Nuclear Proliferation in the Context of the U.N. N.P.T.

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Abstract

The non-proliferation of nuclear weapons is a process bound by cultural, political, economic, and sociological factors. This project will increase the precision of the definitions and characterizations of these factors both qualitatively and quantitatively.

A procedure is created that can be useful as a means for assessing a state's nuclear program measuring threat levels ranked and categorized into analytical scenarios.

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Chapter 1: Introduction

While issues such as global warming and a worldwide energy crisis may pose a serious dilemma to the continued prosperity of mankind, they pale in comparison to the theorized effects of nuclear war. These potentially devastating effects are the driving force behind the Non-Proliferation Treaty (NPT).

The NPT is the international and universal tool used to control the danger of nuclear weapons. It is the only document signed by multiple countries with the sole intention of ending the proliferation of nuclear weapons. It is the goal of this project to expand the characterization of the definition of proliferation of nuclear weapons both qualitatively and quantitatively, as a means for assessment of states whose nuclear weapons programs are a concern.

The NPT defines nuclear proliferation in articles I and II as being the transfer of nuclear weapons or other nuclear explosive devices, or control over weapons from a nuclear-weapons state (NWS) to a non-nuclear-weapon state (NNWS). Proliferation also includes a NWS assisting, encouragement, or induction of a NNWS to manufacture or acquire nuclear weapons or other nuclear explosive devices.

Article III of the NPT proclaims that each NNWS who is a signatory to the Treaty must accept the International Atomic Energy Agency's (IAEA) safeguards. The responsibilities of the IAEA are to implement safeguards on nuclear materials and promote the peaceful uses of nuclear power (NPT, 2005).

Article IV declares that all parties to the treaty have the right to research, produce, and exchange nuclear technology for peaceful energy uses.

Article V states that the benefits from peaceful applications of nuclear energy are to be made available to NNWS's non-discriminately.

Article VI declares that all parties to the treaty should be involved in negotiations "in good faith" to stop the nuclear arms race and move towards complete disarmament.

Article VII states that the NPT does not prohibit regional treaties between states that ban nuclear weapons. The purpose of this article is to assure the possibility of complete disarmament.

Article VII declares that parties to the NPT have the right to propose amendments, which must be approved by a majority vote. Five years after a new amendment is approved, a conference will be held in Geneva, Switzerland to review how well the amendment is working.

Article IX states that all states have the right to become a signatory of the Treaty, and a signature by a state is subject to ratification by preexisting signatories. An NWS is defined in Section 3 as "one which has manufactured and exploded a nuclear weapon or other nuclear explosive device prior to January 1, 1967" (NPT, 1970). According to that definition, the states that meet that qualification are the United States of America, the Soviet Union, the United Kingdom, France, and the People's Republic of China (Wikipedia, 2005).

Article X states that each party, exercising its national sovereignty, has the right to withdraw if the state's interests are in jeopardy.

Lastly, Article XI declares that the Treaty will be translated into equally authentic English, Russian, French, Spanish, and Chinese texts.

Three major themes are present in the Treaty:

- The non-proliferation of nuclear weapons.
- The eventual nuclear disarmament of all countries.
- The right of all signatory nations to pursue the peaceful applications of nuclear technology.

The issue of proliferation of nuclear weapons is context-bound and subjective by nature. The process itself is bound by culture, socio-political, and economic issues.

The next chapter, the literature review, is the source of the first data that will be used to create a model that will allow for threat assessment and analysis of any state's nuclear weapons program. The third chapter explains the methodology of all data collection, including outside data not specifically shown. The fourth chapter is the analysis model. The last chapter is a case study which applies the model to a particular state.

Chapter 2: Literature Review

Introduction

The following is a literature on seven topics considered to be relevant to nuclear weapons proliferation, the NPT, and state issues/negotiation. These topics are:

The Role of the United Nations
Nuclear Energy
National Interest
Negotiation Strategies
Content Analysis
Nuclear Terror
Weapons Grades

The information acquired from this literature review will serve as the basis for the analysis. Each topic of the review has important data that will contribute to creating a threat assessment of states whose nuclear weapons program is in question.

The Role of the United Nations: The United Nations

The United Nations, established in 1945, deals principally with international peace and security, arms control, disarmament, and non-proliferation. The General Assembly, which consists of all 191 UN Member States, continuously adopts resolutions and decisions that are related to disarmament, non-proliferation, arms control and international security. While these resolutions are not technically legally binding for the governments that sign them, they do affect world opinion and are a force of influence on the signatory states (CNS, 2004). The responsibility of enforcing treaties (when it becomes a threat to world peace and security) lies with the United Nations Security Council (UNSC) (CNS, 2004).

The UNSC consists of fifteen members: Five of these membership positions are considered to be permanent seats, and the other ten are non-permanent seats that are

elected every two years. China, France, Russia, the United Kingdom and the United States are the five permanent members, and are each capable of preventing the adaptation of any proposal, in the form of a veto, even if the proposal has a majority of affirmative votes (CNS, 2004). This current system has recently led to numerous requests for reform, especially when one considers that the veto was created solely to protect members from having military force used against them in their own territory (Butler, 2003). A major reform would be the expansion of the permanent member seats on the UNSC.

The Role of the United Nations: The International Atomic Energy Agency

The job of enforcing the resolutions that the United Nations creates is the responsibility of the International Atomic Energy Agency (IAEA). The IAEA conducts the necessary inspections and regularly submits reports on its findings to the UN General Assembly (UNGA). If a state is found to be in non-compliance with a certain resolution, they are referred to the Security Council. The IAEA management team consists of one Director General (Mohamed E lBaradei) and six Deputy Directors Generals below him that head various departments. There are also approximately 2200 professional and support staff throughout the agency at varying positions (IAEA, 2005). In Fiscal Year 2004, the IAEA's regular budget was a mere $268.5 million, which is small for an agency whose duties are to eliminate the threat of use of nuclear weapons (IAEA, 2005).

The Role of the United Nations: Improving Enforcement

In one the first scenes of the 2001 movie Black Hawk Down, SSgt. Eversmann can do nothing but watch as Somalis loyal to the warlord Mohamed Farrah Aidid slaughters a group of starving, innocent civilians that are trying to receive food (Scott, 2001). The reason: because of the nature of their UN peacekeeping mission, they cannot fire unless

fired upon (Scott, 2001). The UN is not without its shortcomings. In addition to being one of the world's largest governing bodies, it is also one of the most inefficient and is sometimes incapable of dealing with threats to world peace.

China was faced with a report from the IAEA that its political ally North Korea was in violation of the NPT some 10 years ago. In response, China threatened to veto any resolution that would have taken action against the Democratic People's Republic of Korea (Butler, 2003). Events such as these are usually followed by cries for reform, especially when one considers that an Islamic extremist state with ties to terrorist groups is getting dangerously close to developing a nuclear weapon.

The IAEA, while displaying a proud history of enforcing the NPT, is not as large or well funded as it should be to ensure global compliance. More inspectors are needed to ensure that any and all possible WMD sites are fully inspected to ensure that these weapons do not fall into the wrong hands. The UN is the only world body that has the authority to go from country to country and ensure that the standards set in the Non-Proliferation Treaty are being enforced. It is therefore essential that, in order to ensure future peace in the world, that the UN makes the necessary reforms that would make the IAEA more efficient and capable of dealing with any possible threats to the NPT.

Nuclear Energy

Energy has always been an important topic of interest and concern as it is an essential part of today's world. With energy and the proliferation of nuclear weapons being two issues watched closely by the media, it is easy to understand that the relationship between peaceful nuclear power and nuclear weapons proliferation is a regularly examined issue.

Joseph S. Nye (1981) observes that "the idea of the Atoms for Peace approach was to assist countries in their development of civilian nuclear energy, in return for their guarantees that they would use such assistance for peaceful purposes only" (Nye, 1981). Nye suggests that President Eisenhower's approach in his Atoms for Peace speech given on December 1953, addressing the General Assembly of the United Nations, has been "correctly criticized for promoting nuclear instances before it was economically justified" (Nye, 1981). This is why "the policy was oversold, and poorly thought through in its execution at a time when too little was known about the pace and cost of peaceful nuclear development" (Nye, 1981).

Nye correctly notes that the "central accomplishment Atoms for Peace program was the creation of a system of international safeguards and an institutional framework in the form of the International Atomic Energy Agency, established in Vienna in 1957" (Nye, 1981). Under the IAEA safeguards system, Nye explains that "the safeguards system is central to the basic bargain of the international regime in which other countries are assisted in their peaceful nuclear energy needs in return for their accepting the intrusion of safeguards and inspection" (Nye, 1981).

