Benchmark III

Ever since the Hiroshima and Nagasaki bombings in August of 1945, the world has been curious, but yet, at the same time, terrified of the disastrous effects of nuclear weaponry. With the passing years of those fateful days in Japan, nuclear weapons have become more and more controversial around the world. For the duration of the Cold War, the United States and Russia had the most nuclear weapons in history (about 70,000) [1]. During that time, "nuclear weapons had the perverse effect of making the world a relatively stable place" [2]. However, in present times, this theory is no longer the case.

Nuclear weapons and disarmament have become two of the most debated, discussed, and harassed issues of the twenty-first century. There are many constant events and concerns troubling world officials and citizens about the weapons themselves and, more importantly, whose hands they will fall into and how it would affect the human race if the wrong persons gained possession of the weapons, such as terrorists. "There are several possible ways that terrorists could obtain nuclear weapons, such as manufacturing, purchasing, or stealing them. A particular concern is that terrorists might acquire highly enriched uranium and use this fissile material to make a simple explosive device" [3]. One terrorist organization of notable authenticity is Al Qaeda. It is believed that Al Qaeda and its comrades, if possible, "will resort to nuclear terrorism" in order to achieve "its ultimate goal of establishing Islamic law throughout the Muslim world" [4]. In June 2008, an article in The Times composed by a group of authors referred that terrorist organizations such as Al Qaeda and other groups affiliated with them today "may be trying to obtain nuclear material to cause carnage on an unimaginable scale", and that if equipped with devices, these linked groups might put forth "little hesitation in using weapons of mass destruction to further their own nihilistic agendas" [2]. Al Qaeda and others connected to them have already been "known to recruit scientists, engineers, and other specialists with the skills needed to improvise nuclear, chemical, or biological weapons" [5].

The recent uncovering of the proliferation network run by Pakistani nuclear scientist A.Q. (Abdul Qadeer) Khan has raised many worries about his possible involvement and purveying of "designs for nuclear weapons [6]" and "uranium enrichment equipment [7]" with other countries, including North Korea and Iran. Khan's newly developed release from house arrest (brought on by his crime) by Pakistan officials has aroused even greater disturbance to countries opposite his vital information leakage, such as the United States [7]. The U.S. is apprehensive about the doctor's actions, concerned if, "due to economic demands, North Korea may attempt to sell nuclear weapons to the highest bidder" [6], which could allow easy access to nuclear utilization by terrorist organizations including Al Qaeda, and countries like Iran. At present, Iran has "an elaborate nuclear infrastructure, including uranium mining, milling, conversion, and enrichment capabilities that could potentially be diverted towards weaponization activities" [6].

Iran's intermittent cycle of enrichment and reprocessing activities in nuclear technology and research has prompted deep consideration among western countries, particularly the United States due to the present conflict faced with Iran. "Iran's plans for building facilities that encompass the full nuclear fuel cycle to support its civilian nuclear

power program [8]" along with the discovery of "enough fissile material for a nuclear weapon [9]" at Iran's disposal have led many countries to suspect that Iran may be misusing its obligations it agreed to in the Non-Proliferation Treaty (NPT) to "obtain and develop technologies and materials that could be used in a clandestine nuclear weapons program. Critics contend that Iran's development of nuclear fuel cycle facilities capable of enriching uranium—potentially to weapons grade—and producing and separating plutonium cannot be justified in economic terms, although Iran insists it is pursuing a nuclear program for energy production only" [8].

As a companion to these concerns and events, the problems relating to nuclear weapons are labeled as heavy, complex burdens, only lingering on the shoulders of world leaders. The complications revolved around nuclear weapons have placed major dilemmas upon this planet and the people in it. One of which, is the environmental perspective. There are three main effects of a nuclear bomb that take a toll on the environment: the blast effects which come immediately after detonation, the thermal energy (heat) effects which also happen instantly, and the nuclear radiation which is both emitted at the time of the explosion and over periods of time afterward.

The force initiated by the explosive blast creates the most damage. "The shock wave of air radiates outward, producing sudden changes in air pressure that can crush objects, and high winds that can knock objects down" [10] and blow them away with great intensity. The closer a nuclear bomb is discharged on or close to ground zero ("the point on the Earth's surface immediately below or above the point of detonation" [11]), the more the explosion will not only produce a blast radius of a much further magnitude and maintain the effects of the shockwave for a longer period of time, but also can "produce serious contamination of radioactive fallout far from the point of detonation" [12].

