at times.

Another disadvantage is that in the 1990’s was ‘ the fastest growing source of power in most of the world.’ However, in 2005 this then deteriorated to being the second slowest growing source of power throughout the world.

(http://www. darvill. clara. net/altenerg/nuclear. htm)

30thJanuary 2011, 17: 00.

-This is a website purely based of evidence for and against nuclear power, and its advantages and disadvantages, it has lots of information solely on nuclear power, which makes it a reliable source of evidence to be used.

There are many different reasons and opinions to why people think nuclear power should be banned, some of which are due to things that have happened previously, and if were to happen again could cause a massive uproar throughout the world. Others are what people are scared could happen, and because of this they believe that nuclear power should be banned.

Here are some examples of previous accidents that have happened involving nuclear power, which could be a reason influencing peoples decisions on whether or not this should be banned:

“ March 28, 1979

Near Harrisburg, Pennsylvania, America’s worst nuclear accident occurred. A partial meltdown of one of the reactors forced the evacuation of the residents after radioactive gas escaped into the atmosphere.”

The radioactive gas that got released into the atmosphere is a cause to cancer in the human body, and as we all know, cancer kills very easily! It may take 20 years or so, for the residents to even realise that they have cancer, as it takes time to affect and the gas in the atmosphere lingers for years.

“ April 26, 1986

The world’s worst nuclear accident occurred after an explosion and fire at the Chernobyl nuclear power plant. It released radiation over much of Europe. Thirty-one people died in the immediate aftermath of the explosion. Hundreds of thousands of residents were moved from the area and a similar number are believed to have suffered from the effects of radiation exposure.”

As you can see already from this 31 innocent people died from a nuclear power accident, that’s hundreds of people left without a family member, and what if this was to happen again, but this time it could be even worse, and possibly even more people killed. Also from this event, thousands and thousands of people were once again exposed to the radiation which can cause cancerous cells in our bodies, which could lead to a number of deaths

years down the line, all from this one accident that happened because of nuclear power.

(http://www. atomicarchive. com/Reports/Japan/Accidents. shtml)

25th September 2010, 19: 30.

-This website is a university website, which is very factual and all its points appear to be logical and true, also the fact that it’s scientists writing the points and information only gives us more reason to believe it’s true and reliable.

Many risks are taken when using nuclear power, there is always the risk of a meltdown occurring, or even a leakage of radioactive waste. There is also a risk to the workers safety and well-being as storing waste from nuclear reactors can be a problem in some cases. A nuclear meltdown is when the cooling systems fail, and the nuclear reactors reach such a temperature that they melt straight through the reactor or damage the reactor wall. With this melting, then allows the spread of radioactivity, which as before can cause great damage in the human body. There is also the chance of contamination within the environment if there was to be a leakage of radioactive waste in that area. Radioactive waste, if gotten into the workers at a nuclear power plant, can also poison them, which furthermore, would take their life.

On the other hand, there are also many reasons as to why people believe that nuclear power shouldn’t be banned, some of which are listed below;

“ Nuclear power generation does emit relatively low amounts of carbon dioxide (CO2). The emissions of green house gases and therefore the

contribution of nuclear power plants to global warming is therefore relatively little.

This technology is readily available; it does not have to be developed first.

It is possible to generate a high amount of electrical energy in one single plant.”

(http://timeforchange. org/pros-and-cons-of-nuclear-power-and-sustainability)

28th October 2010, 17: 35.

-I think that this is a reliable website to get information from as it is based on the ‘ pros’ and ‘ cons’ of nuclear power, and what needs to be done to make a change, and what needs to stay the same. It cannot be edited or changed by anyone other than the creators, and the creators are have done a lot of research to make the website to the high standard of what it is now.

In 2005, approximately 6. 3% of the earth’s energy supply relied on nuclear power, and gradually over the years, this has increased slightly to 14% in 2009. It also provided 15% of the world’s electricity in 2005 and again in 2009. If we were to ban nuclear power then there would have to be other ways in which this supply of electricity was formed, and therefore more money is going to have to be spent out in order for this supply of electricity.

As you can see from the statements above, it clearly states that nuclear power can generate a lot of electrical energy in just one single plant, and with there being 440 plants across the world; this would cost an awful lot of

money to get rid of and then replace the energy and electricity in which it supplies us with.

Nuclear power also provides for ships and submarines, which we need to transport food and goods from country to country, without these ships we would have to find another way of transporting the items, say if we were to use a plane for example, then this would only be adding to global warming which is another issue known world-wide.

(http://www. world-nuclear. org/info/inf01. html)

27th September 2010, 18: 35.

-I believe this graph to be a reliable source of evidence as it is from a website specifically focused on the use of nuclear power all over the world, in various different countries. Also it is not biased in any way, and it completely based on facts and figures rather than opinions, so therefore this is a reliable piece of information to be used in this case study.

As you can see from the graph above, most of the large MEDC (More Economically Developed) countries reply on nuclear power as a source of energy and electricity. Although there are other ways of them getting their energy supply, with the loss of nuclear power, they would only have to increase one or more of their other supplies in order to make up for what they have lost from the lack of nuclear power.

“ SHOULD NUCLEAR POWER BE BANNED?”

Taking into account both sides of the argument, we can see that there are many reasons for nuclear power being banned, just as well as reasons for

nuclear power to not be banned. The main reason that people believe nuclear power should be banned is that there is always the risk of a spillage of nuclear gases, or a leak in the power stations, which would have a great impact on humans health. The main reason as too why nuclear power shouldn’t be banned is that it provides a huge amount of the world’s energy and electricity source.

As you can see from the ‘ for’ and ‘ against’ arguments on the previous pages, I think that overall the benefit of nuclear power outweighs the risk so therefore nuclear power SHOULDN’T be banned, and I think this because…to get rid of all the nuclear power stations over the world would cost an awful lot of money for the governments and that’s money that could be put to a better use elsewhere. Also after paying out to get rid of the nuclear power plants throughout the earth, we would then also have to pay for other methods of providing the electricity and energy resources that these plants provided, it would be easier and more efficient to just spend the money into finding more ways in which we can prevent a leakage at a power plant and how we would handle such a situation, if another one were to occur. Nuclear power plays too big a role in everyday life, we just take it for granted and don’t actually realise how much we do rely on it.

Furthermore, as for the number of deaths that have occurred from nuclear power accidents; there are so many things nowadays that could kill people, we just try not to look at them in that way, for instance there could be a massive pile-up on a motorway and kill a numerous amount of drivers, passengers and general citizens, but that doesn’t mean that people are going to stop driving does it? So why should nuclear power be banned

because of the risk of there being a fault that could cause deaths among humans? The workers in nuclear power plants, are fully aware of the risks they take every day and the risks of the radiation, but safety measures are in place to protect these workers from getting harmed, and they are trained of what to do in the case of emergency, so therefore it’s entirely down to them to do the job or not, at no point are they being forced to work under such conditions that are putting themselves at risk.