Scheinman (1981) makes the case that the established measures in the Atoms-for-Peace era that were put into effect to stop the spread of fuel cycle facilities were too preoccupied in politics and verification safeguards to effectively decelerate the spread of these facilities. Impeding the spread of nuclear fuel cycle facilities is crucial to the non-proliferation effort as each facility provides another opportunity for diversion. These facilities require immaculate regulation and inspection (Scheinman, 1981).

Scheinman suggests that multinational alternatives can be an effective solution to decelerate the spread of these facilities. (Scheinman, 1981) The first alternative that Scheinman mentions is that states could have "supplier-state commitments" to a reliable trusted source for nuclear fuel. (Scheinman, 1981) This idea was suggested in the analysis by the International Nuclear Fuel Cycle Committee (INFCE) Working Group III. This agreement between the supplier and the consumer state would have a multilateral and/or international contingency plan, in the event that the supplier breaches their obligation. This fall-back protection would be, according to Scheinman, a "nuclear fuel safety net, or international nuclear fuel bank" (Scheinman, 1981). The second alternative would require that each state conducts their sensitive activities on a national basis under "carefully defined and significantly augmented international controls" (Scheinman, 1981). This alternative, according to Scheinman, would not be the right step towards nonproliferation as it does not seek to "curtail the spread of sensitive activities, and thus may not adequately meet al energy security concerns" (Scheinman, 1981).

The third alternative would be to have multinational sensitive fuel cycle activities where two or more states would operate together. Scheinman observes that this alternative could "meet energy security concerns by providing participants with a legal and economic stake in the supply system, and to meet nonproliferation concerns by limiting the spread of sensitive facilities, localizing and complicating the risk of proliferation, and going beyond conventional verification safeguards" (Scheinman, 1981). The disadvantage of this alternative is that it requires that the states involved develop an organized structure to employ this facility. This organized structure could be so complex in nature that it would not make this alternative economically feasible (Scheinman, 1981). Another issue dealing

with economic feasibility is the disadvantage of having a nuclear reactor solely for peaceful energy use. According to the Nuclear Energy Information Service (NEIS), a study was performed in 1951 by the Atomic Energy Commission (AEC) that concluded, "Commercial nuclear reactors would not be economically feasible if they were used solely to produce electricity; they would be, however, if they also produced plutonium which could be sold" (NEIS, 2004). It seems that with nuclear energy, the numbers are working against non-proliferation.

The plutonium by-product is weapons-grade material and can be made to build bombs. A typical thousand megawatt commercial power reactor, such as Seabrook Station Nuclear Power Plant in Seabrook, New Hampshire, if converted to a dual-purpose reactor, could produce three to five hundred pounds of plutonium a year. That is enough plutonium to build between twenty five and forty "Nagasaki-sized" atomic bombs (NEIS, 2004). Although those numbers are staggering, C. Pierre Zaleski contends that "one should also avoid a simplistic correlation between the quantity of separated plutonium and the risk of diversion" (Zaleski, 2000). Zaleski claims that the management of the plutonium, along with which state is using it and how far it travels may be more important than the actual amount of plutonium at hand. Zaleski continues, "The diversion of nuclear weapons themselves or fissile materials from nuclear weapons programs in some countries, notably those of the former Soviet Union, pose in my view a much larger threat today than the diversion of plutonium coming from the reprocessing of commercial reactor fuel" (Zaleski, 2000).

It is safe to say that the use of nuclear technology for electricity is here to stay for a while. Behram Kurdsunoaeglu notes that "over 30 countries now use nuclear power for

generating electricity and many more have research or test reactors"(Kurdsunoaeglu, 2000).

National Interest

A state's decision making process depends on its views and what it considers its national interests. The interest role of a state is a deciding major factor in determining whether it wishes to get involved in a particular issue, and to what extent. There are three basic levels at which to judge the importance of a states involvement in an issue, they are: some interest, significant interest and vital interest.

In his book, "Strategy and National Interests: Reflections for the Future", Bernard Brodie discusses which members of a state determine what their vital interests are, and the thought process involved in determination. Brodie states that our vital interests are customarily defined as concerns against the infringement of which we are prepared to take a form of serious military action. The United States is at all times "committed to a set of strategic policies aimed at supporting or implementing certain purposes usually designated by the term 'vital interests' " (Brodie, 1971). It is natural that as the times change, the United States' national interests must adjust to the needs of new and important issues that are encountered. The national interests are for the most part determined by the Administration in power at the time. They are influenced by their own people as well as governments internationally, but the final decision and responsibility rests on the state's government, not on other states (Brodie, 1971).

Richard Clark, who at the time was a US Assistant Secretary to the Subcommittee on Technology and National Security of the Joint Economic Committee, describes the United States' interests in proliferation issues in his article "A multi-faceted approach to

non-proliferation" (Clarke, 1991). Clarke states early his main point to the committee that "The proliferation of missiles and nuclear, chemical, and biological weapons is a significant threat to US national security and to the vital interests of our friends and allies" (Clarke, 1991). He discusses the threat of countries, for example Iraq, who have acquired dangerous weapons and may have ill intentions for their use. However, decreasing the threat is not easy and is quite a balancing act. Clarke notes there are "frequently competing and legitimate interests at play—national security, foreign policy, and export promotion" (Clarke, 1991).

Clarke observes that these vital interests are justifiably shared by many states. As a response, states have assembled to form groups such as the Missile Technology Control Regime (MTCR) as well as the Nuclear Suppliers Group to strengthen multilateral export controls (Clarke, 1991).

Joseph Nye (2002) discusses the interest role in the making of American Foreign Policy in his article, "The American National Interest and Global Public Goods". He covers economics and countering terrorism. Nye observes that Americans are divided over the issue of US involvement with the rest of the world. Nye states, "At the end of the Cold War, many observers were haunted by the spectre of the return of American isolationism. But the historic debate today is taking place not only between isolationists and internationalists, but also within the internationalists' camp between unilateralists and multilateralists" (Nye, 2002). Today, a common standpoint among many states is that the US gets too involved in overseas activity. The role of interests affects a states degree of involvement, and how the state carries it out, whether it is unilaterally or multilaterally.

Matthew Yeomans (2005) highlights a current vital interest to the US economy in his article, "Crude politics: the United States, China, and the race for oil security." The oil crisis is a crucial subject matter across the world. Many preparations have to be made by states to secure their oil supply. The fact that three countries alone in the Middle East sit on approximately half the worlds accessible oil is why it is necessary for all oil-dependent states to keep strong ties with the Middle East (Yeomans, 2005).

In 1980 President Jimmy Carter announced America's oil security policy. Yeomans refers to the Carter doctrine, "Any attempt by an outside force to gain control of the Persian Gulf will be regarded as an assault on the vital interests of the United States of America" (Yeomans, 2005). The US has built military bases where its oil refineries are located to protect its oil flow.

Yeomans states that China has been found supplying weapons to Tehran in return for oil (Yeomans, 2005). This is a good example of how each countries administration in power must weigh the level of interest versus how far they are willing to go to protect that interest.

Cleo Paskal (2002) focuses on the efforts of the geopolitics professor Madhav Das Nalapat to promote relations between India and other countries in the article, "The Matchmaker". India's economy and power has grown dramatically. However, since the clashing views on the Cold War between US and India, they have not been forthcoming towards each other. The Indian Diaspora has been a huge factor in breaking the ice between the two countries. Nalapat's role as matchmaker demonstrates the importance of having a network of alliances. Maintaining powerful allies is certainly a key vital interest. Nalapat states that "the only countries that made rapid economic progress in the

1980's were those friendly to the U.S" (Paskal, 2002). As a result of these evolving relationships between India, the US and Israel have shifted the global power as well as their interests in each other.

The "Worldwide Threat", a report delivered by George J. Tenet (2002), director of the CIA to the Senate Select Committee on Intelligence discusses the effects of 9/11 on the vital interest role of the United States. The 9/11 attacks on the US opened the nations eyes to the vital threats to the US and its interests by Osama bin Laden and terrorist groups such as al-Qaeda. Tenet stated that from 9/11 emerged threats that "… we have long been aware of. It is the convergence of these threats that I want to emphasize the connection between terrorists and other enemies of this country, the weapons of mass destruction they seek to use against us, and the social, economic and political tensions across the world that they exploit in mobilizing their followers" (Tenet, 2002).