The thermal energy occurring with the blast comes in an intense burst of heat and a blinding flash. "Since the thermal radiation travels at roughly the speed of light, the flash of light and heat precedes the blast wave by several seconds, just as lightning is seen before thunder is heard" [13]. The thermal radiation causes burns in first, second, and third degrees from exposure "at distances of five miles away from the blast or more" [13]. The heat produced can directly and critically ignite any flammable or "combustible material to generate a self-sustaining fire" [13]. Also, "under some conditions, the many individual fires created by a nuclear explosion can coalesce into one massive fire known as a firestorm" [14]. Its birth transpires when the "combination of many smaller fires heats the air and causes winds of hurricane strength", from the pulsing shockwave, to be "directed inward toward the fire, which in turn fan the flames" [14].

"The release of radiation is a phenomenon unique to nuclear explosions" [15]. It comes in two forms: initial and residual nuclear radiation. The initial radiation is direct and revealed at the time of the explosion and "lasts only as long as nuclear fission occurs in the fireball" while representing "about three percent of the total energy in a nuclear explosion" [16]. The residual radiation mostly consists of radioactive fallout. "This radiation comes from the weapon debris" and "fission products" [17] being "subsequently distributed at varying distances from the site of the blast" [18]. In the case of a burst at surface level, the radiation would also affect the surfaced soil. "The radioactive particles that rise higher will be carried some distance by the wind before

returning to Earth" [18]. Depending on how far the explosion was from ground zero, the radiation present there could remain "long enough that the materials can be a hazard for months or years" [17].

The environment of the dropping site the nuclear weapon would certainly be at great risk for complete obliteration due to the effects of detonating the nuclear device. In unfortunate addition, the radiation in the aftermath would make rescue or the reinstating and reconstruction of what was there prior to the blast seriously delayed if not impossible.

Eliminate Nuclear Weapons Now

Nuclear weapons have become a cornerstone of global controversy over the years since their introduction into this world. The uncontrolled and undeniably accelerating spread of nuclear weapons and material have brought the world to the brink of a "nuclear tipping point. We face a very real possibility that the deadliest weapons ever invented could fall into dangerous hands" [19]. In January 2007, Mikhail Gorbachev wrote: "'it is becoming clearer that nuclear weapons are no longer a means of achieving security; in fact, with every passing year they make our security more precarious'" [19].

Attempting to lower the number of weapons around the world, treaties have been signed, agencies and institutions have been erected, government and non-government organizations have taken form, ties amidst countries have been sealed and broken, relations encompassed between nations have, for the most part, become worse, and the topic has been handed out among numerous colleges and even to high schools. No real action or effort has indefinitely been put forth in an aspiring and momentous exertion. Countless scientists and officials of nations have talked about it, but no true banishment act has been made to counter nuclear weapons with complete, total, global, and verified elimination.

The extinction of nuclear weapons is tremendously important to the Earth and all who inhabit it. Everything that has been done about it so far is essential and a fair starting point, but much more must be done if this goal is to be met before it is too late. Albert Einstein once spoke: "'I know not with what weapons World War III will be fought, but World War IV will be fought with sticks and stones'" [20]. From the relations of which are set at present along with misinterpretation of actions because of the lack of verification, it is reasonable to say that 'World War III' may, more than likely, begin by accident, and it's obvious that this war will be fought with nuclear weapons if necessary actions are not pursued.

Myriad questions will be raised about the elimination of nuclear weapons, and many of them will be answered. Whether they are answered correctly cannot be determined at the moment. They will deal with important issues, and their resolution in the correct manner is one of grave importance.