Tenet appropriately notes that it is in our best interests not only to look for dangers where we've usually found them, but to pay attention to other areas that desperately need our attention. He uses Somalia as an example of a place where "absence of a national government has created an environment in which groups sympathetic to al-Qaeda have offered terrorists an operational base and potential haven" (Tenet, 2002). Due to the seriousness of threats posed by terrorist organizations it is a significant if not vital interest for most countries to eliminate these groups. Tenet highlights the importance of denying them sources of financing (Tenet, 2002).

Negotiation Strategies

Negotiations are used every day from casual conversation to international relations. The ability to negotiate and use it as an effective tool is indeed complex. The ability to

negotiate is an important skill used by all parties involved in national and international affairs. Officials need to know every aspect and every side of an issue to negotiate properly. They must know their own stance on the topic and to what lengths they should go to win the argument. They must know the opponent as well, including their past and current views and their likelihood of negotiating. An official knows what he or she wishes to get out of the negotiation, however the most crucial part is being able to anticipate what the other party wants. Endless debates have been held over nuclear proliferation, which has been a heated topic for discussion. The aforementioned techniques are clearly demonstrated in these proliferation disputes.

The article "Nuclear Taboo and War Initiation in Regional Conflicts" by T. V. Paul (1995) presents a key factor in strategic international negotiations. The idea of nuclear taboo refers to the non-use of nuclear weapons (especially against non-nuclear states) due to the fear of its consequences. This unwritten prohibition emerged after attacks on Hiroshima and Nagasaki. This article argues that one of the key calculations of a non-nuclear state comes from this taboo. The author found that, "In a majority of cases analyzed in this study, the disproportionate destructive capacity of nuclear weapons inhibited their actual use" (Paul, 1995). Non-nuclear states use nuclear taboo as their main arguments.

The hazardous nature of nuclear weapons also may cause third party intervention such as an ally or a nuclear superpower putting pressure on the nuclear weapon state to back down. Paul states that the "innocent victims of a nuclear attack and the possibility of after-effects for generations could make the leader who casually ordered a nuclear attack a permanent dark figure in history books" (Paul, 1995). Any orderly state would

not want to be associated with a country that has a careless disregard for international peace and stability.

Paul applies the affects of nuclear taboo to two case studies. They appropriately demonstrate the strategic and political calculations that the decision makers of both nuclear and non-nuclear states take in gauging each others initiative and capability.

The first case looks at the 1973 Middle East War. A good example of tactical negotiation was used by the Egyptian leaders who "conceived war as a means to attract superpower attention to the stalemated dispute" (Paul, 1995). This strategy worked just as they had anticipated, causing intervention that eventually forced Israel to find a middle ground. Egypt's skill to effectively negotiate over this issue allowed them to achieve the ultimate goal of preventing the issue from escalating to the nuclear level (Paul, 1995).

The second case looks at the 1982 Falklands War. Before the war Argentines strategy was based on the thought that Britain wasn't going to nuclear warfare to defend a far-away island group with little direct economic or strategic value and later under a limited arms strategy they would be able to practice negotiations afterward to gain control over the disputed area. "Nuclear retaliation by Britain was discounted, and nuclear taboo did play a major role in that calculation" (Paul, 1995). The case studies prove that acquiring these weapons does not stop non-nuclear states from initiating a conventional attack on a nuclear state. This of course is true as long as the non-nuclear state feels the war will be limited enough to not provoke a nuclear response (Paul, 1995).

The article "Accommodation, not confrontation (US mediation between India and Pakistan on nuclear nonproliferation)" by Tariq Rauf (1999), explains the complexity of the nuclear disarmament issues between India and Pakistan and the stalemate they had

reached. Washington had three priorities during its dealings with Islamabad and New Delhi. These priorities were, "preventing an escalation of a nuclear and missile race; minimizing damage to the nonproliferation regime; and promoting bilateral dialogue between India and Pakistan on reducing tensions" (Rauf, 1999). Taking on these issues would call for carefully planned negotiations. Instead of choosing sides, the US took the role of the logical mediator between the two. Assisting and encouraging strategic negotiations between the two countries were hoped to have positive effects. In return for cooperation, other nations considered the removal of sanctions.

Among many of India's goals in negotiating with the United States, one was the "recognition of its status as a regional and a global power" (Rauf, 1999). This is a good example of a nuclear state using its nuclear capabilities to gain power and influence, which are common motivators.

The article "Don't trust, don't verify" written in the Economist (2004), shows the involvement of the US in nuclear proliferation issues and the Fissile Material Cut-Off Treaty in particular. The term "trust, but verify" was used by Ronald Reagan in conducting negotiations to decrease nuclear arsenals. The main point of the article is that the current Bush administration has no patience for the approach taken by the Reagan administration. US officials tried to convince 65 skeptical governments that negotiations of the "fiss-ban" should go on without applying any verification rules. Strategic negotiations are important in this type of situation. To persuade those governments to act without considering the rules of verification would be an impressive accomplishment. The motives of the Bush administration are seen by some countries as self serving.

However, it is the job of the negotiators to strategically present these objectives into what would seem like a service to all nations. (Economist, 2004)

The Bush Doctrine asserts the right to preemptively attack states supporting or harboring terrorists and pursuing WMD's. In the "Global Debate and the Limits of the Bush Doctrine" by Peter Dombrowski (2003), the worldwide disagreement over preemption is discussed. As mentioned earlier, an important part of skillful negotiation is being able to anticipate the actions of your opponent and their likelihood to negotiate. The Bush Doctrine holds the right to attack. This is a tactical move to keep states from associating with terrorists, in fear of the repercussions.

It is argued that states, for example the US, are making decisions based on its view of the world when it should be based on the view of international relations (Dombrowski, 2003). Decisions, however, are made after a series of strategic negotiations by all parties involved, which for the most part are all looking out for their own interests. Decisions based on the view of international relations are mostly made by allies looking out for one another's interests or from organizations such as the United Nations. When negotiations reach a stalemate and questions are raised about a particular state's international relations, a state may decide to deal with issues unilaterally.

"Understanding the Unilateralist Turn in U.S. Foreign Policy" by David Skidmore (2005), explores the reasoning behind the change in US foreign policy to a unilateral approach. This is notably seen in the US War on Iraq. The unilateral approach eliminates the responsibility of having to consult and agree with the other state before taking action. Many other countries may not agree with the war on Iraq but since the US is doing it single handedly they don't feel as if they should have to negotiate what actions

they take. The strategy behind this was that to get something done, and deal with Iraq without involving other countries. This approach eliminated the possibility for long drawn out debates that may very easily have resulted in a deadlock.

Skidmore's discussion of the increasing tendency of the US to challenge the authority of the United Nations exemplifies a major change in the way the US is taking on these issues. This article poses the argument of "US versus the world" and where this unilateralist trend seems to be heading (Skidmore, 2005).

Nuclear Terror: Introduction

While many scientists and policy makers disagree with one another on issues such as al Qaeda's ability to construct a nuclear device, or where terrorists are most likely to steal nuclear material, the one thing that they all agree on is that we are ill prepared. The numerous methods of entry into the United States, the lack of accurate records in Russia, and the potential for a deposed government in Pakistan are amongst the numerous reasons why there needs to be drastic changes in the way that all governments maintain their nuclear materials.

There are many scenarios for a possible nuclear attack by terrorists, but they mainly break into two broad categories: A nuclear detonation and the spread of radiological material (Keller, 2002). While the nuclear bomb scenario is less likely to happen, it would have the biggest effect, both in human life and in structural damage. A radiological device wouldn't cause nearly as high death toll, but such a device would be much easier to obtain, and the property damage would also be significant. The spread of radiation could be achieved by exploding conventional explosives that are encased in

nuclear material, or through the destruction of a nuclear power plant's protective concrete dome and of the core's coolant system.

Nuclear Terror: Detonation

The detonation of a 10 kiloton nuclear device at Grand Central Station in Manhattan would immediately kill 500,000 New York travelers, tourists, and citizens. The structural damage from the blast would be extensive as well, and would cause a direct cost of well over $1 trillion (Medalia, 2005; CRS, 2005). This nightmarish scenario is the most unlikely of probable nuclear terror attacks, but could very well happen.

When most people think about nuclear weapons, they picture a thermonuclear warhead on the tip of an intercontinental ballistic missile (ICBM) complete with safeguards, and navigation systems. Most people don't think about a terrorist parking a Chevy Suburban on a crowded street in Washington DC, and pressing a button that slams one piece of highly enriched uranium (HEU) into another piece of HEU using little more than a small explosive and an artillery tube (O'Neill, 1997). The previously mentioned device would be similar to the "gun-type" bomb "Little Boy" that was dropped on Hiroshima. This bomb design is so simple that the scientists at Los Alamos didn't bother testing it before they flew it to Japan (Medalia, 2005; CRS, 2005). To build such a weapon would require the acquisition of 50kg of HEU, which, when one takes into the fact that there is approximately 1,300 to 2,100 metric tons of weapons grade uranium in the world (Keller, 2002), isn't all that much.

The other type of nuclear weapon that a terrorist could potentially use would be of a design resembling the "Fat Man" bomb dropped on Nagasaki: An implosion type bomb. This design is far more technically complex than a gun-type bomb, as it requires the

simultaneous detonation of explosives around a sphere of weapons grade plutonium (WGPU). This type would require less material than a gun type device to achieve supercritical mass, more specifically between 10-17kg of WGPU depending on the phase (O'Neill, 1997). Such a device would probably be out of the engineering capacity of a small terrorist group, but a large group that had the backing of a state, and more importantly, a state's scientific resources, could produce such a device (Medalia, 2005; CRS, 2005).

The state backing of a terrorist organization poses perhaps the biggest threat to US national security. Iran, for example, has a history of backing extremist Islamist groups, would probably have no hesitation in giving a terrorist organization a nuclear device to use against the United States. Another such state that could provide terrorists with a nuclear device, intentionally or unintentionally, is Pakistan. Pakistan could inadvertently provide terrorist with a nuclear weapon if Perez Musharraf's government were overthrown, and Pakistan's nuclear stockpiles taken over by military units sympathetic to extreme Islamist groups (Medalia, 2005). Finally, to add to this already undesirable situation, the warheads that countries such as Pakistan possess do not have the extensive safeguards that American and Russian warheads have (Keller, 2002). This lack of weapons control and the large amount of extreme Islamist sympathizers in Pakistan creates what could possibly be the most likely place where a terrorist organization could obtain a nuclear device.

Nuclear Terror: *Radiological Dispersal Device*

A relatively small size of Americium detonated in New York City could cause the radioactive contamination of an area covering 60 city blocks. These buildings would have

to be evacuated, demolished and rebuilt at a cost of more than $50 billion (FAS, 2000). While a radiological dispersal device (RDD) may not be as devastating as a nuclear bomb, the relative ease of creating such a devise makes one wonder why such an attack hasn't been carried out already. The materials are easy to obtain, and the device could fit in something as small as a back pack. The only other thing needed besides the small amount of radioactive material is the explosive that would disperse the radioactive material.

Oil drilling facilities, food irradiation plants, laboratories, and medical centers are some of the places that use materials that could be employed in an RDD (FAS, 2000). However, due to the different types of particles that certain isotopes emit (alpha, beta and gamma), their half lives (the amount of time it takes for one half of the substance's atoms to decay), and how much radiation they emit (measured in Curies). Some isotopes are more effective than others in a RDD. U-235, while essential in creating a "gun-type" nuclear weapon wouldn't be as useful in an RDD due to the long half life (and hence the low amount of radiation that it emits) of that particular Uranium isotope (Medalia, 2005; CRS, 2005). Cesium-137, used in food disinfection, would be a logical choice for such a device due to the high amount of radiation it emits at even extremely small samples (Royland, 2005).

In a report by the Federation of American Scientists, the radiation dispersion in Washington DC was calculated if a small amount of Cesium (about the amount found in a medical gauge) was exploded by 10 lbs of TNT. In the simulation, approximately 40 city blocks were contaminated to the point where the amount of radiation exceeded EPA standards (FAS, 2000). However, one should look at the EPA's contamination standard

when deciding exactly how lethal these substances could be over a long period of time: According to the EPA standards, in areas where there is a 1 in 10,000 change of getting cancer due to radiation (which was most of the contaminated area in this case), the area is considered uninhabitable. Take this in addition to the normally occurring 20,000 cancers per 100,000 persons, and an additional 10 people per 100,000 doesn't seem all that significant (Medalina, 2005; CRS, 2005).

Another scenario of radiation dispersal which doesn't necessarily involve explosives or the terrorists acquiring nuclear material would be an attack on a nuclear power plant. The two main methods by which this could take place are: An armed attack on the plant itself by a group of suicidal gunmen, or, such as what was done on 9/11, a commercial airliner crashing into the concrete dome that protects the reactor.

Every eight years or so federal agents test the US' 103 nuclear power plants' preparedness against armed gunmen in mock raids. These raids have rules that heavily favor the defenders of the plant, yet due to the unacceptable security at these locations, the federal agents regularly succeed in reaching and damaging the reactor core (Keller, 2002). If a real group of terrorists were able to get into the plant, they could potentially disable the systems that keep the reactor from overheating, and blast a hole through several feet of reinforced concrete so that the radiation could escape. A much simpler way of doing the same thing (and possibly with larger results) would be to fly a commercial airliner into the containment dome surrounding the core.

An engine from a commercial airliner has a good possibility of penetrating a few feet of reinforced concrete, thus creating a hole in the concrete dome. The shock of the airplane hitting the dome and the ignition of the remaining jet fuel could disrupt or shut down the

cooling and electrical system responsible for stopping a nuclear meltdown. Put these two factors together and you get a "volcano of radioactive isotopes" (Keller, 2002) coming out of a plant that once produced nuclear power.

Many of these scenarios involving nuclear terrorism are not pleasant to think about, but in order to ensure the security of America's citizens they must be analyzed so that solutions can be created to nullify these threats.

Weapons Grades

When most people hear the words Uranium or Plutonium, the first phrase that usually comes to mind is "nuclear bomb." This is not necessarily the case. There are varying grades of nuclear material, some of which are not readily usable in a nuclear weapon. When dealing with Uranium, the key factor in determining what it can be used for is how much of the isotope U-235 is in the sample.

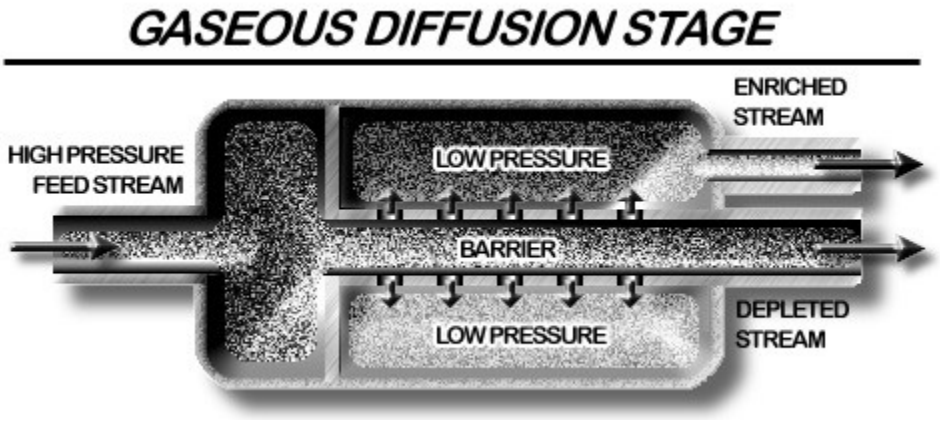
In its naturally occurring state, Uranium is composed of approximately 0.71% of the highly fissionable isotope U-235, while most of the Uranium is comprised of the non-fissionable U-238 isotope (HyperPhysics, 2005). When a slow moving neutron comes into contact with an atom of U-235, that particular atom absorbs the neutron, causing the atom to break apart (HyperPhysics, 2005). When this atom breaks apart, energy is released and more neutrons are given off. The additional neutrons that are given off hit other atoms of U-235, continuing the reaction. The energy given off by this process can either be used in power plants to create electricity, or if there are enough U-235 atoms in the sample, the massive amount of energy that is released at once will produce an explosion

In order to be used in US nuclear power facilities, mined Uranium needs to be lightly enriched. This means that an additional amount of U-235 needs to be in the sample in order for it to be able to sustain a chain reaction (FAS, 2005). If the Uranium is enriched to a level where less than 20% of the sample consists of U-235, the sample is considered to be Lightly Enriched Uranium (LEU) (FAS, 2005). This level of enrichment is what most US nuclear reactors are using today. The chances of LEU being turned into weapons grade Uranium is low.

Uranium that contains 20% or more U-235 is considered to be Highly Enriched Uranium (FAS). Research reactors in the US are the main recipients of this type of Uranium, which is considered to be highly dangerous. Depending on the level of enrichment at this level, it might be easy for enrich the sample further to create Uranium that could be used in a fission type bomb.