Scientific/Environmental: In September of 1989, at a meeting of his senior political aides and advisors, President F.W. de Klerk of South Africa declares that in order to end the country's "isolation from the international community", both the political system of apartheid and the concurrent operational nuclear weapons program must be dismantled [21]. This announcement was presented in succession to the statement made

four years earlier by President P.W. Botha in September of 1985, which confirmed to limit South Africa's weapons program to only seven fission devices, with six gun-type nuclear warheads already assembled at the time. South Africa is the first and only country to construct nuclear weapons and subsequently voluntarily abandon its weapons program. Since then, South Africa has been "instrumental" in promoting nonproliferation globally [22]. The kingdom allowed fellow nations to absorb the knowledge that it is possible for a country to abandon the weapons and disregard their nuclear facilities. Now the question is: who will follow the lead? Another circumstance of dismantlement lies with Russia. Following the Cold War, Russia has been pursuing the priority to reduce its tremendous nuclear stockpile. The United States volunteered at their own expense that if the Russian government would make its nuclear material available for U.S. purposes, they would take a vast portion of it away from Russian responsibility. The United States and Russia signed a document in March, 1993 to fulfill the proposal and Russia agreed to install facilities to convert five hundred tons of highly enriched uranium (HEU) to low enriched uranium (LEU) by "blending the HEU with uranium hexafluoride (UF_6) to produce LEU in the form of UF_6" [23]. The U.S., in turn, funded around $400 million for the purchase, transport, and utilization of the material. The United States plans to focus the material provided for "safe" use in nuclear medicine and power reactors, and deliver it in "UF_6 commercial shipping cylinders" [23] on purpose-built transport cargo ships "to the U.S. Uranium Enrichment Corporation" [23] for storage and development in necessary energy plants such as the ones located in Pantex, Texas, Paducah, Kentucky, and Portsmouth, Ohio. "By August of 1993, an implementing contract is to require a total of twenty years for the conversion of 500 tons" of HEU to LEU [23]. This operation has stood side by side with South Africa's effort and together envelops the facade of the truth that nonproliferation is indefinitely possible and must happen for the sake of the Earth itself and the creatures in it. No matter where a nuclear weapon is chosen to reveal its horrific and enormous power, whether it be over land ("known as a surface burst", creates a colossal amount of heat, which radiates outward, causing a high-pressure wave to develop, traveling rapidly away from the fireball as a "moving wall of highly compressed air"; leaves radioactive debris and traces which do not dissipate for years [24]), underground (often spawn catastrophic seismic activity in the form of massive earthquakes; depending on how deep detonated, can "'vent' considerable amounts of radioactive" substances [25]) , or underwater (can disperse large amounts of radioactive water and steam, contaminating nearby ships, structures and individuals"; may erect earthquakes [25]), the damage is inconceivable and astoundingly terrifying and must be prevented and become extinct.

Social/Cultural: Due to the oncoming criticism and the worry of a potential military strike by fellow or neighboring nations and through the people's word, no country really has a direct desire for nuclear weapons. The only reasons any country would regard them with ownership is for national security purposes for if a military strike was intended on that nation, or just because of the envy toward other countries who have them. Some countries, such as Iran, are upset not to have obtained nuclear material for two main reasons: others, such as "Israel, India, Pakistan, and the United States, have them", and the need of "self-sufficiency to defend itself in the event of an attack" [26]. Some countries, however, don't approve of Iran's feasible undertaking of nuclear material, no matter what Iran's purpose, such as the Persian Gulf States, who profess to

be "worried that an American government, intent on war with Iran, would drag them into their fourth regional war in a generation" [26]. Others, including Israel, declare a nuclear-armed Iran as a "clear and present danger" [26] to them. Israel takes "at face value Iran's threats to destroy the Jewish state and restore Muslim control of the Holy Places" [26]. Summarizing the second reason, if all countries eliminated their nuclear weapons, today's situation of nations yearning for nuclear weapons just out of jealousy, along with other nations being troubled when considering the possibility of those countries acquiring nuclear material would soon be insignificant because nobody would have them. On the other hand, for the first motive, most countries don't even want to resolve their problems in the area of nuclear defense, such as Egypt, Syria, and Libya, who "abandoned their nuclear efforts because of a lack of resources, the possibility of inducements, and/or a well-funded fear of negative repercussions" [26]; precisely to discard resorting to that reason to avoid risking possible attack or criticism. If the global elimination and disarmament of nuclear weapons is taken more seriously, these two reasons would start to dissolve and disappear because there would be no need of the nation's people to want their country to defend themselves on that scale or level, and nobody would have the weapons, so what desire would there be for other countries to begrudge one another just for their nuclear stockpile? If nuclear weapons states, with unquestioned conventional superiority, choose to rely on nuclear weapons, then states – particularly those not covered by alliance security promises – would apparently have a far greater need for nuclear weaponry in order to be prone to alertness of a greater oncoming threat. For this reason, it is vital to promote nuclear disarmament everywhere so that when nobody has the weapons, no one will feel they need to have them.