The final major grade of Uranium is weapons grade. Uranium that contains more than 90% of the highly fissionable isotope U-235 is considered to be in this category (FAS). This is the most dangerous type of Uranium, as it is readily capable of being used in a fission type bomb.

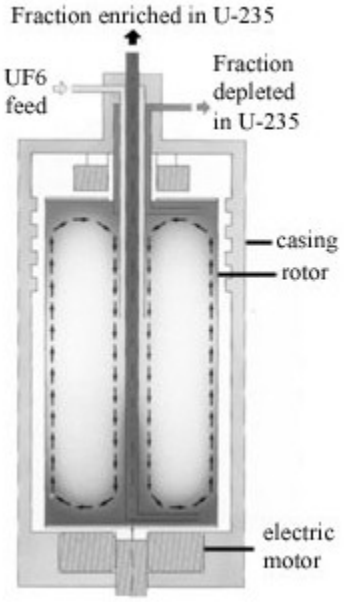
In the US and in most other countries, there are 2 processes that are primarily used for Uranium enrichment: Gaseous diffusion and a process involving gas centrifuges. Gaseous diffusion is capable of creating both LEU and HEU and can be seen in the diagram below (Global Security, 2005):



Source: Global Security, 2005

The UF_6 that is created from Uranium Yellow Cake is heated into a gaseous form, and passed into a series of porous membranes with extremely small (one-millionth of an inch in diameter) holes that are uniform in size. Upon reaching these holes, the lighter U-235 is separated from the U-238 and sent through a different path. Running this process over and over will cause more and more U-238 to leave the enriched stream, causing the continuously smaller sample to become composed mostly of U-235 (Global Security). The other method that was mentioned involves gas centrifuges, which can be seen below and to the right (ISIS, 2005):

In this method, gaseous UF_6 is passed into a cylinder that rotates at high speeds. Next, because of centrifugal forces acting upon the UF_6 inside the cylinder, the heavier U-238 if pushed up against the walls of the cylinder while the U-235 rests just outside of it. The degree of separation is further increased by a slower moving countercurrent flow of gas within the cylinder that separates and concentrates the enriched and



Source: ISIS, 2005

depleted gases (Global Security, 2005).

Each one of these cylinders produces approximately 30 grams of HEU per year, and with the average nuclear bomb requiring approximately 20-25 kg of HEU, it would take some time to create a sufficient amount. In order to create 20-25kg in a year, a nuclear program would need approximately 850-1,000 of these tubes (1.5 m in length), operating continuously at 400 m/s (Global Security). Uranium is without a doubt the main ingredient in creating a nuclear fission device; even it's byproduct from nuclear energy can be used to make a weapon.

Plutonium is not found naturally in sufficient enough quantities to be mined, and is rather produced by man made means. Breeder reactors and the reprocessing of spent nuclear fuel rods are two ways of obtaining this extremely dangerous element (FAS). In fact, the Plutonium that's obtained from reprocessing is immediately capable of being used in a nuclear weapon (FAS). This is the exact opposite of Uranium, which needs to be enriched before it is capable of being used in a weapon.

Content Analysis

Content Analysis, also referred to as textual analysis, is defined by Krippendorff (1980) as "a research technique for making replicable and valid inferences from data to their context" (Krippendorff, 1980). It can be used for many purposes, such as a tool to determine authorship, examining trends and patterns in documents, or to monitor shifts in public opinion (Stemler, 2001).

To apply the definition, there are six questions, according to Krippendorff, that need to be addressed. The first question is which data are going to be analyzed? Secondly, how are the data defined? Next, what is the population from which the data are being drawn from?

Fourthly, what is the context relative to which the data are analyzed? Fifthly, what are the boundaries of the analysis? Lastly, what is the target of the inferences (Krippendorff, 1980; Stemler, 2001)?

A common misconception is that content analysis is simply determining the frequency of words (Stemler, 2001). Words have multiple meanings, and a simple word count is not effective enough to draw significant conclusions on an issue. Word frequency counts must be done with a "Key Word in Context" (KWIC) search as well. According to author of the content analysis article on Wikipedia, "with KWIC, routines words can be analyzed in their specific context to be disambiguated" (Wikipedia, 2005). By categorizing the words by context, the content analysis technique is rich and meaningful (Stemler, 2001).

The use of computers became the most efficient way to analyze data. The authors of the Wikipedia article observe, "By having contents of communication available in form of machine readable texts, the input is analyzed for frequencies and coded into categories for building up inferences" (Wikipedia, 2005). Computing machines have become the most efficient means of implementing content analysis.

Chapter 3: Methodology

The purpose of the model being created is to serve as a tool useful in assessing a government's reaction to another state's initial applications for nuclear energy, charges of non-compliance, or major extensions or changes in existing programs. Content Analysis, mentioned in the previous chapter, will be used in creating this model.

In order to create an analytical model, and to effectively apply that model to a particular state, several steps were needed within the content analysis using a methodological protocol

The previous chapter, the literature review, is the main source of data for analytical model. Content analysis results dictated that this model would be effectual if it were comprised of a series of defined conditions for which a state in question would have to measure up against. The goal of each condition is to assess one aspect of the state in question and evaluate whether the state supports the values of the NPT in that particular aspect. The condition is evaluated by means of a ranking scale, where the condition can be ranked 0, 1, or 2:

- "0" ranking implies that the state in question poses no threat.
- "1" ranking implies that the state in question poses a moderate threat.
- "2" ranking implies that the state in question poses a high threat.

A balance is needed when defining each condition's threat level. If the threat level definition is too descriptive, it leaves little room for interpreted application to a specific state. Alternatively, a threat level too broadly defined and generalized is impractical. It leaves room for excess interpretation and eliminates the uniformity of the model when comparing modeled states by different interpreters.

The model required additional in order to thoroughly examine Iran and conclude the case study with more accuracy and relativity. There was a need for more data that would allow for characterization of the problems of the Nuclear Proliferation Treaty. We sought out the data by performing a content analysis on transcripts from debates and speeches on National Public Radio.

As described in the literature review, the content analysis approach was used as a tool to determine patterns in documents. The six questions as proposed by Krippendorff were considered in this analysis:

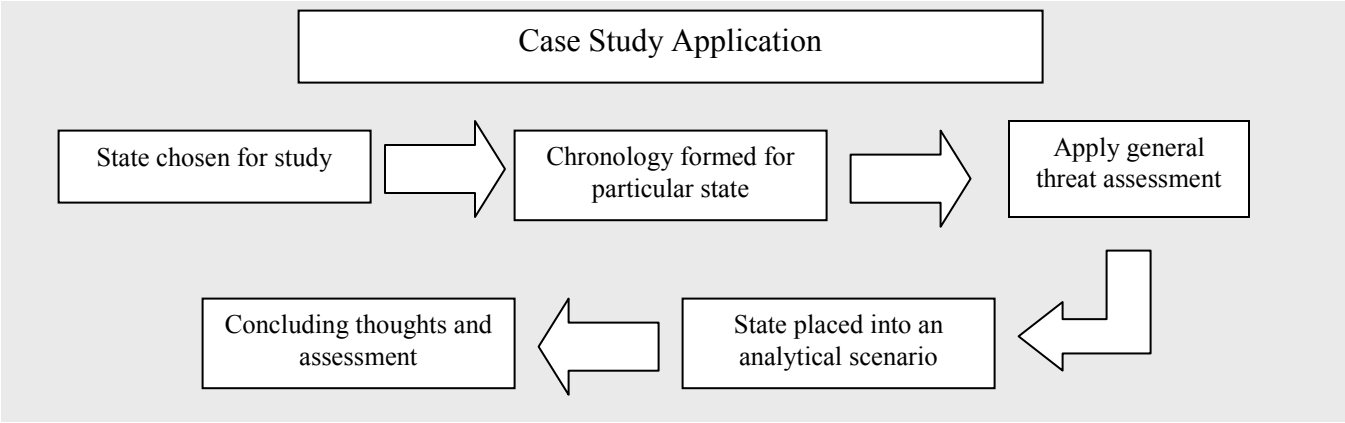
Which data are going to be analyzed?
How are the data defined?
What is the population from which the data are being drawn from?
What is the context relative to which the data are analyzed?
What are the boundaries of the analysis?
What is the target of the inferences?

A list of scenarios was derived from data already collected and each project partner's knowledge. These scenarios are possible environments that categorize the possible nature of competing states. For example, India and Pakistan would be associated with the scenario of two non-signatories that are in direct conflict with each other. It is possible for state to be a part of more than one of these scenarios, as they still would serve as constructive means of organizing an analysis.

The next chapter is the analysis model description. This chapter describes how the model works, and how it can be applied to any state in question.