Economic: The production and cost of nuclear warfare have both aided in increasing the debt of the United States, and have worked to bring other countries not in debt to that point. The production of the weapons by some countries, such as the United States, is literally draining the nations of their income profits because of intentions to make the homelands "safe, secure, and reliable" [27]. The recent proposal, approval and mild development of new nuclear weapons by the United States are said to serve that purpose. The "Reliable Replacement Warhead (RRW)" is claimed to provide a "new generation of nuclear warheads" [28]. The "total proposed budget" for this project is "$725 million" [28] and "the initial design of the first new warhead, designated RRW-1," has been affirmed "and a First Production Unit is planned to be built by 2012" [27]. The production of these weapons will directly violate the United States commitment in the Non-Proliferation Treaty (NPT) and, in the words of Sam Nunn in his Congressional Testimony, could be "misunderstood by our allies, exploited by our adversaries, complicate our work to prevent the spread of nuclear weapons, and make resolution of the Iran and North Korea challenges all the more difficult" [29]. This new weapons program is exactly the opposite of what should be done in order to achieve the goal of exterminating nuclear weapons that seems to be slipping away. "We need new policies, not new weapons" [30]. The assembly line of these new weapons would permit the country to soar more into deficit and could infuriate or agitate many citizens, allies and even adversaries unless actions are taken. If nuclear weapons were eliminated, multitudes of money would be saved and, in the future, possibly earned, which could be used to tremendously help the recession present in the United States and to strengthen

associations, such as the International Atomic Energy Agency (IAEA) and its safeguards for it to "carry out all of its NPT-related verification and other duties" [31].

Political/Geopolitical: The government's point of view is the most critical aspect of reducing nuclear weapons. The political system of leaders dominating every country is probably one of the major reasons total nuclear disarmament cannot unambiguously formulate or take a substantial step forward. The United States government plans to build the RRW as a new generation nuclear weapon to replace "the entire U.S. nuclear arsenal with new warheads" [28], yet they were one of the first to sign the NPT and agree to promote and influence nuclear disarmament, nonproliferation, and deterrence. The leaders in countries like Iran want nuclear material for technological and energy sufficient uses, but they also have enrichment facilities built for that material capable of producing it to weapons-grade. Since their withdrawal from the NPT, North Korea has conducted tests of a "nuclear explosive device and has deployed short-range and medium-range ballistic missiles" [32], restored nuclear facilities, is suspected of spreading nuclear technology, and, in February 2009, announced the testing of, what many analysts speculate to be, their long-range missile system – all of which the North Korean government is the culprit. In early April 2009, North Korea came through with their launch and since then, concerns and fear-provoking rumors are spreading among the authoritative portions of northwestern areas such as the Canadian government, of which Foreign Minister Lawrence Cannon stated that, "this ill-advised action undermines confidence in North Korea's commitment to peace and security" [33]. Also, newly-elected President Barack Obama of the United States, to North Korea's actions, responded, "Now is the time for strong international response and North Korea must know that the path to security and respect will never come through threats and illegal weapons" [34]. North Korea's government has agreed make so-called negotiations with the United States to dismantle its nuclear reactor in 2007 and the U.S. removed North Korea from its "list of state sponsors of terrorism" [35], but the verifying of North Korea's "nuclear declaration and dismantlement of its nuclear complex remains problematic" [35] and the issue resides as "stalled" [36]. The governments of these countries and more feel that the nuclear weapons are an essential part of national security because they supposedly make the people feel safe against enemies and that, if a threat were posed toward them, their leaders would take care of it and obliterate the opposing country to shattered pieces. World governments are failing to see nuclear weapons as the problem and until then, the problem may not be fully solved.