Chapter 4: Analysis Model

We would offer this model to any government in the UN in assessing that government's reaction to another state's initial application for nuclear energy, charges of non-compliance, or major extensions or changes in existing programs. The following describes the four step process of analyzing any state.



After choosing a state to analyze, the first step is to determine all significant events pertaining to the state's nuclear weapons program. The information collected should encompass all areas of the state's history, and should be organized chronologically. The sources of information on these events should be impartial, so that all the data may be used in rating the country without a preconceived subjective nature.

Step two is to apply the general threat assessment to the state being analyzed. The generic threat assessment works by applying each of the 10 conditions to the state in question, the result is a composite score that will be used for further detailed threat assessment in the conclusion. These conditions are:

NPT Signatory Status
History of IAEA Compliancy
Effectiveness of Sanction
Internal Stability
Geopolitical Intentions
Availability of Nuclear-Related Resources
Nuclear Program Status
Energy Intent
Defensive Capabilities
Extremist Group Alignment

Each condition is ranked individually based on the risk level definitions given. Other countries should be applied with the rating scale so that a comparison can be made to total threat levels relations can be found. A chart with the rankings of all the countries should be made to easily see the ranking for each condition for each state as well as the total threat level of each state. The following are the descriptions of each condition, and defined risk levels:

NPT Signatory Status

It is important that the state in question is a signatory of the NPT, or has intentions to sign upon starting their nuclear program. Signing the treaty shows a gesture of good faith by the country in question to abide by the articles of the NPT. The Treaty has been accepted internationally as the most effective set of guidelines to prevent the proliferation of nuclear weapons. States are more inclined to trust another state's nuclear intentions if they are signatories of the NPT.

Risk Levels:

0 – The State in consideration is a signatory to the NPT, and has fully abided by its regulation.
1 – The State in consideration is a signatory to the NPT, but has breached its terms in some form, or has withdrawn in the past.
2 – The State in consideration is not a signatory to the NPT.

History of IAEA Compliancy

Compliance with the IAEA is a good way to measure the good faith of the country in following the articles of the treaty. It is important to know if the state has been deceptive in regards to their nuclear ambitions

Risk Levels:

0 – The state in consideration has been completely forthcoming about its nuclear ambitions. No problems have occurred in the past regarding IAEA inspections, safeguards, and monitoring.
1 – The state in consideration has mostly demonstrated compliance with the IAEA, with infractions not being overtly severe in nature
2 – The state in consideration has routinely misinformed and/or deceived the IAEA about its nuclear aspirations.

Effectiveness of Sanction

The ability to place sanctions on the state in question should prove as a deterrent to their present or future non-compliance of the NPT. There are certain variables that change the effectiveness of a sanction. These variables must be looked at for the state in question.

Risk Levels:

0 – The state in consideration relies heavily on other nations for imports and exports. Placing sanctions on this state would have the desired effect.
1 – The state in consideration is relies moderately on other nations. Placing sanctions would limit the state's activities, but it could still be able to function on a limited scale.
2 – The state in consideration is fully capable of functioning independently. Placing sanctions on this state would not have the desired effect.

Internal Stability

It is understandable why a state would not be trusted with nuclear technology when its internal workings are unstable. A major overthrow or even a smaller disruption on the government of a state that possesses nuclear technology and/or nuclear weapons would most certainly pose a threat. Important economical signs of instability to look at for the state in question include but are not limited to its economy and government leadership

Risk Levels:

0 – The state in consideration has a history of being internally stable and there are no recent issues that would change the stability any time soon.

1 – The state in consideration has had incidents in the past which are noteworthy and cause the state's stability to pose a moderate threat.
2 – The state in consideration is very unstable. Historically, there have been significant events that would lead experts to believe it could collapse and lead to an uncontrolled nuclear program.

Geopolitical Intentions

A state's ideology, its history with nuclear weapons, and it's justification for carrying out a nuclear strike contributes to the level of threat that a country possesses.

Risk Levels:

0 – The state in consideration is essentially neutral when it comes to affiliations between states. It possesses a military large enough only to carry out national defense, and has no intentions of using nuclear weapons.
1 – The state in consideration has a strong military, but is not necessarily belligerent. It has no intention of carrying out a nuclear strike other than in the most extreme cases.
2 – The state in consideration is overtly militant, has used weapons in the past, and has no reservations towards using weapons in the future.

Availability of Nuclear-Related Resources

There is a great deal of components involved in nuclear technology. Resources may include personal connections, money, personnel, facilities and equipment. Some states may have enrichment plants at there disposal and may be able to produce their own fissile materials instead of having them imported. A state which has abundant resources to draw from has a greater ability to produce nuclear materials.

Risk Levels:
0 – The state in consideration has no resources within its boarders to produce nuclear materials on its own. In the past, this state has not had fissile materials imported to it from other states with technology to produce.
1 – The state in consideration has some resources available but not enough to produce nuclear materials without obtaining some materials from other states.
2 – The state in consideration has enrichment plants and/or other abundant resources available to produce its own nuclear materials.

Nuclear Program Status

The status of a states nuclear program depends on the availability of resources and technology. Three main stages of developing a nuclear program are obtaining resources, producing the materials for the weapon and having the capability of delivering the weapon. A state may be at any given point in these stages. So, it is crucial to know the status of a state's nuclear program in assessing the level of threat presented.

Rating Scale

0- The state in consideration currently does not have any nuclear technology.
1- The state in consideration has obtained some technology, but does not have what it would need to establish a fully functioning nuclear weapon.
2- The state in consideration has a complete and functioning nuclear program that is capable of launching the weapon.

Energy Intent

A state's desire for the abundant power that nuclear power plants would provide must be assessed in order to determine if nuclear energy is actually necessary for the state, or if the state is merely using their nuclear energy program to covertly develop nuclear weapons.

Rating Scale

0 – The state in consideration has no nuclear power plants and has no intention of building them in the foreseeable future
1 – The state in consideration is using nuclear power as an energy source, which may or not be necessary given the state's resources in other energy areas.
2 – The state in consideration is looking to pursue nuclear power, yet has no real reasoning for doing so given the state's energy resources.

Defensive Capabilities

The composition of a state's armed / paramilitary forces and its location could rule out the need, or justification for nuclear weapons.

Rating Scale

0 – The state has a strong military that does not possess any nuclear arms.

1 – The state has a relatively strong military, yet it needs to make up for numbers with nuclear deterrence
2 – The state has a weak military that possesses nuclear arms. The ability to safeguard and the general need for the possession of such devices is in question.

Extremist Group Alignment

State sponsored terrorism is still considered to be somewhat of a shady area where plausible deniability reigns supreme. The ability for a state to manufacture a nuclear device and give it to an extremist group to use against an enemy country would have far reaching implications.

Rating Scale:

0 – The state has no affiliations whatsoever with any type of extremist group.
1 – The state is suspected of being aligned with a group that would employ a nuclear device.
2 – The state is an overt supporter of groups that are considered to be extreme in their views, or has worked with such groups in the past.

The third step is to use the data from the basic generic threat assessment to help place the country into an analytical scenario, from which we will derive a country specific analysis. The following are these scenarios, which are environments that categorize the nature of competing states:

1. A nation is seeking nuclear technology strictly for energy.
2. A confrontation between two first-world superpowers.
3. A nation utilizing nuclear weapons to feed their country.
4. Two non-signatories that are in direct conflict with each other.
5. A nation seeking to deliver its ideological hegemony through nuclear weapons.
6. A nation sponsoring terrorism only for its local, political geographical disputes.

Step Four is to conclude the results from the threat assessment and the analytical scenario. The pros and cons of the state's nuclear program should be considered. The

relevance of the NPT to the particular scenario should be assessed, as well as the NPT's relevance to enforcement in the scenario.

The next chapter is the application of this model to Iran. It will provide detailed analysis and conclusions on Iran's nuclear program.

Chapter 5:
Case Study application of Model to Iran

The country chosen to be assessed in the case study is Iran. In order to properly rate the countries level of threat under given categories, significant events pertaining to Iran's history or current issues need to be taken into consideration. The purpose of forming this chronology is to attain important and unbiased facts on Iran.

Chronology

June 28, 1974- A ten year development agreement is signed between Iran and France. This contract included the terms of the sale of five 1000-megawatt nuclear reactors worth over a billion dollars.

New York Times (June 27, 1974): 69.

June 30, 1974- Five nuclear reactors are being prepared to be sold from France to Iran, and another may be supplied by the United States.

New York Times (June 30, 1974): 170.

March 12, 1975- A seven billion dollar deal between the United States and Iran is being delayed. The sale of six to eight American nuclear-power reactors to Iran has raised questions as to Iran intentions; nuclear energy use or nuclear weapons. It is speculated that if the United States does not sell nuclear weapons to Iran then other countries will provide them. The idea of strengthening safeguards under such agreements is being looked into. *New York Times* (March 12, 1975): 38.

August 6, 1976- In Teheran, Shah Mohammed Riza Pahlevi tells Washington that they must keep selling arms to Iran or risk instability and war in that area. He warned that such instability may lead the west into "an all-out nuclear holocaust".

New York Times (August 7, 1976)

May 3, 1977- West Germany sold two large nuclear reactors to Iran. Morris Rosen, from the IAEA, finds that these reactors were bought for a plant which is located in a "relatively high seismic area". A growing concern is that there is an increase of developing countries installing nuclear power pants that are not safe, and have not been checked by supplier nations.

New York Times (May 4, 1977): 5

January 29, 1979- Prime Minister Shahpur Bakhtiar cancels a 6.2 billion dollar contract to construct two nuclear plants, but continues construction of two water reactors at Bushehr. Bakhtiar canceled the construction because it was overly "grandiose" and worried Iran would not be able to pay for it in the years to come.

New York Times (January 30, 1979): D13

July 31, 1979- Kraftwerk, West Germany's largest nuclear contractor terminates its contract to build two reactors in Iran. The work was stopped due to continual failure in negotiating with Iranian officials on $450 million of overdue pay.

New York Times (August 1, 1979): D3

April 25, 1984- The United States pushes for a worldwide ban on the sale of nuclear materials to Iran. The State Department believes that the actions of the Iranian government in the past shows that they can not be trusted to abide by its international commitments.

New York Times (April 26, 1984): A3

November 19, 1987- Iran claims that Iraq attacked its unfinished nuclear power plant, and that the fissionable material recently moved into the plant may result in a nuclear disaster. The IAEA found no evidence that supported any of Iran's claims regarding this event.

New York Times (November 20, 1987): A5

October 30, 1991- US Administration officials think that Iran's nuclear arms program is larger and a greater threat than most people realize. The group of nuclear scientists from the Shah's era who are still there would be key in producing such technology that is feared. Officials question why Iran, a major oil producing country, needs nuclear reactors.

New York Times (October 30, 1991): A7.

July 6, 1993- Iran signs a pact with China to build a nuclear power plant near Teheran. They maintain that the nuclear activity is under the NPT framework and for peaceful uses only.

New York Times (July 7, 1993): A6

August 27, 2003- Enriched uranium is found in Iran by the United Nations. The uranium conversion in Iran has caused once unsure governments to recognize Iran as a serious threat.

Wall Street Journal (Aug 27, 2003):A.3

December 5, 2003- IAEA releases a report about Iran's continuous breaching of the NPT's nuclear safeguard agreements. They also found that Iran has been

producing plutonium in addition to uranium, which are both key elements in fabrication nuclear weapons.

Christian Science Monitor (Dec 5, 2003):7

December 17, 2004- On Dec. 15, Iran signed the agreement with Europe to suspend its uranium enrichment. Iran would receive economic benefits in return for toning down its nuclear power ambitions.

Atlanta Journal - Constitution (Dec 17, 2004*):*A.23

May 26, 2005- An agreement was reached between Iran and the foreign ministers of Germany, France and Britain. The agreement did not in any way solve the conflict over Iran's nuclear program, but it allows for extra time and hope of making a deal with Iran to keep nuclear weapons out of the grasp of its leaders. The demands made by Iran, in return for a bargain, come at a very high price and only Washington may sign off on these concessions.

Boston Globe (May 28, 2005): A14

June 7, 2005- Rowhani, Iran's top nuclear negotiator said that his country does not seek weapons of mass destruction because it is against their religious and ethical beliefs. He added that these kinds of weapons are not and will not be involved in Iran's defense approach.

Islamic Republic News Agency (June 7, 2005)

July 21, 2005- Mahmoud Ahmadinejad, Iran's president elect spoke with a religious gathering about his dislike of nuclear weapons and how they should be eliminated. He states that despite his devotion to worldwide policy, he does not think Iran should give in to unfounded requests of the global powers.

Islamic Republic of Iran Network (July 21, 2005)

August 12, 2005- The head of Iran's delegation to the IAEA, speaks of his country as becoming a producer and supplier of nuclear fuel within a decade. However, many countries are insisting that they postpone all of their actions involving enrichment of uranium before the national dispute gets any more heated that it already is.

NPT Associated Press (August 12, 2005)

October 16, 2005- The U.S. and European countries are working to make some kind of progress around the Iranian nuclear situation. They are trying to induce either diplomatic discussion with Iran or to pose a threat of punishment from the UN Security Council. Condoleezza Rice met with the Foreign Minister of Russia, Sergey Lavrov, hoping to gain the countries support on a tougher stance on this dispute with Iran. Iran's nuclear intentions have been highly scrutinized, and despite the reasons for drawing a harder line on Tehran, Rice was not offered support from Russia. Lavrov expressed his feeling that the situation can and should be handled by the IAEA.

The Globe (November 5, 2005)

November 4, 2005- Iran is accused by the European Union of having documents containing information on the making of nuclear warheads. Tehran is warned of referral to the UN Security Council.

The Globe (November 5, 2005)

November 17, 2005- IAEA confirms that Iran has begun new uranium conversion despite ongoing talks and international requests.

Voice of America (November 18, 2005)

November 18, 2005- A resolution was passed today by a United Nations committee regarding human rights violations in Iran. Among a few other requests, it is demanded that Iran stop the executions of people under eighteen years old.

Radio Free Europe/Radio Liberty (November 18, 2005)

November 19, 2005- Iran completely dismisses the UN resolution to stop Iran from using torture, discrimination and intimidation. Iranian officials shrugged off the report because they felt it was political and misguided.

Radio Free Europe/Radio Liberty (November 18, 2005)

November 23, 2005- When Iran restarted raw uranium conversion for enrichment back in August, negotiations between themselves and France, Britain and Germany ended. The US and European allies are slowly gaining China's support for Iran to halt its enrichment process. Iran has been relying on Moscow and Beijing to fend off these pressures. However, intelligence collected on Iran's nuclear program has helped China shift closer to Europe and the US.

The Globe (November 23, 2005): A40

December 1, 2005- Israeli leaders maintain that diplomacy is the best way to deal with Iran. Prime Minister Sharon stated that Iran is a threat many countries and to the whole Middle East. Leaders feel it is imperative that Iran be put before the UN Security Council and be denied the ability to possess nuclear weapons.

AFP (December 1, 2005)

General Threat Assessment

The following is the general threat assessment. Each condition was rated individually.

The results are as follows:

NPT Signatory Status
Rating: 1
Justification: Iran has been a signatory of the NPT since July 1, 1968, but its commitment to the treaty is currently in question.

History of IAEA Compliancy
Rating: 2
Justification: In 2002 two secret nuclear facilities were revealed. Iran has deceived the IAEA about its nuclear aspirations.

Effectiveness of Sanction
Rating: 2
Justification: While the state relies upon other countries for various resources, it could use its vast supplies of oil as a huge bargaining chip.

Internal Stability
Rating: 1
Justification: Violation of human rights threatens the internal stability of Iran. The possibility of reform in an unclear future poses a moderate threat to the stability of Iran.

Geopolitical Intentions
Rating: 2
Justification: Iran's new president Mahmoud Ahmadinejad is a hard-line conservative promising an advanced powerful Islamic nation. He recently declared that Israel should be wiped off the map.

Availability of Nuclear-Related Resources
Rating: 2
Justification: Iran has various means of acquiring nuclear material and is trying to develop its own nuclear fuel cycle.

Nuclear Program Status
Rating: 1
Justification: Iran has yet to test a nuclear missile, but as of 2002 its heavy water production plant was 85% done (NTI).

Energy Intent
Rating: 1

Justification: Although Iran has an abundant energy source, its rationale for nuclear power as a means of diversifying the economy's energy source is justifiable.

Defensive Capabilities
Rating: 1
Justification: Various Arab countries have tried to attack Israel in the past, yet none have done so successfully. Israel is now in the possession of nuclear weapons, and in order to deter a nuclear attack, Iran feels that it needs its own nuclear capability to defend itself.

Extremist Group Alignment
Rating: 2
Justification: Iran has supported Hezbollah and al-Quaida, which would use a nuclear device the second they got their hands on one.