The nonproliferation of nuclear weapons is one of the most important and compelling issues to plague America and every other neighboring and inhabiting country of the planet Earth. It is very critical to eliminate them completely so that this might be a better and safer place. This needs to happen for every country. Why? For example, if unstable nuclear material were to fall under incorrect influences, it could lead to uncontrolled cataclysmic mayhem, which could raise tremendous concerns among the targeted countries. With that in mind, the damage concentrated in those countries could infuriate others, especially allies, and therefore, set off a chain reaction and draw up the horrid fortuity of a nuclear world war. It is of tremendous value that this threat of nuclear world warfare does not come to pass so that it will not attempt to completely obliterate mankind. In the Rome Declaration, nuclear weapons were referred to as "more of a

problem than any problem they seek to solve. In the hands of anyone, the weapons themselves remain an unacceptable, morally reprehensible, impractical, and dangerous risk" [37]. In the words of Former Senator Sam Nunn, Co-Chairman of the Nuclear Threat Initiative World Institute for Nuclear Security, "preventing the spread and use of nuclear, biological, and chemical weapons should be the central organizing principle of the 21st century" [38].

In order for a the goal of a safer world and the reward of not living in fear to become reality, the leading supreme that tops everyone's list and the dominant prime factor above all else to address and verify is nuclear material. With that said, the problem of how to accomplish this feat arises. The International Atomic Energy Agency (IAEA) is a vital source for the peaceful uses of nuclear energy. However, its safeguards have been "woefully under-funded for many years. Without a comprehensive safeguards agreement in force, the IAEA cannot give credible assurances that no nuclear material is being diverted for use in nuclear weapons or nuclear explosive devices" [31]. Also, strengthening the IAEA verification system is "one of the most urgent challenges" which must be sought after [31]. If there is not a solid verification system set, there can be no essential guarantee of peaceful managing of the material. In addition, the non-proliferation treaty (NPT) is a "cornerstone of global security" [39], but "given the diminishing confidence in the NPT" [40] by way of the challenges the treaty is not formally dealing with, the agreement faces question to its "effectiveness and fundamental validity" [41]. "Since the NPT was primarily designed with nuclear weapons states, it has very little capacity to deal with the new threat" coming from nuclear-weapon-free zone actors using or developing technology to improvise nuclear devices [3].

To respond to these intimidations, state parties of the NPT and all others should approach unilateral, bilateral, and multilateral measures along with "collective efforts by and in civil society" [41]. The NPT and agencies like the IAEA must be enforced by all means and from every angle to combat these obstacles, and it is strictly important to bind commitments and negotiations and reconstruct the present treaties to address all the bickering grievances of which are predicting trouble and hindrance for the advancement of a world free of nuclear weapons. Most crucial, is that there also be provided irreversibility for both. Furthermore, there must be ratified and provable verification and transparency to all actions, statements, and undertakings of nations who undergo this responsibility. If nuclear nonproliferation can take a fateful leap forward and these potential and rational methods can be met intelligently and meticulously, the road to total, complete, and, primarily, real and verified global nuclear disarmament may be shorter than we think. A nuclear war is preventable. If there's any time to act, it's now.

Scenario Leading to a Better World

- **2010:** Necessary changes, enforcements, and spending are put into the treaties and agencies that need them

- **2015:** Number of nuclear weapons gradually decreases around the world; more negotiations are made with more world leaders easier due to the reducing threat of nuclear warfare; the League of Nations gains growth and strength

- **2020:** Number of nuclear weapons on Earth downsized even more, almost in half; arguments and criticisms rise about nuclear weapon reduction from leaders and people having second thoughts; futuristic arms, grenades, and ammunition introduced

- **2025:** rebellious behavior and unsatisfied world leaders become to hard to handle; negotiations break loose; chaos erupts; World War III begins

- **2030:** World War III ends; majority of wreckage caused by futuristic weapons popularized in early 2020s; damages in conflict conducted by a small amount of nuclear material by reason of the lowering account of their presence, fear of destruction beyond restoring, and lack of time for necessary preparations; results somewhat similar to World War II but devastating on a slightly bigger scale; negotiations are put back in place and massively reinforced; agencies and treaties are built up again, reimbursed, strengthened, and intensified substantially; nuclear weapon charts greatly subtracted

- **2035:** Nuclear weapons count lower than one-fourth what it was in 2010; negotiations holding tight; League of Nations bond solid and reformed; treaties renewed regularly; agencies and corporations for nuclear nonproliferation constantly funded; nonproliferation becomes a global effort because of the little damage done by nuclear weapons and the curiousness of what may have happened if nuclear weapons took a major place in World War III

- **2040:** Total global nuclear weapons number to less than 1,000; nuclear minimizing effort still healthy and firm

- **2045:** A safer world

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