Total Threat Assessment Score: 14

Since this is the first application of the threat assessment conditions chart, there did not exist any other scores in which to compare Iran's score of 14 upon. A simple assessment of 8 other countries or groups of countries was done to make Iran's score more relevant, and compare similarities in countries that were thought to have a high threat level before the model was created. The following is a chart of the results of the assessment of the additional countries:

Conditions	India	Israel	North Korea	Pakistan	US	England, France, Germany	China	Russia	Iran Case Study
Are they a signatory to the NPT?	2	2	2	2	0	0	0	0	1
History of compliance with the IAEA	1	2	2	0	0	0	0	1	2
Would sanctions have their desired effect?	1	1	0	1	0	0	0	0	1
Is the state internally stable?	1	0	2	1	0	0	0	1	1
State's geopolitical intentions?	1	1	2	1	1	1	2	1	2
What kind of resources does the state have?	2	2	1	2	2	2	2	2	2
Status of the state's program?	2	2	1	2	2	2	2	2	1
Energy	1	1	1	1	1	1	1	1	1
What are their defensive capabilities?	1	1	1	1	1	1	1	2	1
Are they aligned with any extremist groups	1	0	2	2	0	0	0	0	2
Total:	13	12	14	13	7	7	8	10	14

Content Analysis Data

The following are data collected from Content Analysis on three National Public Radio transcripts that were relevant and useful in assessing Iran's threat and scenario.

11/7/05 NPR Morning Edition: Iran Signals willingness for Nuclear Talks

Key Players: Ahmed Chalibi, a prominent Iraq figure who has a close relationship with the US, visited Iran upon invitation by Iran officials

Problems: Iran may be brought up for charges of violating the NPT.

Justification: Iran stated earlier that they didn't breech the terms of the NPT, and there is no evidence.

Reaction: new government has discovered that it's better to negotiate in talks now before it hits the Security Council

Regularly Occurring Themes: US pressured India, and old ally of Iran, to not support Iran's stance on their nuclear program being legit.

Politics: Ahmed Chalibi visited Iran to build stronger relations there. Chalibi seeks Iran's assurance that they will not interfere in Iraq's affairs before he makes a trip to Washington to give a message to US officials that ties can be kept with Iran without causing trouble

11/7/05 NPR Morning Edition: Congress Examines US-India Nuclear Deal

Key Players: Robert Einhorn, former assistant secretary of the state
George Perkavich of the Carnegie Endowment for National Peace

Problems: On July 18th the White House announced that the US will begin nuclear cooperation with India despite its status as a state with nuclear weapons outside the NPT. The step was taken without consulting congress even though US Law will have to change to implement the policy.

The NPT bans US nuclear cooperation with any state that has a nuclear bomb and is not a party to the treaty. The policy shift puts the international system of nonproliferation at risk.

Justification: US will require a separation of India's Civilian from its Military nuclear facilities and put civilian program under inspection by the International Atomic Energy Agency. Administration officials have not commented on how these be aligned with a commitment to the NPT.

One claim for stating this is a good idea is that United States and India can unite more in the fight against terrorism. Also, this will allow for the US to better support India as a successful democracy.

Reaction: Could result in US sales of reactor fuel and uranium enrichment techniques.

Regularly Occurring Themes: Big Brother US, Mutually Assured Destruction, Potential Asian Arms Race

11/8/05 NPR Talk of the Nation: Sixty Years of Trying to Control the Bomb

Key Players: US, Russia, Iran, DPRK, Israel, India, Pakistan, A.Q. Khan, Sen. Lugar, Sen. Nunn, IAEA

Problems: Nuclear terrorism, the breakdown of the NPT, the emergence of new nuclear players, the problems of existing arsenals.

Justification: Nuclear warheads for defense against a numerically superior force. An enemy state has them.

Reaction: Current political climate does not justify the need for nuclear weapons on such a large scale.

Regularly Occurring Themes: How do we stop the spread of nuclear weapons? Nunn-Lugar agreement, Aid to Israel.

Concluding Thoughts

The Islamic Republic of Iran is a large and wealthy nation with a sizeable amount of resources. They are located in a geographic position with worldwide implications, Iran representing significant challenges to the vital interests of several countries within and outside the region. This nation has displayed a history of non-compliance with the IAEA, and in addition their political ideology does not mix well with a nuclear weapon. There

are still, however, measures that can be taken to further encourage Iran to become a non-proliferation regime.

The approach for dealing with Iran has been multilateral and should continue to be so. Dealing with the situation in Iran unilaterally would put a large and unnecessary strain on one country's resources. Although Iran adamantly denies that its program is for weapons research, and that their intent is only to develop nuclear energy, all effort should be invested in ensuring that Iran does not obtain or create a nuclear weapon. It is too dangerous to assume that Iran will use a nuclear program only for energy and not for weapons. That assumption could lead to the launching of a nuclear weapons program.

The issue remains that by the terms of the NPT, Iran is legally able to pursue nuclear energy. A method must be found in which the IAEA can allow for Iran to have a peaceful nuclear energy program, prevent Iran from having a nuclear weapons program, and also mitigate unilateral action by a threatened nation against Iran.

One possible solution proposed is to have Russia serve as a middle man, where Russia would create lightly enriched uranium and send it to Iran. This proposed bid by Russia was supported by the United Nations, but rejected by Iran.

The threat that the Islamic Republic of Iran poses to the proliferation of nuclear arms was measured in this project. In the report, the threat that Iran posed was expressed quantitatively for each condition. The total threat that Iran poses is expressed numerically as the sum of all ten conditions. This total threat level was contrasted with other nuclear armed countries. This was done to give a contrasting view to other nuclear armed countries in the world, especially those located in more unstable regions.

Iran is located in a highly volatile geopolitical region, which is one of the main causes of this instability. Their state sponsorship of terrorist groups such as Hezbollah has been a problem with many modernized nations. Iran began a serious push to finish its incomplete nuclear weapons program a few years ago. The possibility that Iran could give a nuclear weapon to a terrorist group upon completion of its program is a major concern. Iran could maintain deniability because they didn't officially launch the weapon, while a nuclear bomb could be delivered to a terrorist organization's target. Due to these facts, Iran received an exceptionally high threat score, in comparison to other countries that were also listed.

During the course of the project it was evident that Iran poses a threat to any hope for global stability. The question that now must be asked is: What kind of action can the world take against such a threatening state? Following are a few recommendations that have been derived from the research and analysis done in this project through the use of analytical scenarios.

The best recommendation for insurance of non-proliferation in Iran is to multilaterally pressure Iran to drop its nuclear weapons program. While Iran may be able to ignore the pressure of one nation, it certainly cannot ignore the pressure of all signatories of the NPT and all other nations that are willing to collaborate. Sanctions would have little effect on the regime itself, and would merely hurt the citizens of Iran, much like the ineffective sanctions that were imposed upon Iraq. Also, Iran could use its massive reserves of oil as leverage to nullify the intended effects of sanctions.

It is also recommended that the IAEA have absolute unrestricted access to any site in Iran. The complete and unconditional surrender of Iran's weapons program needs

to be verified due to the high level of threat that Iran poses. The purpose of unrestricted access would allow for the needed verification.

The use of multilateral military action should be considered as a contingency plan to the above recommendations. A multinational presence is more favorable by the international community than a unilateral strike. A unilateral strike can lead to accusations by outside nations that the state in combat with Iran is merely fulfilling its own national interests.

An option similar to what Russia proposed is another viable option. A nation that already has a nuclear energy program could enrich the uranium to energy grade levels, and send the material to Iran. This would eliminate Iran's need for enrichment plants, which would allow Iran to produce not only energy grade uranium, but weapons grade uranium as well. The spent nuclear material would also have to be sent back to the provider nation to ensure that the spent fuel rods aren't reprocessed into Plutonium (also capable of being used in a nuclear bomb).

Currently, the United States military is primarily tied up in Iraq and Afghanistan, and doesn't have the manpower to fight and police another Middle Eastern country. If a military option is used, the larger nations in Europe would have to be the main force in this international effort.

Implications for Future Research

Future projects relating to this Independent Qualifying Project might examine other scenarios in the same manner that Iran was analyzed. Their respective threat levels could be measured which would allow for further clarification to threat analysis. System

dynamics models could be created as well to determine variables such as the effect on a country's economy before and after sanctions have been imposed.

Subsequent reports should keep in mind the importance of unbiased and objective data. As these reports are collected, countries already assessed should be revisited periodically or when significant events occur. The effectiveness of the UN's Nuclear Non-Proliferation Treaty in that particular situation should be examined as it is critical to maintain continuity with that issue.

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